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Systematic literature review: Examining the impact of generative AI on human agency, critical thinking, and creativity

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Abstract

This study investigates how generative artificial intelligence (GenAI) influences human agency, critical thinking, and creativity through a systematic literature review (SLR). Following PRISMA guidelines, a comprehensive search across five databases yielded 30 studies. A thematic analysis approach was applied to identify key mechanisms and conditions shaping human agency. The findings reveal that human agency and critical thinking are primarily influenced by mechanisms related to control, transparency, collaboration, and cognitive regulation, while over-reliance acts as a boundary condition. GenAI enhances creativity when used as a collaborative, iterative, and human-centered tool that supports idea generation and co-creation, but limits it when dependency reduces originality and critical engagement. The study proposes a GenAI-Human Agency Model and contributes to theory and practice by providing a design framework for human-in-the-loop and sociotechnical, and AI-supported learning systems that promote active engagement and responsible use.

Keywords: Generative AI, Human Agency, Autonomy, Critical Thinking, Creativity.

Introduction

The rapid development of Gen AI represents one of the most important changes (Giannakos et al., 2025). Large language models (LLMs), such as OpenAI's ChatGPT, released in 2022, can write, solve problems, and generate new ideas, often simulating human-like reasoning and interaction (Monib et al., 2024). These technological developments have reopened debates about the role of artificial intelligence (AI) in learning and introduced several issues related to teaching, ethics, and knowledge (Cheng et al., 2025). Gen AI is no longer limited to theoretical applications; it is now part of learning experiences in information systems (IS) education and beyond (Alfarwan, 2025; Monib et al., 2024).

Existing research suggests that GenAI can support individuals in learning concepts, receiving instant feedback, and improving their problem-solving and creativity (Lee et al., 2025; Ray, 2023). On the other hand, it has also raised concerns about academic integrity, the spread of misinformation, bias, and the potential reduction in students' critical thinking if they depend heavily on AI-generated outputs (Charfeddine et al., 2024; Wach et al., 2023). In some institutions, fears about the use of GenAI have led to the adoption of strict rules or even a ban on GenAI tools, reflecting a general sense of uncertainty and a loss of authority (Baloda et al., 2025; Ritala et al., 2024). These conflicting viewpoints raise a question: how does the use of GenAI influence human capacity to think, make decisions, and be creative? Rather than

focusing on its positives and negatives, the issue is its impact on human agency. Human agency is defined as the ability to choose and act on decisions to support learning (Bandura, 2001; Yung, 2025) and is expressed by three interrelated dimensions relevant to GenAI-mediated environments: autonomy (Gupta et al., 2024), critical thinking (Facione, 1990), and creativity (Amabile, 1983). Moreover, agency is not a personal trait in digitally mediated settings; it emerges from sociotechnical systems, institutional norms, and design choices that shape decision-making and human interaction with AI systems (Code, 2025; Krakowski, 2025; Rivera et al., 2025). It depends on how humans understand things in the era of AI, make good decisions, and are responsible for their own learning and its outcomes, particularly the conditions under which GenAI enhances or constrains creativity and the mechanisms that shape critical thinking and human agency (Roe & Perkins, 2024).

Previous research focuses on various aspects of GenAI, such as ethics, collaboration, augmentation, and technological capabilities, without clearly linking them to human agency, critical thinking, and creativity as interconnected entities. Furthermore, there is a limited body of literature on precisely how GenAI affects cognitive and behavioral outcomes, particularly the conditions under which GenAI increases or limits creativity, and the mechanisms that shape critical thinking and human agency. This gap is addressed via a systematic literature review (Kitchenham & Charters, 2007). Consequently, this review is directed by the following research questions:

- **RQ1:** *What mechanisms shape human agency and critical thinking, and their impact in GenAI-mediated learning environments?*
- **RQ2:** *Under what conditions does GenAI enhance or constrain learner creativity?*

To address these questions, the review focuses on human agency in GenAI-mediated contexts and synthesizes studies on human-AI interaction, cognition, creativity, collaboration, and decision-making across interconnected digital and sociotechnical environments in which GenAI influences human cognition and behavior. Although educational and learning environments are important application domains, adopting this broader perspective offers a more comprehensive understanding of how GenAI shapes autonomy, critical thinking, and creativity beyond formal educational settings. While GenAI adoption occurs at multiple levels, this study specifically examines its influence on agency at the cognitive and behavioral levels, particularly regarding autonomy, critical thinking, and creativity. More specifically, the review seeks to: (1) examine the impact of GenAI on human agency and critical thinking, (2) identify the conditions under which creativity is enhanced or constrained through GenAI use, and (3) develop a human-agency model grounded in the review findings.

The study contributes to academia, education, and IS practice by positioning humans as the primary unit of analysis in GenAI-mediated environments. To achieve this, an inductive thematic analysis was employed to identify recurring mechanisms and contextual conditions across the reviewed studies (Braun & Clarke, 2006). The remainder of this manuscript is organized as follows: methodology, results addressing the research questions, discussion, limitations, future research directions, conclusion, and implications.

Background and Related Work

Human agency (HA) means that a person can choose to act, act with purpose, and change their circumstances and surroundings, rather than merely being an object of society or external forces (Bandura, 2006). The way people think about, use, and respond to technological systems shows that their agency is digitally mediated. This study examines HA as a construct demonstrated through autonomy, critical thinking, and creativity, mediated by GenAI. Critical thinking (CT) is the intelligent process of actively and

skillfully thinking about, applying, analyzing, and judging information you get from observing, experiencing, reflecting, reasoning, or communicating, so you can make decisions about what to believe and what to do (Facione, 1990). Being Creative means your mind is often focused on making new things, and you don't know exactly what you're trying to achieve (Green et al., 2024). These constructs are closely related to GenAI contexts in which learners not only interact with AI systems but also make decisions, critically evaluate AI-generated outputs, and generate original, useful ideas. This study views autonomy/control, critical thinking, and innovation as interrelated aspects of human agency evident in people's interactions with Gen AI systems.

The growing incorporation of GenAI and LLMs into real-world fields (Chintalapudi et al., 2025, 2026) has attracted significant academic exploration. Studies have investigated many aspects of AI adoption, with particular emphasis on ethical, educational, and technological ramifications. Chau et al. (2025) explained the importance of issues such as bias, transparency, and responsibility in AI-powered learning spaces. Ma et al. (2025) demonstrate the importance of equipping students with the skills to use AI systems safely. An interdisciplinary study has investigated the impact of AI on cognition, behavior, and decision-making beyond the education sector. This shows how LLMs can mimic parts of human thought and help create new knowledge (Ke et al., 2025). Baer et al. (2025) view AI as a means to enhance people's thinking and creativity. Puerta-Beldarrain et al. (2025) argue that human agency is increasingly shaped by how people interact within sociotechnical systems rather than only by their own traits. These works together offer important theoretical insights into AI-enabled learning and interaction. Even with these contributions, the current literature remains inconsistent and lacks a comprehensive synthesis.

Methodology

This SLR followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines (Page et al., 2021) to guide study selection, screening, eligibility criteria, and final inclusion. A thorough literature search was conducted across ACM Digital Library, Elsevier ScienceDirect, IEEE Xplore, ProQuest Research Library, and Web of Science, which collectively index high-quality publications in the field of information systems (Kitchenham & Charters, 2007). The search string includes the combination of ("human agency" OR "human autonomy") AND ("Gen AI" OR "Generative AI") AND ("creativity" OR "critical thinking") in Full text to cover the objectives of this study, which was published between 2018 and 2026. GenAI became more popular after 2022, with tools like ChatGPT, but the search period was extended to 2018 to include early conversations about AI-enabled agency-related ideas (Cornelio et al., 2022; HAI, 2026). A standardized period that captured reflections, the revolution, and the adoption of Gen AI contexts, and loaded them into Zotero to track citation sources, and used Excel for further assessment of the articles by the authors.

To maintain the rigor and relevance of each article used in this SLR, it was screened, as shown in the table below (Table 1). To rate the quality of each study, we used a checklist Kitchenham & Charters (2007) that assessed factors such as the clarity of the goals, the rigor of the methods, and the study's relevance to human agency, critical thinking, and creativity. Articles with poor methodological detail or weak relevance to the study aims were removed during quality screening. A standardized data extraction form was developed in Excel. Data were independently extracted by the authors, including theoretical perspectives, mechanisms, conditions, and constraints, and the impacts on autonomy, critical thinking, and creativity were noted. The differences were resolved through discussion, and a thematic analysis was employed to assess and categorize findings from various studies into the themes of agency, creativity, and critical thinking (Braun & Clarke, 2006).

Data Analysis

Thematic analysis was conducted in six steps: first, the articles were read to become familiar with the content. Next, key ideas were coded and grouped into broader themes, which were then reviewed and refined for accuracy. Finally, similar concepts are grouped into higher-order mechanism categories. The study employed explicit inclusion and exclusion criteria to ensure the selection of relevant, high-quality literature, as shown in Table 1. To maintain academic rigor, only peer-reviewed journal articles and conference proceedings were considered. The articles are chosen to at least address one of the fundamental elements of this study, including learner autonomy or agency, critical thinking, and creativity, particularly in human-AI or GenAI-mediated environments. During the first screening, duplicate records were removed. To ensure that only the main empirical or conceptual research with sufficient detail for analysis was included, book sections, journals, and studies without abstracts were excluded. Moreover, articles primarily on legal, copyright, or regulatory matters, on philosophical or conceptual matters, or on business were excluded. Finally, studies that focused only on business or technical uses of AI, unrelated to human agency, critical thinking, or creativity, were excluded from the final dataset. Screening articles was conducted in multiple steps, including abstract and full-text screening, to ensure that the selected articles were fully aligned with the research questions and inclusion criteria.

We used Cohen's Kappa coefficient to assess inter-rater reliability (Cohen, 1960). The analysis yielded substantial agreement ($k = 0.85$), indicating acceptable consistency among authors. Cohen's Kappa was determined using separate decisions made by the researchers regarding coding and categorization during the screening and thematic coding stages. Differences in article classification and theme coding were resolved through discussion and agreement among the researchers. This strategy ensured the reliability of the methodologies used and the outcomes in the identification of mechanisms and circumstances in the selected research.

Table 1. Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion Criteria
- Published between 2018 and 2026 - Peer-Reviewed Journal articles - Conference Proceedings - Full-Text availability - Focus on autonomy or agency, critical thinking, and creativity.	- Duplicates, Book Sections - Literature Review Articles, Articles with no abstracts - Legal/Copyright/regulatory, Philosophical articles, security focus, governance lens. - Focused on Business

Results

The steps in the screening process are outlined in Figure 1. In Step 1, a total of 103 articles were identified from various databases, including ACM Digital Library ($n = 5$), IEEE Xplore ($n = 37$), ProQuest Research Library ($n = 40$), ScienceDirect ($n = 13$), and Web of Science ($n = 8$), using full-text search criteria. Duplicate records ($n = 2$) were identified and removed prior to screening. In Step 2, the remaining 101 articles were screened based on their titles and abstracts. During this stage, articles were excluded for being book sections ($n = 4$), literature reviews ($n = 25$), or lacking an abstract ($n = 5$), leaving 67 articles to proceed to the next stage. In Step 3, full-text screening was conducted on these 67 articles, leading to the exclusion of 37 articles based on predefined criteria, including legal/copyright/regulatory focus ($n = 3$), philosophical or conceptual nature ($n = 7$), security-focused studies ($n = 1$), governance or policy-oriented research ($n = 5$), and studies primarily focused on business or technical applications unrelated to learning

or learner agency ($n = 21$). Finally, Step 4 yielded 30 articles that met the inclusion criteria. To improve the reliability of the selection and coding procedure, multiple coders (three scholars) independently examined and classified the papers.

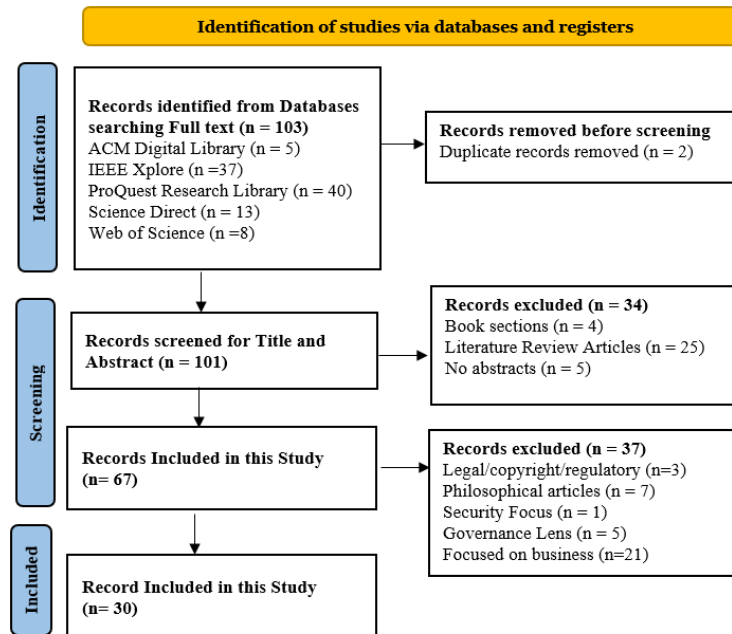


Figure 1. PRISMA Flowchart

The year-wise distribution of the selected articles shows that research activity has steadily increased over time. The number of articles increased slowly from 1 in 2022 to 12 in 2024, then increased to 14 in 2025. This rapid growth shows how quickly academics are becoming interested in generative AI and what it means for learning-related concepts like autonomy, critical thinking, and creativity. But there is a big drop in 2026, with only one item. This could be because the year was only partially covered or because there weren't many indexed articles available when the data were collected. Overall, the trend shows that research in this area is still new but growing significantly, especially from 2023 to 2025.

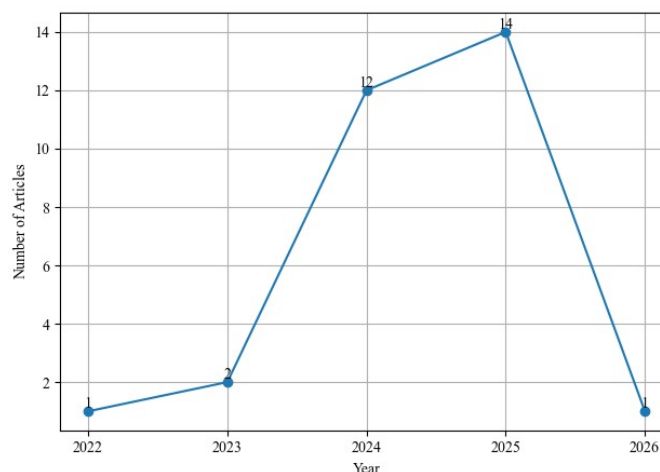


Figure 2. Year-wise Distribution of Selected Articles

The database-wise distribution (Figure 3) shows that most of the papers selected are from IEEE Xplore and ProQuest Research Library, with 11 and 8 articles, respectively. This means these databases likely contain extensive research spanning disciplines and focusing on technology. Web of Science also added a reasonable number of articles (7), indicating it included high-impact, peer-reviewed studies. ScienceDirect, on the other hand, had only 4 articles, suggesting they were underrepresented in the final set. The distribution shows that although several databases were used to ensure all relevant studies were included, most were found in a few dominant academic sources, especially those focused on engineering, information systems, and applied AI research.

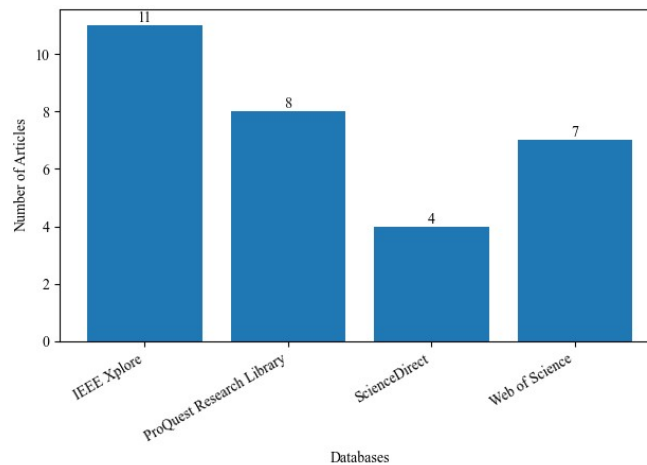


Figure 3. Database-wise Distribution of Selected Articles

To answer RQ1: What mechanisms shape human agency and critical thinking, and what is their impact in GenAI-mediated learning environments?, the selected research articles were thoroughly examined and synthesized into the main thematic mechanisms shown in Table 2 below.

The findings indicate that human agency and critical thinking in GenAI-mediated environments are primarily shaped by mechanisms related to control, transparency, collaboration, and reflective evaluation. However, these benefits are contingent on avoiding overreliance and maintaining human oversight, underscoring the importance of balancing AI autonomy with human control. The mechanisms mentioned in Table 2 are presented as themes in the discussion below.

To address RQ2: Under what conditions does GenAI enhance or constrain learner creativity?, the reviewed studies indicate that GenAI enhances creativity primarily when used as a collaborative, people-focused, iterative technology rather than a replacement for human thought. When humans actively participate in prompt refinement, editing, and co-creation processes, their creativity grows. This is evident in situations where students work with AI to adjust its outputs and use them to explore ideas rather than just submit them (Hwang & Lee, 2025). In the same way, GenAI helps creativity in the early phases of idea generation by making ideas more fluent, diverse, and exploratory. This lets students generate more ideas and apply combinatorial innovation (Krakowski, 2025; Leiba, 2025). Collaborative approaches, such as co-creation and visual-aid interactions, make creative products even better by adding greater diversity, novelty, and user delight (Majumder et al., 2024). Creativity is also enhanced when learners have a sense of control, trust, and autonomy, as these elements enable individuals to experiment and innovate while retaining ownership of the creative process. Structured co-creativity frameworks that balance automation and human agency also allow learners to customize their interactions and retain control over their creative process (Moruzzi & Margarido, 2024).

Table 2. Classification Based on Selected Articles

Mechanisms	Description	Impact on HA	Impact on CT	Authors{Ref.,}
Control, Prompting & Human Oversight	Users actively direct AI by prompting it, retaining the power to make decisions and ownership of the results.	Gives more freedom, ownership, and control.	Fosters self-evaluation.	(Askari, 2025; Fisher, 2023; Hwang & Lee, 2025; Jarvenpaa & Klein, 2024; Pashev & Gaftandzhieva, 2025; Ritala et al., 2024)
Collaboration	AI works with people to help them do their jobs by interacting with them and co-creating.	Preserves shared agency and user participation.	Helps with problem-solving, but needs a human to check it.	(Holter et al., 2025; Hwang & Lee, 2025; Krakowski, 2025; Moruzzi & Margarido, 2024; Richter et al., 2025)
Pedagogical Design & human-centered learning	Provides structured ways of teaching.	Encourages students to take charge of their own learning	Encourages thinking, reasoning, and deeper involvement.	(Consoli & Petko, 2025; Guan et al., 2025; Kong & Yang, 2024; Ruhi et al., 2025; Stuchlikova & Weis, 2024)
Reflection, judgment & evaluation	Ways for students to look at AI outputs.	Strengthens the power of human decisions.	Enhances CT by accounting for judgments and evaluations.	(Dwivedi et al., 2022; Hwang & Lee, 2025; Rady et al., 2026; Stuchlikova & Weis, 2024)
Transparency	AI systems provide clear explanations that help users understand the outputs and the logic.	Boosts informed trust and control.	Makes reasoning, judgment, and comprehension better.	(Correia & Lindley, 2022; Herrera, 2025; Longo et al., 2024; Mahmoud et al., 2025)
AI Literacy & Prompt Literacy	Skills and abilities needed to work well with AI.	Enhances how well AI works and how well it can be controlled.	Improves evaluation and interpretation.	(Hwang & Lee, 2025; Ruhi et al., 2025; Weligodapola & Kumarapperuma, 2025)
Ethical & Responsible AI	Use of ethical principles to guide AI use and decision-making.	Strengthens responsible human oversight	Helps with thinking and making ethical decisions.	(Ferrell et al., 2024; Ghandour et al., 2024; Rivera et al., 2025)
Cognitive Augmentation	AI makes it easier to generate new ideas, think differently, and solve problems.	Arguments about what people can do without replacing them.	Improves thinking but needs human filtering.	(Colson & Gross, 2024; Krakowski, 2025; Rady et al., 2026)
Trust, Perception & Social Interaction	User trust, perception, and interaction with AI affect how engaged they are and how they make decisions.	Trust makes people use more, but blind trust takes away control.	Impacts how willing someone is to judge outputs.	(Mahmoud et al., 2025; Majumder et al., 2024; Pirjan & Petroșanu, 2025)
Over-Reliance	Too much dependence on AI and automation, and too little human engagement.	Reduces autonomy and agency.	Makes it harder to think critically and independently.	(Giering & Kirchner, 2025; Majumder et al., 2024; Pashev & Gaftandzhieva, 2025)

But GenAI limits creativity when people rely too much on it, use it passively, or rely less on their own judgment. Overreliance on AI can lead to cognitive offloading, in which students copy ideas generated by AI rather than generating their own. This limits creativity and innovation (Majumder et al., 2024; Stuchlikova & Weis, 2024). Empirical evidence indicates that although GenAI increases the quantity of ideas, it may not promote originality or adaptability, suggesting a trade-off between productivity and creative depth (Leiba, 2025). Creativity is also limited when AI reduces human agency or authorship, as automation can supplant human initiative and reduce the uniqueness in creative outputs (Fisher, 2023). Algorithmic hallucinations and unclear reasoning add more hazards. Learners may find it difficult to tell whether AI-generated ideas are true or false, making it harder to make creative decisions (Rady et al., 2026). Furthermore, concerns about originality and differences between human and machine roles make creative processes in AI-mediated environments even more difficult (Colson & Gross, 2024). Overall, the results show that GenAI can increase learners' creativity when used as a helpful, engaging, and human-controlled partner. However, it can also limit creativity when it makes people dependent on it, less critical, or less able to be creative.

Discussion

This study investigated the impact of GenAI by exploring two principal inquiries: (RQ1) the mechanisms that influence human agency and critical thinking, and (RQ2) the circumstances in which GenAI either increases or limits creativity. The results together demonstrate that the influence of GenAI is neither fundamentally beneficial nor harmful; rather, it is significantly dependent on its design, implementation, and use. The findings for RQ1 indicate that human agency and critical thinking are predominantly shaped by mechanisms of control, transparency, collaboration, and reflective evaluation. Mechanisms such as prompting, human oversight, and explainability let humans retain the power to make decisions and interact with AI outputs in meaningful ways. In the same way, human-AI collaboration and pedagogical design encourage meaningful engagement by treating AI as a partner rather than a replacement. Critical thinking is especially enhanced by processes that promote reflection, judgment, and evaluation, guaranteeing that learners interrogate and authenticate AI-generated material. But these benefits only work if certain conditions are met. Excessive reliance on AI and blind trust might make people less active and less able to think critically, pushing them to passively consume AI outputs.

The results for RQ2 show that GenAI boosts creativity when used as a collaborative, iterative, and human-centered tool. When learners actively participate in co-creation, improve prompts, and utilize AI to explore and expand ideas, they are most likely to be creative. In this way, GenAI makes it easier for learners to generate new ideas and integrate them in novel ways. Also, maintaining power, freedom, and authorship is important for sustaining creative engagement. Moreover, creativity is limited when students rely too much on AI. This leads to cognitive offloading, reduced originality, and reduced ownership of their creative work. Algorithmic hallucinations, a lack of transparency, and unclear roles for humans and AI make creative processes even harder, making it hard to judge and trust the ideas AI generates.

Taken together, these findings show that providing learners with active control over AI interaction through prompting, transparency, and informed choice combines human agency. These strategies work together to promote learner autonomy by making users responsible for evaluating and redirecting AI results, rather than passively using them. Results also suggest that AI literacy and ethical awareness are important for meaningful interaction and for maintaining human oversight in GenAI-mediated contexts. Interaction-oriented mechanisms indicate that GenAI is most effective when perceived as a collaborative partner rather than an independent substitute for human intellect. Shared agency is maintained through collaboration and co-creative interaction, which enhances learner engagement. Furthermore, cognitive augmentation

encourages idea development and thinking. However, trust was a double-edged sword; over-reliance on AI outputs could lead to a decline in independent judgment and a reduction in learner control. Cognitive regulatory methods emphasize the importance of reflective, structured learning processes for preserving critical thinking in GenAI-mediated settings. Across the research, educational scaffolding, reflection, and evaluative judgment are consistently found to promote deeper cognitive engagement and reduce passive reliance on AI-generated outputs. These strategies enhance metacognitive awareness by compelling learners to critically evaluate and verify knowledge rather than outsourcing cognition to AI systems.

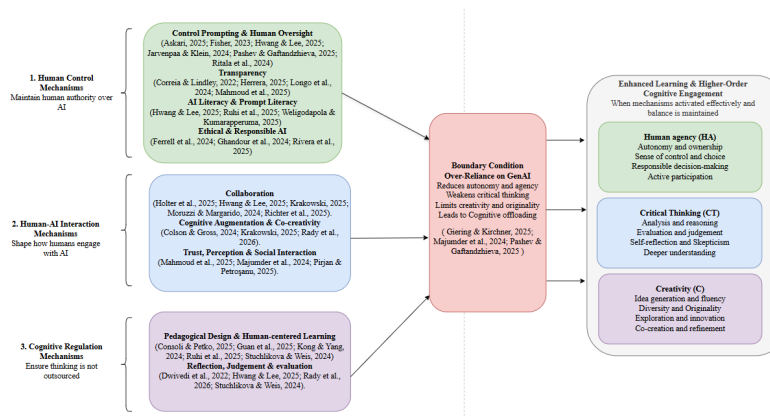


Figure 4. GenAI-Human Agency Model

The results of this study have been integrated into the GenAI–Human Agency Model (Figure 4), which provides an in-depth understanding of the impact of generative AI on human agency, critical thinking, and creativity in an educational context. The model does not look at these results separately. Instead, it sees them as coming from the interaction of three main mechanisms: human control mechanisms, human–AI interaction mechanisms, and cognitive regulation mechanisms.

Human Control Mechanisms - Prompting, transparency, AI literacy, and ethical monitoring ensure that learners can still make decisions when using GenAI. This aligns with sociotechnical systems theory (Bostrom & Heinen, 1977), which holds that the best results come from optimizing both human and technological components. By keeping control, learners keep their freedom and ownership, which are important parts of being human.

Human-AI Interaction Mechanisms - The ways people interact with AI, such as collaborating, being creative together, and trusting one another, affect how learners use AI systems. These results align with human-in-the-loop (HITL) and augmentation theories (Amershi et al., 2019; Shneiderman, 2020), which suggest that AI enhances rather than supplants human capabilities. AI can help people work together by getting them to think about new ideas and explore them.

Cognitive Regulation Mechanisms -Reflection, judgment, and pedagogical design, make sure that students think about what AI outputs. This supports the theory of self-regulated learning (SRL) (Zimmerman, 2002), which holds that reflection and feedback are important for developing higher-order cognitive skills such as critical thinking. In this scenario, GenAI serves as a scaffold that can either enhance or hinder cognition, depending on its use.

Boundary Condition - Over-reliance on AI is a major limiting factor across all systems. It takes away people’s ability to act, weakens their critical thinking, and limits their creativity by offloading cognitive

tasks. This result indicates that GenAI is effective only when human participation and human-AI interaction are active and balanced.

In general, the conceptual model shows that GenAI works best when it serves as a cognitive partner, focusing on people and supporting their thinking rather than replacing it. The fundamental problem isn't the technology itself; it's making sure that learning spaces are set up to keep people engaged, in charge, and thinking critically. This way, AI can do the most good with the least amount of risk. This study makes three key theoretical contributions. First, it integrates autonomy, critical thinking, and creativity into a unified model of human agency. Second, it moves beyond outcome-based analysis by identifying mechanism-level explanations, providing a deeper understanding of how GenAI shapes cognition. Third, it introduces over-reliance as a boundary condition, offering an explicit viewpoint on when GenAI enhances or constrains learning outcomes.

This study has limitations at both the research and review levels. First, the study is based on a limited number of papers, which could lead to selection bias, as research that is relevant but not in the chosen databases or within the time frame (2018–2026) may not have been included. Even if several databases were searched, the review may still not have found all the information that appeared. Second, differences in study designs, settings, and methods across the papers considered may limit the generalizability of the conclusions to other situations. Reporting bias, as studies showing positive results with GenAI are more likely to be reported. Finally, the synthesis depends on mechanisms that are clearly specified. This makes the work more rigorous, but it may miss findings that are not well articulated in the literature.

Future studies should evaluate the proposed model utilizing various research designs. Experimental investigations can determine how AI-supported learning environments affect student engagement, critical thinking, and learning results. How AI affects learning over time and across educational environments can be studied longitudinally. AI-enabled teaching methodologies and pedagogies can be tested in the classroom. Researchers should also develop and validate human–AI cooperation metrics to assess trust, interaction quality, cognitive support, and collaborative performance, thereby strengthening the proposed framework.

Conclusion

This study offers a thorough analysis of the impact of GenAI on human agency, critical thinking, and creativity. These research findings illustrate that the influence of GenAI is neither advantageous nor disadvantageous; instead, it depends on the mechanisms by which learners engage with and use it. The suggested GenAI-Human Agency model is enhanced by drawing out three principal mechanisms: human control, human-AI interaction, and cognitive regulation, while emphasizing over-reliance as a significant limitation that may compromise cognitive and creative outcomes.

This study enhances the literature by integrating agency, critical thinking, and creativity into a model of human agency, thereby addressing the gap observed in previous studies. It expands sociotechnical and human-AI interaction theories (Amershi et al., 2019; Trist, 1981) by providing mechanism-level insights into the cognitive impacts of AI-enabled systems for IS researchers. It introduced over-reliance as a boundary condition, yielding a more comprehensive understanding of when GenAI facilitates or limits learning outcomes.

Furthermore, the findings have substantial implications for the design of AI-supported learning. Institutions should be set up to encourage human-in-the-loop engagement, enabling learners to actively guide AI

outputs. Instead of just using it as is, humans must be involved in improvement and co-creation by combining tasks that need contemplation and review to improve critical thinking. Developing AI literacy programs can help users to better understand and control it. Fully automating the tasks can take away the human accountability and ownership.

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