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Generative AI, cognitive offloading, and learner agency in higher education: a scoping review protocol

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ADMINISTRATIVE INFORMATION

Support - No external funding.

Review Stage at time of this submission - completed but not published (This scoping review has been completed and is currently under peer review. The protocol was not registered prospectively because the authors initially followed PRISMA-ScR reporting guidance without formal registry submission. Following the assistant editor's recommendation, the protocol is now being retrospectively registered to improve transparency. No changes have been made to the completed search, screening, data charting, or synthesis procedures after registration).

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 May 2026 and was last updated on 27 May 2026.

INTRODUCTION

Review question / Objective This scoping review aims to map the emerging literature on the relationships among generative artificial intelligence, cognitive offloading, and learner agency in higher education. Using the PCC framework, the population is higher education learners, the concept is the relationship among GenAI-supported learning, learner agency, cognitive offloading, overreliance, dependence, and related mechanisms, and the context is higher education. The review addresses the following questions: how has learner agency been conceptualized in GenAI-supported higher education; how may GenAI enhance learner agency through self-regulation, self-efficacy, feedback literacy, and reflective engagement; how may GenAI undermine learner agency through cognitive offloading, overreliance, technological dependence, and uncritical uptake; which mechanisms link GenAI use to agency-related learning processes; and which pedagogical conditions shape whether GenAI functions as augmentation rather than replacement?

Background Generative artificial intelligence is increasingly integrated into higher education, where it supports writing, feedback, problem solving, reading, and research-related tasks. Existing studies suggest that GenAI can provide immediate feedback, personalized assistance, adaptive dialogue, and content generation, thereby creating new opportunities for learner-centered education. At the same time, scholars have raised concerns about cognitive offloading, overreliance,

technological dependence, uncritical acceptance of AI-generated output, diminished originality, and weakened independent judgement. These tensions suggest that the educational implications of GenAI cannot be understood only through performance, efficiency, or technology acceptance. Learner agency provides a useful analytical lens because it concerns whether students remain able to direct, monitor, evaluate, and take responsibility for their own learning while interacting with AI systems. However, the literature remains fragmented across constructs such as learner agency, autonomy, self-regulation, metacognition, critical thinking, self-efficacy, feedback literacy, cognitive offloading, and dependence. A scoping review is therefore appropriate to map this emerging field.

Rationale This scoping review is conducted because research on GenAI-supported learning in higher education is rapidly expanding but remains conceptually and methodologically heterogeneous. Many studies examine isolated variables such as intention to use, satisfaction, writing performance, self-efficacy, or feedback engagement, while fewer studies use learner agency as an organizing construct. In addition, although cognitive offloading, overreliance, and technological dependence are frequently discussed as risks of GenAI use, they are rarely integrated into a unified account of how learner agency may be weakened. The review is consistent with the purposes of a scoping review because it seeks to identify the types of available evidence, clarify key concepts and definitions, examine how research has been conducted, identify mechanisms and boundary conditions, and analyse knowledge gaps in the literature on GenAI, cognitive offloading, and learner agency in higher education.

METHODS

Strategy of data synthesis The literature search was conducted in the Web of Science Core Collection on March 31, 2026. The search focused on English-language, peer-reviewed journal articles at the intersection of three domains: generative artificial intelligence, higher education, and agency- or offloading-related learning processes. The full search strategy was:

((TI=(ChatGPT OR "generative AI" OR "generative artificial intelligence" OR GenAI OR "large language model*" OR LLM* OR GPT-3 OR GPT-4) AND AB=(("higher edu-cation" OR universit* OR college* OR "tertiary education" OR undergraduate* OR postgraduate*) AND ("learner agency" OR "student agency" OR "learner autonomy" OR "student autonomy" OR "self-directed learning")) NOT AB=("primary school*" OR "secondary school*" OR "high school*" OR K-12 OR child* OR adolescen* OR patient* OR clinical)))
OR
((TI=(ChatGPT OR "generative AI" OR "generative artificial intelligence" OR GenAI OR "large language model*" OR LLM* OR GPT-3 OR GPT-4) AND AB=(("higher edu-cation" OR universit* OR college* OR "tertiary education" OR undergraduate* OR postgraduate*) AND ("cognitive offload*" OR overreliance OR "over-reliance" OR "AI reliance" OR "reliance on ChatGPT" OR "automation bias" OR "cognitive outsourcing")) NOT AB=("primary school*" OR "secondary school*" OR "high school*" OR K-12 OR child* OR adolescen* OR patient* OR clinical)))
OR
((TI=(ChatGPT OR "generative AI" OR "generative artificial intelligence" OR GenAI OR "large language model*" OR LLM* OR GPT-3 OR GPT-4) AND AB=(("higher edu-cation" OR universit* OR college* OR "tertiary education" OR undergraduate* OR postgraduate*) AND ("self-efficacy" OR "self efficacy" OR "self-regulation" OR "self regulation" OR "self-regulated learning" OR metacognit* OR "critical thinking")) NOT AB=("primary school*" OR "secondary school*" OR "high school*" OR K-12 OR child* OR adolescen* OR patient* OR clinical))).

The included studies were synthesized through descriptive mapping and thematic analysis. First, the literature was mapped in terms of publication year, context, study design, disciplinary distribution, and focal variables. Second, findings were coded and grouped through a combined deductive-inductive approach. Deductively, the review was guided by the distinction between learner agency enhancement and agency erosion through cognitive offloading. Inductively, recurrent themes were identified through repeated reading of the included studies. No meta-analysis was planned or conducted.

Eligibility criteria Studies were included if they met all of the following criteria: they were peer-reviewed journal articles; they focused on GenAI tools, such as ChatGPT or other large language model-based systems; they were situated in higher education contexts, including undergraduate, postgraduate, university, college, or tertiary-level learning settings; they addressed at least one construct related to learner agency, autonomy, self-regulation, metacognition, critical thinking, feedback literacy, self-efficacy, cognitive offloading, overreliance, dependence, or related learning processes; they were published in English; and they were published from 2022 onward.

Studies were excluded if they were editorials, commentaries, opinion essays, conference abstracts, or non-peer-reviewed reports. Studies were also excluded if they focused primarily on teachers, faculty, or institutional adoption without direct evidence about student learning processes; if they centered exclusively on technical AI model performance or benchmarking; or if they addressed general technology acceptance without meaningful connection to learner agency, cognitive offloading, self-regulation, metacognition, critical thinking, self-efficacy, feedback literacy, or related educational mechanisms. Studies focused primarily on primary or secondary education, child or adolescent populations, clinical populations, or non-educational uses of AI were also excluded.

Source of evidence screening and selection Retrieved records were exported and screened in multiple stages. First, duplicate records were removed. Second, titles and abstracts were screened to exclude clearly irrelevant studies. Third, full texts were examined to assess final eligibility according to the inclusion and exclusion criteria. Screening was conducted iteratively because some studies did not explicitly use the term learner agency but examined closely related constructs such as autonomy, self-directed learning, self-regulation, metacognition, or reflective engagement. Literature search and screening were conducted by Guanhua Wang and Wenna Wang. Any uncertainties or disagreements were resolved through discussion among the review team, with Daozhou Yang consulted when needed.

Data management A structured data-charting form was developed to extract and organize information from the included studies. Charted information included author, year, country or region, educational context, participant characteristics, GenAI tool or platform, research design, focal constructs, conceptualization of learner agency, positive pathways, negative pathways, mediators, moderators, boundary conditions, and pedagogical implications. Data charting was conducted by Guanhua Wang and Wenna Wang, and the analysis involved Guanhua Wang, Wenna Wang, and Daozhou Yang.

Reporting results / Analysis of the evidence The evidence was analysed through descriptive mapping and thematic synthesis. Descriptive mapping summarized the characteristics of the included studies, including contexts, methods, focal constructs, and publication patterns. Thematic synthesis identified recurring patterns related to learner agency, cognitive offloading, overreliance, dependence, self-regulation, metacognition, critical thinking, self-efficacy, feedback literacy, and pedagogical conditions. The synthesis focused on conceptual relationships and mechanisms rather than pooled effect sizes.

Presentation of the results Results will be presented using a PRISMA-style flow diagram, descriptive summary tables, and a conceptual framework. The flow diagram will report the number of records identified, duplicates removed, records screened, full texts assessed, exclusions with reasons, and studies included in the final synthesis. A study characteristics table will summarize the core included studies, including context, design, constructs, and main findings. A thematic summary table will present major themes, mechanisms, representative studies, and pedagogical implications. A dual-pathway conceptual framework will illustrate how GenAI may enhance learner agency through self-regulation, feedback engagement, and reflective use, or erode learner agency through cognitive offloading, overreliance, dependence, and uncritical uptake.

Language restriction English only.

Country(ies) involved China.

Other relevant information This is a retrospective registration completed following a peer-review recommendation. The manuscript has already been prepared and submitted for journal review. The authors confirm that no changes will be made to the completed search, screening, data charting, or synthesis procedures after retrospective registration. Guanhua Wang and Wenna Wang contributed equally to this work.

Keywords generative AI; ChatGPT; learner agency; cognitive offloading; overreliance; self-regulated learning; higher education; scoping review.

Dissemination plans The findings of this scoping review will be disseminated through publication in a peer-reviewed academic journal.

Contributions of each author

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