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

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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.**INPLASY registration number:** INPLASY202650152

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 1 July 2026.

INTRODUCTION

Review question / Objective This scoping review maps and synthesizes peer-reviewed or scholarly journal literature on the relationships among generative artificial intelligence (GenAI), cognitive offloading, and learner agency in higher education. The review examines: (1) how learner agency is conceptualized in GenAI-supported higher education; (2) how GenAI use is associated with agency-supportive patterns, including self-regulation, self-efficacy, feedback engagement, and reflective participation; (3) how GenAI use is associated with agency-eroding patterns, including cognitive offloading, overreliance, technological dependence, uncritical uptake, and weakened judgement; (4) which recurring mechanism-related

constructs, such as self-regulation, metacognition, critical thinking, trust, self-efficacy, feedback literacy, AI literacy, and evaluative judgement, help explain these patterns; and (5) which pedagogical boundary conditions shape whether GenAI functions as augmentation rather than replacement in higher education learning.

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 GenAI has become increasingly embedded in higher education learning activities, including writing, feedback use, problem solving, language learning, research support, and self-regulated learning. Existing studies report both positive and negative implications. GenAI may support learners' confidence, engagement, feedback literacy, and self-regulated learning, but it may also intensify cognitive offloading, overreliance, technological dependence, and uncritical acceptance of AI-generated outputs. The literature is conceptually diverse, methodologically heterogeneous, and distributed across education, psychology, applied linguistics, and technology-related higher education research. A scoping review is therefore appropriate for mapping key concepts, types of evidence, mechanism-related constructs, pedagogical boundary conditions, and knowledge gaps. Learner agency provides the organizing construct for understanding how GenAI may both support and erode students' capacity to direct, monitor, evaluate, and take responsibility for learning in AI-mediated contexts.

METHODS

Strategy of data synthesis The review uses descriptive mapping and theory-informed configurative synthesis. The included studies are first mapped descriptively by publication year, database source, document type, evidence category, study design or method, country or region where identifiable, educational context, participant group, GenAI tool or platform, learning task or activity, and charted construct signals. The synthesis then uses a framework-synthesis logic to organize findings around five theme families: learner agency/autonomy conceptualization; agency-supportive patterns; agency-eroding/offloading patterns; regulatory and evaluative mechanism-related constructs; and boundary

conditions or pedagogical responses. Construct signals are recorded only when a construct is substantively discussed, measured, operationalized, or used to interpret findings; keyword occurrence alone is not sufficient. The resulting framework is treated as an interpretive synthesis of heterogeneous evidence rather than as a statistically tested causal model or meta-analysis.

Eligibility criteria Studies are included if they meet all of the following criteria: (1) they are peer-reviewed or scholarly journal articles, including articles, review articles, and early-access articles where allowed by database filters; (2) they focus on GenAI tools, such as ChatGPT or other large language model-based systems; (3) they are situated in higher education contexts, including undergraduate, postgraduate, graduate, university, college, or other tertiary-level learning settings; (4) they provide substantive evidence, conceptual analysis, or operationalization of at least one construct directly related to learner agency, autonomy, self-directed learning, cognitive offloading, overreliance, dependence, AI reliance, self-regulation, metacognition, critical thinking, feedback literacy, self-efficacy, trust, AI literacy, evaluative judgement/judgment, or related mechanisms in higher education students' learning processes; and (5) they are published in English between 2022 and 24 June 2026.

Studies are excluded if they are editorials, commentaries, opinion essays, conference abstracts, theses, book chapters, non-peer-reviewed reports, or records without sufficient retrievable bibliographic information. Studies are also excluded when they focus primarily on K-12 education, clinical or patient populations, teacher or faculty adoption, institutional governance, AI detection, technical system performance, performance/satisfaction/attitudes only without an analyzable agency/offloading mechanism, or general technology acceptance without direct relevance to higher education students' learning processes or agency/offloading-related mechanisms.

Source of evidence screening and selection

The literature search was conducted on 24 June 2026 across six database sources: Web of Science Core Collection, Scopus, EBSCOhost ERIC, EBSCOhost Education Source, APA PsycInfo via ProQuest, and ProQuest Education Collection via ProQuest Social Science Premium Collection. Search terms were organized around three conceptual blocks: GenAI technologies, higher education contexts, and agency/offloading/

mechanism-related constructs. GenAI-related terms were searched in title, abstract, keyword, topic, subject, NOFT, or database-equivalent indexed fields according to each platform. Database filters were applied to retain English-language peer-reviewed or scholarly journal records published from 2022 to 24 June 2026.

The search identified 8020 records. After 2693 duplicates were removed, 5327 records were screened by title and abstract. Three authors independently screened records using include/unsure/exclude coding after calibration on a pilot subset, and unresolved cases were adjudicated by a fourth author. A total of 717 reports were sought for retrieval; 26 could not be retrieved despite reasonable access attempts. Therefore, 691 full-text reports were assessed for eligibility. Three authors independently screened the full texts using binary include/exclude decisions, followed by consensus discussion and fourth-author adjudication where needed. After full-text screening, 568 reports were excluded with reasons, and 123 studies were included in the final charting matrix and synthesis.

Data management Records retrieved from all six database sources were exported and prepared for deduplication before title and abstract screening. Deduplicated records were assigned screening identifiers and tracked through title/abstract screening, retrieval, full-text eligibility assessment, exclusion-reason coding, and final inclusion. A structured charting matrix was developed for the 123 included studies. The charting fields included bibliographic details, database source, document type, evidence category, study design or method, country or region where identifiable, educational context, participant group, GenAI tool or platform, learning task or activity, learner agency or proxy construct, cognitive offloading/reliance/dependence construct, mechanism-related constructs, agency-supportive evidence, agency-eroding/offloading evidence, boundary conditions or pedagogical responses, theme assignment, and charting notes. Bibliographic metadata for included studies were cross-checked against database export files and available source information. Full-text exclusion decisions and exclusion reasons were documented separately for transparency and auditability.

Reporting results / Analysis of the evidence The review reports descriptive mapping, screening reliability, full-text exclusion reasons, charted construct signals, and an interpretive synthesis of theme families. The review reports the number of records retrieved, duplicates removed, title/

abstract records screened, reports sought for retrieval, reports not retrieved, full-text reports assessed, full-text reports excluded with reasons, and final included studies. Inter-rater agreement at the title/abstract and full-text screening stages is summarized using kappa statistics where available, while final inclusion decisions are based on consensus and fourth-author adjudication.

The analysis distinguishes between construct signals and theme-family contributions. Construct signals indicate that a construct was substantively discussed, measured, operationalized, or used to interpret findings. Theme-family counts indicate that a study contributed evidence or conceptual material to a synthesized result theme. Because the included evidence is heterogeneous, the review does not conduct meta-analysis or formal risk-of-bias appraisal, and the interpretive framework is not presented as a causal model.

Presentation of the results The results are presented through a PRISMA-ScR-compatible flow diagram, descriptive tables, a theme-evidence matrix, supplementary charting materials, and an interpretive framework figure. The main text presents the study selection process in a PRISMA-ScR flow diagram, including database retrieval, duplicate removal, title/abstract screening, full-text retrieval, full-text exclusions with reasons, and final inclusion. The characteristics of the included studies are summarized in a descriptive table, including evidence category, publication year, database source, country or region signals, educational context signals, participant group signals, task or activity signals, and construct/theme signals.

The synthesized findings are presented through five theme families: learner agency/autonomy conceptualization; agency-supportive patterns; agency-eroding/offloading patterns; regulatory/evaluative mechanism-related constructs; and boundary conditions or pedagogical responses. An interpretive framework figure illustrates how GenAI affordances, mechanism-related constructs, and pedagogical boundary conditions are associated with agency-supportive and agency-eroding patterns. Supplementary Table S1 provides the charting matrix for the included studies, and Supplementary Table S2 reports full-text exclusions with final exclusion reasons.

Language restriction English only.

Country(ies) involved China.

Other relevant information The registered protocol record is aligned with the revised review process reported in the manuscript. The review process was expanded and clarified after the earlier draft, including expansion from a narrower search strategy to a six-database search, movement of GenAI-related terms beyond title-only searching, updated eligibility criteria, detailed documentation of deduplication and screening, structured data charting, reporting of full-text exclusion reasons, and clearer specification of descriptive mapping and theory-informed configurative synthesis. These revisions improve transparency, reproducibility, and consistency between the registered record, the manuscript, and the supplementary materials.

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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