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Impacts of the use of Generative Artificial Intelligence in doctoral programmes: A systematic review based on knowledge and mobilisation management

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ADMINISTRATIVE INFORMATION

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INTRODUCTION

Review question / Objective This systematic review addresses four research questions: RQ1: What are the primary uses of GenAI tools among doctoral students across different disciplines? RQ2: What are the reported benefits and challenges of GenAI adoption in doctoral research and education? RQ3: What ethical considerations and academic integrity concerns have been identified? RQ4: What pedagogical frameworks or guidelines exist for GenAI integration in doctoral education? The overall objective is to identify, appraise, and synthesise peer-reviewed evidence on the application of Generative Artificial Intelligence (GenAI) and Large Language Models (LLMs) in doctoral education from the perspectives of knowledge management and knowledge mobilisation.

Rationale Generative Artificial Intelligence (GenAI) is transforming how knowledge is produced, managed, and mobilised in doctoral education. Although a growing body of research examines the use of GenAI in higher education, evidence specific to doctoral education remains dispersed across disciplines, methods, and national contexts. Doctoral settings amplify the consequences of inappropriate or opaque use because research outputs are expected to be novel, defensible, and attributable, and doctoral progression often depends on high-trust supervisory relationships and assessment processes. A systematic synthesis is needed to consolidate what is currently known about GenAI in doctoral education and to clarify the dominant uses, reported outcomes, and governance implications.

Condition being studied The integration of Generative Artificial Intelligence (GenAI),

particularly Large Language Models (LLMs) such as ChatGPT, into doctoral education. This includes their use in academic writing, dissertation development, research communication, doctoral supervision, mentoring, formative feedback, assessment, curricular innovation, and knowledge mobilisation within doctoral programmes across multiple disciplines.

METHODS

Search strategy Search queries were designed to capture GenAI/LLM technologies and doctoral education processes. Core terms included: GenAI/LLMs: "generative AI", "GenAI", "large language model*", "LLM*", "ChatGPT", "GPT-3.5", "GPT-4", "GPT-4o". Doctoral education: "doctoral", "PhD", "doctorate", "doctoral education", "doctoral supervision", "thesis", "dissertation", "postgraduate research". Boolean query: ("generative AI" OR GenAI OR "large language model*" OR LLM* OR ChatGPT OR GPT-4 OR GPT-3.5 OR GPT-4o) AND (doctoral OR PhD OR doctorate OR "doctoral education" OR "doctoral supervision" OR thesis OR dissertation OR "postgraduate research"). Electronic databases: Scopus and Web of Science Core Collection. Publication window: January 2023 to December 2025. Languages: English and Spanish.

Participant or population Doctoral education contexts, including PhD candidates, dissertation/thesis workflows, doctoral supervision and mentoring relationships, doctoral programme design, and closely related doctoral research contexts. Participants include doctoral students, supervisors, and mixed cohorts across multiple disciplines and countries.

Intervention The use, adoption, evaluation, or implications of Generative Artificial Intelligence (GenAI) tools, with explicit reference to Large Language Models (LLMs) such as ChatGPT or comparable systems, applied to doctoral research or doctoral learning activities. This includes GenAI used for academic writing support, feedback generation, supervision augmentation, curriculum design, and research communication.

Comparator Not applicable. This is a qualitative systematic review that does not involve a direct comparison between intervention and control groups. The review synthesises evidence on GenAI adoption patterns, benefits, challenges, and governance frameworks across doctoral education contexts.

Study designs to be included Peer-reviewed journal articles with empirical methods (qualitative, quantitative, mixed methods) and/or systematic, methodological, or theoretically grounded scholarly analyses relevant to the topic. This includes case studies, course interventions, autoethnographic accounts, discourse analyses, tool-specific evaluations, survey-based studies, and acceptance framework analyses.

Eligibility criteria Inclusion: Published between January 2023 and December 2025; written in English or Spanish; focused on doctoral education or doctoral research contexts; involving GenAI/LLM tools; peer-reviewed with empirical or scholarly methods. Exclusion: (EC1) Focused exclusively on K-12 or undergraduate education; (EC2) Non-generative AI only; (EC3) No explicit relevance to doctoral education; (EC4) Editorials, opinion pieces without methodology; (EC5) Languages other than English or Spanish; (EC6) Duplicates or incomplete records; (EC7) No empirical evidence or formal scholarly analysis.

Information sources Two major bibliographic databases were used: Web of Science Core Collection and Scopus. These were selected for their broad coverage of peer-reviewed literature across education, information systems, health sciences, and interdisciplinary research.

Main outcome(s) The main outcomes include: (1) Primary uses of GenAI tools among doctoral students across disciplines; (2) Reported benefits and challenges of GenAI adoption in doctoral research and education; (3) Ethical considerations and academic integrity concerns identified; (4) Pedagogical frameworks or guidelines for GenAI integration in doctoral education. These are organised into five thematic perspectives: academic writing and scientific communication, doctoral supervision and mentoring, assessment and formative feedback, curricular and pedagogical innovation, and knowledge mobilisation, adoption, and ethical implications.

Additional outcome(s) Additional outcomes include: cross-cutting governance, privacy, and policy concerns; adoption patterns and behavioural intention variables (perceived usefulness, enjoyment, ethics, self-efficacy, social influence); and the identification of gaps in longitudinal and comparative evidence regarding sustained learning gains, supervision outcomes, and research quality.

Data management All retrieved records were exported to a reference management workflow for

deduplication. A standardised data extraction form was developed and piloted on a subset of studies, then refined for consistency. For each included article, data were extracted independently by one reviewer and verified by other reviewers. Discrepancies were resolved through discussion and, when required, consultation with the whole author team.

Quality assessment / Risk of bias analysis A fit-for-purpose appraisal strategy was applied given the methodological heterogeneity of the evidence base. Empirical studies were assessed for methodological transparency and internal validity using an appraisal framework appropriate to their design (qualitative, quantitative, or mixed methods). Conceptual/theoretical contributions were assessed for clarity of purpose, coherence of argumentation, and explicitness of claims and limitations. Particular attention was paid to common risks of bias in emergent GenAI research, including: convenience sampling and limited generalisability; overreliance on self-reported perceptions; short-term pilots; and insufficient reporting of ethical safeguards. Appraisal outcomes were used to contextualise confidence in findings rather than to exclude studies.

Strategy of data synthesis A narrative synthesis was conducted, complemented by a thematic synthesis to organise findings into analytically meaningful clusters. The synthesis proceeded in three steps: (1) Descriptive mapping: studies summarised by year, geography, discipline, study design, sample type, and GenAI tools; (2) Thematic coding: findings coded inductively and deductively against the review questions; (3) Thematic aggregation: codes grouped into higher-order themes. A meta-analysis was not conducted because the included studies varied substantially in their designs, measures, and reported outcomes.

Subgroup analysis No formal subgroup analysis was conducted. However, findings were organised and compared across thematic strands: (1) writing, dissertation development, and research communication; (2) supervision, mentoring, and formative feedback; (3) authorship, agency, originality, and academic integrity; (4) AI literacy, prompting, and curriculum/training; (5) adoption, behavioural intention, and research progress; (6) cross-cutting governance, privacy, and policy concerns. Geographic distribution was also examined across Europe, Asia, Americas, Oceania, and Africa.

Sensitivity analysis No formal sensitivity analysis was conducted due to the heterogeneity in outcomes and study designs, which precluded conventional pooled meta-analysis. Where relevant, patterns were triangulated across qualitative and quantitative evidence, and findings were interpreted in light of appraisal results and contextual constraints.

Language restriction English and Spanish.

Country(ies) involved Chile.

Other relevant information The review followed the PRISMA 2020 statement. A total of 489 records were identified from Scopus and Web of Science. After deduplication and screening, 37 studies met the inclusion criteria for qualitative synthesis. Two additional review papers were retained outside the analytical sample for contextual comparison only. ChatGPT was the predominant GenAI system examined across the corpus. The review contributes to understanding GenAI's impact on doctoral education by situating its use within knowledge management and mobilisation frameworks.

Keywords Generative Artificial Intelligence; GenAI; Doctoral Education; Knowledge Management; Knowledge Mobilisation; Large Language Models; LLMs.

Dissemination plans Publication in a peer-reviewed journal. The study aims to inform doctoral programmes, supervisors, and institutional policymakers about the governance of GenAI integration in doctoral education.

Contributions of each author

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