

Exploring the Impact of Gen-AI on Team-Based Computing Capstone Projects

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Abstract

Team-based capstones are a cornerstone of computing education, designed to prepare students for professional computing practice. The rapid adoption of Generative AI (GenAI) is reshaping how students plan, implement, test, and document their capstone work, raising new questions about workflows, team dynamics, assessment practices, and graduate readiness for using GenAI in the workplace. This Working Group (WG) investigates how GenAI is influencing capstone design and practice from the perspectives of students, early-career graduates, instructors, and employers.

Using a mixed-methods approach, including a scoping literature review, cross-institutional surveys, and semi-structured interviews, the WG will examine how GenAI is currently integrated into capstone courses, how students use and perceive GenAI across the project lifecycle, how instructors are adapting task design, supervision, feedback, and assessment, and how employer expectations for GenAI competencies align with university preparation. The

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ultimate goal is to produce evidence-based guidance that helps educators realign capstone experiences with the realities of GenAI-integrated professional computing practice.

CCS Concepts

• **Social and professional topics** → **Computing education.**

Keywords

capstone, team-based projects, generative AI, GenAI, industry alignment, computing education

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1 Background and Related Work

Capstone courses are widely recognized as the culminating experience of computing degrees, integrating technical skills with teamwork and stakeholder engagement to develop the work-ready capabilities expected by industry [6]. The rapid adoption of GenAI

has sparked widespread debate in computing education [8]; however, existing research has largely focused on introductory programming rather than upper-division or capstone courses [1]. This distinction matters, as GenAI’s impact may vary by student mastery: early-stage learners may risk over-reliance, which can impede foundational skill development, whereas more advanced students may be better positioned to use GenAI critically and productively.

Recent work highlights a widening gap between industry AI adoption and graduate preparation, with employers increasingly expecting responsible AI use, critical evaluation of AI output, and awareness of organizational constraints [2]. Prior studies show that GenAI tools can support students’ troubleshooting, documentation, and process management in capstone contexts [4, 7], and a 2025 ITiCSE Working Group confirms that GenAI is emerging globally across capstone courses, albeit inconsistently and with mixed views on its fairness and impact [5].

However, major gaps remain. There is limited cross-institutional evidence on how teams integrate GenAI into collaborative development practices, how such use is assessed equitably, and how evolving student practices align with employer expectations for AI-augmented professional work. Our work bridges these gaps by examining student practices, instructional adaptations, and employer perspectives across institutions.

2 Research Questions

This Working Group investigates how GenAI is shaping computing capstones, defined here as team-based courses completed in the final or penultimate year of a Diploma, Bachelor’s, or Master’s program, in which a substantial project spans the full duration of the course. We address the following research questions:

- **RQ1 (Integration and Governance):** How is GenAI currently integrated into team-based computing capstones, and what policies, guidance, and governance structures shape its use?
- **RQ2 (Student Use, Learning, and Team Dynamics):** How do students use GenAI across the capstone lifecycle, and how does it influence their learning, skill development, teamwork, and perceived fairness?
- **RQ3 (Pedagogical and Assessment Adaptation):** How are instructors adapting capstone design, supervision, and assessment in response to GenAI, and what challenges arise in preserving fairness, integrity, and authentic evaluation?
- **RQ4 (Industry Expectations and Alignment):** What GenAI-related competencies and practices do employers expect from computing graduates, and to what extent do current capstone practices align with these expectations?
- **RQ5 (Gaps, Misalignments, and Support Needs):** What gaps and misalignments exist between capstone practices and employer expectations for AI-augmented professional practice, and what guidance, policy, or institutional support do stakeholders identify as most needed to address them?

3 Methodology

We will employ a mixed-methods approach combining quantitative and qualitative analyses [3]. We will survey students, instructors, and employers who hire computing graduates to capture current GenAI practices, perceived benefits and risks, policy awareness,

and implications for assessment and graduate readiness. We will also conduct semi-structured interviews with the same stakeholder groups to get deeper insights into day-to-day GenAI use, expectations for responsible use, and the skills required in AI-augmented professional computing. To contextualize these perspectives, we will analyze industry reports to identify emerging workforce expectations, complemented by a scoping literature review of published academic research mapping current work on GenAI in capstone contexts to identify current practices, gaps, and misalignments.

4 Expected Deliverables

We expect to produce the following outcomes from our work:

- **Scoping Literature Review:** A scoping review of academic and industry-facing literature on GenAI in capstones and team-based project courses, in both computing and non-computing disciplines, examining current use patterns, pedagogical challenges, policy considerations, industry practices, and skills expectations.
- **Multi-Stakeholder Data Analysis:** An analysis of survey and interview data examining current GenAI practices, perceived benefits and challenges, and implications for capstone design.
- **Industry Alignment Insights:** A synthesis of capstone practices and employer expectations identifying gaps and opportunities for better alignment.
- **Evidence-Based Recommendations:** Concrete guidelines for integrating GenAI into capstone design, assessment, and policy, while maintaining rigor and equity.

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