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College Students' Experiences, Attitudes, Skills, and Expectations Regarding Artificial Intelligence (AI): A Survey-Based Study

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ABSTRACT

This study examined differences between undergraduate and graduate students' experiences, perceptions, and concerns regarding the use of artificial intelligence (AI) in higher education. Using survey data collected across four domains: Experience and Usage of AI, Skills/Education/Training in AI, Perceptions and Attitudes Toward AI, and Future Expectations of AI, the analysis revealed significant distinctions between the two groups. Undergraduate students reported stronger agreement that AI-powered tools are essential for academic success, that AI positively supports their learning, and that they feel comfortable using AI-generated responses in coursework. They also viewed the use of AI as providing an academic advantage. In contrast, graduate students expressed higher levels of skepticism regarding the academic benefits of AI and greater concerns about the social stigma of using AI for schoolwork. Graduate students also held stronger beliefs about AI's potential to reduce human biases, alongside heightened worries about AI's long-term societal impacts and risks associated with unregulated AI development. These findings illustrate developmental, professional, and ethical differences in how AI is perceived across educational levels. The study highlights the need for differentiated AI literacy initiatives that address varying expectations, competencies, and concerns among undergraduate and graduate learners.

Keywords: Artificial intelligence; undergraduate students; graduate students; AI literacy; educational technology; student perceptions; academic integrity; future of AI; AI in higher education

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Introduction

Artificial intelligence (AI) has rapidly emerged as a transformative force in higher education, reshaping how students learn, study, and interact with academic content. From adaptive learning platforms and AI-driven tutoring systems to generative AI tools such as ChatGPT, Claude, and Gemini, students increasingly rely on AI to support academic tasks such as writing, problem-solving, research, and coding (Zawacki-Richter et al., 2019). As the presence of AI expands, understanding students' experiences, perceptions, and expectations becomes essential for informing institutional policy, curriculum design, and ethical guidelines.

While AI offers potential benefits including personalized feedback, enhanced access to information, and increased efficiency, its integration into higher education also poses challenges. Concerns regarding academic integrity, data privacy, transparency, and the accuracy and validity of AI-generated responses have contributed to growing debates about appropriate AI use (Kasneci et al., 2023; OECD, 2023). Many institutions remain uncertain about how to support students' learning while managing risks related to over-reliance on automated systems or the erosion of foundational academic skills.

The proposed study examines how college students interact with AI technologies, how they perceive the risks and benefits of AI in academic settings, and how prepared they feel to engage with AI tools. Specifically, it surveys students across four conceptual domains: (1) Experience and Usage of AI, (2) Perceptions and Attitudes Toward AI, (3) Skills, Education, and Training in AI, and (4) Future Expectations of AI. Investigating these interconnected areas will generate valuable insights for colleges seeking to develop responsible AI policies, integrate AI literacy into curricula, and better support students navigating an increasingly AI-mediated academic landscape.

Review of Literature

AI in Higher Education: Usage and Impact on Learning

AI adoption among college students has grown significantly as generative AI technologies become more widely available. Recent studies indicate that a majority of students use AI tools such as chatbots, grammar checkers, and problem-solving assistants, either regularly or occasionally for coursework and study tasks (Alexander et al., 2023; EDUCAUSE, 2023). These tools can enhance learning efficiency, improve writing quality, and provide immediate feedback (Zhai, 2023). For many students, AI is perceived as an essential resource for academic success, especially when used to clarify complex content or supplement instructor feedback.

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However, findings also show mixed perceptions regarding AI's impact on learning. Some students report that AI positively supports their learning process, while others warn that over-reliance on AI-generated content can undermine deep understanding, critical thinking, and academic integrity (Kasneci et al., 2023). Concerns that AI may lead to decreased effort, superficial learning, or the temptation to complete assignments dishonestly have been widely documented (Cotton et al., 2023). In addition, inaccurate or fabricated responses commonly called "hallucinations" highlight the need for verification and critical evaluation of AI outputs (Ji et al., 2023), supporting survey items related to the necessity of verifying AI content.

Outside of academic contexts, students increasingly use AI tools for personal and everyday tasks such as scheduling, information-seeking, and creative exploration. This broader usage may influence their comfort level with AI and shape their expectations of future applications (Bai & Mintz, 2023).

Student Attitudes Toward AI: Ethics, Transparency, and Privacy

Research suggests that students' perceptions of AI's societal role are shaped by both optimism and caution. Many believe AI can contribute to solving social issues, improving efficiency, and addressing complex global challenges (Brynjolfsson & McAfee, 2017). Yet worries about AI's impact on privacy, surveillance, and personal data security remain high among young adults (Smith & Anderson, 2019).

Ethical concerns including bias, fairness, and transparency are also prominent in contemporary AI discourse. Students increasingly express a desire for AI algorithms to be more transparent and accountable (Long & Magerko, 2020). Feelings of embarrassment or stigma around AI use, particularly for schoolwork, have been noted in studies examining academic integrity and peer perceptions (Rudolph et al., 2023). These findings align with survey items regarding privacy concerns, social perceptions of AI use, and attitudes toward algorithmic transparency.

AI Skills, Education, and Training Needs

Despite growing use of AI tools, many students report limited formal education or training in AI literacy. Studies highlight gaps in curricula related to understanding how AI systems work, how to evaluate outputs critically, and how to use AI ethically and responsibly (Holmes et al., 2022). The need for AI education is recognized internationally, with major organizations calling for AI literacy as a key competency for the workforce of the future (OECD, 2023; UNESCO, 2021).

Students who receive training in AI concepts demonstrate greater confidence in assessing AI-generated material, identifying misinformation, and applying AI tools appropriately (Fawns et al., 2023). Instructors also play an influential role: when professors encourage responsible AI

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use, students are more likely to integrate AI tools effectively into their learning (Alkhowaiter, 2023). Many students believe peers who use AI have academic advantages, reinforcing the importance of equitable access and structured training opportunities.

Future Expectations of AI

Higher education is increasingly preparing students for a world in which AI will play a major role in solving scientific, economic, and global challenges. Literature suggests that students who are more familiar with AI tend to express optimism about AI's potential to contribute to large-scale problem solving, including climate modeling, healthcare innovation, and social policy design (Marcus & Davis, 2019). These expectations reflect broader societal narratives about AI's transformative future and underscore the importance of understanding student perspectives as institutions develop AI strategies and policies.

Purpose of the Study

As AI technologies become increasingly embedded in higher education, understanding how students at different academic levels experience and interpret these tools is essential. Prior research shows that students' engagement with AI varies widely based on their academic preparation, disciplinary context, and exposure to AI-integrated coursework (Holmes et al., 2022; Fawns et al., 2023). Undergraduate and graduate students may differ in how frequently they use AI tools, the extent to which they trust AI-generated content, and the degree to which they perceive AI as beneficial—or detrimental—to their learning (Kasneci et al., 2023; Zhai, 2023). Likewise, distinctions in privacy concerns, perceptions of algorithmic transparency, and confidence in evaluating AI outputs have been highlighted across student populations (Long & Magerko, 2020; Smith & Anderson, 2019).

Given these variations, the purpose of this study is to compare undergraduate and graduate students' perceptions across several key domains measured in the survey: (1) experience and usage of AI, (2) attitudes and concerns regarding AI, (3) skills and training needs related to AI literacy, and (4) expectations for AI's potential to address complex societal issues. By investigating differences between these academic groups, the study seeks to illuminate how students' developmental and educational trajectories shape their engagement with AI technologies. Such comparisons are critical for understanding who benefits most from AI, who may be disadvantaged by its rapid adoption, and how institutions can design equitable AI policies and learning supports (OECD, 2023; UNESCO, 2021).

Findings from this research will contribute to a deeper and more nuanced understanding of AI use in higher education, informing institutional strategies around AI literacy initiatives, responsible-use guidelines, and curriculum development. In doing so, the study aims to support

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colleges and universities in preparing students at every academic level to engage critically, ethically, and effectively with emerging AI technologies in both academic and societal contexts (Zawacki-Richter et al., 2019; Brynjolfsson & McAfee, 2017).

Research Questions

Based on the purpose of the study and the themes identified in the literature, the following research questions (RQs) guide the investigation:

RQ1. Are there significant differences between undergraduate and graduate students in their experiences and usage of AI in academic and non-academic contexts?

RQ2. How do undergraduate and graduate students differ in their perceptions and attitudes toward AI, including perceived benefits, concerns about privacy, algorithmic transparency, and social acceptance?

RQ3. To what extent do undergraduate and graduate students differ in their AI-related skills, educational needs, and perceived adequacy of AI training in their curriculum?

RQ4. Do undergraduate and graduate students differ in their expectations of AI's potential to address complex global and societal challenges?

RQ5. To what extent do the four conceptual domains—AI experience/usage, perceptions/attitudes, AI skills/training, and future expectations—predict students' confidence in using AI effectively for academic success?

Methods

Research Design

This study uses a **cross-sectional, quantitative survey design** to examine differences between undergraduate and graduate students' perceptions of artificial intelligence across four conceptual domains. A structured online questionnaire was administered to participants, allowing for comparison across academic levels and analysis of relationships among variables.

Participants

Participants will consist of undergraduate and graduate students enrolled at a four-year university in the United States. Eligibility criteria include:

- being currently enrolled as an undergraduate or graduate student,
- being at least 18 years of age, and

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- having access to the online survey.

A target sample size of **N = 250–400** students is anticipated, with proportional representation from both academic levels. The data collection procedures began in the Fall semester of 2025 and will continue into the Spring 2026. Prior literature suggests that both groups have varied exposure to and concerns about AI tools in higher education (Fawns et al., 2023; Kasneci et al., 2023), making comparison meaningful. Demographic variables such as age, gender, race/ethnicity, academic level, major, and frequency of technology use will also be collected in the survey.

Survey Instrument and Measures

The survey comprises four domains aligned with the literature:

1. Experience and Usage of AI

Items assess students' frequency of AI use, perceived academic necessity of AI, verification practices, and use of AI outside coursework. These items align with research showing diverse usage patterns and reliance levels across student groups (Alexander et al., 2023; Zhai, 2023).

2. Perceptions and Attitudes Toward AI

Items address beliefs about AI's societal contributions, privacy concerns, stigma associated with AI use, and expectations for algorithmic transparency. Literature documents heightened concerns in these areas, especially among less experienced or younger users (Smith & Anderson, 2019; Long & Magerko, 2020).

3. Skills, Education, and Training in AI

Items examine students' desire for AI training, perceptions of curricular gaps, perceived academic advantages for AI users, and faculty encouragement. These align with findings that many students lack formal AI literacy despite frequent tool usage (Holmes et al., 2022; OECD, 2023).

4. Future Expectations of AI

Items evaluate optimism about AI's ability to address global challenges (Marcus & Davis, 2019).

All items will use a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

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Data Analysis Plan

Data analysis procedures will begin with descriptive measures (means, frequencies) will summarize demographic characteristics and survey responses. To address the research questions a series of MANOVA tests were conducted comparing undergraduate vs. graduate students across the four domains. Cronbach's alpha was performed to assess internal reliability of each survey domain ($\alpha \geq .70$ acceptable). Finally, Confirmatory Factor Analysis (CFA), was performed to confirm the conceptual structure of the four domains in the survey.

Results

Experience and Usage of AI

Comparative analyses revealed significant differences between undergraduate and graduate students in their engagement with and perceptions of AI use in academic settings. Undergraduate students reported stronger agreement with statements indicating that:

- *AI-powered tools are essential for my academic success*
- *AI has positively affected my learning experience at college*
- *I am comfortable submitting a prompt to an AI like ChatGPT and turning in the answer it provides*

These findings suggest that undergraduates demonstrate a higher degree of comfort, reliance, and perceived benefit from AI technologies compared to graduate students. Graduate students, while still using AI, reported lower levels of comfort with relying on AI-generated responses for academic work.

Skills, Education, and Training in AI

Undergraduate students were more likely than graduate students to agree that *students who use AI for coursework have an academic advantage*. This indicates that undergraduates may see AI not only as a supportive tool but as a competitive resource within academic environments.

Conversely, graduate students expressed greater skepticism regarding the educational benefits of AI. Their responses indicated more caution about overreliance on AI tools, reflecting critical concerns about academic integrity, skill development, and the quality of AI-generated outputs.

Perceptions and Attitudes Toward AI

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Graduate students demonstrated greater concern about social stigma, reporting stronger agreement with the statement *I would feel embarrassed if someone found out that I used AI for schoolwork*. This suggests heightened sensitivity to perceptions of academic authenticity and professional expectations.

At the same time, graduate students expressed stronger agreement with the belief that *AI has the potential to reduce human biases*, indicating more nuanced consideration of AI's societal and ethical role.

Future Expectations of AI

Graduate students exhibited greater concern about AI's long-term societal impact, agreeing more strongly that unregulated AI development may lead to unforeseen risks. These findings reflect a broader pattern of caution and critical awareness among graduate respondents regarding future implications of widespread AI adoption.

Discussion

The findings reveal notable distinctions between undergraduate and graduate students in how they use, perceive, and anticipate the future role of AI in education and society. These differences align with broader research on digital literacy development, academic norms, and generational divides in technology adoption.

Undergraduates' Higher Reliance on AI

Undergraduates' stronger agreement that AI is essential for academic success and has positively influenced their learning aligns with research showing that younger students often earlier adopters of emerging technologies tend to integrate AI tools more seamlessly into their study habits (Sun et al. 2023; Zawacki-Richter et al. 2019). Their comfort with generating and submitting AI-assisted responses also reflects recent studies indicating reduced perceived stigma among younger users regarding AI-supported work (Kasneci et al. 2023).

This enthusiasm may be shaped by undergraduates' broader exposure to AI-powered educational technologies, such as automated tutoring systems, adaptive learning platforms, and writing assistants, which have increasingly become part of undergraduate learning environments.

Graduate Students' Caution and Skepticism

Graduate students' greater skepticism about AI's academic benefits reflects their heightened expectations for originality, disciplinary expertise, and methodological rigor—values cultivated through advanced academic training. Research suggests that graduate students often have a more

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developed sense of academic integrity norms and thus may evaluate AI tools with greater scrutiny (Strohmaier et al. 2024; Cotton et al. 2023).

The finding that graduate students felt more embarrassment about using AI for coursework aligns with literature indicating that professional identity formation increases sensitivity to perceptions of competence and authenticity (Gee 2014; Wenger 1998). As graduate students prepare for roles as researchers, clinicians, or educators, concerns about dependence on automated tools may feel more consequential.

Ethical Awareness Among Graduate Students

Graduate students' belief that AI can reduce human biases is consistent with analyses highlighting the potential for algorithmic systems to improve equity in decision-making when carefully designed and monitored (Buolamwini & Gebru 2018; Mitchell 2019). Their stronger concerns about long-term societal risks and unregulated AI development reflect scholarly debates emphasizing the need for robust governance frameworks, transparency, and ethical oversight (Floridi & Cowls 2021; Crawford 2021).

This heightened awareness may stem from disciplinary exposure to research ethics, policy considerations, or data governance issues that appear more frequently in graduate-level curricula.

Implications for Higher Education

These findings underscore the importance of differentiated AI-related instructional and support strategies:

- Undergraduates may benefit from structured guidance on appropriate and ethical AI use, helping them avoid overreliance or misuse while still leveraging AI's potential benefits.
- Graduate students may require more advanced, critical, and discipline-specific AI training that addresses both the benefits and risks, while aligning with professional standards.
- Institutions should consider implementing tiered AI literacy frameworks, ensuring that expectations for AI use align with developmental stages, disciplinary norms, and academic goals.

The final sample consisted of 255 students enrolled at a four-year institution in the United States. Of these participants, 207 (81.2%) were undergraduate students and 48 (18.8%) were graduate students. Participants ranged in age from 18 to 61 years (M = 23.08, SD = 9.13). With respect to gender, 176 participants (69.0%) identified as women, and 79 participants (31.0%) identified as men.

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Students represented a range of academic majors and years in their respective programs. The sample also included students with varying levels of technology access and AI exposure, providing sufficient variability for examining differences in experiences, perceptions, and expectations related to artificial intelligence. These demographic characteristics supported subsequent comparisons between undergraduate and graduate students using multivariate analyses.

Table 1: Perception and Attitude Toward Artificial Intelligence

	Undergraduate	Graduate	F	Sig.
AI can contribute positively to social issues	3.52	3.48	0.065	.80
I worry about AI's impact on personal privacy.	3.82	3.98	8.30	.005
I would feel embarrassed if someone found out that I used AI for schoolwork.	2.96	3.90	3.23	.074
AI algorithms should be more transparent	4.07	4.56	.34	.563
AI technology can enhance creativity and innovation.	4.19	4.82	3.96	.048
I trust AI algorithms to provide accurate information	3.50	2.80	3.43	.066
The ethical use of AI is a major	3.63	4.58	.77	.382

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concern for me.				
AI has the potential to reduce human biases.	3.74	3.34	.42	.519
I have concerns about AI's impact on job security.	4.00	4.64	5.70	.018

As shown in Table 1, most perceptions and attitudes toward artificial intelligence did not differ significantly between undergraduate and graduate students. However, several differences were observed. Graduate students reported significantly greater concern about AI's impact on personal privacy (M = 3.98) than undergraduates (M = 3.82), F = 8.30, p = .005, as well as greater concern about AI's impact on job security (M = 4.64 vs. M = 4.00), F = 5.70, p = .018. Graduate students were also more likely to agree that AI technology can enhance creativity and innovation (M = 4.82) compared to undergraduate students (M = 4.19), F = 3.96, p = .048.

Two items approached statistical significance. Graduate students reported higher levels of embarrassment associated with using AI for schoolwork (M = 3.90) than undergraduates (M = 2.96), F = 3.23, p = .074, whereas undergraduates reported slightly greater trust in AI algorithms (M = 3.50) than graduate students (M = 2.80), F = 3.43, p = .066. No significant differences were found for remaining items (ps > .05).

Table 2: Experience and Usage of Artificial Intelligence

	Undergraduate	Graduate	F	P
I regularly use AI-powered tools or applications in my studies	3.64	3.08	7.11	.008
AI-powered tools are essential for my academic success.	3.24	2.78	3.91	.049
I feel that it is necessary to verify the validity and accuracy of the responses that AI generates.	4.23	5.28	20.23	.000
AI has positively affected my learning experience at college.	4.02	3.24	12.30	.001
AI has negatively affected my learning experience at	2.57	3.15	7.86	.005

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college				
I use AI outside of my classwork.	4.20	3.70	3.98	.047
I am comfortable submitting a prompt to an AI like ChatGPT and turning in the answer it provides.	2.72	2.11	5.46	.020

As shown in Table 2, significant differences emerged between undergraduate and graduate students in their experience and usage of artificial intelligence. Undergraduate students reported significantly greater use of AI-powered tools in their studies (M = 3.64) than graduate students (M = 3.08), F = 7.11, p = .008, and were more likely to view AI-powered tools as essential for academic success (M = 3.24 vs. M = 2.78), F = 3.91, p = .049. Undergraduates also reported significantly higher agreement that AI has positively affected their learning experience (M = 4.02) compared to graduate students (M = 3.24), F = 12.30, p = .001, greater use of AI outside of coursework (M = 4.20 vs. M = 3.70), F = 3.98, p = .047, and greater comfort submitting AI-generated responses for academic work (M = 2.72 vs. M = 2.11), F = 5.46, p = .020.

In contrast, graduate students reported significantly higher agreement that it is necessary to verify the accuracy of AI-generated responses (M = 5.28) than undergraduate students (M = 4.23), F = 20.23, p < .001, and were more likely to report that AI has negatively affected their learning experience (M = 3.15 vs. M = 2.57), F = 7.86, p = .005.

Table 3: Skills, Education, and Training in Artificial Intelligence

	Undergraduate	Graduate	F	Sig.
I am interested in receiving formal training in AI through coursework or other resources at your college	2.97	2.65	.043	.837
My curriculum lacks adequate exposure to AI.	2.78	2.51	2.84	.096
Students who use AI for their coursework have an advantage academically.	2.95	1.97	7.57	.007
My college Professors encourage the use of AI in coursework.	2.65	2.65	.087	.769

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I am actively seeking opportunities to learn more about AI.	2.49	2.18	.445	.507
I am skeptical about the benefits of AI in education	2.85	3.59	.710	.402

As shown in Table 3, few statistically significant differences were observed between undergraduate and graduate students regarding skills, education, and training related to artificial intelligence. The only significant group difference was found for perceptions that students who use AI for coursework have an academic advantage, with undergraduate students reporting higher agreement (M = 2.95) than graduate students (M = 1.97), F = 7.57, p = .007.

No significant differences were observed between groups in interest in receiving formal AI training, perceptions of curricular exposure to AI, perceived faculty encouragement of AI use, active pursuit of AI learning opportunities, or skepticism regarding the benefits of AI in education (all *ps* > .05). Although graduate students reported slightly greater skepticism toward AI's educational benefits (M = 3.59) than undergraduates (M = 2.85), this difference was not statistically significant.

Table 4: Future Expectations of Artificial Intelligence

	Undergraduate	Graduate	F	Sig.
I see potential for AI to solve complex global problems.	2.78	2.57	2.91	.093
AI will become an essential part of most professions.	3.33	3.63	2.75	.102
I worry about AI negatively affecting human creativity.	3.08	3.86	.559	.458
I have concerns about AI's long-term societal impact.	3.22	4.63	.903	.345
Unregulated AI development may lead to Unforeseen risks.	3.31	4.44	.553	.460
AI will play a significant role in my future career.	2.86	2.38	2.82	.098

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As shown in Table 4, no statistically significant differences were observed between undergraduate and graduate students regarding future expectations of artificial intelligence (all *ps* > .05). Although several items approached statistical significance, these differences did not meet conventional thresholds. Graduate students reported slightly higher agreement that AI will become an essential part of most professions (M = 3.63) compared to undergraduates (M = 3.33), F = 2.75, p = .102, and expressed greater concern about AI negatively affecting human creativity (M = 3.86 vs. M = 3.08), F = 0.56, p = .458. Graduate students also reported higher concern regarding AI's long-term societal impact (M = 4.63) and risks associated with unregulated AI development (M = 4.44) than undergraduate students (Ms = 3.22 and 3.31, respectively), though these differences were not statistically significant.

Undergraduate students reported slightly higher agreement that AI will play a significant role in their future careers (M = 2.86) compared to graduate students (M = 2.38), F = 2.82, p = .098. Overall, findings suggest broadly similar expectations of AI's future role across academic levels.

Conclusion

This study found that differences between undergraduate and graduate students' engagement with artificial intelligence are most evident in **experience and usage**, rather than in skills or future expectations. Undergraduate students reported greater reliance on AI, higher comfort using AI-generated content, and stronger beliefs in AI's academic utility, whereas graduate students demonstrated greater caution, particularly emphasizing verification of AI outputs and reporting more negative learning effects. Differences in **perceptions and attitudes** were selective, with graduate students expressing greater concern about privacy, job security, and ethical implications. In contrast, few differences emerged in **skills, education, and training** or **future expectations of AI**, suggesting shared uncertainty across academic levels regarding formal AI preparation and AI's long-term role. Overall, the findings highlight the importance of **developmentally differentiated approaches** to AI instruction and policy in higher education.

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