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ARTÍCULO

ChatGPT in Higher Education: A Cross-Sectional Study of Student Usage, Ethical Perceptions, and Implications for Academic Integrity

ChatGPT en l'educació superior: un estudi transversal sobre el seu ús, percepcions ètiques i impacte en la integritat acadèmica

ChatGPT en la educación superior: un estudio transversal sobre su uso, percepciones éticas e impacto en la integridad académica

Federico Vásquez Cardona¹, Valentina Carmona García²,
Daniel Pérez Valencia³

¹ Federico Vásquez Cardona, MD, MSc, Medical Doctor, Bioethicist, Epidemiologist, CES University (Colombia). Email: federicovasquez.c@gmail.com. ORCID: <https://orcid.org/0009-0008-6924-9097>.

² Valentina Carmona García, MD, Medical Doctor, CES University (Colombia). Email: valen.carmona0917@gmail.com. ORCID: <https://orcid.org/0009-0003-7447-8189>.

³ Daniel Pérez Valencia, MA, MPhil, Humanities Scholar, Philosopher, CES University (Colombia). Email: dperezv@ces.edu.co. ORCID: <https://orcid.org/0000-0002-8465-4348>.



Abstract

The rapid adoption of ChatGPT—a Generative AI chatbot—in higher education has raised concerns about academic integrity, ethical responsibility, and the development of critical-thinking skills. This cross-sectional study investigates the usage patterns and ethical perceptions of ChatGPT among 381 students (technical, undergraduate, and postgraduate) at a university in Colombia during the first semester of 2024. An anonymous online survey—distributed through snowball sampling—collected data on demographics, ChatGPT usage, perceptions, and its impact on academic assignments. Descriptive statistics and bivariate analyses were conducted using crude prevalence ratios (PR) and 95% confidence intervals to explore associations between sex, training, and perceptions. Results indicate that 46.7% of students used ChatGPT for evaluative assignments, 34.6% for essays, and 25.2% for research projects. Notably, 60.4% allowed ChatGPT to complete parts of their assignments, and 17.1% used it to fully complete at least one of the last four assignments. Only 7.6% received training on its optimal use. Male students were significantly more likely to participate in training courses (PR = 5.57; 95% CI: 2.54–12.22; $p < 0.001$), and this participation was associated with an increased perception of incoherent responses generated by ChatGPT (PR = 1.31; 95% CI: 1.09–1.58; $p = 0.033$). This study highlights the widespread use of ChatGPT and underscores the urgent need for enhanced training and the integration of ethical considerations into academic curricula. Such measures are essential for maximizing the benefits of generative AI while mitigating risks to academic integrity, ethical responsibility, and critical thinking.

Keywords: ChatGPT; higher education; artificial intelligence; critical thinking; perception; risks; ethics.

Resum

La ràpida adopció de ChatGPT —un bot d'intel·ligència artificial generativa— en l'educació superior suscita inquietuds sobre la integritat acadèmica, la responsabilitat ètica i el pensament crític. Aquest estudi transversal va tenir com a objectiu caracteritzar patrons d'ús i percepcions ètiques en 381 estudiants de programes tècnics, de pregrau i de postgrau d'una universitat colombiana durant el primer semestre de 2024. Es va aplicar una enquesta en línia anònima, distribuïda per mostreig en bola de neu, que va recollir dades sociodemogràfiques, d'utilització de ChatGPT i del seu impacte en tasques acadèmiques. L'anàlisi va emprar estadístiques descriptives i proves bivariades amb raons de prevalença (RP) i intervals de confiança del 95%. El 46,7% va usar ChatGPT en tasques avaluatives, el 34,6% en assajos i el 25,2% en projectes de recerca; el 60,4% va permetre que l'eina completés part de les seves assignacions i el 17,1% va delegar per complet almenys una de les seves quatre tasques més recents. Només el 7,6% va rebre capacitació formal, més freqüent en homes (RP = 5.57; 95% IC: 2.54–12.22; $p < 0.001$), i la capacitació es va associar amb major percepció de respostes incoherents (RP = 1.31; 95% IC: 1.09–1.58; $p = 0.033$). Aquestes troballes evidencien la necessitat de reforçar formació fent ús de ChatGPT i incorporar reflexions ètiques en plans d'estudi. Implementar aquestes mesures és essencial per a aprofitar la intel·ligència artificial generativa sense comprometre integritat acadèmica, responsabilitat ètica ni el desenvolupament del pensament crític.

Paraules clau: ChatGPT; educació superior; intel·ligència artificial; pensament crític; percepcions; riscos; ètica.

Resumen

La rápida adopción de ChatGPT —un chatbot de inteligencia artificial generativa— en la educación superior suscita inquietudes sobre la integridad académica, la responsabilidad ética y el pensamiento crítico. Este estudio transversal tuvo como objetivo caracterizar patrones de uso y percepciones éticas en 381 estudiantes de programas técnicos, de pregrado y de posgrado de una universidad colombiana durante el primer semestre de 2024. Se aplicó una encuesta en línea anónima, distribuida por muestreo en bola de nieve, que recogió datos sociodemográficos, de utilización de ChatGPT y de su impacto en tareas académicas. El análisis empleó estadísticas descriptivas y pruebas bivariadas con razones de prevalencia (RP) e intervalos de confianza del 95%. El 46,7% usó ChatGPT en tareas evaluativas, el 34,6% en ensayos y el 25,2% en proyectos de investigación; el 60,4% permitió que la herramienta completara parte de sus asignaciones y el 17,1% delegó por completo al menos una de sus cuatro tareas más recientes. Solo el 7,6% recibió capacitación formal, más frecuente en hombres (RP = 5.57; 95% IC: 2.54–12.22; $p < 0.001$), y la capacitación se asoció con mayor percepción de respuestas incoherentes (RP = 1.31; 95% IC: 1.09–1.58; $p = 0.033$). Estos hallazgos evidencian la necesidad de reforzar formación en uso de ChatGPT e incorporar reflexiones éticas en planes de estudio. Implementar estas medidas es esencial para aprovechar la inteligencia artificial generativa sin comprometer integridad académica, responsabilidad ética ni el desarrollo del pensamiento crítico.

Palabras clave: ChatGPT; educación superior; inteligencia artificial; pensamiento crítico; percepciones; riesgos; ética.

1. Introduction

ChatGPT, a chatbot built on a generative artificial-intelligence model, has gained widespread popularity. Its capacity to simulate conversation with coherent, information-rich responses—and, more recently, to process images, audio, and video—has attracted attention across disciplines. Within classrooms these features already underpin automated formative feedback, concise content summaries, on-demand code hints, and real-time language support, reshaping daily teaching and learning practices. Beyond education, the tool is rapidly permeating healthcare and business, prompting fresh questions about moral reasoning and professional responsibility. These debates center on autonomy, beneficence, non-maleficence, and justice (Sandel, 2009; Rahman & Watanobe, 2023).

Although ChatGPT debuted as a text generator, it now assists with code creation, data analysis, visual interpretation, and audiovisual production. Since its November 2022 launch, this expanded functionality has made it the fastest-growing application on record, surpassing 100 million active users in just two months (Sok & Heng, 2023).

Despite ChatGPT's widespread acceptance and success, its emergence has introduced challenges in various areas of knowledge, especially within higher education. The tool's capacity to provide precise and coherent answers to user queries enables the rapid completion of evaluative tasks—such as exams and assignments—thereby allowing students to bypass the intended learning objectives of these activities. This situation raises ethical concerns regarding academic integrity and moral accountability, prompting some universities to restrict access to mitigate issues arising from insufficient student responsibility (Farrelly & Baker *et al.*, 2023; Lo *et al.*, 2023).

Given the novelty of ChatGPT, scholars have only recently begun examining its impact. Because of the technology's rapid evolution and adoption, there is an urgent need to analyze its use to optimize its integration while ensuring alignment with core ethical principles. This involves documenting how ChatGPT has been employed and identifying the challenges of its implementation, focusing on both risks and benefits in the academic sphere (Shahzad, Xu, & Javed *et al.*, 2024).

Without a timely and accurate understanding of ChatGPT's impact, educational institutions risk failing to uphold academic integrity and ensure effective learning outcomes. Such a scenario could produce a future in which professionals lack the necessary competencies for their fields, as the tool may replace genuine learning processes and yield high grades that go unnoticed by educators and institutions. It is therefore crucial to evaluate how ChatGPT is being utilized in

academic environments, in order to propose strategies that optimize its use while mitigating risks and ensuring ethical oversight (Abd-alrazaq et al., 2023).

This concern is particularly pertinent to higher education, where scientific and humanistic teaching serve as fundamental pillars in understanding both the natural and social world. Academia's connections with politics, morality, critical thinking, worldviews, science, and technology have significantly shaped cultural development. Given the importance and impact of higher education on society, it is essential to address the new dynamics introduced by ChatGPT's presence in academic settings, ensuring that its use adheres to ethical standards and fosters moral responsibility (Matthews, 2014).

This study seeks to provide critical insights into the use and perceptions of ChatGPT within higher education. Understanding how this tool is employed and reflecting on the factors that contribute to recognizing its associated risks, are essential steps toward taking effective action—not only at the level of institutional policies but also in cultivating the critical thinking and ethical judgment required of students (Nussbaum, 1998).

The overall objective of this research is to characterize the use and perceptions of ChatGPT among students in technical, undergraduate, and postgraduate programs at a university in Colombia during the first semester of 2024.

2. Materials and Methods

This research adopts a post-positivist paradigm, which recognizes the existence of an objective and measurable reality while acknowledging that knowledge of this reality is inevitably shaped by perceptions, theories, and the broader context in which the study is conducted (Petrou et al., 2021). Such an approach allows for a nuanced understanding of the differences and patterns in ChatGPT usage among students, taking into account the institution's specific environment and the time period in which this research was carried out.

2.1. Survey Management

A cross-sectional, anonymous online survey was conducted in 2024 among students over 18 years of age who were enrolled in technical, undergraduate, or postgraduate programs at a university in Colombia. The survey aimed to analyze ChatGPT usage and perceptions. Employing a non-probabilistic snowball sampling method, the survey was disseminated electronically via email and various digital platforms. Researchers also approached students directly, inviting them to

participate and share the survey with their peers, thereby facilitating broad participation and maintaining respondent confidentiality.

The questionnaire, created specifically for this study using Google Forms, featured multiple-choice items regarding demographics (sex, age, semester, and program), ChatGPT usage (types of assignments, scope of usage in assignments, idea generation, and writing assistance), as well as participants' perceptions and experiences with ChatGPT (incoherent responses, frequency of ChatGPT use in assignments, and participation in ChatGPT-related courses). Prior to distribution, a pilot test was carried out with undergraduate and graduate students from multiple faculties to assess the survey's clarity, comprehensibility, and relevance. Feedback from the pilot phase was used to refine question phrasing and response options. Validation items confirmed that respondents were indeed students who had utilized ChatGPT for academic purposes, and only complete, consistent responses were retained for the final analysis.

To mitigate errors and bias, the study's objectives and research question were explicitly defined, while survey questions were designed with neutral wording to avoid leading responses. Short-term recall was encouraged to reduce memory bias. Confidentiality and anonymity were strictly upheld to foster honest, accurate participation. The survey data were collected between April 1 and May 31, 2024.

2.2. Sample Size Calculation

The sample size was calculated using OpenEpi software. For a total population of 6,635 students, an expected proportion of 50%, an alpha error of 5%, and a 95% confidence interval, the minimum required sample size was estimated at 364. In total, 381 students completed the survey, surpassing the planned sample size target. Given the non-probability snowball sampling, this target was used as a size guideline rather than a guarantee of representativeness.

2.3. Data Analysis

Once the survey results were obtained and the sample size requirement was met, the data were downloaded and thoroughly reviewed to identify and resolve any missing data, typographical errors, or inconsistencies. A data-cleaning protocol was then applied to ensure the integrity of the dataset.

Descriptive statistics were used to summarize respondents' characteristics. Quantitative variables are presented as means or medians, according to their distribution, along with standard

deviations or interquartile ranges, respectively. Qualitative variables are shown as absolute frequencies and corresponding relative frequencies.

Additionally, we conducted bivariate analyses to examine associations between binary outcomes (perceived risk; perceived incoherent/out-of-context responses) and sex or course participation. We reported crude prevalence ratios (PR), computed directly from 2×2 contingency tables as the ratio of outcome prevalences in exposed versus unexposed groups. Two-sided significance was assessed at $\alpha=0.05$ using Pearson's, χ^2 test (or Fisher's exact test when expected cell counts were <5). No multivariable modeling was performed; potential confounding is addressed in the Limitations.

The dataset was initially cleaned using Microsoft Excel and subsequently analyzed in Jamovi (The jamovi project, version 2.6.13), which utilizes R as its computational engine. Graphical and tabular outputs were produced using Microsoft Power BI (version 2.138.1004.0).

2.4. Ethical Considerations

This research aims to raise awareness of, and analyze, the risks associated with using ChatGPT at this university—and by extension, at other higher education institutions worldwide. By identifying potential risk factors that challenge higher education, the results provide significant social value by offering insights that can inform improvements and optimizations in how ChatGPT is used among students.

The study was conducted using approved, well-documented scientific procedures to ensure transparency and clarity. It was not intended to benefit any specific third party or individual; rather, its purpose was to highlight potential educational challenges within the institution. No compensation was provided to participants. Far from seeking to discredit the university, the study aims to identify potential weaknesses that relevant authorities could address to facilitate improvements. In accordance with the principles of the Declaration of Helsinki, participants' rights and interests were prioritized over the research findings.

This study was submitted to the University's Institutional Ethics Committee and received approval under Act No. 321 on November 29, 2023. The project respects intellectual property rights, and the software used for data analysis is properly licensed. Pursuant to Resolution No. 8430 of 1993, which sets forth guidelines for health research, this study is classified as risk-free.

3. Results

3.1 Sociodemographic Characteristics

The study included 381 students from technical, undergraduate, and postgraduate programs at a university in Colombia. Their sociodemographic characteristics, ChatGPT usage patterns, and perceptions were analyzed. The median age of participants was 20 (IQR: 19–22). Regarding sex, 122 (32.0%) were male and 259 (68.0%) were female. The students were distributed across three educational levels: 64 (16.8%) in technical programs, 282 (74.0%) in undergraduate programs, and 35 (9.2%) in postgraduate programs.

The semester distribution was varied: 25.7% were in their first semester, 21.0% in the second, 15.5% in the third, 6.8% in the fourth, 9.2% in the fifth, 5.2% in the sixth, 5.0% in the seventh, 3.7% in the eighth, 1.6% in the ninth, 3.4% in the tenth, 2.4% in the eleventh, and 0.5% in the twelfth. Most participants (51.8%, $n = 197$) were enrolled in the undergraduate Medicine program, followed by Prehospital Care Technology (16.8%, $n = 64$) and Physiotherapy (7.8%, $n = 30$). An additional 23.6% ($n = 90$) were enrolled in various other programs, each with fewer than 10 participants (see Table 1).

Table 1: *Sociodemographic Variables of Participants*

Variable	N (%) (N=381)
Age	20.0 (19,22)
Sex	
Male	122 (32.0)
Female	259 (68.0)
Level of education	
Technical	64 (16.8)
Undergraduate	282 (74.0)
Postgraduate	35 (9.2)
Semester	
1 st	98 (25.7)
2 nd	80 (21.0)
3 rd	59 (15.5)
4 th	26 (6.8)
5 th	35 (9.2)
6 th	20 (5.2)
7 th	19 (5.0)
8 th	14 (3.7)
9 th	6 (1.6)

10 th	13 (3.4)
11 th	9 (2.4)
12 th	2 (0.5)
Program	
Medicine	197 (51.8)
Prehospital Care Technology	64 (16.8)
Physiotherapy	30 (7.8)
Other programs with less than 10 participants	90 (23.6)

3.2 ChatGPT Usage

Students reported using ChatGPT for various evaluative tasks: 46.7% used it for assignments, 34.6% for essays, and 25.2% for research projects. Additionally, 230 (60.4%) indicated that ChatGPT directly completed parts of an academic assignment. In other capacities, 253 students (66.4%) employed ChatGPT for idea generation in academic activities, while 210 (55.1%) used it for writing or translating academic texts (see Table 2).

With respect to the frequency of ChatGPT use in academic assignments, 108 students (28.3%) did not use ChatGPT for any of their last four assignments, 159 (41.8%) used it for one assignment, 76 (19.9%) for two, 25 (6.6%) for three, and 13 (3.4%) employed ChatGPT for all four assignments (see Table 2).

Table 2: Patterns of ChatGPT Usage among Students

Variable	N (%) (N=381)
ChatGPT use for evaluative assignments	
Yes	178 (46.7)
No	203 (53.3)
ChatGPT use for essays	
Yes	132 (34.6)
No	249 (65.4)
ChatGPT use for research projects	
Yes	96 (25.2)
No	285 (74.8)
Allowing ChatGPT to directly complete parts of an academic assignment	
Yes	230 (60.4)
No	151 (39.6)
ChatGPT use for generating ideas in academic activities	

Yes	253 (66.4)
No	128 (33.6)
ChatGPT use for writing or translating academic texts	
Yes	210 (55.1)
No	171 (44.9)
How many of the last 4 academic assignments did you use ChatGPT as a support tool?	
0	108 (28.3)
1	159 (41.8)
2	76 (19.9)
3	25 (6.6)
4	13 (3.4)
How many of the last 4 assignments did you let ChatGPT complete entirely by itself?	
0	316 (82.9)
1	38 (10.0)
2	17 (4.5)
3	6 (1.6)
4	4 (1.0)

3.3 ChatGPT Perceptions

Only 29 (7.6%) of students reported having taken specific courses or training on how to formulate questions for ChatGPT, while 352 (92.4%) had not. Additionally, 206 (54.1%) of students believe that ChatGPT could pose risks to achieving academic goals, whereas 175 (45.9%) did not share this perception. Furthermore, 64.6% of students (246) reported encountering incoherent or out-of-context responses generated by ChatGPT, compared to 35.4% (135) who did not (see Table 3).

Table 3: *Perception of ChatGPT*

Variable	N (%) (N=381)
Perceived incoherent or out-of-context responses generated by ChatGPT	
Yes	246 (64.6)
No	135 (35.4)
Have you taken any courses or training on how to formulate questions for ChatGPT?	
Yes	29 (7.6)
No	352 (92.4)
Do you believe ChatGPT could pose risks to achieving academic goals?	
Yes	206 (54.1)
No	175 (45.9)

3.4 Bivariate Analysis of Associations between Sex, Training and Perceptions of ChatGPT

The bivariate analysis examined whether participation in ChatGPT training courses was associated with students’ perception of incoherent AI responses. Results showed that 82.8% of trained students perceived incoherent responses, compared to 63.0% of untrained students. The prevalence ratio was 1.31 (95% CI: 1.09–1.58; $p = 0.033$), consistent with the interpretation that trained students may be better equipped to detect inconsistencies in ChatGPT’s responses (see Table 4).

Table 4: Association between Perception of Incoherent Responses and Course Participation

Variable: Course Participation	Perception of Incoherent Responses			
	Yes (%)	No (%)	PR (CI 95)	p-value
Yes	82.8	17.2	1.31 (1.09,1.58)	0.033
No	63.0	37.0		

Notes (apply to Tables 4–7). Estimates are crude PR with 95% CIs. p-values from two-sided Pearson’s and χ^2 . Abbreviations: PR, prevalence ratio; CI, confidence interval.

An examination of course participation by sex revealed that 17.2% of male students and 3.1% of female students participated in the courses, indicating that men were 5.57 times more likely to participate than women (PR = 5.57, 95% CI: 2.54–12.22; $p < 0.001$). This significant disparity suggests possible barriers for women, such as accessibility issues, perceived relevance, or other influencing factors. The sex-based difference in course participation could explain some of the observed variations in how men and women perceive incoherent responses and associated risks. Since men are more likely to receive training, they may be more attuned to identifying inconsistencies in the tool’s responses (see Table 5).

Table 5: Association between Course Participation and Sex

Variable: Sex	Course Participation			
	Yes (%)	No (%)	PR (CI 95)	p-value
Male	17.2	82.8	5.57 (2.54,12.22)	<0.001
Female	3.1	96.9		

Building on these findings, the analysis explored sex differences in incoherent responses perception. 76.2% of men and 59.1% of women reported incoherent responses, with a prevalence ratio of 1.29 (95% CI: 1.12–1.49; $p = 0.001$), indicating that men have a 29% higher prevalence of

perceiving incoherencies than women. This statistically significant result aligns with the previous finding that men are more likely to participate in courses, potentially heightening their sensitivity to inconsistencies (see Table 6).

Table 6: Association between Perception of Incoherent Responses and Sex

Variable: Sex	Perception of Incoherent Responses			
	Yes (%)	No (%)	PR (CI 95)	p-value
Male	76.2	23.8	1.29 (1.12,1.49)	0.001
Female	59.1	40.9		

Finally, a bivariate analysis of sex and risk perception showed that 43.4% of men and 59.1% of women perceived risks, with women demonstrating a 36% higher prevalence of risk perception compared to men (PR = 1.36, 95% CI: 1.08–1.71; p = 0.004). This notable sex difference suggests that, despite men’s increased likelihood of perceiving incoherent responses due to training, women remain more risk-averse or cautious about the tool’s potential drawbacks. This could indicate an underlying difference in how men and women assess technological risks, regardless of their level of training (see Table 7).

Table 7: Association between Risk Perception of ChatGPT Use and Sex

Variable: Sex	Risk Perception of ChatGPT Use			
	Yes (%)	No (%)	PR (CI 95)	p-value
Male	59.1	40.9	1.36 (1.08,1.71)	0.004
Female	43.4	56.6		

In summary, the results indicate that course participation significantly influences how students perceive incoherent responses with ChatGPT. Students who underwent training were more likely to detect inconsistencies in the AI’s outputs, suggesting that such courses enhance critical evaluation skills. Notably, male students were substantially more likely to participate in these courses than female students, while women more frequently reported risks associated with ChatGPT use.

These findings underscore the importance of developing educational interventions that address sex-specific concerns and barriers to training participation. By making courses more accessible and relevant to all students, institutions can balance skill development and risk awareness across sexes. Recognizing and addressing these differences can help design training

programs that enhance user confidence and satisfaction with AI tools like ChatGPT, fostering a more inclusive and effective learning environment.

4. Discussion

4.1 Autonomy and justice: when students can choose well—and when they cannot

In a Kantian sense, autonomy entails not merely the freedom to use a tool but the informed capacity to govern one's use of it through reasons that could be universalized (Kant [1788], 1997). In our data, two features constrain that capacity. First, formal preparation is scarce (7.6% trained). Second, access to preparation is unequally distributed (men were 5.57 times more likely than women to have taken a course). These are not neutral background facts: they are enabling (or disabling) conditions for autonomous, reason-guided engagement with generative AI. Viewed through Nussbaum's capabilities approach, these training and access gradients delimit the very capabilities that make autonomy practicable in higher education—competence to evaluate outputs and substantive opportunities to exercise that competence (Nussbaum, 1998).

The observed association between training and the recognition of incoherent outputs (PR = 1.31) is consistent with the claim that instruction strengthens the evaluative faculties on which autonomy depends. A plausible alternative mechanism is selection: students already inclined to critical scrutiny may be more likely to seek training, which could inflate the observed association (see Limitations). This possibility underscores the need for designs that test whether instruction itself improves error detection.

Conversely, unequal access to training and to higher-capacity models (a structural disparity we did not measure directly but that plausibly varies with ability to pay) raises a justice concern: if the resources required for rational scrutiny cluster among already advantaged groups, then the very capacity to use AI well becomes unequally distributed—an adoption pattern echoed in recent multi-context evidence on generative-AI exposure and benefit gaps (Sallam, 2023; Abdaljaleel et al., 2024; Köhler & Hartig, 2024). Under a distributive-justice lens, institutional responsibilities therefore run in parallel to individual duties: universities should level the preconditions of autonomous choice—competence and access—rather than merely articulate rules about permissible use (Bauman, 2000; Cardona et al., 2024).

4.2 Beneficence and non-maleficence: securing learning gains without eroding cognitive work

Beneficence in education justifies AI integration when it enhances feedback, clarity, or access (Küchemann *et al.*, 2024; Banihashem *et al.*, 2024). Yet non-maleficence cautions against displacing the student's core cognitive labor, a risk documented in studies of over-reliance and problem-solving erosion with automated assistance (Chan & Hu, 2023; Farrokhnia *et al.*, 2023; Sullivan *et al.*, 2023).

Our usage pattern—frequent reliance for ideation and drafting and, in a non-trivial minority, full delegation of at least one recent assignment (17.1%)—is indicative of an instructional environment in which AI can either scaffold understanding or substitute for it. The training-incoherence link helps interpret this tension: where instruction is present, students appear better able to detect limits; training introduces “desirable difficulty” into otherwise frictionless interactions, preserving learners' monitoring and verification work while using AI (Brown *et al.*, 2014). Given the small trained subgroup ($n = 29$), this pattern should be read as suggestive. The ethical directive that follows is not to reduce AI use to zero but to reconfigure conditions so that each interaction yields a net increase in understanding rather than a mere increase in output—through competencies that teach students to question, verify, and revise model outputs and through assessments that reward the quality of reasoning, not only the final artifact (Noroozi *et al.*, 2024).

4.3 Intellectual virtue and pedagogical design: from frictionless shortcuts to Socratic scrutiny

If autonomy delineates the normative ideal and beneficence/non-maleficence specify prudential constraints, intellectual virtue provides the operational bridge to classroom practice. Habits of inquiry, fallibilism, and willingness to refute one's first answer do not arise spontaneously in high-automation settings; they must be deliberately cultivated. The coexistence of widespread use and minimal formal preparation in our cohort marks precisely the context in which virtue is liable to atrophy unless pedagogically scaffolded (Plato [399 a. C], 2017).

The sex disparity in course participation and the differing perceptions of risk point to another lesson: virtue is socially conditioned; it flourishes where pathways into competent practice are open, legible, and inclusive. As reported in Results (3.4, Table 7), women more frequently judged ChatGPT as posing educational risks—an asymmetry we interpret as a

systematically different appraisal of uncertainty and potential harms when pathways into competent use are less accessible.

Accordingly, course designs that require students to explain, defend, and, where necessary, correct AI outputs—brief oral defenses, decision logs justifying prompts and revisions, and grading rubrics that explicitly score error detection—convert AI from an engine of frictionless production into a catalyst for disciplined thought, in line with Socratic traditions of self-examination and with contemporary accounts of intellectual virtue in education (Plato [360 a. C], 2016; Brown et al., 2014; Peens & Louw, 2000). Under this view, the relevant question is not “Did AI help?” but “What did the student come to understand by working with, and sometimes against, the model?” Complementary consequentialist reflection on payoffs and externalities can further align incentives with integrity (Mill [1863], 2021; Bentham [1789], 2009), while basic prompt-engineering competence reduces uncritical delegation (Eysenbach, 2023; Noroozi et al., 2024).

4.4 Practice-oriented implications derived from the theory–evidence synthesis

The integration above yields a programmatic agenda that is both ethically grounded and empirically responsive to our context.

a) Autonomy-enabling AI literacy. Implement a short, compulsory module at entry (prompt formulation, verification strategies, and source traceability), assessed for competence rather than mere completion. The goal is to equip students to govern their use through reasons, consistent with the autonomy framework and with our training–incoherence finding (Kant [1788], 1997; Noroozi et al., 2024).

b) Justice through equalized means. Where feasible, provide institution-level licensing or standardized access so that model quality and guardrails do not track ability to pay. Monitor participation and access by sex, program, and semester with explicit equity targets, addressing the disparity we observed in course uptake (Sallam, 2023; Abdaljaleel et al., 2024).

c) Assessment for non-maleficence. Adopt a “declare–disclose–justify” policy: students declare any AI use, disclose the specific contributions, and justify why outputs are acceptable (or how they were corrected). Weight grading toward reasoning quality and error handling rather than polished prose alone. This aligns incentives with learning and reduces substitution risks signaled by full-delegation behaviors (Chan & Hu, 2023; Sullivan et al., 2023).

d) Cultivating intellectual virtue. Embed micro-tasks of guided refutation (identify, explain, and fix at least one model error) and brief viva-style defenses. These practices operationalize Socratic

scrutiny and make virtues teachable and assessable (Plato [399 a. C], 2017; Brown et al., 2014).

e) A research agenda tied to design. Because our study is cross-sectional and focused on users, the claims above are mechanistic hypotheses, not causal conclusions. The next step is to pilot the interventions in a quasi-experimental or randomized format, estimating adjusted effects on learning outcomes, perceptions of integrity, and equity gaps across programs and sexes (Noroozi et al., 2024).

Taken together, the evidence suggests that when competencies and access are treated as preconditions for responsible use, the normative aims of autonomy, justice, beneficence, and intellectual virtue become operational, not merely aspirational.

5.Limitations

Several methodological factors constrain the confidence with which these findings can be generalized. Most fundamentally, the study's cross-sectional design offers only a temporal snapshot; it describes correlations at a single point rather than causal trajectories that unfold as students gain experience with generative AI. Compounding this limitation is the sampling strategy: snowball recruitment produced a markedly unbalanced cohort—68 % of respondents were women and more than half (51.8 %) were enrolled in Medicine, with far smaller contingents from Prehospital Care Technology (16.8 %) and Physiotherapy (7.8 %). Such clustering blurs the boundaries between program, academic year, and sex, increasing the likelihood of uncontrolled confounding and restricting the relevance of the results to similarly composed student bodies.

Measurement issues introduce additional uncertainty. Because all data were self-reported, the study is vulnerable to recall error and social-desirability bias. The exclusive use of an online questionnaire may also have excluded students with limited internet access or low digital confidence, further narrowing the sampling frame. Finally, although the instrument was piloted for clarity, perceptions of large-language-model tools are evolving rapidly; survey items that are meaningful today may become obsolete as capabilities, pricing tiers, and institutional policies shift.

To mitigate these constraints, future research should employ probability-based sampling that secures balanced representation across sex and disciplinary lines, integrate longitudinal or mixed-methods designs to capture change over time, and routinely update survey instruments to reflect the fast-moving generative-AI landscape. Such refinements would strengthen both the internal and external validity of subsequent investigations.

6. Conclusions

6.1 Preliminary insights into ChatGPT use

In this single-institution cross-sectional sample of ChatGPT users, the tool appears increasingly routine in day-to-day coursework: roughly two-thirds reported using it for brainstorming or drafting, nearly three in five allowed it to generate substantial portions of an assignment, and a non-trivial minority fully delegated at least one recent task. These figures do not establish a shift from active knowledge construction to passive text assembly, but they make that possibility salient for longitudinal testing. Notably, the small subset with formal training was more adept at recognizing incoherent outputs, consistent with the idea that even brief instruction can help preserve the evaluative and metacognitive work higher education seeks to cultivate—provided such training is made widely available.

6.2 Ethical undercurrents and emerging inequities

Asymmetries observed in our data implicate autonomy, justice, beneficence, and non-maleficence. Male students were substantially more likely than female students to report course participation. Learners without such preparation face a plausible “double jeopardy”: greater risk of uncritical reliance and fewer skills to detect model flaws. Compounding this, nearly half perceived no educational risk in using ChatGPT. Absent targeted AI-literacy and ethics-embedded instruction, generative AI may widen—rather than narrow—existing achievement gaps by concentrating the preconditions for good use (competence and access) among already advantaged groups.

6.3 Directions for nuanced inquiry and action

Given the cross-sectional design, the sex-skewed and discipline-specific composition, and the very small trained subgroup, these observations should be read as suggestive rather than definitive. Even so, they point to a balanced policy path between blanket prohibitions and laissez-faire adoption. First, pilot inclusive, subsidized AI-literacy modules that teach students to question, verify, and revise model outputs, and evaluate their effects on learning and integrity perceptions. Second, where feasible, pursue institution-level licensing or standardized access to reduce economic barriers. Third, redesign assessment to require students to annotate and justify any AI-generated contribution, thereby making epistemic contributions visible and gradable. Longitudinal and mixed-methods studies that track how training, economic accessibility, and

disciplinary context interact over time will be essential to determine whether generative AI ultimately enhances higher-order cognition or encourages superficial shortcuts.

References

- ◆ Abdaljaleel, M., Barakat, M., Alsanafi, M., Salim, N. A., Abazid, H., Malaeb, D., Mohammed, A. H., Hassan, B. A. R., Wayyes, A. M., Farhan, S. S., Khatib, S. E., Rahal, M., Sahban, A., Abdelaziz, D. H., Mansour, N. O., AlZayer, R., Khalil, R., Fekih-Romdhane, F., Hallit, R., . . . Sallam, M. (2024). A multinational study on the factors influencing university students' attitudes and usage of ChatGPT. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-52549-8>.
- ◆ Abd-Alrazaq, A., AlSaad, R., Alhuwail, D., Ahmed, A., Healy, P. M., Latifi, S., Aziz, S., Damseh, R., Alrazak, S. A., & Sheikh, J. (2023). Large Language Models in Medical Education: Opportunities, Challenges, and Future Directions. *JMIR Medical Education*, 9, e48291. <https://doi.org/10.2196/48291>.
- ◆ Banihashem, S. K., Kerman, N. T., Noroozi, O., Moon, J., & Drachsler, H. (2024). Feedback sources in essay writing: peer-generated or AI-generated feedback? *International Journal Of Educational Technology In Higher Education*, 21(1). <https://doi.org/10.1186/s41239-024-00455-4>.
- ◆ Bauman, Z. (2000). *Liquid Modernity*. Polity Press.
- ◆ Bentham, J. (1789/2009). *An introduction to the principles of morals and legislation*. Dover Publications.
- ◆ Brown, P. C., Roediger, H. L., & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. Belknap Press of Harvard University Press.
- ◆ Cardona, F. V., Cartagena, D. V., & Carvajal, J. A. (2024). La búsqueda de la felicidad en la literatura de autoayuda. Un desafío para la bioética. *Revista de Bioética y Derecho*, 35-51. <https://doi.org/10.1344/rbd2024.60.43279>.
- ◆ Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology In Higher Education*, 20(1). <https://doi.org/10.1186/s41239-023-00411-8>.
- ◆ Eysenbach, G. (2023). The Role of ChatGPT, Generative Language Models, and Artificial Intelligence in Medical Education: A Conversation With ChatGPT and a Call for Papers. *JMIR Medical Education*, 9, e46885. <https://doi.org/10.2196/46885>.
- ◆ Farrelly, T., & Baker, N. (2023). Generative artificial intelligence: Implications and considerations for higher education practice. *Education Sciences*, 13(11), 1109. <https://doi.org/10.3390/educsci13111109>.
- ◆ Farrokhnia, M., Banihashem, S. K., Noroozi, O., & Wals, A. (2023). A SWOT analysis of ChatGPT: Implications for educational practice and research. *Innovations In Education And Teaching International*, 61(3), 460-474. <https://doi.org/10.1080/14703297.2023.2195846>.
- ◆ Firat, M. (2023). What ChatGPT means for universities: Perceptions of scholars and students. *Journal Of Applied Learning & Teaching*, 6(1). <https://doi.org/10.37074/jalt.2023.6.1.22>.

- ◆ González-Flores, P., & De la Luz, V. L. (2019). La transformación de la educación médica en el último siglo: innovaciones curriculares y didácticas (parte 1). *Investigación En Educación Médica*, 8(30), 95-109. <https://doi.org/10.22201/facmed.20075057e.2019.30.18165>.
- ◆ Grájeda, A., Burgos, J., Córdova, P., & Sanjinés, A. (2023). Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2023.2287917>.
- ◆ Kant, I. (1788/1997). *Critique of practical reason*. Cambridge University Press.
- ◆ Köhler, C., & Hartig, J. (2024). ChatGPT in higher education: Measurement instruments to assess student knowledge, usage, and attitude. *Contemporary Educational Technology*, 16(4), ep528. <https://doi.org/10.30935/cedtech/15144>.
- ◆ Küchemann, S., Steinert, S., Kuhn, J., Avila, K., & Ruzika, S. (2024). Large language models—Valuable tools that require a sensitive integration into teaching and learning physics. *The Physics Teacher*, 62(5), 400-402. <https://doi.org/10.1119/5.0212374>.
- ◆ Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410. <https://doi.org/10.3390/educsci13040410>.
- ◆ Matthews, M.R. (2014). *Science Teaching: The Contribution of History and Philosophy of Science, 20th Anniversary Revised and Expanded Edition (2nd ed.)*. Routledge. <https://doi.org/10.4324/9780203123058>.
- ◆ Microsoft Corporation. Microsoft Power BI (Version 2.138.1004.0) [Computer software]. 2023. Available from: <https://powerbi.microsoft.com>.
- ◆ Mill, J. S. (1863/2021). *Utilitarianism*. W. W. Norton & Company.
- ◆ Noroozi, O., Soleimani, S., Farrokhnia, M., & Banihashem, S. K. (2024). Generative AI in Education: Pedagogical, Theoretical, and Methodological Perspectives. *International Journal Of Technology In Education*, 7(3), 373-385. <https://doi.org/10.46328/ijte.845>.
- ◆ Nussbaum, M. C. (1998). Cultivating humanity: a classical defense of reform in liberal education. *Choice Reviews Online*, 36(02), 36-1104. <https://doi.org/10.5860/choice.36-1104>.
- ◆ Peens, B. J., & Louw, D. A. (2000). Kohlberg's theory of moral development: Insights into rights reasoning. *Medicine and Law*. PMID: 11143871.
- ◆ Petrou, L., Mittelman, E., Osibona, O., Panahi, M., Harvey, J. M., Patrick, Y. A. A., & Leedham-Green, K. E. (2021). The role of humanities in the medical curriculum: medical students' perspectives. *BMC Medical Education*, 21(1). <https://doi.org/10.1186/s12909-021-02555-5>.
- ◆ Plato. (399 a. C./2017). *The Apology of Socrates*. Aiora Press.
- ◆ Plato. (360 a. C./2016). *Phaedo*. Oxford University Press.
- ◆ Rahman, Md. M., & Watanobe, Y. (2023). ChatGPT for education and research: Opportunities, threats, and strategies. *Applied Sciences*, 13(9), 5783. <https://doi.org/10.3390/app13095783>.
- ◆ Sallam, M. (2023). ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare*, 11(6), 887. <https://doi.org/10.3390/healthcare11060887>.
- ◆ Sandel, M. J. (2009). *Justice: What's the right thing to do?* Farrar, Straus and Giroux.
- ◆ Shahzad, M. F., Xu, S., & Javed, I. (2024). ChatGPT awareness, acceptance, and adoption in higher education: the role of trust as a cornerstone. *International Journal of Educational Technology in Higher Education*, 21(1). <https://doi.org/10.1186/s41239-024-00478-x>.

- ◆ Sok, S., & Heng, K. (2023). ChatGPT for education and research: A review of benefits and risks. SSRN Electronic Journal. <https://www.ssrn.com/abstract=4378735>. <http://dx.doi.org/10.2139/ssrn.4378735>.
- ◆ Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal Of Applied Learning & Teaching*, 6(1). <https://doi.org/10.37074/jalt.2023.6.1.17>.
- ◆ The jamovi project. jamovi (Version 2.6.13) [Computer software]. 2023. Available from: <https://www.jamovi.org>.

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