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University Students' Use of Artificial Intelligence in Academic Work: Efficiency, Learning Quality, and Academic Integrity

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ABSTRACT

The rapid integration of artificial intelligence (AI), particularly generative AI tools, has reshaped academic practices in higher education, raising concerns regarding learning quality, academic effort, and academic integrity. Although AI offers substantial efficiency gains, its implications for student learning and ethical conduct remain contested. This study investigates university students' patterns of AI use, orientations toward efficiency and learning quality, perceptions of academic effort, ethical concerns, and attitudes toward institutional regulation in AI-mediated academic contexts. Using a quantitative cross-sectional survey, data were collected from 316 undergraduate students across multiple universities and study programs. Data were obtained through a self-administered online questionnaire comprising 10 Likert-type items (four- to six-point scales) and analysed using descriptive and correlational statistics in SPSS. Results indicate that AI usage is nearly universal, reflecting its normalisation as an academic resource. Students predominantly deploy AI for efficiency-oriented purposes, such as accelerating task completion, whereas learning-oriented use is endorsed to a lesser extent. Students also recognise that AI may reduce academic effort, signalling a tension between productivity gains and meaningful academic engagement. Ethical concerns are acknowledged and perceptions of potential misuse are evident. Notably, students express openness toward institutional regulation and AI-aware assessment practices, indicating a regulation-ready stance rather than resistance. The study contributes empirical evidence to ongoing debates on AI in higher education and highlights the need for pedagogical and policy frameworks that balance efficiency, learning quality, and academic integrity in AI integration.

Integrasi cepat artificial intelligence (AI), terutama AI generatif, telah mengubah praktik akademik di pendidikan tinggi dan memunculkan kekhawatiran tentang kualitas pembelajaran, upaya akademik, dan integritas. Meskipun AI menawarkan efisiensi, implikasinya terhadap keterlibatan belajar dan perilaku etis masih diperdebatkan. Penelitian ini mengkaji pola penggunaan AI oleh mahasiswa, orientasi terhadap efisiensi dan kualitas belajar, persepsi mengenai upaya akademik, pertimbangan etis, serta sikap terhadap regulasi institusional. Menggunakan survei kuantitatif potong lintang, data dikumpulkan dari 316 mahasiswa sarjana dari berbagai universitas dan program studi. Data diperoleh melalui kuesioner daring dengan 10 butir skala Likert dan dianalisis menggunakan statistik deskriptif dan korelasional. Hasil menunjukkan bahwa penggunaan AI hampir universal, menandakan normalisasi AI sebagai sumber akademik. Penggunaan berorientasi efisiensi lebih dominan dibanding penggunaan berorientasi pembelajaran. Mahasiswa mengakui bahwa penggunaan AI dapat menurunkan upaya akademik, menciptakan ketegangan antara efisiensi dan keterlibatan belajar yang bermakna. Kekhawatiran etis teridentifikasi dan persepsi potensi penyalahgunaan terlihat. Mahasiswa juga menunjukkan keterbukaan terhadap regulasi institusional dan penilaian yang melek-AI, mencerminkan sikap siap-regulasi dibanding penolakan. Temuan ini menegaskan perlunya desain kebijakan dan pedagogi yang menyeimbangkan efisiensi, kualitas belajar, dan integritas akademik dalam integrasi AI.

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Introduction

Artificial intelligence (AI) has rapidly reshaped multiple sectors, including higher education, by transforming how knowledge is produced, accessed, and evaluated. Recent advances in generative AI—particularly large language models (LLMs) such as ChatGPT—have accelerated this transformation by enabling the rapid generation of texts, summaries, and analyses with minimal human effort (Brown et al., 2020; OpenAI, 2023). Within academic contexts, such technologies are increasingly embedded in students' everyday learning practices, challenging long-standing assumptions about academic work, authorship, and assessment (Dwivedi et al., 2023; Kasneci et al., 2023).

The integration of AI in higher education has been linked to a range of potential benefits, including increased efficiency, improved accessibility, and enhanced learning support (Ouyang et al., 2022; Zawacki-Richter et al., 2019). Generative AI tools can reduce time spent on routine academic tasks, support language production, and provide immediate feedback—features that are particularly valuable in diverse and resource-constrained learning environments. At the same time, scholars have raised concerns about potential unintended consequences, such as reduced academic effort, superficial cognitive engagement, and new challenges to academic integrity (Cotton et al., 2024; Eke, 2023).

Academic integrity remains a core principle of higher education, encompassing honesty, responsibility, and respect for intellectual labour (Bretag, 2016). Generative AI complicates these principles by blurring boundaries between legitimate academic assistance and the substitution of student effort. Without clear pedagogical guidance, AI may operate as a double-edged tool—enhancing productivity while simultaneously undermining deep learning and ethical judgement (Kasneci et al., 2023; Rudolph et al., 2023). Empirical studies further suggest that students frequently prioritise efficiency and performance outcomes over learning quality when engaging with AI, even when they demonstrate ethical awareness (Cotton et al., 2024; Kohnke et al., 2023).

Despite rapid growth in AI-in-education research, several gaps remain. First, much existing scholarship focuses on institutional policy, technological capabilities, or normative ethical debates, with fewer empirical studies examining how students themselves make sense of AI use in relation to academic effort, learning quality, and integrity. Second, AI adoption is often treated as a binary phenomenon (use vs non-use), obscuring variation in orientations of use, such as efficiency-driven versus learning-oriented use. Third, little attention has been paid to students' views on institutional regulation and AI-aware assessment systems, despite increasing emphasis on AI governance in international guidelines (European Commission, 2022; UNESCO, 2023). This gap is particularly salient in developing higher education systems, including Southeast Asia and Indonesia, where policy frameworks and pedagogical responses are still emerging.

Responding to these gaps, this study investigates university students' use of AI in academic contexts by examining (1) patterns of use, (2) orientations toward efficiency and learning quality, (3) perceptions of academic effort, (4) ethical considerations, and (5) attitudes toward institutional regulation. Using a quantitative survey approach, the study provides empirical insights into how students navigate both the opportunities and risks of AI in higher education. By foregrounding students' perspectives, the study contributes to ongoing debates on AI-mediated learning and offers evidence to inform pedagogical design and institutional policy in higher education.

Literature Review

AI Adoption in Higher Education

Research on AI in higher education has expanded rapidly, documenting a wide range of applications including adaptive learning systems, automated feedback, learning analytics, and, more recently, generative AI tools (Zawacki-Richter et al., 2019; Ouyang et al., 2022). Generative AI, particularly LLMs, represents a significant shift due to its ability to perform complex language-based academic tasks traditionally associated with student authorship (Brown et al., 2020; Dwivedi et al., 2023). This has prompted renewed scholarly attention to how AI alters the nature of learning, assessment, and academic labour.

Efficiency-Oriented and Learning-Oriented AI Use

Emerging studies suggest that students' AI use is not uniform, but varies according to underlying motivations and orientations. Several studies report that students primarily use AI tools to increase efficiency, reduce workload, and accelerate task completion (Cotton et al., 2024; Kohnke et al., 2023). In contrast, learning-oriented uses—such as conceptual clarification or reflective feedback—are less consistently reported. This distinction aligns with broader motivational frameworks that differentiate between performance-oriented and mastery-oriented learning behaviours (Ryan & Deci, 2000).

Academic Effort, Engagement, and Ethical Concerns

The relationship between AI use and academic effort has become a central concern in recent literature. Scholars argue that excessive reliance on generative AI may diminish cognitive engagement and reduce opportunities for deep learning (Kasneci et al., 2023; Rudolph et al., 2023). At the same time, students often acknowledge ethical risks associated with AI use, including plagiarism, misrepresentation of authorship, and erosion of academic responsibility (Eke, 2023; Cotton et al., 2024). These findings suggest that ethical awareness alone may be insufficient to regulate AI use in practice.

Academic Integrity and the Need for Regulation

Academic integrity frameworks emphasise that ethical behaviour in higher education is shaped not only by individual values but also by institutional norms, assessment design, and regulatory clarity (Bretag, 2016). Recent policy-oriented research highlights growing calls for AI-aware governance, including transparent guidelines, redesigned assessments, and responsible AI integration rather than outright bans (Floridi & Chiriatti, 2020; European Commission, 2022; UNESCO, 2023). However, empirical research examining students' attitudes toward such regulatory approaches remains limited.

Summary and Research Gap

Overall, the literature indicates that generative AI is rapidly normalised in higher education, with efficiency-driven use dominating student practices. While ethical concerns and integrity risks are widely acknowledged, there is limited empirical understanding of how students themselves perceive the trade-offs between efficiency, learning quality, and academic effort, as well as how they view institutional regulation. Addressing this gap, the present study provides empirical evidence on students' orientations toward AI use, ethical awareness, and openness to regulation, contributing to a more nuanced understanding of responsible AI integration in higher education.

Research Methodology

Research Design

A quantitative cross-sectional survey design was employed to examine university students' use of artificial intelligence (AI), their orientations toward efficiency and learning quality, and their perceptions of academic effort, ethics, and regulation in AI-mediated academic contexts. A quantitative survey approach was selected to enable systematic measurement of students' attitudes and behaviours across a relatively large sample and to identify dominant patterns of AI engagement (Creswell & Creswell, 2018).

Participants and Sampling

The sample consisted of 316 undergraduate students, with 314–315 valid responses retained across most items after data screening. Respondents represented multiple study programs across different universities, ensuring variation in academic backgrounds and disciplinary exposure. Purposive sampling was used to recruit students with prior experience using AI for academic tasks, aligning with the study's analytical focus on AI-engaged learners rather than population-level generalisation (Etikan et al., 2016). The gender distribution comprised 79.4% female (n = 251), 19.6% male (n = 62), and 0.9% (n = 3) not reporting gender.

Instrument Development

Data were collected through a self-administered online questionnaire constructed for this study. Instrument development followed a multi-stage process, including construct identification from the literature (e.g., AI use, efficiency orientation, learning orientation, ethical perception, effort displacement, and regulation), item formulation, expert review, and pilot testing for clarity. The final instrument consisted of 10 Likert-type items measuring:

1. Extent and intensity of AI use
2. Perceived ease and efficiency
3. Impact on academic effort
4. Orientation of use (efficiency vs learning quality)
5. Ethical considerations
6. Technology ethics awareness
7. Perceived misuse risks
8. Openness to AI-based assessment systems
9. Institutional regulatory solutions

Response scales ranged from four- to six-point Likert formats to maximise construct discrimination while maintaining response clarity (Joshi et al., 2015). Higher scores indicated stronger endorsement of each construct.

Validity and Reliability

Content validity was established through expert review involving three academics specialising in educational technology and higher education assessment to ensure construct relevance, wording clarity, and alignment with research aims. Reliability analysis indicated that the instrument achieved acceptable internal consistency for exploratory quantitative research (Cronbach's $\alpha = .72$ for the overall scale), exceeding widely accepted thresholds ($\alpha \geq .70$) (Taber, 2018). Construct-level reliability can be reported upon disaggregation if required by journal standards.

Data Collection and Screening

The survey was administered online using Google Forms. Participation was voluntary, anonymous, and based on informed consent. No personally identifiable data were collected. Data were screened for completeness, removing cases with >20% missing values. Item-level missing data were minimal and handled using pairwise deletion. Normality was assessed via skewness and kurtosis values within acceptable exploratory bounds.

Data Analysis

Data analysis was conducted using SPSS. Descriptive statistics (means, standard deviations, and percentages) were used to summarise AI use patterns and perceptions. Correlational analyses were performed to examine associations among key constructs. Given the exploratory nature of the study, the analytic emphasis was on pattern identification rather than causal inference or predictive modelling.

Ethical Considerations and Bias Mitigation

The study adhered to recognised ethical standards for educational research, including voluntary participation, informed consent, anonymity, and the right to withdraw, consistent with BERA guidelines (BERA, 2018). To mitigate potential response bias, the questionnaire avoided evaluative wording, incorporated neutral phrasings, and assured participants that there were no right or wrong answers. Social desirability bias was further reduced through anonymous data collection without institutional attribution.

Research Findings

Extent of AI Use in Academic Tasks

The survey involved 316 undergraduate students, with valid responses ranging from 314 to 315 across almost all questionnaire items. Participants were drawn from various academic programs, and the gender distribution was relatively balanced.

The findings reveal that the use of artificial intelligence (AI) in academic activities is nearly universal among the respondents. Descriptive analysis shows a very high level of AI adoption, with a mean score of $M = 5.03$ ($SD = 0.16$) on a six-point scale. The median and mode values further confirm that almost all respondents reported having used AI-based tools to support their academic tasks. This minimal variance indicates that AI is no longer perceived as an optional or supplementary technology but has become an integral part of students' academic routines. The widespread use of AI suggests a shift in students' learning ecology, where digital intelligence tools are embedded in everyday academic practices.

Perceived Benefits of AI: Efficiency and Ease of Task Completion

Students demonstrated a strong agreement with the statement that AI facilitates faster and easier completion of academic tasks. The mean score for this item was M = 2.09 (SD = 0.70), indicating a consistent perception that AI significantly enhances efficiency. The concentration of responses around the "agree" category suggests that students primarily value AI for its instrumental benefits. Rather than viewing AI as a means to deepen conceptual understanding, students tend to position it as a productivity-enhancing tool that reduces time and effort in completing assignments.

AI Use and Reduction of Academic Effort

The findings also demonstrate that students are explicitly aware of the potential impact of AI use on their academic effort. Responses to the item measuring perceived reduction of academic effort show a strong concentration in the dominant response category, with 81.6% of respondents selecting the lowest category, 3.2% the middle category, and 15.2% the highest category (M = 1.34, SD = 0.77). This distribution indicates that the majority of students converge on a shared perception that AI substantially alters the level of cognitive and procedural effort required to complete academic tasks. This heightened awareness represents a critical dimension of AI integration in higher education. While students clearly benefit from the efficiency gains associated with AI use—evidenced by high agreement on items related to task completion speed (M = 2.09, SD = 0.70)—they concurrently recognise that such efficiency may come at the cost of reduced active engagement in learning processes. The coexistence of these perceptions underscores a central tension in AI-mediated learning: AI functions simultaneously as a facilitator of academic performance and as a potential disruptor of deep learning engagement. This duality reinforces concerns raised in prior research that the pedagogical value of AI depends not on its availability, but on how its use is framed and regulated within instructional and assessment contexts.

Orientation of AI Use: Efficiency over Learning Quality

The findings indicate that students predominantly use AI to accelerate task completion rather than to enhance the quality of learning or academic output. Items measuring efficiency-oriented use show relatively consistent agreement, with the statement that AI helps complete academic tasks more quickly and easily receiving a mean score of M = 2.09 (SD = 0.70). Responses across efficiency-related items generally fall within the lower-to-moderate range of the scale, indicating a pragmatic orientation toward AI use. In contrast, items related to learning-oriented use—such as using AI to deepen understanding or improve academic quality—remain at moderate levels of agreement and do not reach the same level as efficiency-related items. Overall, the findings suggest that students' engagement with AI is largely efficiency-focused, prioritising speed and convenience over learning quality or conceptual depth.

Ethical Awareness and Perceptions of AI Misuse

Students demonstrated a moderate level of ethical awareness regarding the use of AI in education. Responses related to the importance of technology ethics yielded mean scores ranging from M ≈ 2.5 to 3.0, indicating that most respondents recognize ethical considerations as relevant and important. However, perceptions of AI misuse were also evident. The item measuring perceptions of AI misuse produced a mean score of M = 2.03 (SD = 0.74), with the majority of responses clustered around the lower-middle range. This finding suggests that students perceive misuse as a realistic possibility within academic contexts, even if they do not uniformly classify it as severe misconduct. The coexistence of ethical awareness and acknowledgment of misuse indicates an ethical ambivalence: students understand normative expectations but may lack clear operational guidelines for responsible AI use.

Attitudes toward Regulation and Assessment Systems

The findings further indicate that students are generally open to institutional regulation of AI use. Responses to items addressing regulatory solutions and AI-based assessment systems show moderate-to-positive acceptance, with mean scores clustering in the mid-to-upper range of the scale (M ≈ 2.5–3.0) and relatively low dispersion, indicating limited resistance across respondents. This pattern suggests that acceptance of regulation is not marginal but shared by a substantial proportion of students.

Importantly, this openness appears to be conditional. Students' acceptance is strongest when regulatory and assessment mechanisms are perceived as fair, transparent, and supportive of learning, rather than as solely punitive controls. The absence of strong negative skew in responses further indicates that students do not inherently oppose institutional oversight. Instead, they appear to expect

regulation to function as a pedagogical safeguard, providing clear boundaries and guidance for responsible AI use. These findings suggest that clear policies, transparent assessment criteria, and explicit guidance on ethical AI use are likely to be positively received within AI-mediated academic environments.

To synthesise the empirical findings and facilitate a more integrated understanding of the observed patterns, the results are further conceptualised in an analytical framework. While the preceding section presents the findings descriptively, the framework serves to illustrate the relationships among key elements identified in the data, including the pervasive use of AI, students' efficiency-oriented practices, ethical considerations, and their attitudes toward institutional regulation. Rather than proposing a causal model, this framework offers an analytical representation that highlights underlying mechanisms, tensions, and interconnections that may not be immediately apparent from descriptive statistics alone. The framework is presented in Figure 1 to provide a visual summary of the study's core insights and to support subsequent interpretation and discussion.

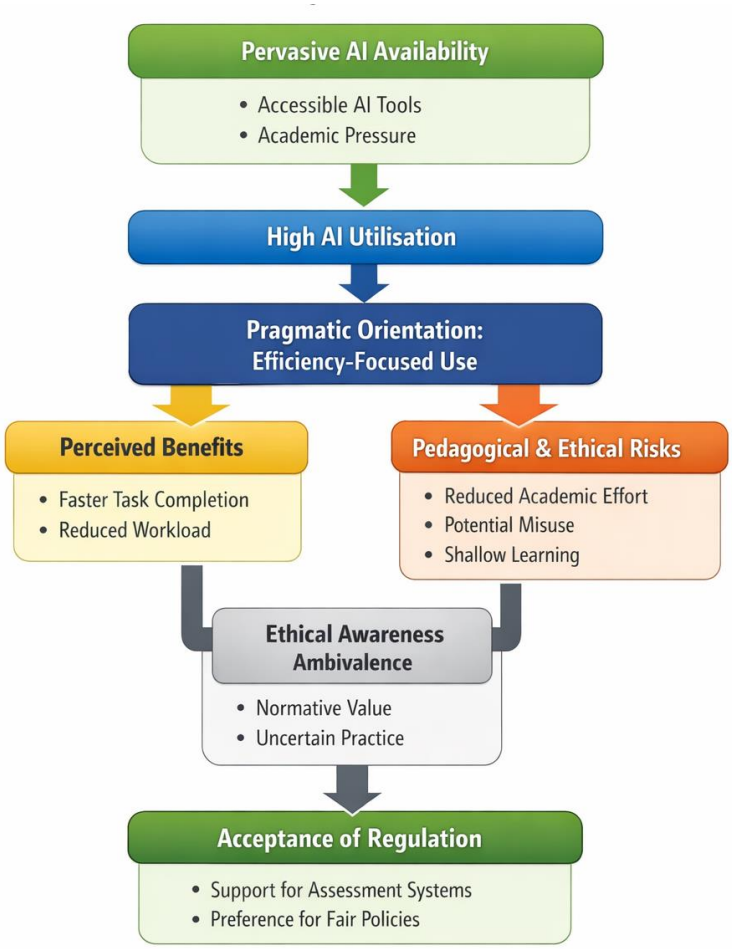

Figure 1. An Analytical Framework of Student AI Use

Figure 1 visually summarises the main patterns emerging from the survey data by integrating students' AI use, orientations, ethical considerations, and attitudes toward regulation into a single analytical framework. At the top of the figure, pervasive AI availability reflects the empirical finding that AI use among students is nearly universal, with an exceptionally high mean score ($M = 5.03$, $SD = 0.16$) on a six-point scale. The minimal variance and dominant median value indicate that AI has become a routine academic resource rather than an optional tool.

This widespread availability is directly associated with high AI utilisation, as evidenced by consistently high response frequencies across items measuring AI use and intensity. The central position of pragmatic orientation toward efficiency in the framework corresponds to students' strong agreement that AI helps them complete academic tasks more quickly and easily ($M = 2.09$, $SD = 0.70$).

These results indicate that efficiency and convenience constitute the primary motivation for AI use, rather than deeper engagement with learning content.

From this efficiency-oriented practice, the framework illustrates two parallel outcomes. On the positive side, perceived benefits—such as faster task completion and reduced workload—are supported by the concentration of responses in the "agree" category for efficiency-related items. On the other hand, the pathway labelled pedagogical and ethical risks reflects students' acknowledgement that AI use may reduce academic effort and increase the possibility of misuse. This perception is substantiated by moderate mean scores on items addressing effort reduction and misuse, including students' perceptions of AI misuse ($M = 2.03$, $SD = 0.74$), suggesting that such risks are recognised as realistic rather than hypothetical.

The lower section of the framework highlights ethical awareness ambivalence, which aligns with findings showing that students generally consider technology ethics important (mean scores ranging approximately between $M \approx 2.5–3.0$), yet do not consistently translate this awareness into restrained or reflective AI use. This coexistence of ethical recognition and pragmatic behaviour illustrates a key tension identified in the data.

Finally, the framework culminates in acceptance of regulation, which is grounded in students' relatively positive responses toward AI-based assessment systems and regulatory solutions. Rather than expressing resistance, students indicate openness to institutional control mechanisms, provided these are perceived as fair and supportive of learning. This regulation-ready stance represents a notable empirical insight, positioning institutional guidance as a potential mediator between efficiency-driven AI use and the maintenance of academic integrity.

Discussion

Normalisation of AI Use in Academic Contexts

The findings demonstrate that AI use has become deeply embedded in students' academic practices. The near-universal adoption of AI observed in this study ($M = 5.03$, $SD = 0.16$) indicates that AI is no longer perceived as a novel or optional technology but rather as a routine academic resource. This pattern aligns with recent studies showing that generative AI tools have rapidly transitioned into mainstream academic use across higher education contexts (Dwivedi et al., 2023; Kasneci et al., 2023). The normalisation of AI use reflects a broader transformation of the academic learning ecology, where students increasingly operate within AI-mediated environments.

Efficiency-Oriented AI Use and Its Implications for Learning Quality

Analysis of students' usage orientation reveals that AI is predominantly employed to enhance efficiency rather than to improve learning quality. Agreement with the statement that AI helps complete academic tasks more quickly and easily was relatively high ($M = 2.09$, $SD = 0.70$), with responses across efficiency-related items clustering within the lower-to-moderate range of the scale ($M \approx 2.0–2.3$). These findings indicate that speed and convenience constitute primary motivations for AI use.

In contrast, learning-oriented uses of AI—such as supporting deeper understanding or improving the quality of academic output—received more moderate endorsement. This imbalance suggests that students' engagement with AI is largely performance-oriented, prioritising task completion efficiency over reflective learning, critical thinking, or conceptual mastery.

Perceived Reduction of Academic Effort and Learning Engagement

The findings further show that students are explicitly aware of AI's impact on academic effort. Responses to the item measuring perceived effort reduction demonstrate a strong convergence, with 81.6% of respondents selecting the dominant category, compared to 3.2% and 15.2% in the remaining categories ($M = 1.34$, $SD = 0.77$). This distribution indicates a shared perception that AI substantially alters the cognitive and procedural effort required to complete academic tasks.

This awareness highlights a critical tension in AI-mediated learning. While students benefit from efficiency gains, they simultaneously recognise that extensive reliance on AI may reduce active engagement in learning processes. AI thus appears to function both as a facilitator of academic performance and as a potential disruptor of deep learning engagement.

Ethical Awareness and Perceived Risks of AI Misuse

Students' responses indicate a moderate level of ethical awareness regarding AI use in academic contexts. Items assessing the perceived importance of technology ethics yielded mean scores within the moderate range ($M \approx 2.5–3.0$), suggesting general recognition of ethical considerations. At the same time, perceptions of potential AI misuse were evident, with responses indicating that misuse is viewed as a realistic concern ($M = 2.03$, $SD = 0.74$).

The coexistence of ethical awareness and acknowledged misuse risk reflects an ambivalent stance toward AI. Students appear to understand normative expectations surrounding ethical AI use, yet this awareness does not necessarily translate into restrained or reflective practices, particularly when efficiency pressures are present.

Regulation-Ready Attitudes Toward AI Use and Assessment

The findings also indicate that students are generally open to institutional regulation of AI use. Responses to items addressing regulatory solutions and AI-based assessment systems show moderate-to-positive acceptance, with mean scores clustering in the mid-to-upper range of the scale ($M \approx 2.5–3.0$) and limited dispersion. This pattern suggests that acceptance of regulation is shared by a substantial proportion of students rather than confined to a small subgroup.

Importantly, students' openness to regulation appears to be conditional. Acceptance is strongest when regulatory mechanisms are perceived as fair, transparent, and supportive of learning, rather than punitive. These results indicate that students do not inherently oppose institutional oversight but instead expect regulation to function as a pedagogical safeguard that provides clear boundaries and guidance for responsible AI use.

Integrating the Findings: An Analytical Perspective

Taken together, the findings depict a coherent pattern of AI use in higher education. AI is widely adopted and primarily used for efficiency-driven purposes, accompanied by recognised impacts on academic effort and ethical risk. At the same time, students demonstrate awareness of these risks and express openness to institutional regulation. This combination of efficiency-oriented practices, ethical ambivalence, and regulation-ready attitudes underscores the need for pedagogical and policy responses that align AI integration with learning quality and academic integrity, rather than focusing solely on access or detection.

Conclusion

This study examined university students' use of artificial intelligence (AI) in academic contexts and identified four key empirical patterns. First, AI use is nearly universal among the respondents, indicating that AI has become a routine academic resource rather than an optional support tool. Second, students primarily employ AI to enhance efficiency, perceiving it as a means to complete academic tasks faster and with less difficulty. Third, students acknowledge that AI use alters—often reduces—the cognitive and procedural effort required for academic work, suggesting pragmatic decision-making in balancing efficiency gains with potential learning trade-offs. Fourth, despite ethical concerns and awareness of potential misuse, students demonstrate openness toward institutional regulation and AI-aware assessment practices, indicating a regulation-ready rather than resistant stance.

Taken together, these findings suggest that AI integration in higher education is characterised by widespread adoption, efficiency-driven practices, recognised impacts on academic effort, and receptiveness to governance mechanisms. Theoretically, the study contributes to emerging debates on AI-mediated learning by shifting attention from normative discussions of academic integrity toward students' lived orientations of use—particularly the distinction between efficiency-oriented and learning-oriented engagement with AI. This orientation-based perspective offers a more granular understanding of how AI reshapes academic effort, performance expectations, and ethical reasoning in contemporary higher education.

Pedagogically, the findings highlight the need for instructional approaches and assessment designs that integrate AI use without eroding meaningful learning. Institutions may need to develop AI-aware assessment strategies, explicit guidelines for legitimate AI support, and learning activities that foster metacognitive awareness of when and how AI should be used. Transparent regulatory

frameworks may also support students in navigating ethical and academic expectations while reducing ambiguity around acceptable AI use.

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the cross-sectional survey design precludes causal interpretation and cannot capture temporal shifts in AI use as technologies and institutional responses evolve. Second, the use of purposive sampling among AI-engaged learners limits generalisability to the broader student population. Third, the study relied on self-reported perceptions, which may be influenced by social desirability or recall bias.

Future research may address these limitations by employing longitudinal or mixed-methods designs to examine how AI use practices and ethical reasoning develop over time. Comparative studies across disciplines or institutional types would further illuminate contextual variations in AI adoption. Experimental or design-based research may also explore interventions that promote productive, learning-oriented use of AI rather than purely efficiency-driven engagement.

Overall, the findings underscore the importance of aligning institutional policy, assessment, and pedagogy with emerging student practices to ensure that efficiency gains do not come at the expense of learning quality and academic integrity in AI-mediated higher education environments.

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