

Beyond Exams: Investigating AI Tool Impact on Student Attitudes, Ethical Awareness, and Academic Dishonesty in Online College Assessments

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Abstract

Academic dishonesty in higher education is a growing concern, exacerbated by the increasing use of AI tools in online assessments. This study investigates the relationship between AI tool dependence, ethical awareness, student attitudes, and academic dishonesty among college students. It also explores the moderating effects of demographic factors. Survey data from college students were analyzed using a Generalized Linear Model (GLM) framework for a thorough examination of the complex interplay between the variables while considering the moderating influence of age, gender, type of institution, and technological proficiency. The study reveals that AI tool dependence is prevalent among college students. While students generally hold positive attitudes toward academic integrity, there is variability in the intensity and nature of these attitudes. Moreover, ethical awareness appears limited, highlighting a potential gap between ethical beliefs and behavior. Surprisingly, there is a consistent pattern of positive attitudes toward academic dishonesty. However, these findings are not explored in-depth in this study. Importantly, neither ethical awareness nor student attitudes significantly mediate the relationship between AI tool dependence and academic dishonesty. Demographic factors do not appear to significantly moderate these relationships. In light of these findings, institutions are encouraged to explore the implementation of the AI Dependence Inclusive Course for Transparency Program (AIDICT). This specialized initiative, shaped by the study's insights, enhances ethical education and raises awareness of the ethical implications associated with AI tool usage.

Keywords: *academic dishonesty, AI tool dependence, ethical awareness, online college assessments, student attitudes*

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1. Introduction

The prevalence of online learning platforms in academic institutions has led to an increase in both the barriers and possibilities for students to participate in dishonest activities during examinations. According to OECD (2020), students' academic dishonesty, translated to cheating and plagiarism, was the frequently discussed challenge during the shift to online examination. The systematic literature review conducted by Newton and Essex (2023) showed that 44.7% of students self-reported online exam cheating with trend showing 29.9% cases in pre-COVID to 54.7% during the pandemic. Holden et al. (2021) provide precise manifestations of online cheating, which include but are not limited to the use of illegal resources, enabling cheating on behalf of others, fabricating one's identity or work, and appropriating someone else's work as one's own (Şendağ et al., 2012, as cited in Holden et al., 2021). In the online learning, this phenomenon has been described by Dawson (2020) as e-cheating, cheating enabled by technology. This platform eventually provides opportunity for students to cheat in online examinations (Shariffuddin et al., 2022; Alguacil et al., 2023; Ivo & Arnold, 2022; Mellar et al., 2018; Ababneh et al., 2022; Adama et al., 2023; Newton & Essex, 2023).

The investigation of the frequency and qualities of the various forms of academic dishonesty plays a crucial role in developing a comprehensive comprehension of the significant obstacles that educators and institutions face when striving to uphold academic integrity in online educational settings. While research reflected a decrease in plagiarism cases from 1990 to 2020 (Curtis & Tremayne, 2021; Curtis, 2022), the onset of the COVID-19 pandemic has introduced new challenges, leading to an increase in reported incidents of academic dishonesty (Efetie, 2021; Stoesz et al., 2023; Erguvan, 2021; Basken, 2020; Jenkins et al., 2023; Yazici et al., 2022; Elsalem et al., 2021; Chang et al., 2021; Davies & Al sharefeen, 2022; Gamage et al., 2020; Wahab et al., 2022; Malik et al., 2023; Münscher, 2022; Hazra & Priyo, 2022; Erguvan, 2021; Janke et al., 2021; Maryon et al., 2022; Comas-Forgas et al., 2021; Ives & Cazan, 2023; Maryon et al., 2022). Similarly, the pandemic situation has impacted the attitudes and viewpoints of both students and academic staff (Perkins, 2023) and the post-pandemic phenomenon introduced yet another challenge of academic dishonesty tool. The advent of Artificial Intelligence (AI) technologies, particularly Large Language Models (LLMs) such as ChatGPT, introduces a new level of complexity to the issue of academic dishonesty in the realm of online college examinations. While these are valuable learning tools, they are seen as another

potential for academic dishonesty (Debby et al., 2023; Nashwan et al., 2023; Elkhatat, 2023; Eke, 2023). The use of these tools, which impose an inequitable advantage on certain students, fundamentally contravene the well-established ethical principles advocated by institutions of higher education (Hylton et al., 2016).

The widespread availability and use of these technical tools raise concerns over their potential to produce novel and unattributable content, therefore eroding the differentiation between human-authored and AI-authored work. According to Perkins (2023), AI tools can generate original and logically coherent writing, in order to overcome conventional methods used to identify instances of plagiarism. This has raised a notable issue within the context of academic honesty, as it increasingly poses a challenge for educators and institutions to differentiate between work produced by students and that created by artificial intelligence. Hence, the purpose of this study is to investigate the associations of AI tool utilization within the context of online higher education assessments. It primarily elucidates the intricate interplay between reliance on AI tools and its consequential effects on academic dishonesty, ethical awareness, and student attitudes. Furthermore, the study endeavors to scrutinize the moderating role played by demographic factors in shaping these relationships.

2. Literature Review

2.1. Impact of AI tool dependence on students' attitudes

Several studies had been conducted on the students' perception of AI as well as the impact of AI on student attitude. For instance, Alzahrani (2023) provided crucial insights into the factors shaping students' perceptions of AI in higher education including the interplay of perceived risk, performance expectancy, and facilitating conditions. Notably, the study revealed a noteworthy negative impact of perceived risk on attitudes, signaling concerns associated with AI tool dependence. Simultaneously, positive influences from performance expectancy and facilitating conditions emerge as pivotal elements fostering favorable attitudes toward AI utilization, particularly within the context of Saudi Arabian higher education institutions. In addition, Burkhard (2022) highlighted the unreflective tool use to skepticism and a lack of effective learning strategies while García-Martínez et al. (2023) emphasized heightened motivation and positive attitudes toward learning, marking a transformative role for AI tools in shaping students' perceptions and engagement.

The perception of students towards AI tool vary depending on their academic needs and nature. For example, in terms English as a Foreign Language (EFL) students in Indonesia, Sumakul et al. (2022) found that students had positive perceptions towards the use of the AI app in the writing class, Marzuki et al. (2023) also found that students' writing quality improved in content and organization with the use of AI tools and Siregar et al. (2023) highlighted the positive significant impact of Chat GPT to learning motivation. These findings are congruent with the Chinese students. Chan and Hu (2023) described higher education students in Hong Kong with generally positive attitude towards GenAI in teaching and learning specifically as learning, writing and research support while Liu et al. (2023) indicated Chinese scholars' positive attitude towards integration of AI for personalized educational experience. In the field of health and sciences programs, the attitude of students towards AI differ. While Al Hadithy (2023) found students concerned on the impact of AI on employment prospects and Sabra et al. (2023) pointed out student apprehension on the use of AI in the health care, Kwak et al. (2022), Kleine et al. (2023), Schulz et al. (2023), Scott et al. (2021), Sallam et al. (2023), Doumat et al. (2022), and Fritsch et al. (2022) described students as generally positive towards AI usage in the medical program. Generally, the use of AI in teaching and learning improvement students' motivation and engagement (Yilmaz & Yilmaz, 2023; Kairu, 2020; Rodway & Schepman, 2023; Seo et al., 2021) and academic performance (García-Martínez et al., 2023).

While recognizing the positive impacts, the findings also acknowledge the educational and ethical challenges faced by teachers in implementing AI technologies. Together, these findings contribute to a comprehensive understanding of how students' dependence on AI tools may influence their attitudes, providing educators with valuable insights for navigating the integration of technology in education. This also underscores the need for tailored teaching strategies to address the varying attitudes, providing valuable considerations for educators seeking to integrate AI-powered tools into the curriculum.

2.2. Impact of AI tool dependence on ethical awareness

Borenstein and Howard (2020) stress the paramount importance of AI ethics education, focusing on understanding the ethical dimensions of AI and its potential impact on ethical awareness. They advocate for the incorporation of ethical considerations into the curriculum, emphasizing the need to train future AI developers to thoughtfully reflect on AI's societal influence. The proposed key elements include teaching the ethical design of AI algorithms,

integrating data science concepts, and reinforcing ethics lessons regularly. Hence, the role of ethics in navigating AI's evolving societal impact is imperative. According to Green (2020), technical safety, transparency, and bias become pertinent in educational decision-making processes, student assessments, and resource allocation as institutions adopt AI tools. The ethical dilemma of unemployment aligns with education, prompting a reevaluation of curricula to equip students with skills relevant to a job market transformed by AI. Socio-economic inequality underscores the ethical need for providing equitable access to AI-driven educational benefits.

Majority of the studies showed students ethical awareness on the use of AI tools (Kwon, 2023; Shih et al., 2021; Kwak et al., 2022; Ghotbi & Ho, 2021; Akgun & Greenhow, 2022) but the incidence of academic cheating using AI tool continue to increase (Perkins & Roe, 2023; Eke, 2023). For this, Folynek et al. (2023) suggest the implementation of relevant education policies on the ethical use of AI tools.

2.3. AI and academic dishonesty in online college assessments

In the exploration of AI and academic dishonesty in online college assessments, Chami (2023) asserts on the intricate intersection of technological progress and the preservation of academic integrity in higher education. While acknowledging AI's potential to transform education through personalized learning, it underscores the ethical concerns, particularly regarding plagiarism and cheating. It sets the urgency of defining ethical AI use, educating students about its capabilities, and maintaining a thoughtful balance that upholds human interaction and critical learning processes within the educational landscape.

While numerous studies highlighted cheating in online assessments during the pandemic, Bubaš and Čižmešija's (2023) critically analyzed the pervasive issue of cheating in online assessments in the post-COVID-19 era with a focus on conversational artificial intelligence (CAI) systems. Similarly, Perkins (2023) explored the intricate landscape of academic integrity considerations related to the use of Large Language Models (LLMs), such as ChatGPT, in post-pandemic education. Highlighting the potential threats posed by LLMs to traditional plagiarism detection methods, Perkins (2023) emphasized the evolving nature of academic misconduct and the need for HEIs to update their policies.

Several studies provided empirical evidence on academic dishonesty in online assessments using AI (Cotton et al., 2023; Eaton, 2022; Birks & Clare, 2023; Oravec, 2023; Bubaš & Čižmešija, 2023; Sweeney, 2023) that take any form of plagiarism. For this, every

educational institution must look into educational policies on the use of AI, institutional assessments and institutional teaching pedagogy.

2.4. Theoretical and conceptual framework

AI tool dependence is rooted in the Technology Acceptance Model (TAM) by Davis (1989), which is widely recognized for understanding technology adoption. It encompassed five pertinent factors; perceived usefulness, perceived ease of use, behavioral intention, actual usage, and perceived utility. As outlined by Kelly et al. (2023), perceived usefulness underscores the perceived value of AI tools for improving academic performance in online college assessments. Conversely, perceived ease of use assesses the extent to which students find AI tools user-friendly and accessible for assessment tasks. Additionally, behavioral intention focuses on students' intentions and willingness to incorporate AI tools into their online college assessments. Meanwhile, actual usage observes the tangible implementation of AI tools by students in their online assessments. Lastly, perceived utility encapsulates students' views on the practical benefits AI tools bring to enhancing assessment outcomes.

The primary mediating variable, as explained by Zvereva (2023), underscores the modernization of moral values and ethical considerations within the digital landscape of higher education. It comprises five key elements: ethical reflection, awareness of ethical guidelines, perceived ethical responsibility, ethical accountability, and perceived ethical accountability. In this context, ethical reflection involves the assessment of students' critical thinking concerning the ethical implications of relying on AI tools for online college assessments. Conversely, awareness of ethical guidelines focuses on measuring students' knowledge of established ethical guidelines related to technology use in education while perceived ethical responsibility gauges students' sense of responsibility for making ethical choices amid AI tool dependence on online assessments. Ethical accountability assesses the extent to which students hold themselves accountable for the ethical consequences of using AI tools. Finally, perceived ethical accountability evaluates how students perceive the accountability of educational institutions and AI tool providers regarding the ethical use of technology in assessments.

Exploring student attitudes in AI tool dependence involved the application of the Unified Theory of Acceptance and Use of Technology (UTAUT), as elucidated by Venkatesh et al. (2003). This theory provides insights into key dimensions: social influence, facilitating conditions, behavioral intention, attitudinal beliefs, and perceived trust. Social influence delves

into how perceptions from significant individuals, such as peers or faculty, impact students' attitudes toward using AI tools in online college assessments. Conversely, facilitating conditions assessed the extent to which students believe that organizational and technical infrastructure support the use of AI tools, thus influencing their attitudes. Behavioral intention explores students' intentions and willingness to adopt AI tools in their assessment process, reflecting their attitudes while attitudinal beliefs investigate students' opinions about AI tools, shaping their attitudes toward their use. Finally, perceived trust gauges the level of trust students place in AI tools and its impact on their attitudes toward incorporating these tools in their assessments.

In the examination of academic dishonesty, the Rational Choice Theory, as articulated by Bridge (2020), was employed. This theory encompasses factors such as moral considerations, perceived opportunity, expected gain, effort vs. cheating, and past behavior. Moral considerations delve into students' ethical and moral beliefs concerning academic honesty, influencing their decisions when confronted with opportunities for dishonesty. Perceived opportunity scrutinizes the extent to which students perceive opportunities for academic dishonesty in online college assessments. Expected gain assesses students' evaluation of the potential benefits or gains achievable through academic dishonesty. The dimension of effort vs. cheating investigates the trade-off students make between investing effort in completing assessments honestly and choosing cheating as a seemingly easier alternative. Lastly, past behavior, encompassing students' prior engagement in academic dishonesty, serves as an indicator of their propensity for future dishonest actions.

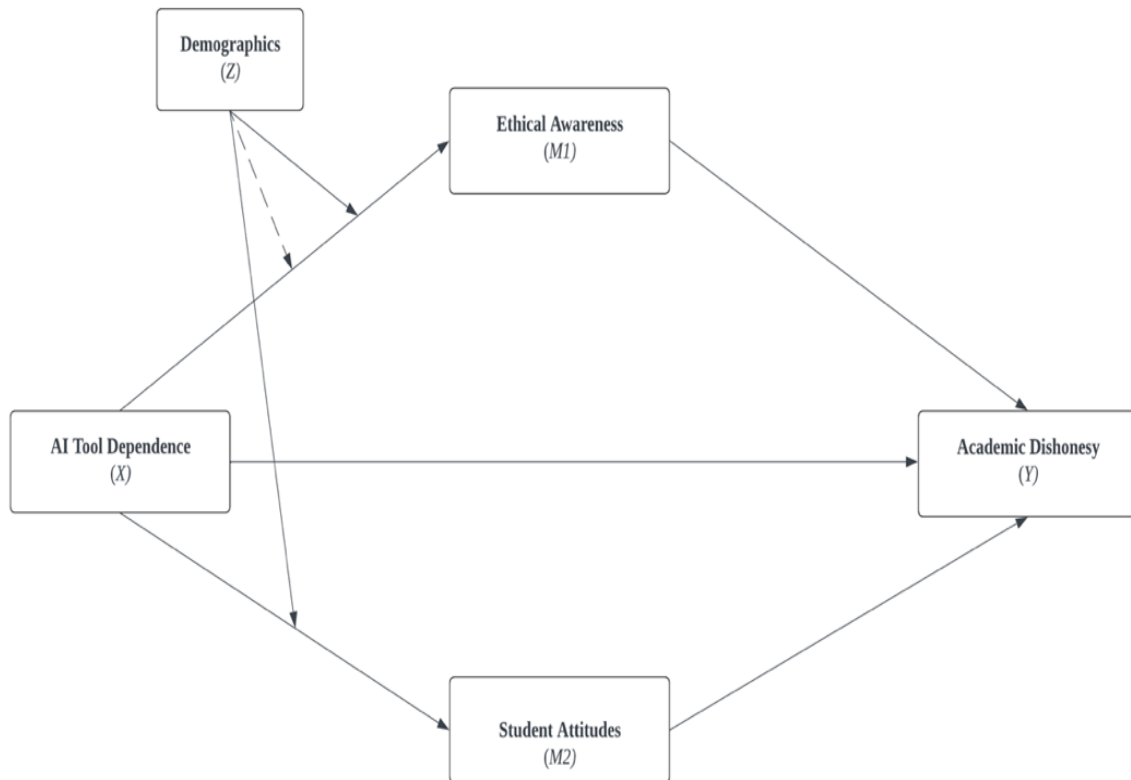
This study utilizes Hayes (2022) approach to moderated mediation analysis, as illustrated in figure 1. The conceptual framework investigates the impact of AI tool dependence (X) on academic dishonesty (Y), considering mediating variables: ethical awareness (M1) and student attitudes (M2). Additionally, demographic factors are explored as potential moderators in both the direct relationship between AI tool dependence and mediating variables (M1 and M2) and the indirect relationship involving ethical awareness, student attitudes, and academic dishonesty in online college assessments.

Prior to applying the conceptual framework, the researcher precisely established the theoretical foundations guiding the study. This step is essential for grasping how the moderating variable influences the entire mediation process. In essence, this conceptual

framework serves as a robust guide for investigating the interplay between AI tool dependence, ethical awareness, student attitudes, and academic dishonesty, while also considering the moderating influence of demographic factors in online college assessments.

Figure 1

General model of moderated multiple mediation



3. Methodology

3.1. Research design

The research technique employed in this study follows Hayes (2022) method for moderated mediation analysis utilizing GLM mediation analysis. The present study aims to examine the potential mediating effects of ethical awareness and student attitudes on the association between reliance on AI tools and academic dishonesty. Additionally, this research takes into account the potential moderating impact of demographic characteristics.

3.2. Participants

This study focused on undergraduate students in the Philippines, encompassing a diverse group from various educational institutions engaged in online learning. With a sample size of 1700 respondents, volunteer sampling was employed through online platforms such as social media, forums, and email lists for participant recruitment. Eligible respondents, meeting specific criteria, including those enrolled in Philippine colleges or universities, aged 17 or older, identifying as male, female, or non-binary, with experience in flexible online education, encompassing both synchronous and asynchronous modes, and having completed online assessments as part of their coursework.

3.3. Research instrument

This study utilized a researcher-made online survey questionnaire, structured in four parts, each focusing on distinct aspects. Employing a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree," participants conveyed their agreement or disagreement with presented statements. Ensuring content validity, a panel of five experts rigorously assessed the questionnaire's alignment with the constructs of AI tool dependence, ethical awareness, student attitudes, and academic dishonesty. Reliability was confirmed through a pilot test involving 50 respondents, resulting in a high Cronbach's alpha coefficient of .97, indicating strong internal consistency among questionnaire items.

3.4. Data collection procedure

The study began by identifying potential participants among undergraduate students in the Philippines who met specific criteria. Recruitment was voluntary, with invitations sent electronically, accompanied by a clear explanation of the research purpose. The voluntary nature of participation was emphasized, respecting potential respondents' autonomy. Detailed informed consent was presented on the online platform, ensuring participants' voluntary engagement. Data collection occurred over a designated period, allowing respondents to complete the survey at their convenience. To maintain accuracy, participants were encouraged to respond thoroughly and honestly, with reminders sent to non-responders to maximize participation rates.

3.5. Data analysis

Descriptive statistics were employed to address research questions, with means and standard deviations calculated for AI tool dependence, ethical awareness, student attitudes, and academic dishonesty. The analysis provided initial insights into central tendencies and variations in these variables within the sample. A General Linear Model (GLM) mediation analysis was conducted to explore relationships between AI tool dependence, mediating variables (ethical awareness and student attitudes), and academic dishonesty. This analysis tested both direct and indirect effects, examining how AI tool dependence influenced academic dishonesty while considering ethical awareness and student attitudes as potential mediators. Demographic factors were explored as moderators, providing a comprehensive understanding of the relationships. Bootstrapping, a resampling technique, was applied to enhance the robustness of findings, contributing to a more nuanced understanding of the research questions.

3.6. Ethical considerations

This research adhered strictly to ethical guidelines outlined by Asirit et al. (2022), ensuring the protection of participants' rights and welfare, along with the validity and reliability of findings. Participants were guaranteed voluntary participation with the freedom to withdraw at any time. Stringent ethical and legal requirements for informed consent were followed, providing comprehensive explanations and contact details. Anonymity measures, including numerical codes, were implemented to protect identities, and research data was stored securely to maintain confidentiality. Precautions were taken to minimize harm, and participants were informed about available support mechanisms. The study's ethical conduct reflects a deep commitment to respecting participants' rights and well-being while upholding research integrity and validity.

4. Results and Discussion

Table 1 presents the Mediators Model (m1) for ethical awareness that bared the R-squared value of 0.00688 indicating that this model does not explain a significant amount of variance in ethical awareness ($p = 0.471$). This suggests that the predictor variables included in this model, such as AI tool dependence and various demographic factors, collectively do not have a strong influence on students' ethical awareness.

Table 1*Mediators model (m1)*

R-squared	F	df1	df2	p
0.00688	0.974	12.0	1687	0.471

The regression coefficients (β) in the model shed light on the individual relationships of predictor variables with ethical awareness. Firstly, AI tool dependence ($\beta = 0.00127$, $p = 0.959$) reveals a coefficient close to zero, indicating no statistically significant impact ($p > 0.05$). This suggests that students' levels of AI tool dependence do not directly influence their ethical awareness, implying no evidence that high dependence on AI tools correlates with lower ethical awareness (Cotton et al., 2023). Secondly, various demographic variables (age, gender, type of institution) also yield non-significant coefficients ($p > 0.05$), indicating that differences in ethical awareness among students are not significantly predicted by these demographic factors. Finally, perceived technological proficiency, categorized as "novice - basic" and "expert - basic," does not demonstrate a significant direct relationship with ethical awareness ($p > 0.05$). Overall, the results from this model indicate that, based on the variables included, there is no significant direct influence of AI tool dependence or demographic factors on students' ethical awareness. This outcome aligns with the previous finding that students generally lack strong ethical awareness regarding AI tool usage in online assessments (Akgun & Greenhow, 2021; Kooli, 2023; Cotton et al., 2023).

The absence of a significant relationship between AI tool dependence, demographic factors, and ethical awareness holds critical implications for educational institutions. Despite the prominent role of AI tools in contemporary education, this study indicates that students' reliance on these tools does not necessarily correlate with their ethical awareness (Alnajjar & Abou Hashish, 2021). As a result, institutions should contemplate targeted interventions aimed at enhancing ethical awareness, particularly within the realm of technology usage. Additionally, the negligible impact of demographic variables on ethical awareness underscores the importance of inclusive ethical education and awareness programs that cater to the diverse needs of student populations (Mercer-Mapstone et al., 2021). These programs should prioritize

the promotion of ethical behavior and decision-making, irrespective of students' age, gender, or institutional type (Klimova et al., 2023).

Table 2 shows the mediators model (m2) for students' attitudes, the R-squared value of 0.00951 indicates that this model explains a relatively small amount of variance in students' attitudes ($p = 0.184$). While the model has some explanatory power, it suggests that the included predictor variables collectively have a limited influence on students' attitudes toward academic integrity.

Table 2

Mediators model (m2)

R-squared	F	df1	df2	p
0.00951	1.35	12.0	1687	0.184

The examination of regression coefficients (β) pertaining to predictor variables in the model provides valuable insights into the distinct associations between these factors and students' attitudes. First, concerning AI tool dependence ($\beta = 0.02550$, $p = 0.294$), the positive coefficient, while not statistically significant ($p > 0.05$), suggests that levels of AI tool dependence among students do not exert a significant direct impact on their attitudes toward academic honesty. In essence, heightened AI tool dependence does not necessarily correlate with more positive or negative attitudes regarding academic integrity. Second, the coefficients for various demographic variables, including age groups, gender, and type of institution, are also not statistically significant ($p > 0.05$), indicating that these demographic factors do not significantly forecast differences in students' attitudes. Lastly, perceived technological proficiency, represented by categories such as "novice - basic" and "expert - basic," does not demonstrate a significant direct relationship with students' attitudes ($p > 0.05$).

Table 3 shows the full model (m3) to predict academic dishonesty while considering the mediation of ethical awareness and student attitudes, as well as the moderation by demographic factors such as age, gender, type of institution, and perceived technological proficiency.

Table 3*Full model (m3)*

R-squared	F	df1	df2	p
0.0149	1.82	14.0	1685	0.031

The R-squared value of 0.0149 indicates that the predictors in the model explain approximately 1.49% of the variance in academic dishonesty. Although this is a relatively small proportion, it signals that factors beyond those considered in the model contribute to academic dishonesty.

Examining the effects of the predictors on academic dishonesty reveals specific patterns. First, ethical awareness ($\beta = -0.04827$, $p = 0.047$) demonstrates a negative beta coefficient, suggesting that an increase in ethical awareness is associated with a decrease in academic dishonesty. This implies that students with higher ethical awareness may be less prone to engaging in dishonest academic behaviors. Second, student attitudes ($\beta = 0.00699$, $p = 0.774$) exhibit a positive but statistically insignificant beta coefficient ($p > 0.05$), indicating no strong relationship between students' attitudes and academic dishonesty in the model. Third, AI tool dependence ($\beta = -0.01578$, $p = 0.515$) also lacks a statistically significant effect on academic dishonesty, suggesting that students' reliance on AI tools does not significantly impact their likelihood of engaging in academic dishonesty. Lastly, demographic variables, including age, gender, type of institution, and perceived technological proficiency, serve as moderators in the model. Notably, the age categories "21-23 years old - below 18 years old" and "24 years old and older - below 18 years old" emerge as statistically significant predictors of academic dishonesty, both with positive coefficients. This implies that older students may be more inclined to engage in academic dishonesty compared to their younger counterparts (San et al., 2023). It could be gleaned that ethical awareness negatively predicts academic dishonesty underscores the importance of promoting ethical values and awareness among students. Educational institutions should consider incorporating digital ethics and discussions into their curriculum to help students develop a stronger ethical foundation (Akgun & Greenhow, 2021).

Moreover, student attitudes and AI tool dependence do not appear to significantly influence academic dishonesty in this model. This suggests that other factors not considered in this study may play a more substantial role in students' decisions to engage in dishonest academic behaviors. The age-related findings imply that older students may need additional support or interventions to deter academic dishonesty (San et al., 2023). Institutions should tailor their academic integrity programs to address the specific needs and challenges faced by different age groups.

Table 1.4 presents the results of the Total Effects Model predicting academic dishonesty while considering the influence of various demographic and AI tool dependence factors. The Total Effects Model examines the direct effects of AI tool dependence and demographic variables on academic dishonesty.

Table 4

Total effects model predicting academic dishonesty

R-squared	F	df1	df2	p
0.0126	1.79	12.0	1687	0.045

The R-squared value of 0.0126 suggests that the model explains a small portion of the variance in academic dishonesty. The beta coefficient for AI tool dependence is -0.01566 with a p-value of 0.519. This indicates that AI tool dependence does not have a statistically significant direct effect on academic dishonesty. Among different age groups, students aged 21-23 years old (compared to those below 18 years old) exhibit a statistically significant positive effect on academic dishonesty ($\beta = 0.11396$, $p = 0.003$). Students aged 18-20 and 24 years old and older also show positive but less significant effects. Neither female nor non-binary students exhibit statistically significant direct effects on academic dishonesty. Both Local Universities and Colleges (LUCs) and State Universities and Colleges (SUCs) compared to Private Universities and Colleges (PUCs) do not have statistically significant direct effects on academic dishonesty. Different levels of technological proficiency (from novice to expert) do not show statistically significant direct effects on academic dishonesty.

The results indicate that AI tool dependence does not have a direct impact on academic dishonesty. Within the context of this study, students aged 21-23 are more likely to engage in academic dishonesty compared to students in other age groups. However, it is important to note that this study does not conclusively establish causation. Instead, it identifies a statistical association between this age group and academic dishonesty. This finding does not necessarily mean that all college students in the 21-23 age group are prone to academic dishonesty. Rather, it implies that, on average, students in this particular age range are more likely to be involved in dishonest academic behaviors compared to their younger counterparts (San et al., 2023). It is also crucial to recognize that the association does not provide insights into the reasons behind this behavior. To draw more definitive conclusions about the reasons for academic dishonesty among college students in this age group, further research and a more in-depth investigation of potential contributing factors, such as increased academic pressure or other contextual variables would be necessary (Alberola-Mulet et al., 2021).

Other demographic factors such as gender, type of institution, and technological proficiency do not have significant direct effects. These findings suggest that while AI tool dependence does not directly lead to academic dishonesty, age plays a role. It is noteworthy that students aged 21-23 are more prone to academic dishonesty. This could be due to various factors, such as increased academic pressure, competition, or other unexplored variables not included in this study (Yang et al., 2021). The non-significant direct effects of gender, type of institution, and technological proficiency indicate that these factors may not be primary drivers of academic dishonesty among college students in this context.

5. Conclusion and Recommendations

This study revealed the profound influence of AI tools in education, emphasizing students' significant dependence on technology. The findings, rooted in non-significant direct influences of AI tool dependence and demographic factors on ethical awareness, underscore the growing importance of technology in academic settings. Variations in students' attitudes toward academic integrity are revealed, raising concerns about a potential gap between professed values and actual behaviors. These insights are drawn from non-significant direct influences of AI tool dependence and demographic factors on ethical awareness. The prevailing attitudes toward academic dishonesty had emerged, indicating a consistent pattern among respondents. However, further exploration is warranted to comprehensively understand

the underlying reasons for these attitudes. This is shown in the non-significant direct effects of student attitudes and AI tool dependence on academic dishonesty.

Challenging conventional assumptions, the study suggests that demographic considerations do not substantially regulate the interplay between AI tool dependence, ethical awareness, student attitudes, and academic dishonesty. This conclusion is supported by non-significant direct effects in the total effects model, emphasizing the need for a more nuanced understanding of these complex processes.

The following recommendations can be made for educational institutions, policymakers, and future research:

Enhancing transparency in AI tool usage: To ensure transparent AI tool utilization, educational institutions should establish clear guidelines outlining the purpose and mechanics of these tools in assessments. Communication channels must be developed to convey this information to students, emphasizing the potential consequences for academic honesty.

Understanding student attitudes toward academic dishonesty: For a deeper understanding of student attitudes, institutions should conduct surveys and interviews to gather diverse perspectives on academic dishonesty. Collaborating with behavioral experts, institutions can analyze this data to design targeted interventions aligned with students' motivations for maintaining academic integrity.

Exploring contextual factors influencing ai tool dependence and dishonesty: To explore contextual factors, institutions can conduct literature reviews to identify potential influences such as peer dynamics, institutional policies, and personal values. Utilizing mixed-method research approaches will help uncover how these factors impact AI tool dependence and academic honesty.

AI Dependence Inclusive Course for Transparency Program (AIDICT) as an Intervention: Institutions are encouraged to facilitate an AI Dependence Inclusive Course for Transparency Program (AIDICT) as a targeted intervention. This program should be designed to educate students on the ethical use of AI tools, emphasizing transparency in their integration into assessments. The implementation process should involve collaboration with educators, technology specialists, and behavioral experts to ensure effectiveness. Regular assessments and feedback mechanisms can gauge the program's impact on reducing academic dishonesty associated with AI tool dependence.

References

- Ababneh, K. I., Ahmed, K., & Dedousis, E. (2022). Predictors of cheating in online exams among business students during the Covid pandemic: Testing the theory of planned behavior. *The International Journal of Management Education*, 20(3), 100713. <https://doi.org/10.1016/j.ijme.2022.100713>
- Adama, E.A., Graf, A., Adusei-Asante, K. *et al.* (2023). COVID-19 and alternative assessments in higher education: implications for academic integrity among nursing and social science students. *Int J Educ Integr* **19**, 8. <https://doi.org/10.1007/s40979-023-00129-0>
- Akgun, S., & Greenhow, C. (2021). Artificial Intelligence in education: Addressing ethical challenges in K-12 settings. *AI and Ethics*, 2(3), 431–440. <https://doi.org/10.1007/s43681-021-00096-7>
- Al Hadithy Z. A., Al Lawati, A., Al-Zadjali, R., *et al.* (2023) Knowledge, Attitudes, and Perceptions of Artificial Intelligence in Healthcare Among Medical Students at Sultan Qaboos University. *Cureus* 15(9): e44887. doi:10.7759/cureus.44887
- Alberola-Mulet, I., Iglesias-Martínez, M. J., & Lozano-Cabezas, I. (2021). Teachers' beliefs about the role of Digital Educational Resources in Educational Practice: A qualitative study. *Education Sciences*, 11(5), 239. <https://doi.org/10.3390/educsci11050239>
- Alguacil, M., Herranz-Zarzoso, N., Pernías, J.C. *et al.* (2023). Academic dishonesty and monitoring in online exams: a randomized field experiment. *J Comput High Educ.* <https://doi.org/10.1007/s12528-023-09378-x>
- Alnajjar, H. A., & Abou Hashish, E. A. (2021). Academic ethical awareness and moral sensitivity of undergraduate nursing students: Assessment and influencing factors. *SAGE Open Nursing*, 7, 237796082110267. <https://doi.org/10.1177/23779608211026715>
- Alzahrani, L. (2023). Analyzing students' attitudes and behavior toward Artificial Intelligence Technologies in higher education. *International Journal of Recent Technology and Engineering (IJRTE)*, 11(6), 65–73. <https://doi.org/10.35940/ijrte.f7475.0311623>

- Asirit, L. L., Hua, J. H. & Mendoza, L. (2022). A closer look at neophyte teachers' instructional competence: A phenomenological study. *International Research Journal of Science, Technology, Education, and Management*, 2(2).
- Basken, P. (2020). Universities say student cheating exploding in Covid era. *Time Higher Education*
- Bin-Nashwan, S.A., Sadallah, M., & Bouteraa, M. (2023). Use of ChatGPT in academia: Academic integrity hangs in the balance. *Technology in Society*, 75, 102370. <https://doi.org/10.1016/j.techsoc.2023.102370>
- Birks, D. & Clare, J. (2023). Linking artificial intelligence facilitated academic misconduct to existing prevention frameworks. *Int J Educ Integr* 19, 20 (2023). <https://doi.org/10.1007/s40979-023-00142-3>
- Borenstein, J., & Howard, A. (2020). Emerging challenges in AI and the need for AI Ethics Education. *AI and Ethics*, 1(1), 61–65. <https://doi.org/10.1007/s43681-020-00002-7>
- Bubaš, G., & Čižmešija, A. (2023). A critical analysis of students' cheating in online assessment in Higher Education: Post-covid-19 issues and challenges related to conversational artificial intelligence. *2023 46th MIPRO ICT and Electronics Convention (MIPRO)*. <https://doi.org/10.23919/mipro57284.2023.10159826>
- Burkhard, M. (2022). Student perceptions of AI-powered writing tools: Towards Individualized Teaching Strategies. *Proceedings of the 19th International Conference on Cognition and Exploratory Learning in the Digital Age (CELDA 2022)*. https://doi.org/10.33965/celda2022_2022071010
- Chami, G. (2023, October 22). *Artificial Intelligence and academic integrity: Striking a balance*. THE Campus Learn, Share, Connect. <https://www.timeshighereducation.com/campus/artificial-intelligence-and-academic-integrity-striking-balance>

- Chan, C.K.Y. & Hu, W. (2023). Students' voices on generative AI: perceptions, benefits, and challenges in higher education. *Int J Educ Technol High Educ* **20**, 43 (2023). <https://doi.org/10.1186/s41239-023-00411-8>
- Chang, L., Cerimagic, S. & Conejos, S. (2021). Challenges of running online exams and preventing academic dishonesty during the Covid-19 pandemic. *Journal of Learning Development in Higher Education*, 22
- Comas-Forgas, R., Lancaster, T., Calvo-Sastre, A., & Sureda-Negre, J. (2021). Exam cheating and academic integrity breaches during the COVID-19 pandemic: An analysis of internet search activity in Spain. *Heliyon*, 7(10), e08233. <https://doi.org/10.1016/j.heliyon.2021.e08233>
- Cotton, D., Cotton, P., & Shipway, J. R. (2023). *Chatting and Cheating. Ensuring Academic Integrity in the Era of Chatgpt*. <https://doi.org/10.35542/osf.io/mrz8h>
- Curtis, G. J. (2022). Trends in plagiarism and cheating prevalence: 1990-2020 and beyond. In D. Rettinger, & T. Bertram Gallant (Eds.), *Cheating academic integrity: Lessons from 30 years of research* (1 ed., pp. 11-44). Jossey-Bass.
- Curtis, G.J. & Tremayne, K. (2021). Is plagiarism really on the rise? Results from four 5-yearly surveys. *Studies in Higher Education*, 46:9, 1816-1826, DOI: [10.1080/03075079.2019.1707792](https://doi.org/10.1080/03075079.2019.1707792)
- Davies, A., & Al sharefeen, R. (2022). Enhancing academic integrity in a UAE safety, security defence emergency management academy – the Covid- 19 response and beyond. *Int J Educ Integr* **18**, 17. <https://doi.org/10.1007/s40979-022-00110-3>
- Doumat, G., Daher, D., Ghanem, N.N. & Khater, B. (2022). Knowledge and attitudes of medical students in Lebanon toward artificial intelligence: A national survey study. *Frontiers in Artificial Intelligence*. 5:1015418. DOI: 10.3389/frai.2022.1015418.
- Eaton, S. (2022). The Academic Integrity Technological Arms Race and its Impact on Learning, Teaching, and Assessment. *Canadian Journal of Learning and Technology*, 48(2). <https://doi.org/10.21432/cjlt28388>

- Efetie, D. (2021). University faces dramatic increase in academic misconduct over the pandemic. *The Commonwealth Times*. <https://commonwealthtimes.org/2021/09/15/university-faces-dramatic-increase-in-academic-misconduct-over-the-pandemic/>
- Eke, D.O. (2023). ChatGPT and the rise of generative AI: Threat to academic integrity? *Journal of Responsible Technology*, 13, 100060. <https://doi.org/10.1016/j.jrt.2023.100060>
- Elkhatat, A.M. (2023). Evaluating the authenticity of ChatGPT responses: a study on text-matching capabilities. *Int J Educ Integr* 19, 15 (2023). <https://doi.org/10.1007/s40979-023-00137-0>
- Elsalem, L., Al-Azzam, N., Jum'ah, A. & Obeidat, N. (2021). Remote E-exams during Covid-19 pandemic: A cross-sectional study of students' preferences and academic dishonesty in faculties of medical sciences. *Annals of Medicine and Surgery*. 62, 326-333. <https://doi.org/10.1016/j.amsu.2021.01.054>
- Erguvan, I.D. (2021). The rise of contract cheating during the COVID-19 pandemic: a qualitative study through the eyes of academics in Kuwait. *Lang Test Asia* 11, 34 (2021). <https://doi.org/10.1186/s40468-021-00149-y>
- Foltynek, T., Bjelobaba, S., Glendinning, I. *et al.* (2023). ENAI Recommendations on the ethical use of Artificial Intelligence in Education. *Int J Educ Integr* 19, 12. <https://doi.org/10.1007/s40979-023-00133-4>
- Fritsch, S.J., Blankenheim, A., Wahl, A., et al. (2022). Attitudes and perception of artificial intelligence in healthcare: A cross-sectional survey among patients. *Digital Health*. 8. doi:10.1177/20552076221116772
- Gamage, K.A.A., Silva, E.K.d. & Gunawardhana, N. (2020). Online Delivery and Assessment during COVID-19: Safeguarding Academic Integrity. *Education Sciences*. 2020; 10(11):301. <https://doi.org/10.3390/educsci10110301>
- García-Martínez, I., Fernández-Batanero, J. M., Fernández-Cerero, J., & León, S. P. (2023). Analysing the impact of Artificial Intelligence and Computational Sciences on Student

Performance: Systematic Review and meta-analysis. *Journal of New Approaches in Educational Research*, 12(1), 171. <https://doi.org/10.7821/naer.2023.1.1240>

Ghotbi, N., & Ho, M. T. (2021). Moral Awareness of College Students Regarding Artificial Intelligence. *Asian bioethics review*, 13(4), 421–433. <https://doi.org/10.1007/s41649-021-00182-2>

Green, B. P. (2020, August 18). *Artificial Intelligence and ethics: Sixteen challenges and opportunities*. Markkula Center for Applied Ethics. <https://www.scu.edu/ethics/all-about-ethics/artificial-intelligence-and-ethics-sixteen-challenges-and-opportunities/>

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis, third edition: A regression-based approach*. Guilford Press.

Hazra, U. & Priyo, A. (2022). Unethical practices in online classes during COVID-19 pandemic: an analysis of affordances using routine activity theory. *Journal of Information, Communication & Ethics in Society*, 20 (4), 546-567.

Holden, O. L., Norris, M. E., & Kuhlmeier, V. A. (2021). Academic integrity in online assessment: A research review. *Frontiers in Education*, 6. <https://doi.org/10.3389/feduc.2021.639814>

Hylton, K., Levy, Y., & Dringus, L. P. (2016). Utilizing webcam-based proctoring to deter misconduct in online exams. *Computers & Education*, 92–93, 53–63. <https://doi.org/10.1016/j.compedu.2015.10.002>

Ives, B., & Cazan, AM. (2023). Did the COVID-19 pandemic lead to an increase in academic misconduct in higher education? *High Educ* (2023). <https://doi.org/10.1007/s10734-023-00996-z>

Ivo, J. & Arnold, M. (2022). Online proctored assessment during COVID-19: Has cheating increased? *The Journal of Economic Education*, 53:4, 277-295, DOI: [10.1080/00220485.2022.2111384](https://doi.org/10.1080/00220485.2022.2111384)

- Janke, S., Rudert, S.C. Petersen, A., Fritz, T.M. & Daumiller, M. (2021). Cheating in the wake of COVID-19: How dangerous is ad-hoc online testing for academic integrity? *Computers and Education Open*, 2, 100055. <https://doi.org/10.1016/j.caeo.2021.100055>
- Jenkins, B. D., Golding, J. M., Le Grand, A. M., Levi, M. M., & Pals, A. M. (2023). When Opportunity Knocks: College Students' Cheating Amid the COVID-19 Pandemic. *Teaching of Psychology*, 50(4), 407-419. <https://doi.org/10.1177/00986283211059067>
- Kairu, C. (2020). Students' Attitude Towards the Use of Artificial Intelligence and Machine Learning to Measure Classroom Engagement Activities. In *Proceedings of EdMedia + Innovate Learning* (pp. 793-802). Online, The Netherlands: Association for the Advancement of Computing in Education (AACE). Retrieved December 8, 2023 from <https://www.learntechlib.org/primary/p/217382/>.
- Kelly, S., Kaye, S.-A., & Oviedo-Trespalacios, O. (2023). What factors contribute to the acceptance of artificial intelligence? A systematic review. *Telematics and Informatics*, 77, 101925. <https://doi.org/10.1016/j.tele.2022.101925>
- Kleine, A. K., Kokje, E., Lermer, E., & Gaube, S. (2023). Attitudes Toward the Adoption of 2 Artificial Intelligence-Enabled Mental Health Tools Among Prospective Psychotherapists: Cross-sectional Study. *JMIR human factors*, 10, e46859. <https://doi.org/10.2196/46859>
- Klimova, B., Pikhart, M., & Kacetl, J. (2023). Ethical issues of the use of AI-driven mobile apps for Education. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.1118116>
- Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. *Sustainability*, 15(7), 5614. <https://doi.org/10.3390/su15075614>
- Kwak, Y., Ahn, J. W., & Seo, Y. H. (2022). Influence of AI ethics awareness, attitude, anxiety, and self-efficacy on nursing students' behavioral intentions. *BMC nursing*, 21(1), 267. <https://doi.org/10.1186/s12912-022-01048-0>

- Kwon, J. (2023). A Study on Ethical Awareness Changes and Education in Artificial Intelligence Society. *Revue d'Intelligence Artificielle*, 37 (2), 341-345. <https://doi.org/10.18280/ria.370212>
- Liu, M., Ren, &, Nyagoga, L.M., Stonier, F., Wu, Z. & Yu, L. (2023). Future of education in the era of generative artificial intelligence: Consensus among Chinese scholars on applications of ChatGPT in schools. *Future in Educational Research*, 1(1), 72-101. <https://doi.org/10.1002/fer3.10>
- Malik, A.A., Hassan, M., Rizwan, M., Mushtaque, I., Lak, T.A. & Hussain, M. (2023). Impact of academic cheating and perceived online learning effectiveness on academic performance during the COVID-19 pandemic among Pakistani students. *Front. Psychol.* 14:1124095. doi: 10.3389/fpsyg.2023.1124095
- Maryon, T., Dubre, V., Elliott, K., Escareno, J., Fagan, M.H., Standridge, E., Lieneck, C. (2022). COVID-19 Academic Integrity Violations and Trends: A Rapid Review. *Education Sciences*. 12(12):901. <https://doi.org/10.3390/educsci12120901>
- Marzuki, U.W., Rusdin, D., & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective, *Cogent Education*, 10:2, DOI: [10.1080/2331186X.2023.2236469](https://doi.org/10.1080/2331186X.2023.2236469)
- Mellar, H., Peytcheva-Forsyth, R., Kocdar, S. *et al.* (2018). Addressing cheating in e-assessment using student authentication and authorship checking systems: teachers' perspectives. *Int J Educ Integr* 14, 2. <https://doi.org/10.1007/s40979-018-0025-x>
- Mercer-Mapstone, L., Islam, M., & Reid, T. (2021). Are we just engaging 'the usual suspects'? challenges in and practical strategies for supporting equity and Diversity in student-staff partnership initiatives. *Teaching in Higher Education*, 26(2), 227-245. <https://doi.org/10.1080/13562517.2019.1655396>
- Münscher, S. (2022). The relationship between just world belief and wellbeing, cheating behaviors, and academic work behaviors during COVID 19 among university students. *Sci Rep* 12, 14328. <https://doi.org/10.1038/s41598-022-18045-7>

- Newton, P.M., & Essex, K. (2023). How Common is Cheating in Online Exams and did it Increase During the COVID-19 Pandemic? A Systematic Review. *J Acad Ethics* (2023). <https://doi.org/10.1007/s10805-023-09485-5>
- OECD. (2020). *Remote Online Exams in Higher Education During the COVID-19 Crisis*. OECD Publishing.
- Oravec, J. (2023). Artificial Intelligence Implications for Academic Cheating: Expanding the Dimensions of Responsible Human-AI Collaboration with ChatGPT and Bard. *Jl. of Interactive Learning Research*, 34(2), 213-237
- Perkins, M. (2023). Academic integrity considerations of AI large language models in the post-pandemic era: Chatgpt and beyond. *Journal of University Teaching and Learning Practice*, 20(2). <https://doi.org/10.53761/1.20.02.07>
- Rodway, P. & Schepman, A. (2023). The impact of adopting AI educational technologies on projected course satisfaction in university students. *Computers and Education: Artificial Intelligence*. 5, 100150. <https://doi.org/10.1016/j.caeai.2023.100150>
- Sabra, H.E., Elaal, H., Sobhy, K., & Bakr, M. (2023). Utilization of Artificial Intelligence in Health Care: Nurses' Perspectives and Attitudes. *MNJ*, 8(1), 253 – 268
- Sallam, M., Salim, N.A., Barakat, M., Al-Mahzoum, K., Al-Tammemi, A.B., Malaeb, D., Hallit, R., & Hallit, S. (2023). Assessing Health Students' Attitudes and Usage of ChatGPT in Jordan: Validation Study. *JMIR Med Educ*, 9:e48254 doi: [10.2196/48254](https://doi.org/10.2196/48254)
- San, S., Silivanh, S., & Phannalath, V. (2023). An investigation of academic dishonesty among undergraduates in four universities in Laos: Critical analysis of students' final reports. *International Journal of Multidisciplinary Research and Analysis*, 06(03). <https://doi.org/10.47191/ijmra/v6-i3-05>
- Schulz, P.J., Lwin, M.O., Kee, K.M., Goh, W.W.B., Lam, T.Y.T. & Sung, J.J.Y. (2023) Modeling the influence of attitudes, trust, and beliefs on endoscopists' acceptance of artificial intelligence applications in medical practice. *Front. Public Health*. 11:1301563. doi: 10.3389/fpubh.2023.1301563

- Scott, I.A., Carter, S.M., & Coiera, E. (2021). Exploring stakeholder attitudes towards AI in clinical practice. *BMJ Health & Care Informatics* 2021; **28**:e100450. doi: 10.1136/bmjhci-2021-100450
- Seo, K., Tang, J., Roll, I. *et al.* (2021). The impact of artificial intelligence on learner–instructor interaction in online learning. *Int J Educ Technol High Educ* **18**, 54. <https://doi.org/10.1186/s41239-021-00292-9>
- Shariffuddin, S.A., Ibrahim, I., Shaaidi, W., Syukor, F. & Hussain, J. (2022). Academic Dishonesty in Online Assessment from Tertiary Students’ Perspective. *International Journal of Advanced Research in Education and Society*, 4 (2), 75-84
- Shih, P.K, Lin, C.H., Wu, L.Y. & Yu, C.C. (2021). Learning Ethics in AI—Teaching Non-Engineering Undergraduates through Situated Learning. *Sustainability*. 2021; 13(7):3718. <https://doi.org/10.3390/su13073718>
- Siregar, F.H., Hasmayni, B. & Lubis, A.H. (2023). The Analysis of Chat GPT Usage Impact on Learning Motivation among Scout Students. *International Journal of Research and Review*, 10 (7)
- Stoesz, B.M., Quesnel, M. & De Jaeger, A.E. (2023). Student perceptions of academic misconduct amongst their peers during the rapid transition to remote instruction. *Int J Educ Integr* **19**, 14 (2023). <https://doi.org/10.1007/s40979-023-00136-1>
- Sumakul, D.Y.G., Abdul Hamied, F. & Sukyadi, D. (2021). Students’ Perceptions of the Use of AI in a Writing Class. *Advances in Social Science, Education and Humanities Research*, volume 624 67th TEFLIN International Virtual Conference & the 9th ICOELT 2021 (TEFLIN ICOELT 2021)
- Sweeney, S. (2023). Who wrote this? Essay mills and assessment – Considerations regarding contract cheating and AI in higher education. *The International Journal of Management Education*, 21(2), 100818. <https://doi.org/10.1016/j.ijme.2023.100818>
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425. <https://doi.org/10.2307/30036540>

- Wahab, R. A., Mansor, N., Halid, S., & Rahman, R. A. (2022). The Impact of Covid-19 on Academic Dishonesty: Malaysian Evidence. *International Journal of Academic Research in Accounting Finance and Management Sciences*, 12(2), 176–185.
- Yang, C., Chen, A., & Chen, Y. (2021). College students' stress and health in the COVID-19 pandemic: The role of academic workload, separation from school, and fears of contagion. *PLOS ONE*, 16(2). <https://doi.org/10.1371/journal.pone.0246676>
- Yazici, S., Durak, H.Y., Dunya, B.A. & Senturk, B. (2022). Online versus face-to-face cheating: The prevalence of cheating behaviours during the pandemic compared to the pre-pandemic among Turkish University students. *Journal of Computer Assisted Learning*, 39 (1), 231-254. <https://doi.org/10.1111/jcal.12743>
- Yilmaz, R. & Yilmaz, F. (2023). The effect of generative artificial intelligence (AI)-based tool use on students' computational thinking skills, programming self-efficacy and motivation. *Computers and Education: Artificial Intelligence*, 2(3), 100147. <https://doi.org/10.1016/j.caeai.2023.100147>
- Zvereva, E. (2023). Digital Ethics in higher education: Modernizing moral values for effective communication in Cyberspace. *Online Journal of Communication and Media Technologies*, 13(2). <https://doi.org/10.30935/ojcm/13033>