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Exploring the Nexus of Students' Attitudes Toward AI in Academic Tasks and Academic Integrity Awareness: A Mixed-Methods Study

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Abstract

The widespread adoption of Artificial Intelligence (AI), with its high accessibility, has led to a significant rise in its use in academia, raising significant concerns related to academic integrity, which is imperative for promoting sustainable learning practices. However, there is a critical need for studies exploring students' attitudes toward AI in relation to academic integrity awareness. This study aimed to examine higher education students' attitudes and academic integrity awareness regarding AI use in academic tasks and explore their correlation. Moreover, this study utilizes the Theory of Planned Behavior. A convergent parallel mixed-methods design, including a questionnaire (n = 248) and a focus group discussion (n = 8), was employed. The findings revealed that students had positive attitudes but low academic integrity awareness related to AI use in academia. Moreover, they showed a positive but weak relationship between these variables. This indicates that the more students are exposed to descriptions of "ethical AI use" that decrease violations of academic integrity, the more likely they are to utilize AI in academia. Additionally, it suggests that factors other than integrity awareness might play a bigger role in shaping students' attitudes. Recommendations and implications are discussed.

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Introduction

Rapid advancements in artificial intelligence (AI) have impacted different sectors, including manufacturing, agriculture, transportation, healthcare, and education (Demir & Güraksın, 2022; Rashid & Kausik, 2024; Singh et al., 2024). While its capabilities provide opportunities for growth in these sectors, they also present ethical and practical challenges, such as the stunning increase in power demand (Aziz et al., 2024), the potential for market manipulation (Azzutti, 2022), and issues related to academic integrity (Sullivan et al., 2023) that require thoughtful academic considerations.

Recently, education has witnessed a dramatic acceleration in integrating AI technologies in teaching and learning, especially in higher education. The easy access to AI-driven tools, such as ChatGPT, QuillBot, Google Bard, and other content-generating tools, has contributed to this adoption. However, this adoption has occurred without sufficient studies on its benefits, challenges, impact on learning and teaching strategies, and its ethical use in academic settings.

Thus, educational institutions are beginning to focus more on using AI in education. They also encourage researchers to explore its pedagogical outcomes and ethical issues (Williamson & Piattoeva, 2020). However, this focus is not enough for properly regulating how educators use AI and how students perceive and interact with it ethically, even though these are crucial aspects for achieving effective AI integration in education (Mhlanga, 2023).

The emergence of AI tools and the high quality of their outputs are connected to major concerns regarding academic integrity and how students may misuse them for academic tasks (Sullivan et al., 2023). This was confirmed by previous researchers like Sullivan et al. (2023), who reported that one-fifth of students rely on AI for their assignments. Moreover, Cavaliere et al. (2020), Stone (2023), and Tidjon and Khomh (2023) reported that countries like Canada, Sweden, and Australia have observed cases of students' academic integrity breaches, which were due to the absence of clear guidance. Stone (2023) also noted that students often commit these breaches because they lack awareness of how AI use could intersect with integrity principles.

Therefore, it is important for educators to understand their students' attitudes toward the use of AI in academic tasks and their level of awareness of academic integrity principles. This knowledge helps them prepare and be equipped to use and accept AI. Additionally, understanding these aspects is essential for helping educational administrators make informed decisions about integrating AI in education and developing policies to maintain academic integrity, which in turn enhances the quality of education.

However, there is a gap in the literature regarding students' attitudes and academic integrity. Kim et al. (2020) and Lima et al. (2020) pointed out that until now, only a few studies have explored students' attitudes toward AI use in academic settings, despite its importance. Furthermore, Williamson and Piattoeva (2020) reported that studies regarding the responsible use of AI, which requires a clear ethical framework to help students, are limited. At the same time, Sullivan et al. (2023) noted that most of the previous studies have focused on the benefits of

using AI in academia and its easy access, rather than academic integrity and ethical considerations. Accordingly, essential questions have arisen about students' attitudes toward AI, their awareness of the academic integrity issues related to it, and the connection between the two.

Additionally, a limitation in conducting research with different approaches to investigate these variables creates another gap in the AI literature. Sullivan et al. (2023) reviewed 100 articles on the use of generative AI tools in higher education. The findings showed that although AI can enhance students' learning, there were significant concerns regarding academic integrity. Furthermore, Sullivan et al. (2023) observed that student voices were missing from most of the articles reviewed. Therefore, they recommended conducting studies that utilize qualitative methods with focus group discussions (FGD) to capture students' perspectives. They believed this would provide valuable insights into the literature. Similarly, Fošner (2024) suggested using instruments like interviews and FGD to capture students' voices and address this gap in the literature.

These recommendations helped in direct the methodology of this mixed-methods study, which focused on: 1) understanding higher education students' attitudes toward using AI in academic tasks; 2) investigating students' awareness of academic integrity regarding AI use; 3) exploring whether there is a correlation between these two variables; 4) providing a deeper understanding of these variables in the context of AI use in academic tasks by combining qualitative insights with quantitative results, and adopting the Theory of Planned Behavior (TPB).

Thus, this study includes the following research questions (RQs):

1. What are higher education students' attitudes toward AI use in academic tasks?
2. To what extent, if any, do higher education students have academic integrity awareness for AI use in academic tasks?
3. Is there a correlation between student attitudes and the level of academic integrity awareness regarding the use of AI in academic tasks?
4. How can the qualitative data help explain the quantitative findings?

Literature Review

AI and Education

The use of AI by students and instructors in education is not new (Du Boulay, 2016). The term *artificial intelligence* first appeared in 1956 by McCarthy, Minsky, Rochester, and Shannon, who discussed AI's possibilities of mimicking human intelligence at Dartmouth College. During the 1980s, AI became a booming industry (Allen et al., 2021). It is defined as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages" (Chassignol et al., 2018, p. 17). Additionally, the arrival of Big Data helped the widespread of AI adoption in different domains (Mcafee & Brynjolfsson, 2012), leading to its use in education by students, instructors, and institutions (Yu, 2023).

This AI technology has contributed in enhancing students' learning experiences by offering personalized learning

and allowing students to learn at their own pace (Pratama et al., 2023), helping students to improve their learning by offering immediate feedback on assignments and quizzes (Porter & Grippa, 2020), and providing immediate access to a plethora of relevant materials in seconds (Chen et al., 2020). However, students have used them in unethical ways, such as attempting to take online exams (Nigam et al., 2021) or using them for writing, problem-solving, computer-code writing, research conducting, human-like text generating, and more (Chaudhry et al., 2023). Thus, some institutions have banned students from using AI tools on campuses, which is ineffective, as students can access them from other locations (Burkhard, 2022).

On the other hand, as the use of AI in the educational and health sectors has increased among advanced countries (Fast & Horvitz, 2017), nations like the United Arab Emirates have started to accommodate the use of AI in education. They encourage researchers to explore safe ways to integrate AI, rather than restricting its use, and instead, they offer training programs on how to use it effectively (Chaudhry et al., 2023). In the United States, leading universities, including Harvard, NYU, Stanford, and MIT, now offer courses and programs focused on AI ethics and development (Whittaker et al., 2018). Regarding the Saudi Arabian context, the Ministry of Communications and Information Technology (MCIT) is working collaboratively with the Ministry of Education (MoE) to launch training programs on machine learning targeting students and instructors (Sarirete et al., 2021).

Student Attitudes Toward AI Use in Academia

With the increasing adoption of AI in education, it becomes imperative to understand students' attitudes toward it because it plays an important role in enhancing learning outcomes. Many researchers have emphasized how attitudes are a fundamental aspect of the learning process and academic success (Cinkara & Bagceci, 2013; Fraser & Killen, 2005). Evaluating these attitudes can also contribute to improving AI usage skills by offering guidance related to instructional content design and best practices (Allen et al., 2021).

Recently, some researchers have investigated students' attitudes towards AI use, such as Kashive et al. (2020), who found that the use of AI tools can improve personalized learning outcomes. In addition, they found that intention to use AI is related to attitudes and satisfaction levels. Kim et al. (2020) also found that students had positive attitudes towards using AI as a teaching assistant. Moreover, Yu (2023) concluded that students reported their positive attitudes and appreciation for the personalized feedback they received when using AI to assist with their writing.

Other studies pointed out that students' attitudes towards AI, when considering the principles of AI ethics, are contradicted. For example, Burkhard (2022) found that students have different attitudes toward using AI in academic writing—some of them use AI with insufficient thinking, which can lead to unintentional plagiarism, while others are hesitant to use AI because they are concerned about plagiarism. Lima et al. (2020) explained how students refused to use AI and had negative attitudes towards AI use, but these attitudes changed after they received clearer information about the ethical and responsible use of AI in academia. However, Fošner (2024) pointed out that concerns about the ethical issues related to AI usage lead to negative attitudes towards its use.

AI and Academic Integrity

Academic integrity is a complex concept, but it is considered a foundation in the learning process for teachers, researchers, and students. It is often associated with negative behaviors such as cheating, plagiarism, dishonesty, and fraud (Bretag, 2018). It is defined as "a proxy for the conduct of students, notably in relation to plagiarism and cheating" (Macfarlane et al., 2014, p. 340).

Academic integrity is not a new concept; a 1996 study reported that one in three higher education students violated academic integrity (McCabe & Trevino, 1997). However, recent studies have shown high percentages of academic cheating and recommend that institutions reconsider the threats to academic integrity to protect their credibility and reputation (Moyo & Saidi, 2019; Kumar et al., 2024). They also reported that it has the potential to violate academic integrity, promote unethical usage (Alexander et al., 2023), and introduce a new form of plagiarism (Rogerson & McCarthy, 2017). Rogerson and McCarthy (2017) discussed how this accessibility encourages learners to submit assignments that are not self-written, thereby making them guilty of academic misconduct. Furthermore, some students rely on AI more often than their peers because of a lack of learning ability or confidence (Allen et al., 2021). Shi (2012) reported that one student believed that using AI to phrase the original text is not considered plagiarism. Oravec (2023) also noted that AI's ability to generate high-quality academic content in a short time has raised concerns about academic cheating and plagiarism because students, faculty, and researchers may use it and consider it their own. Additionally, Burkhard (2022) noted that AI may sometimes provide inconsistent content without students' acknowledgment, which can lead to unintentional plagiarism. Stone (2023) and Sullivan et al. (2023) found that students view breaches of academic integrity as unintentional and linked to a lack of policies. They also emphasized the importance of providing policies to increase students' awareness of responsible AI use. Kwong et al. (2010) also noted that these breaches often happen when instructions are unclear to students.

For this, Ventayen (2023) emphasized that educational institutions should adopt strategies to ensure that students themselves genuinely write assignments. Rogerson and McCarthy (2017) also suggested that institutions should determine whether a student intentionally commits plagiarism, while Davis and Morley (2015) stated that this behavior should be considered as direct plagiarism, especially if the student does not acknowledge the original source, regardless of the student's intention. Therefore, conducting studies to examine students' attitudes and evaluate their understanding of academic integrity related to AI use in academia is essential, as this area has not been thoroughly explored in research until now (Chaudhry et al., 2023; Oravec, 2023). Exploring these factors would help educational institutions and instructors in making informed decisions regarding the use of AI to improve learning experiences while maintaining academic integrity. This, in turn, would support the sustainable development of learning.

The Theory of Planned Behavior (TPB)

After reviewing previous studies on students' attitudes and academic integrity, such as those by Ababneh et al. (2022), Wang et al. (2022), and Yusliza et al. (2022), this study adopted the TPB as its framework. The TPB is

used to get a better understanding of the study's variables because it has been proven to be an effective model for understanding factors related to the use of technologies, as Bajwa (2024) stated. TPB is a theory developed by Icek Ajzen to predict human behavior based on intentions (Ajzen, 1991). It consists of three constructs: attitudes, subjective norms, and perceived behavioral control, which predict intentions (Beck & Ajzen, 1991).

Attitudes refer to the positive or negative perceptions a person has toward a behavior (Ajzen, 1991). In this study, it appears that students' attitudes toward using AI are influenced by their previous beliefs about its benefits and are also affected by ethical concerns related to its use in academia. Subjective norms mean the perceived social pressure to perform or avoid a behavior (Ajzen, 1991). In other words, intentions are influenced by others' opinions about whether to approve or disapprove of a behavior. In this study, it appears that students' intention to use AI is influenced by their peers and instructors, who serve as role models for AI use in academia.

Perceived behavioral control refers to an individual's sense of control over a behavior that can be influenced by internal and external factors (Ajzen, 1991). In this study, it appears that students' expected behavior regarding the use of AI is shaped by their beliefs about their ability to overcome challenges. These challenges may include threats like leaking personal data, using inaccurate information, or unintentionally violating academic ethics.

Methodology

Design

This study employed a convergent parallel mixed-methods design. The researcher chose this research design in an attempt to gain a better understanding of the RQs via combining the quantitative results with the qualitative insights. Quantitative data were gathered using a questionnaire. This tool measured students' attitudes toward AI use in academic tasks and their awareness of academic integrity. It was selected because it can quickly collect data from a large sample and provide accurate statistics on the study's variables. Qualitative data were collected through a focus group discussion (FGD) to gain deeper insights into the variables. It was chosen because students can share their voices in more detail than they can with closed-ended items within the quantitative instrument.

Ethical Considerations

This study was approved by the University of Jeddah's Institutional Review Board. Consent was obtained before each phase. Anonymity and confidentiality were prioritized, with the option to withdraw at any time. Students were informed that data would be stored securely and accessed only by the researcher. Participants consented to audio recordings, which will be published with pseudonyms. No incentives were offered.

Study Group

Higher education (Undergraduate-graduate) students at one of the Saudi Universities during the academic year 2024–2025. For the quantitative data, a random sampling approach was used. The sample included 248 students for the attitudes toward the use of AI dimension and 229 students for the academic integrity awareness dimension.

Participants were from various disciplines and had used AI-generated content tools.

For the qualitative data, a voluntary sampling approach was employed. Eight students volunteered to participate in the FGD. They were from different specializations, including Special Education, Childhood Education, English Literature, Computer Sciences, and Educational Technology.

Instruments

Questionnaire

The researcher developed a questionnaire based on the literature review, using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). It was administered online to evaluate higher education students' attitudes and assess their academic integrity awareness in relation to AI use in academic tasks. To recruit participants, it was advertised by leveraging faculty assistance. Faculty were asked to encourage participation and distribute it via Blackboard announcements. No names or emails were obtained to encourage honesty.

Students could start the questionnaire only after agreeing to the informed consent. They had the option to complete it in either Arabic or English, and were allowed to participate only if they had previously used AI tools. Academic level information was also collected. It consisted of two main dimensions: 1) Attitudes toward AI use in academic tasks (11 items); and 2) Academic integrity awareness regarding AI use (13 items).

To ensure content validity, the instrument was reviewed by experts in Arabic, English, and educational technology. After that, it was edited based on their comments to ensure clarity and relevance. Additionally, a pilot (n= *30*) study was conducted to examine internal reliability for both constructs. The results showed strong internal consistency, with a Cronbach's alpha of 0.886 for attitudes and 0.933 for academic integrity awareness, both exceeding the commonly accepted threshold of 0.70. These results justify averaging the questionnaire items related to each dimension.

Focus Group Discussion

The FGD was conducted to complement the questionnaire findings and to get deeper insights into the study's variables. There were 24 questions focused on students' background, attitudes, experiences, average usage, advantages and disadvantages, expectations, awareness of policies related to AI's ethical considerations and academic integrity, and finally, their needs to enhance the academic integrity awareness. The questions were reviewed by an expert in qualitative approaches, as well as by Arabic and English experts. The FGD session was conducted in Arabic, lasted about 45 minutes, and was recorded electronically. It took place at the University at a time convenient for all participants.

Data Analysis

To answer the quantitative RQs, the data from the questionnaire were analyzed using SPSS (version 26).

Descriptive statistics were used to summarize the data. Additionally, inferential statistics that included reliability of the new scale variables, *t*-tests, correlation, and multiple linear regression were used. All of the statistics were conducted at a significance level of $\alpha = 0.05$. To answer the quantitative RQs, the data from the FGD were analyzed manually using thematic analysis. The discussions were transcribed, coded, divided into categories, and then grouped to identify the most influential emerging themes. Additionally, a member-check that includes having the participants review and confirm the accuracy of their responses and the interpretation of these responses, and a review of the final report by an external qualitative expert, were conducted to ensure the credibility and accuracy of the results (Creswell, 2014). To answer the mixed-methods RQs, quantitative findings were integrated with qualitative insights through triangulation.

Results

Questionnaire

The descriptive statistics obtained from the analysis of questionnaire data are shown in Tables 1, 2, 3, and 4. Tables 1 and 3 show the descriptive statistics for the attitudes and academic integrity awareness toward AI use in academic tasks. In which center tendency and spread measures, along with assessing distributional properties, are provided. Tables 2 and 4 show the results of normality tests where the Shapiro-Wilks test and its *p*-value are reported to assess the normality of the data distributions.

Table 1. Descriptive Statistics for Attitudes Towards AI Use

Statistics			Value	Std. Error
Attitudes Toward AI Use Average Score	Mean		4.0147	0.04179
	95% Confidence Interval for Mean	Lower Bound	3.9324	
		Upper Bound	4.0970	
	5% Trimmed Mean		4.0577	
	Median		4.1818	
	Variance		0.444	
	Std. Deviation		0.66609	
	Minimum		1.64	
	Maximum		5.00	
	Range		3.36	
	Interquartile Range		0.82	
	Skewness		-0.936	0.153
	Kurtosis		1.023	0.304

Table 2. Tests of Normality for Attitudes Toward AI Use

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Attitudes Toward the Use of AI Tools Average Score	.106	254	.000	.940	254	.000

Table 3. Descriptive Statistics for Academic Integrity Awareness

Statistic			Value	Std. Error
Academic Integrity Average Score	Mean		3.0235	0.06076
	95% Confidence Interval for Mean	Lower Bound	2.9038	
		Upper Bound	3.1432	
	5% Trimmed Mean		2.9997	
	Median		2.7692	
	Variance		0.871	
	Std. Deviation		.93339	
	Minimum		1.23	
	Maximum		5.00	
	Range		3.77	
	Interquartile Range		1.60	
	Skewness		0.333	0.158
	Kurtosis		-0.962	0.316

Table 4. Tests of Normality for Academic Integrity Awareness

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Academic Integrity Average Score	.126	236	.000	.953	236	.000

From the corresponding tables above, it is found that students had positive attitudes toward AI (M=4.01, SD=0.67), indicating a strong tendency to use AI in their learning. Whereas the mean of academic integrity awareness was lower (M= 3.02, SD= 0.93), indicating that a significant portion of students had limited awareness of Academic Integrity.

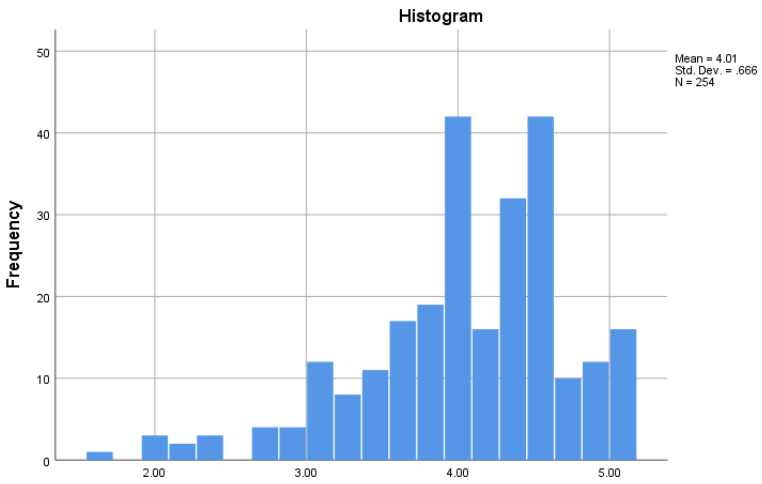

Figure 1. Histogram for Attitudes Towards the Use of AI

Regarding the normality tests, both scales attitudes towards AI (KS =.106, p < 0.001) and academic integrity

awareness (*KS* =.126, $p < 0.001$) depart significantly from normality. This is visually confirmed by the corresponding histograms that show that attitudes towards AI tools average scores appear to be left-skewed (negatively skewed), indicating that more students leaned towards positive attitudes. In contrast, the academic integrity awareness average scores appear to have a bimodal distribution (positively skewed), indicating variability in students' awareness of academic integrity principles. These distributions and skewness are shown in Figure 1 and Figure 2.

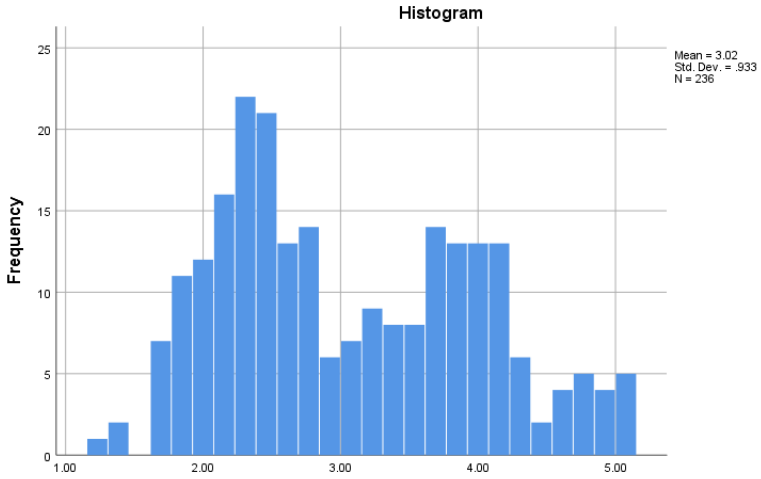

Figure 2. Histogram of Academic Integrity Awareness

A *t*-test for two independent samples was conducted to assess the group differences in attitudes and academic integrity awareness toward AI use broken by education level. Table 5 shows both variables' means and the standard deviations broken down by the education level. Table 6 presents the results of the *t*-test for two independent samples, corresponding *p*-values, and 95% confidence intervals.

Table 5. Group Statistics for Attitudes and Academic Integrity Awareness

Group	Level of Education	N	Mean	Std. Deviation	Std. Error Mean
Attitudes Toward AI Use	Undergraduate	195	3.9786	0.68892	0.04933
Average Score	Graduate	53	4.0875	0.56744	0.07794
Academic Integrity	Undergraduate	176	3.0162	0.97691	0.07364
Average Score	Graduate	53	3.0421	0.75754	0.10406

The mean attitudes score among undergraduates was 3.98 (*SD* = 0.69), whereas it was slightly higher among graduate students at 4.098 (*SD* = 0.57). Similarly, the mean academic integrity score among undergraduates was 3.02 (*SD* = 0.98), whereas it was 3.04 (*SD* = 0.76) among graduate students. These differences are illustrated in Figure 3. However, the *t*-test showed that neither attitudes toward AI ($t(246) = -1.057$, $p = .291 > .05$) nor academic integrity awareness ($t(109.002) = -0.203$, $p = .839 > .05$) had a significant difference between undergraduate and graduate students. This means that education level does not significantly affect students' attitudes or awareness of academic integrity regarding the use of AI.

Table 6. Independent Samples Test for Attitudes and Academic Integrity

		Levene's Test for Equality of Variances		t-Test for Equality of Means						
									95% CI Diff.	
Statistics		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	Lower	Upper
Attitudes Toward AI Use Average Score	Equal Variances Assumed	1.898	0.170	-1.057	246	0.291	-0.10892	0.10303	-0.31185	0.09401
	Equal Variances Not Assumed			-1.181	97.805	0.241	-0.10892	0.09224	-0.29199	0.07414
Academic Integrity Average Score	Equal Variances Assumed	9.842	0.002	-0.178	227	0.859	-0.02592	0.14591	-0.31343	0.26159
	Equal Variances Not Assumed			-0.203	109.002	0.839	-0.02592	0.12748	-0.27857	0.22673

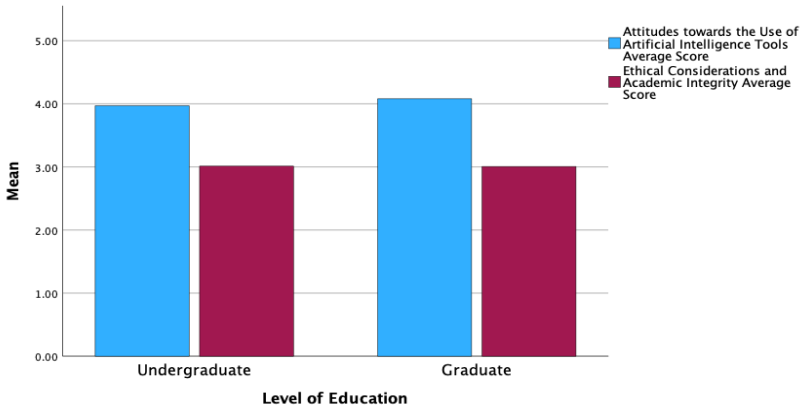

Figure 3. Bar Chart: Attitudes and Integrity by Education Level

Additionally, to examine the correlation between attitudes and academic integrity awareness, correlation and multiple linear regression were conducted. The results showed that the correlation between these two variables is positively significant ($r(252) = .226$, $p = .001$). This means that as students' academic integrity awareness increases, attitudes towards AI use tend to be more positive. Nonetheless, the effect size is small ($R^2 = .056$), indicating a weak relationship, which suggests that factors other than academic integrity awareness might play a more significant role in shaping students' attitudes.

A linear regression model was estimated to determine if education level and academic integrity awareness significantly predict students' attitudes, which are presented in Tables 7-9. Table 7 shows model fit, which includes R and R^2 and indicates how the independent variables explain variance in attitudes. Table 8 shows the F-ratio results, which assess if the overall model is statistically significant. Table 9 shows the estimated regression coefficients and their levels, presenting the individual contributions of academic integrity awareness and education level to attitudes. The estimated model was:

$$\text{Attitudes} = \beta_0 + \beta_1 * \text{Education} + \beta_2 * \text{Academic Integrity} + \varepsilon$$

Table 7. Linear Regression Predicting Attitudes Towards AI

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.237[a]	.056	.048	.66061

Table 8. ANOVA for Linear Regression Predicting Attitudes Toward AI

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.731	2	2.866	6.567	0.002[b]
	Residual	96.447	221	0.436		
	Total	102.178	223			

Table 9. Regression Coefficients for Linear Regression Predicting Attitudes

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	3.353	.200		16.766	0.000
Academic Integrity	0.168	.049	.227	3.468	0.001
Education	0.111	.105	.069	1.060	0.290

From Table 8, it can be concluded that the model is significant overall, $F(2, 221) = 6.567$, $p = .002 < .05$, but the model only explains approximately 5% of the variation in attitudes towards AI use ($R^2 = .056$). The estimated model was:

Attitudes = 3.353+ 0.168* Academic Integrity + 0.111 * Education

It is observed that academic integrity was an individually significant predictor of attitudes when controlling for Education ($t(221) = 3.468$, $p = .001 < .05$). This indicates that one extra point in the academic integrity average brings an extra 0.168 points on the attitudes. Nonetheless, education level was not an individually significant predictor when controlling for academic integrity ($t(221) = 1.060$, $p = .290 > .05$), indicating that differences in educational levels did not significantly impact students' attitudes.

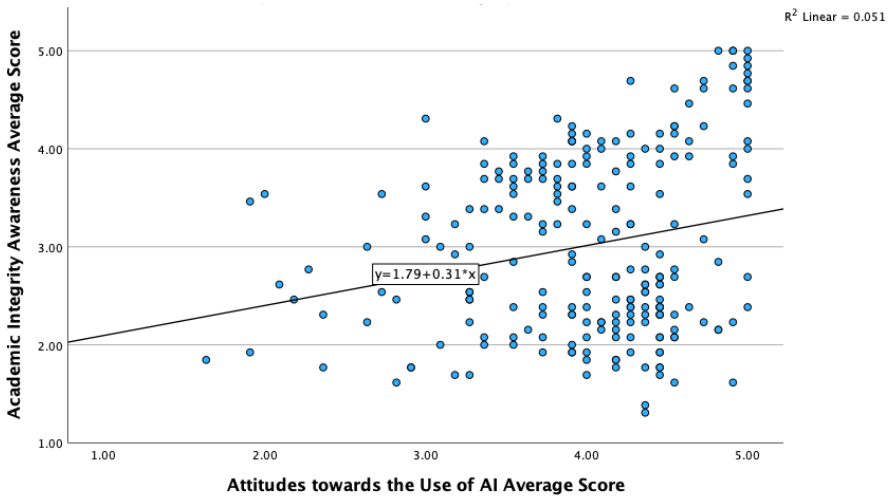

Figure 4. Scatter Plot: Attitudes vs. Academic Integrity Awareness

Even though the model was significant, its low explanatory power suggested that other factors than academic integrity awareness could play a more substantial role in shaping students' attitudes. Figure 4 illustrates this relationship between attitudes and academic integrity awareness related to AI use. This scatter plot shows that data points are spread across the graph with no clear pattern, which suggests a weak relationship and indicates that other factors may influence these attitudes.

In summary, the results found a significant positive correlation between attitudes and academic integrity awareness towards AI use in academic tasks. This indicates that as students' awareness increases, their attitudes towards AI use become more positive. However, the effect size was small, which means a weak relationship and indicates that other factors may have a more substantial effect on students' attitudes.

Focus Group Discussion

Three main themes emerged from the qualitative analysis.

Positive Attitudes and Advantages of AI in Academia

Students expressed positive views toward AI, discussing their high usage and the advantages of AI in academia. Reem described her daily use of AI and how it provides access to a wider range of educational resources: "I use it every day. If I need to find resources or information for even simple ideas, I start by asking ChatGPT about it." Hana agreed and explained how it helps in academic research: "I depend on it about 70% for completing my research. It helps with finding resources, paraphrasing, finding synonyms and if I want to avoid repetition of a specific word, I ask it for help." Sama liked AI's ability to provide different formulations of speech; she noted: " I like how I can have different options for formulating a topic." Other students agreed, added that it helps in organizing ideas. Noor appreciated AI's assistance in brainstorming and generating creative ideas: "I use it in about 40 to 50% of my work. It assists in brainstorming new topics, or when I want to think outside of my usual thinking, or amm come up with creative ideas."

Reem expanded on the discussion by highlighting how AI saves effort and time, saying: "I started my homework by using AI to explore information, and then search for the topic in books. This saves time and instead of spending about 4 hours, I can complete a task in only 2 hours." Sama agreed, adding more advantages like summarizing, translation, and video design: "The paid version of ChatGPT has the feature of summarizing PDF files and translating the entire file. That helps me a lot. One time, I asked ChatGPT to design a video and it did it for me!."

Reem mentioned how some AI tools have the great feature of hourly data updates: "I like to use Bard, which has a different name now. I think it is Gemini…. they are updating their information every moment…..every time, I find new and different information." Sama and Faten discussed how AI helps them overcome challenges with foreign languages and slang. Sama said, "I am not very good in English, and sometimes the article in English is very long. So, I use AI to give me the findings in my language and *bing!* I'm done." Arwa added: "It understands your natural slang language, so I don't have to use classical Arabic." Faten confirmed this, saying: "I sometimes

use AI for Chinese research, which I know nothing about. Honestly, I don't always ask the tool to open it; but I find that it opens up information for me, which I couldn't come across if I were using a regular search engine." Most students agreed that AI tools helped them achieve higher grades by explaining complex information in easy and comprehensive ways. Reem said, "When I study for exams, I ask the AI to explain any confusing points, providing video explanations, and it does a great job." Arwa built upon her friend's opinion: "If I have two confusing topics, I ask it to explain the differences in a table, which help me have greater understanding for specific topics." They also noted some benefits for teachers, such as saving time, accessing resources, explaining ideas in different ways, and building presentations. Hana said, "Teachers can direct students to use AI for additional information." Sama added,: "As a teacher, AI saves time by using ready-made presentation templates.…from which I can get ideas, and use the included pictures, and videos."

Concerns Regarding AI Use in Academia

The AI's rapid integration in education has raised different concerns among students. They expressed concerns about inaccurate information and fake sources that AI sometimes provides, which reduces their trust in the tool. Noor said: "I usually use AI for brainstorming but don't rely on it for references, as it sometimes brings unreliable sources." Reem added that AI sometimes offers incorrect information, not just fake sources: "It provides inaccurate information, and you don't know the source." The limited access due to financial barriers was another concern raised by Sama. Students also highlighted AI addiction as a concern that negatively affecting learning skills, specifically the writing skill. Noor noted:

> I feel that overusing AI decreases my skills. I use AI for paraphrasing, a task I'm usually proficient in, but now it does the job for me. Especially in my research, I go directly to AI for synonyms without thinking about them, which reduces my personal skills.

Additionally, they highlighted concerns related to privacy and data security. Faten said, "In some applications, there is a privacy breach." Hana agreed, saying: "Once I asked Chat Bing about a thing, and it mentioned my name in the answer. I was shocked and couldn't understand how it got that information." Arwa added, "I used AI to create my CV, and now I'm receiving text messages with job offers!"

Hana explained her complex feelings about integrity when using AI in her assignments. She said, "I sometimes submit my assignments with mixed feelings. I am sure it is my best effort, but I worry about whether it is allowed to use AI. At the same time, when I see my friends using AI without getting caught, I tell myself I won't put in more effort than they do. I won't feel good when they get better results than I do."

Arwa also mentioned that she does not like to collaborate with students who rely heavily on AI. She said, " It is hard for me to trust working with students who usually use AI for their assignments. I can't tell them the truth, but I usually avoid working with them because I worry about the credibility of the group work." Noor discussed another concern related to the future jobs that AI might replace human workers: "One of my big concerns is that AI might take instructors' positions and jobs."

Students' Academic Integrity Awareness and Needs for Responsible AI Use in Academia

Students highlighted several ethical issues, revealing their limited awareness of the academic integrity considerations surrounding AI usage in academia. They also expressed the need to foster responsible and ethical use of AI. Some students considered AI a primary source without the need to cite the original source of the provided information. Noor explained,: "It is the AI, which is developed to mimic the human mind. It's the same idea as having a writer. I believe it is enough to mention it as a reference in my academic work." Arwa agreed with her but excluded scientific research from having AI as a reference.

Moreover, they believed that with the AI's widespread use, teachers must be aware that students will absolutely use AI tools in their work, and there is no need to inform them. Areej said, "I don't have to tell my teacher that I used AI to help with my homework; she has to accept it and believe in it as the ultimate assistant. Specifically, when a teacher hasn't provided us with policies to follow when using AI." Faten added, "In this era, everyone knows how to use it, so it is expected to be used in academia." Arwa believed that AI usage would not affect academic work and did not consider it an issue of academic misconduct, so she does not feel the need to ask about its legal use.

Students also expressed their limited awareness of the university's policies related to AI usage. Arwa said, "Maybe because it's a new technology, we don't have regulations yet." Manal added that she always worried about committing an unintentional integrity violation because she is not aware of the policies related to AI use in academia. All the students articulated the need for access to and recognition of policies, as well as clear guidelines to regulate and enhance ethical AI use.

Reem explained the role of universities regarding these policies, "Each university has to build policies related to the responsible use of AI and distribute them among its students". Lamar agreed and suggested that a larger institution is responsible for these regulations. She said, "The Ministry of Education should put these policies, and universities and students should follow them." Arwa said, "We need them to explain the policies." Areej added, "And distribute them on the websites." Manal hoped that when universities build those policies, they would be flexible enough to allow AI adoption: "I hope universities allow us to use AI and accept it as a reference, rather than make it prohibited."

Noor expressed the need for training workshops on the responsible use and navigation of AI: "It's essential to use AI in teaching and research nowadays, but we need courses on ethical usage and the implementation of AI in education." Reem suggested including AI literacy as a course at different educational levels "I hope to see students studying courses about AI's different technologies and how to use AI ethically so they don't misuse it."

Mixed Methods Results

The qualitative data revealed that, although interviewees expressed concerns and mixed feelings regarding AI usage in academic tasks, they reported positive attitudes toward its use through their high dependency on it and

the perceived benefits. Additionally, interviewees explained their lack of awareness of academic integrity related to AI use, as no guidelines had been provided or explained to them. They emphasized the need for clear guidelines, policies, training, and courses on AI literacy and its ethical use in academia to prevent academic misconduct.

This qualitative analysis provided explanations and support for the quantitative findings that indicated, while students generally had positive attitudes toward AI use in academic tasks, they had lower academic integrity awareness related to AI tool usage. Both data analyses reached the same conclusion and validated one another regarding the correlation between the two variables, indicating that as academic integrity awareness increases, attitudes toward AI usage tend to be more positive.

Discussion

This mixed-methods study investigated students' attitudes and academic integrity awareness regarding AI use in academic tasks and the correlation between them. All RQs were addressed through quantitative and qualitative data analyses.

Regarding RQ1, which explores students' attitudes towards AI use in academic tasks, the quantitative analysis showed that students held positive attitudes. This was confirmed by the qualitative analysis through students' expressions, when they revealed their high dependency on AI daily and their belief in its perceived benefits. They mentioned some of these benefits, such as gaining quick and up-to-date information, accessing a plethora of resources in different languages, summarizing and paraphrasing, generating creative ideas, saving time and effort, and helping achieve higher grades. Moreover, one of the students even described AI as "the ultimate assistance." These findings align with previous studies in the AI literature, which indicated an increase in AI usage in academia among students due to its perceived benefits, such as those conducted by Sullivan et al. (2023), Kashive et al. (2020), Kim et al. (2020), Luckin et al. (2016), and Yu (2023).

Regarding RQ2, which examined students' awareness of academic integrity, the quantitative analysis showed that students had a lack of awareness. This finding was supported by the qualitative analysis. Students in the FGD reported this deficiency and expressed concerns about its usage in academia. Also, they expressed the need for clear policies and guidelines, as well as training to be informed about academic integrity issues related to its use in academia. These findings agree with previous studies that reported students' low awareness of AI usage policies, such as Chaudhry's et al. (2023), Oravec's (2023), and Stone's (2023) research. Moreover, they align with the results of Kwong's et al. (2010) study, which connected breaches of academic integrity to unclear instructions for students.

Regarding RQ3, which examined the correlation between attitudes and awareness of academic integrity, the quantitative data showed there was a positive relationship. The linear regression analysis also indicated that awareness of academic integrity is a key factor influencing students' attitudes towards AI, even when controlling for education level. This means that the more students are aware of academic integrity, the more positive attitudes they will have toward the use of AI in their academic tasks. The qualitative analysis confirmed these findings. In

the FGD, students expressed their lack of awareness, which led them to have concerns and fears of committing violations of academic integrity when using AI . In addition, some students expressed concerns about data breaches and accidentally violating integrity policies, and emphasized the need for clear guidance and policies. These issues have caused them to reduce their use of AI. These findings align with studies like Burkhard's (2022), Lima's et al. (2020), and Fošner's (2024) research, which found contradictory attitudes among students exposed to principles of the ethical use of AI. However, while the correlation showed there was a significant relationship, this correlation was weak (R^2= .056). This suggests that there may be other factors that have a greater impact on students' attitudes.

These variables may include cultural background, level of AI exposure, risks, concerns about using AI, or institutional policies. The qualitative data confirmed this when students expressed that seeing peers face no punishments for using AI encourages them to reconsider using AI tools to achieve higher grades, despite their limited awareness of institutional policies.

Regarding RQ4, the qualitative data provided additional insights into the quantitative findings, as discussed above.

In addition, these findings align with the TPB's constructs. Regarding the attitudes, the quantitative data suggest that students have positive attitudes with high mean scores (M=4.01). The qualitative findings confirm this, as participants noted their high dependency on AI because of its perceived benefits, their belief that it is the era of AI, and their expectation that everyone knows how to use it. These results aligned with the TPB's construct that attitudes towards a behavior are affected by the existing beliefs about its benefits.

Regarding the subjective norms, while the quantitative data did not reflect it clearly because the social pressure of others opinions was not measured, the qualitative data provided evidence on how students' behavior towards AI were affected by their peers, as one of them said, "When I see my friends using AI, I tell myself I will not put in more effort than they do". Adding more, their behavior is affected by the lack of institutional policies on using AI, as one of them said, "I don't have to tell my teacher that I used AI… Especially, when a teacher hasn't provided us with policies to follow". These two factors, peers' behavior and institutional silence, work as normative cues that affect students' decisions to use AI and their belief that this behavior is acceptable and not prohibited. These results align with the TPB's construct that subjective norms are influenced by others' opinions for approving or disapproving of a behavior.

Regarding the perceived behavioral control, both data results confirmed that students have a high level of behavioral control over AI usage. The quantitative results indicated that students have confidence in their ability to use AI, which was drawn from their positive attitudes despite their low academic integrity awareness (M= 3.02). In the FGD, students also expressed their confidence and belief in using AI in academia, as one student said, "It is expected to be used in academia", and another said, "The Teacher has to accept it and believe in it as the ultimate assistant." Additionally, they believe that they could overcome the risks and concerns of its usage, despite the absence of institutional policies. These results indicated that students might overestimate their ability to use AI in academia, which is consistent with the TPB's construct that perceived behavioral control means a feeling of

control an individual thinks he/she has when performing a behavior (Ajzen, 1991).

These results align with the findings of some previous studies focusing on students' attitudes and integrity in relation to the TPB theory, such as: Ababneh's et al. (2022) study that emphasized the importance of attitudes and perceived control in shaping students' behavior of cheating, even when integrity concerns are not entirely understood; Wang's et al. (2022) study which indicated that attitudes, social norms and perceived control over Internet ethics affected students' intention to behave ethically when using the Internet; and Yusliza's et al. (2022) study that revealed that TPB's constructs can influence and shape students' intention and behavior.

To sum up, the main insight drawn from this study is that the more students are exposed to descriptions of "ethical AI use" or ways in which generative AI can be incorporated into their academic tasks without violating academic integrity, the more likely they are to actually utilize AI in their academic life, which would contribute to the sustainable development of education.

Limitations

Although the author believes that this study could contribute to the literature on using AI in academia, some limitations may affect the degree to which the results can be generalized. This study was conducted at a single university in Saudi Arabia, and the FGD involved only eight students. Despite the fact that participants were from different specializations, the cultural backgrounds and other factors may differ across other universities, and a larger and more diverse sample might have different insights. Thus, the generalizations of the results should be used with caution. Also, the instruments used in this study focused primarily on students' attitudes and awareness of academic integrity without a detailed application of the TPB theory. Thus, when it comes to drawing conclusions related to the TPB, the results may have limited generalizability, and creating instruments focusing on the TPB's constructs would help in addressing this limitation.

Adding more, the correlation results indicated a significant relationship between attitudes and integrity awareness, but the correlation was weak ($R^2 = .056$). This suggests that other factors may have a more substantial influence on this relationship, which limits the generalizability of the results. For this, it is better in future research to include more variables and employ different statistical methods, such as "Structural Equation Modeling", as it might help the researchers to provide a deeper understanding of the relationship and help assess the accuracy of the TPB theory.

Also, students may be anxious about using AI in academia, especially if they are unfamiliar with its usage policies and ethics. This could lead them to underreport their use of AI, which would then impact the study's overall validity and credibility. Therefore, it is better to encourage students to honestly disclose their AI usage by assuring them there will be no penalties.

Additionally, this study examined students' attitudes and awareness regarding AI use in academia, and its results showed their intentions to use AI, but this does not necessarily lead to actual actions. Therefore, the author

recommends conducting future studies that explore behaviors and actions, not just opinions and attitudes.

Implications

Theoretical Implications

This study is one of the few in the literature that used a mixed-methods research design to provide a deeper understanding of students' attitudes and academic integrity awareness regarding the use of AI in academic tasks. Previous studies have focused mainly on using AI in productivity, plagiarism, and misconduct, and employed a single research design, such as a quantitative method, as Sullivan et al. (2023) noted. Furthermore, this study is unique because it used the TPB as a framework to interpret the results and to examine how its variables relate to constructs that may influence students' decisions about using AI in academia. Additionally, this study is one of the few studies regarding the use of AI in the Saudi educational context. Its importance stems from the fact that Saudi Arabia is focusing now on improving education by using the latest technologies to achieve the goals of its 2030 vision. All of those mentioned above could guide educational institutions and policymakers around the world to explore ways to encourage the responsible use of AI in academia for both students and instructors.

Practical Implications

The findings of this study highlight some practical implications for instructors, educational institutions, and policymakers regarding AI use in academia. It also highlights the need for clear guidance on AI usage and the consequences of academic misconduct related to AI use in academia. The author proposes practices based on students' needs and concerns discussed during the FGD for addressing these issues. These practices include integrating literacy, academic integrity issues, and ethical AI use into the learning environment. This can be achieved via incorporating these elements into all of the academic programs as a required course, orientations, and course materials. Additionally, requiring students to disclose whether they have used AI in their assignments, along with employing AI detection tools, are also strategies that could help monitor and promote ethical AI usage in academia. Moreover, educational institutions should encourage instructors to serve as good role models for students in using AI, and instructors in their turn should encourage students to do the same. These efforts would help in enhancing the positive influence of subjective norms on shaping student behavior. Consequently, and as the results of this study suggest, implementing these practices and raising awareness of AI's usage risks and ethics will help students be better prepared to make informed decisions about using AI in academic tasks.

Recommendations

The results and limitations of this study highlight the need for future research regarding the use of AI in Academia. To improve reliability and to better understand the results of this study, it is recommended to replicate it with a larger and more diverse sample from different cultural backgrounds. Moreover, long-term studies that track the changes in attitudes over time as institutional policies evolve would be beneficial.

Conducting research that applies TBP with instruments that consist of items measuring and focusing on its

constructs, and investigates how attitudes and intentions would influence students' actions and behavior, would provide meaningful insights. Additionally, using different theories might provide diverse interpretations.

Adding more, the result of this study revealed that the correlation between students' attitudes and academic integrity was weak. Thus, further studies that incorporate other factors that might have a greater effect on students' behavior, like demographic characteristics, technology literacy, faculty and peer norms, and ethical reasoning, are recommended.

Finally, future research is recommended to explore strategies for educational institutions and policymakers to bridge the gaps in AI literacy, as outlined above in the implications section. This can strengthen sustainable learning practices and the ethical integration of AI tools into educational and everyday life environments.

Conclusion

This study reports on higher education students' attitudes and academic integrity awareness regarding AI use in academic tasks and their correlations. A mixed-methods approach was employed using a questionnaire and FGD. Findings showed that students held positive attitudes toward using AI-based tools in academic tasks, while showing a lack of academic integrity awareness, which indicates that as AI academic integrity awareness increases, attitudes toward AI usage tend to become more positive. Additionally, a positive yet weak relationship appeared between the study's variables, suggesting that other factors might play a bigger role in shaping students' attitudes than academic integrity awareness.

Educational institutions are encouraged to promote AI literacy and raise awareness of AI ethics by integrating effective approaches and clear policies to mitigate the risks of integrity breaches while taking advantage of the benefits that AI can offer, which is essential for sustainable development in education. Further research should address students' concerns about AI use and examine how institutions and policymakers can provide better guidance for students and instructors on the ethical use of AI. Studies including diverse and larger samples could help confirm or contradict the findings. Additionally, exploring the influence of other factors on students' attitudes toward AI may provide a better understanding to benefit both students and instructors.

Declarations

Acknowledgements: Not applicable.

Ethical Approval: This study was approved by the Institutional Review Board (or Ethics Committee) of University of Jeddah, College of Education.

Informed Consent: Informed consent was obtained from all individual participants involved in the two phases of the study.

Statement Regarding Research Involving Human Participants and/or Animals: This study involved human participants and was conducted according to the guidelines of the Declaration of Helsinki.

Consent to Participate:

Quantitative Phase: In this phase of the study, participants were asked to provide consent to participate in this study through an informed consent form displayed at the beginning of the online survey. Participants were informed that by agreeing to the terms, they could proceed with the survey.

Qualitative Phase: In this phase of the study, which involved a focus group discussion, participants provided written informed consent to participate in this study by signing a formal consent form before participating.

Consent to Publish:

Quantitative Phase: Students gave their consent before starting the questionnaire.

Qualitative Phase: In this phase of the study, which involved a focus group discussion, participants provided their consent for the session to be recorded. They were assured that while their voices would be recorded for research purposes, these recordings would not be included in any published materials or used in a manner that could personally identify them. The recordings are stored securely and will only be used for internal analysis and to support the research findings in anonymized form. Participants' identities and voices will remain confidential and will not be disclosed in any published outputs of the study.

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