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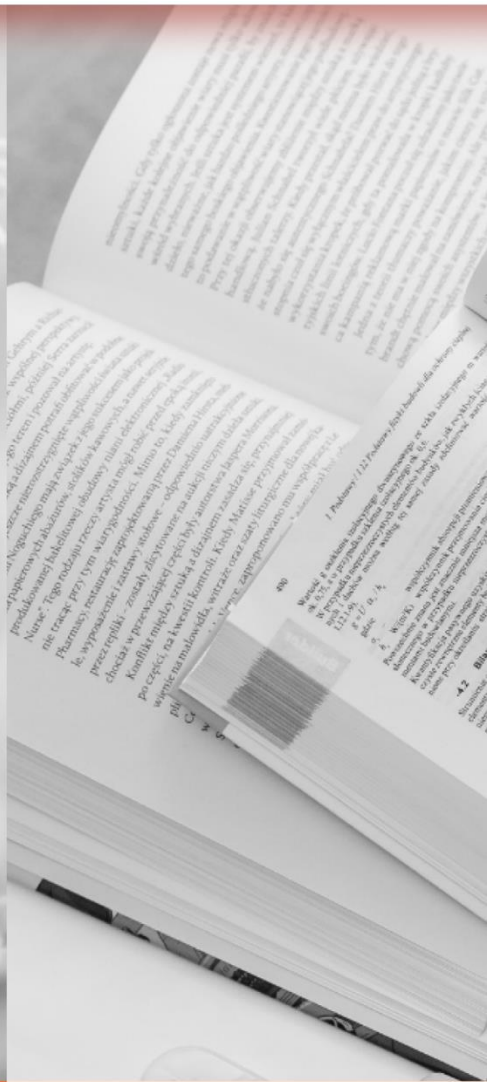

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The Relationship Between Attitude Towards AI And AI Literacy of University Students

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Abstract

This quantitative study investigated the relationship between university students' artificial intelligence (AI) attitude and their AI literacy. The data from 423 students who were randomly selected in Region XI, Philippines, were gathered using adopted scales on AI literacy and attitude towards AI. The instruments were assessed using validity and reliability tests prior to the conduct of inferential analyses. The data was analyzed using descriptive and inferential statistics through the Jamovi software. The findings revealed that, while most students have positive attitude towards AI, their attitudes appeared to have no significant effect or relationship on their AI literacy. The study highlights the importance of practical AI education, arguing that elements such as exposure and institutional support are more important in improving AI literacy.

Keywords

AI Literacy, AI Education, Attitude towards AI, University Students

Introduction

AI literacy is a necessary ability for effectively engaging with and critically evaluating AI technologies in today's tech-centric culture. It includes studying, applying, analyzing, and addressing ethical problems of AI (Ng et al., 2021). Despite fast advances in AI, gaps in AI literacy exist, particularly among children from diverse socioeconomic and cultural backgrounds (Druga et al., 2019). A middle school curriculum aiming to prepare students with the information and abilities needed to become informed citizens and discerning AI users is one of the global programs targeted at promoting AI literacy (Lee et al., 2021). Furthermore, efforts such as building AI-robotics tools to improve AI literacy in impoverished countries seek to narrow the accessibility and comprehension gap (Eguchi, 2021).

AI has the potential to greatly improve English language learners' communication abilities, especially in writing, reading, and vocabulary growth. Several studies have been conducted throughout the world to investigate AI literacy among university students, with encouraging results. Kong et al. (2021) and Lee et al. (2021) demonstrated that students from various backgrounds may successfully gain a conceptual knowledge of AI. They also stated that AI literacy education improves students' ethical awareness, allowing them to manage the moral complexity of AI use. Additionally, Ng et al. (2022) and Lee et al. (2021) demonstrated how novel educational strategies, such as digital storytelling, may build AI literacy in primary and middle school students, laying the groundwork for future learning.

Despite these encouraging improvements, Juma (2021) discovered that, while higher education students recognize the relevance of AI, they frequently lack a thorough knowledge of its ideas. These findings highlight the need for ongoing efforts to promote AI literacy among university students throughout the world. Previous study has looked into people's views and intentions to use artificial intelligence. Yadrovskaia et al. (2023) and Obenza et al., (2023d) discovered that respondents had a generally positive attitude regarding AI, even if they didn't completely grasp its fundamental ideas. Some students feel that artificial intelligence (AI) can have a positive impact on education (Kairu, 2020; Marrone et al., 2022), and they are open to adopting it since it efficiently engages learners and accommodates their various cognitive talents. These perceptions concerning AI influence people's faith in the technology (Lehner et al., 2023). Furthermore, AI technologies such as chatbots have been shown to be particularly appealing to language learners since they allow students to practice without the need for an instructor, encouraging autonomous learning (Mohamed & Alian, 2023).

Chen et al. (2021) found that students' readiness to learn a language was positively correlated with their awareness of AI-based language tools, attitudes toward AI, perceived ease of use, social influences, and intention to use AI. Several research have investigated people's feelings and usage of artificial intelligence (AI) in the Philippines (Obenza et al., 2023a, 2024b). However, there is still a large gap in comprehending AI literacy among university students, particularly in terms of student views regarding AI and AI literacy. This insight would let instructors customize their efforts to develop favorable attitudes and improve AI literacy among a varied student population. Despite the rapid integration of artificial intelligence (AI) into many educational programs, there is still a major gap in understanding the connection between university students' views regarding AI and their AI literacy. While various studies have examined AI literacy and its growth through courses and workshops (Kong et al., 2021; Ng et al., 2023; Liu & Xie, 2021), there has been little study into how students' views about AI impact or are influenced by their degree of AI literacy. Furthermore, Santos et al. (2018) state that most existing studies focus on specific disciplines or demographic groups, such as medical students or students from technical and humanistic specializations, rather than conducting a comprehensive analysis across diverse academic backgrounds (Gherheş & Obrad, 2018).

Thus, the study sought to investigate the relationship between university students' attitudes regarding AI and AI literacy. Understanding the relationship between students' views regarding AI and their AI literacy is critical for guiding curriculum creation, instructional techniques, transdisciplinary relevance, and workforce preparedness. This study's findings can help drive the design of AI-related courses that improve literacy and positively impact attitudes since courses that students view as beneficial can boost their participation in AI development. Romero-Rodriguez et al. (2023) used the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explore how university students view AI tools such as ChatGPT, discovering that students are likely to accept such technology because they feel it will help them learn. Perceived utility, performance expectations, hedonic motivation, personal worth, and established habits all have an impact on how people utilize AI chatbots. Similarly, Kim (2017) used the UTAUT model to investigate healthcare university students' intents to adopt AI technology, discovering that expectancies, social influence, perceived task usefulness, and anxiety were all important factors. Kim's (2017) study also found that the desire to deploy AI moderated the influence of anxiety on attitudes and task usefulness. Kaya et al. (2022) found that concern over AI might act as a barrier, causing people to underestimate its advantages, simplicity, and overall usefulness. Gado et al. (2022) revealed that perceived utility, attitude, social norms, and AI literacy were all significant predictors of students' willingness to utilize AI.

According to Alzahrani (2023), while perceived dangers negatively influenced students' attitudes toward AI, performance expectations and supporting conditions had a substantial impact on their desire to employ AI in education. Interestingly, effort expectations had no significant effect on their sentiments regarding AI in higher education. In addition to this study, the UTAUT model was effectively utilized to evaluate students' adoption of AI-based e-learning platforms (Lin et al., 2021), intelligent robots (Roy et al., 2022), and AI-powered writing help tools (Intiser et al., 2023).

Despite substantial research on attitudes and intentions toward AI usage, no study has yet used the UTAUT model to investigate the role of AI trust and awareness in molding university students' attitudes and actions toward AI. This study intends to fill this gap by providing significant information for academic sectors incorporating AI into teaching tactics and technological sectors trying to build AI solutions that improve users' favorable attitudes and uptake. Future studies might use these data to investigate the elements that impact students' attitudes and intentions to engage with AI in greater depth. Sexual identity has a significant influence on university students' attitudes toward AI and AI literacy.

Materials and Methods

This research used a quantitative method, specifically a non-experimental correlational design, to examine the connection between students' attitudes toward AI and their AI literacy. According to Creswell and Creswell (2022), quantitative research involves a systematic study of real-world concepts by looking at the relationships between different factors. This method allows researchers to use tools to measure these factors and then apply statistical methods to analyze the data.

The tools used to measure the variables in this study were based on the work of Suh and Ahn (2022) and were contextualized to evaluate students' attitudes towards AI. The questionnaires, which used a 5-point Likert scale, were distributed via online surveys (through Google Forms) to university students from different programs across various universities and colleges in Region XI, Philippines. The AI Literacy scale, which includes 12 items was adapted from a study of Wang et al. in 2022. This scale was used to assess students' daily interactions with, understanding of, and judgment of AI technology. Participants were chosen using stratified random sampling, a method that combines random selection with categorization to create groups from a larger population. This approach involves separating the target group into smaller sections called strata. Then, simple random sampling is used within each section, and the

chosen samples from all sections are combined to create one overall sample.

Using G*Power 3.1.9.6, a power analysis was done beforehand to find out that required minimum sample size for the study. A total of 89 samples was recommended to have an 80% chance of detecting a medium effect (f^2 = 0.15) with a significance level of 0.05 when examining the relationship between AI literacy and students' views on AI. With two factors in the model, the calculated noncentrality parameter was 3.65, the critical t-value was 1.99, and the degrees of freedom were 86. However, the actual sample size of 423 in this study exceeded this requirement, making the study robust in investigating the link between AI literacy and students' attitudes toward AI.

The research ensured the reliability of the instruments using the Cronbach's alpha and McDonald's Omega tests. Descriptive statistics, such as mean and standard deviation, were calculated using Jamovi software to analyze variables including AI literacy, cognitive absorption, AI self-efficacy, AI trust, and student attitudes. This was done to determine direct, indirect, and total effects, as well as the sizes of the path effects. Additionally, pilot testing and expert validation were conducted on the instruments to further ensure reliability.

Results and Discussion

Ensuring the accuracy and trustworthiness of the measurement model is essential when doing research that includes moderating analysis, as noted by Hair et al. (2019). Before evaluating the data, any possible problems with specific items were resolved to strengthen the research tool. Table 1 shows the reliability and validity assessment, which was done using Cronbach's alpha—a commonly accepted method for measuring internal consistency in surveys (Mashingaidze et al., 2021). The Cronbach's alpha values for AI Literacy (0.903) and Attitude Towards AI (0.945) were significantly higher than the suggested minimum of 0.7, indicating strong internal consistency and validity of the surveys (Taber, 2017). A reliability coefficient of 0.70 or higher is usually seen as a strong indicator of a scale's reliability. But it's crucial to interpret these results thoughtfully, because a low alpha value could be because the scale has only a few items. On the other hand, an alpha value over 0.90 might suggest that the scale includes too many similar items (Kılıç, 2016). Both of these factors showed values above the 0.70 mark, which confirms that the instrument is reliable in measuring the important concepts. Additionally, since Cronbach's alpha values remained below 0.95, it indicates that there was no issue with redundancy among the factors. Another measure of internal consistency was employed- the McDonald's omega test. The McDonald's omega values of 0.917 for AI Literacy and 0.951 for Attitude Towards AI were obtained. According to Lessa et al. (2020), the suggested upper limit for McDonald's omega in establishing reliability is 0.90. The reliability analysis shows that all items contribute positively to the scale's overall consistency.

Table 1. Construct Validity and Reliability

Variables	Cronbach's alpha	McDonald's omega
AI Literacy	0.903	0.917
Attitude Towards AI	0.945	0.951

The analysis involved 423 participants who provided data on the average AI literacy score was 3.58, suggesting a high degree of AI literacy among students from different universities, as shown in Table 2. Nevertheless, the results also suggest the concerns highlighted by Anderson and Anderson (2006) regarding security, privacy, and biases linked to advanced AI knowledge, AI literacy and attitudes toward AI. The following descriptive statistics were observed AI Literacy Overall mean: 3.58 (SD = 0.664) The mean scores for subcategories were; Ethics: 3.77 (SD = 0.790) Understanding: 3.70 (SD = 0.753) Detection: 3.53 (SD = 0.844) Application: 3.32 (SD = 0.844) Attitude Toward AI: Overall mean: 3.38 (SD = 0.809) The subcategories of attitude showed the following mean scores Cognitive: 3.60 (SD = 0.972) Affective: 3.29 (SD = 0.810) Behavioral: 3.25 (SD = 0.892) The high average score in AI

Literacy Ethics (3.77) indicates that participants possess a strong understanding of AI technologies' ethical implications, which is vital for the responsible development and use of AI.

This finding is consistent with the studies by AI Saad et al. (2022) and Bisdas et al. (2021) as referenced in Obenza et al. (2024b), who also observed that students emphasized the importance of ethical considerations in AI. Conversely, the lower average score in AI Literacy-Application suggests a gap between theoretical understanding and practical application, indicating a need for more hands-on training, as suggested by prior studies such as Juma (2021), which indicated the necessity for ongoing initiatives to enhance AI literacy among students. The overall mean score for attitudes towards AI (3.38) shows a somewhat positive attitude, with the cognitive component (3.60) being the highest, demonstrating that students understand AI's advantages and potential. However, the lower affective (3.29) and behavioral (3.25) scores suggest potential hesitance or uncertainty in emotionally engaging with or actively using AI, as noted in studies like that of Kim and Lee (2023). Additionally, Obenza et al. (2024c) found that AI Trust and AI Awareness significantly impact students' attitudes and intentions to use AI. Specifically, the cognitive aspect had the highest influence, while factors like social influence and facilitating conditions were less significant in shaping AI attitudes. This finding aligns with our results where the behavioral and affective aspects showed moderate engagement. The modal scores in behavioral and affective attitudes, both at 3.00, suggest a significant proportion of participants feel neutral about their engagement with AI, which could be due to limited exposure or concerns regarding the implications of AI technologies, echoing findings by Choung et al. (2022) and Juma and Rodway (2023).

Table 2. Status of University Students' AI Literacy and Attitude towards AI

Variables	N	Mean	SD	Description
AI Literacy	423	3.58	0.664	High
AI Literacy - *Ethics*	423	3.77	0.790	High
AI Literacy - *Detect*	423	3.53	0.844	High
AI Literacy - *Understanding*	423	3.70	0.753	High Moderate
AI Literacy - *Application*	423	3.32	0.844	Moderate Moderate
Attitude toward AI	423	3.38	0.809	Moderate
Attitude - *Behavioral*	423	3.25	0.892	High
Attitude - *Affective*	423	3.29	0.810	Moderate
Attitude - *Cognitive*	423	3.60	0.972	
AI Literacy - *Application*	423	3.32	0.844	

Using Collinearity Statistics, the variance inflation factor (VIF) and tolerance values both indicate that there is no multicollinearity in the model, suggesting that the predictor variable, attitude toward AI, does not overlap significantly with other variables, and the model remains stable. According to Hair et al. (2019), a VIF value exceeding five typically indicates potential collinearity issues among predictor variables. However, collinearity can still be a concern when VIF values fall within the range of three to five, as noted by Mason and Perreault (1991) and Becker et al. (2014). Ideally, VIF values should be around three or lower to minimize collinearity concerns. When faced with collinearity challenges, a common and theoretically sound approach is to develop higher-order models, as recommended by Hair et al. (2017b).

Table 3. Collinearity Statistics

	VIF	Tolerance
Attitude toward AI	1.00	1.00

The R^2 value indicates that the attitude toward AI explains only 0.0347% of the variance in AI literacy. This suggests that the relationship between students' attitudes toward AI and their AI literacy is extremely weak, with attitude toward AI contributing very little to the prediction of AI literacy. The F-statistic is low, and the p-value (0.703) indicates that the model is not statistically significant. In other words, the model fails to establish a meaningful relationship between attitude toward AI and AI literacy. The intercept value (3.6314) suggests that when attitude toward AI is zero, the predicted level of AI literacy is 3.63. This represents the baseline AI literacy level without the influence of attitudes toward AI. The coefficient for attitude toward AI (-0.0153) indicates that as attitudes toward AI become more positive, AI literacy decreases slightly. However, this effect is extremely small and statistically not significant (p = 0.703), meaning that we cannot draw any reliable conclusions about the impact of attitudes toward AI-on-AI literacy. The analysis reveals that the correlation coefficient (R) is 0.0186, and the coefficient of determination (R^2) is 0.000347, indicating that attitudes toward AI account for just 0.0347% of the variance in AI literacy. This demonstrates an extremely weak relationship, suggesting that students' attitudes toward AI have a minimal to no impact on predicting their AI literacy. Additionally, the F-statistic is 0.146, with a p-value of 0.703, showing that the model is not statistically significant. Therefore, it fails to establish any meaningful relationship between attitudes toward AI and AI literacy.

Table 4. Model Fit

Model	R	R^2	F	df1	df2	p
1	0.0186	3.47e-4	0.146	1	421	0.703

Note. Models estimated using sample size N=423

The intercept estimates of 3.6314 (SE = 0.1389, t = 26.136, p < 0.001) indicates that the predicted level of AI literacy is 3.63 when the attitude toward AI is at zero, serving as the baseline measure of AI literacy in the absence of any influence from attitudes toward AI. Regarding the attitude toward AI itself, the coefficient is estimated at -0.0153 (SE = 0.0400, t = -0.382, p = 0.703), suggesting that more positive attitudes toward AI are associated with a slight decrease in AI literacy. However, this effect is minimal and statistically not significant (p = 0.703), implying that attitudes toward AI do not have a meaningful or reliable impact on AI literacy in this context.

Table 5. Model Coefficients – AI Literacy

Predictor	Estimate	SE	t	p
Intercept	3.6314	0.1389	26.136	<.001
Attitude toward AI	-0.0153	0.0400	-0.382	0.703

The results show that students who display enthusiastic attitude toward AI tend to have higher levels of AI literacy. Research by Chen et al. (2021) supports this by highlighting that positive attitudes significantly influence the intention to use AI tools, solidifying the idea that encouraging a positive outlook on AI can enhance students' engagement and understanding of the technology.

Conclusions

The results suggests that students at universities demonstrate that they comprehend AI literacy well, especially when it comes to ethical issues, indicating that they are conscious of the ethical consequences of AI. However, there seems to be an evident gap between academic understanding and real-world application, suggesting that additional practical experience is required. Students' attitudes toward AI are usually favorable, and they clearly see its benefits and potential, especially in cognitive aspects. In spite of this,

there is a discernible lack of emotional investment and active AI use, suggesting apprehension or caution of incorporating AI into daily tasks. This implies that although students understand the usefulness of AI in the classroom, more work is required to help them become more at ease and engage with the technology.

Further, this research shows that there is no strong connection between how university students feel about AI and how well they understand it. Even though students had a decent understanding of AI and generally liked it, their feelings about AI didn't accurately show how skilled they were with AI technologies. This means that AI literacy is affected by more complicated and varied factors than just attitudes. The statistical analysis backs this up, showing that attitudes toward AI only explain a very small part of the differences in AI literacy. These findings bring up important questions about how to improve AI literacy, suggesting that just encouraging positive feelings isn't enough to help students become better at understanding and using AI. Instead of focusing solely on formal education, factors like one's educational background, access to AI tools, and previous experience with AI are more important in determining AI literacy. To enhance AI literacy, a more focused approach is needed, emphasizing practical skills, ethical issues, and a deeper grasp of AI technology.

Recommendations

Considering the absence of a strong connection between attitudes towards AI and AI literacy, future studies should explore other possible influences, such as students' previous educational backgrounds, their exposure to AI technologies, and the extent of institutional support for AI education. This approach would offer a more thorough understanding of the elements that help students develop AI literacy. Universities and educators looking to improve AI literacy should focus on providing practical, hands-on learning experiences rather than just encouraging positive attitudes towards AI. Including experiential learning through workshops, group projects, and real-world applications can better engage students with AI technologies and help them understand AI concepts more deeply. While having a positive attitude towards AI is helpful, it's crucial to take a comprehensive educational approach that combines experiential learning and considers various predictive factors. This will ensure that students are well-prepared for an AI-driven future and have the skills needed to adapt to the changing world of AI technology.

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