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To cite this article:

Albino, M.G., Albino, F.S., Asio, J.M.R., & Gadia, E.D. (2025). Influence of AI anxiety on AI self-efficacy among college students. *International Journal of Technology in Education (IJTE), 8*(2), 557-573. https://doi.org/10.46328/ijte.1109

International Journal of Technology in Education
2025, Vol. 8, No. 2, 557-573 https://doi.org/10.46328/ijte.1109

Influence of AI Anxiety on AI Self-Efficacy Among College Students

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Article Info

Article History

Received:
20 November 2024
Accepted:
21 April 2025

Keywords

AI anxiety
AI self-efficacy
College students
Preliminary investigation
Cross-sectional study

Abstract

Technology has contributed so much to the development and innovation of humankind. Artificial Intelligence (AI) is an off-shoot of such. This article explored the influence of AI anxiety on AI self-efficacy among college students. The investigators used a cross-sectional research design for 695 purposively chosen college students in one higher education institution in Olongapo City, Philippines. The study used two scales to determine the students' AI anxiety and self-efficacy. The gathered data underwent descriptive and inferential analysis with the help of SPSS 23 software. The results showed that the AI anxiety levels of the students in general were moderate; however, in terms of job replacement and sociotechnical blindness, it was high. The students also have a moderate level of AI self-efficacy. There were also significant differences and relationships observed in the analysis as well. Lastly, learning and AI configurations came out as predictors that influence the AI self-efficacy of college students. The investigators suggested some recommendations at the end of this article.

Introduction

Technology is a part of our daily lives in our fast-paced, changing world. Humans have developed innovative ways and measures to make things easier for them. In this matter, technology comes along. In the field of education, technology is already integrated with the curriculum. Moreover, institutions worldwide are maximizing their potential to serve the community and society more efficiently. One of these technological advancements being employed today is the use of Artificial Intelligence (AI). Terzi (2020) defined AI as human-like automation in place of a person who can operate diverse functions based on some degree of intelligence. AI in education opened up new opportunities, potentials, and challenges in the practice of education ((Ouyang & Jiao, 2021), and it already attracted much attention from academia (Zhang & Lu, 2021). Due to its endless possibilities, AI has emerged as a force in the academe, which can have positive and negative effects if not used appropriately. This idea is due to AI's extensive adoption and utilization of education by institutions in different forms (Chen et al., 2020). Because of the adverse effect of AI, Zhai et al. (2021), in a literature review, proposed some challenges in education due to improper use of AI techniques that led to role changes among teachers and students. Nevertheless, a proper strategic plan for AI implementation with its critical factors for educational development assists teachers and students in various ways (Limna et al., 2022). Other literature shows the potential of AI as a valuable tool in the field of practice like in medicine, education, or industry (Salvagno et al., 2023; Moor et al.; Finlayson et al., 2021; Schwendicke et al., 2020; Jan et al., 2023; Bohr & Memarzadeh, 2020; Abioye et al., 2021). Locally, Estrellado and Miranda (2023) reflected on the collaboration between educators and policymakers to focus on

teaching and learning while leveraging AI benefits in the country. AI technology adoption in the country may have adverse effects but still generate more employment in all economic sectors; cooperation with the public and private sectors in the government and academe is necessary to develop appropriate skill sets for graduates and workers (Rosales et al., 2020).

Regarding AI anxiety among students, different perspectives from academicians and researchers prospered along the way. For instance, Li and Huang (2020) said that the rapid development of artificial intelligence (AI) caused the emergence of AI anxiety, which receives global attention. In addition, Hopcan and colleagues (2023) also expressed that AI anxiety heightens, especially in its impact on employment and social life. Nevertheless, AI can also be user-friendly and helpful in sharing across different services, especially in educational institutions (Alhumaid et al., 2023).

Additionally, Lemay et al. (2020) alleged that AI anxiety runs within the spectrum and is influenced by the immediate effects of automatization and popular representations, as well as the discussion of the consequences of AI and addressing technology readiness among students. However, Wang et al. (2022) believe that AI anxiety is essential and can become a guiding principle in the course design of an AI learning setting. In the country, Labrague et al. (2023) shared that students had a moderate readiness to adopt AI in their studies. They also identified some barriers to accessing AI technology, such as a need for computer skills, AI knowledge and awareness, and time constraints. Consequently, a study also discussed the relevance and potential of Artificial Intelligence (AI) in mental health (Salcedo et al., 2023). AI can help in diagnosing and classifying mental health disorders, provide platforms for mental health support, improve patient flow, relieve depression and anxiety, and transform the future of psychiatry. Lastly, Sumandal (2023) investigated the self-efficacy of some teachers in using AI-based educational tools and found that there were high self-efficacy levels among the respondents, indicating solid belief in their ability to use AI-based educational tools.

In the case of AI self-efficacy, there was little literature that mainly discussed the matter in an in-depth manner. Nevertheless, the context of self-efficacy came about and related to artificial intelligence to some extent. For example, a study by Ayanwale (2023) found that students' self-efficacy toward learning AI positively affects their intention to learn. Another one from Weitz's (2021) paper mentioned that self-efficacy is an instrument to evaluate explainable AI approaches in empirical studies. On the other hand, Huo et al. (2023) explained how AI self-efficacy plays a role in respondent participation and acceptance. In a more practical approach, the study of Li (2021) showed the essence of AI in the quality of English writing teaching. It proposed the application of AI technology to assist teachers and help solve the problems of students' low self-efficacy in writing. Moreover, inculcating a positive attitude toward AI and self-efficacy by providing programs based on AI technology is essential (Kwak et al., 2022). This idea will also help HEIs promote their students' self-efficacy and creativity and strengthen their AI capability (Wang et al., 2022).

The literature mentioned shows that AI's potential in education is exponential and promising. Nevertheless, students are still adamant about accepting AI's reality and the assistance it is providing them. Moreover, the investigators also found in their readings that only a few pieces of literature have analyzed the influence of AI

anxiety on the AI self-efficacy of students, especially from the local perspective. That idea fueled the investigators' interest in exploring this subject matter.

The primary purpose of this article is to determine the influence of AI anxiety on the AI self-efficacy of college students in a local higher education institution in Olongapo City, Philippines. The article also determined the level of AI anxiety and AI self-efficacy among students and analyzed the differences when grouped according to demographic characteristics. The result of this study contributes primarily to the ever-growing literature about AI in the local scene. At the same time, it intends to help the institution promote and inculcate in students the potential of integrating AI into the education system, making studying a lot more enjoyable and productive. Lastly, it provides baseline data for future reference and additional knowledge in the field of profession and practice.

Methodology

Research Design

This investigation employed a descriptive cross-sectional design to achieve the investigators' primary objectives. Cross-sectional research is a type of study that collects information from different individuals at a single point in time. Since this article collected data during the academic year of 2023-2024, the said research design is appropriate.

Participants

To gather enough data, the study used students from a higher education institution in Olongapo City as study subjects. Six hundred ninety-five purposively chosen students voluntarily participated in the online survey. For the students to be eligible for the said online survey, they must possess the following criteria: (a) a Bona fide student of the participating institution, (b) currently enrolled in the academic year 2023-2024, (c) a regular student; (d) must have gadgets available for the online survey; and (e) with strong internet connectivity. The exclusion criteria include (a) students from higher education institutions, (b) not enrolled in the current academic year, (c) irregular or part-time students, (d) no gadgets available, and (e) poor internet connectivity. Table 1 below discloses the demographic characteristics of the students.

Table 1. Demographic Characteristics

Profile	Frequency	Percentage
Year Level		
First Year	185	26.6
Second Year	157	22.6
Third Year	143	20.6
Fourth Year	210	30.2
Age		
Less than 20 years old	337	48.5
21 – 25 years old	326	46.9

Profile	Frequency	Percentage
26 – 30 years old	16	2.3
31 years old and above	16	2.3
Sex		
Female	380	54.7
Male	315	45.3
Available Gadgets at Home		
Laptop/ PC	461	66.3
Smartphone/ Tablet	234	33.7
Used any form of AI in Study or Learning		
Yes	535	77.0
No	160	23.0
Total	**695**	**100.0**

Measures

There were two primary measures that the study modified and utilized in order to achieve the study's objectives. The first one was the Artificial Intelligence Anxiety Scale (AIAS) developed by Wang and Wang (2022). This scale was a 21-item measure that has four dimensions (factors). They are learning, job replacement, sociotechnical blindness, and AI configuration. Initial reliability coefficients were .974 for learning, .917 for job replacement, .917 for sociotechnical blindness, and .961 for AI configuration.The second measure originated from Carolus et al.'s (2023) paper, their Meta AI literacy scale. One of the components was AI self-efficacy, which contained six items. The reliability ranges from .70 to .90.

Additional information-gathering procedures were the demographic characteristics of the students, which comprised their year level, age, sex, availability of gadgets at home, and use of any form of AI in study or learning.The modified instrument underwent pilot testing before data gathering, yielding an overall Cronbach coefficient of .989. The investigators also secured permission from the different college deans of the participating institutions. After their approval, the investigator coordinated with the research coordinators of each college to disseminate the online survey form link to all students who are available and capable of answering the survey. Before answering the online survey, the investigators secured their consent and data privacy confirmation.

Data Analysis

After gathering substantial student data, the investigators employed descriptive and inferential statistics. They also treated the data using MS Excel and SPSS 23. For the descriptive statistics, data computations involved frequency, percentage, and mean. At the same time, independent *t*-test, Analysis of Variance, Pearson-R Moment of Correlation, and linear regression analysis were used for the inferential statistics.The investigators patterned the responses of the students from a five (5) point Likert scale, which comprised (1) Very low, (2) Low, (3) Moderate), (4) High, and (5) Very high. The responses were to analyze the students' level of AI anxiety and AI self-efficacy.

Results

This study aims to determine the influence of AI anxiety on the AI self-efficacy of students in a tertiary education institution. To achieve this, the study performed statistical analysis with data gathered from the online survey during the school year of 2023-2024. The succeeding tables below show the result of the analysis.

Table 2. Level of AI Anxiety in Terms of Learning

Item	Mean	Interpretation
1) Learning to understand all of the special functions associated with an AI technique/product makes me anxious.	2.91	Moderate
2) Learning to use AI techniques/products makes me anxious.	2.82	Moderate
3) Learning to use specific functions of an AI technique/product makes me anxious.	2.84	Moderate
4) Learning how an AI technique/product works makes me anxious.	2.82	Moderate
5) Learning to interact with an AI technique/product makes me anxious.	2.83	Moderate
6) Taking a class about the development of AI techniques/products makes me anxious.	2.77	Moderate
7) Reading an AI technique/product manual makes me anxious.	2.78	Moderate
8) Being unable to keep up with the advances associated with AI techniques/products makes me anxious.	2.94	Moderate
Overall Mean	**2.84**	**Moderate**

Legend: *1.00-1.79=Very low; 1.80-2.59=Low; 2.60-3.39=Moderate; 3.40-4.19= High; 4.20-5.00=Very high*

Table 2 displays the mean distribution of the level of AI anxiety regarding learning. Generally speaking, the students gave this sub-variable a modest response for their perspective. To be more specific, the highest mean score given by the students was 2.94, which corresponds to a Likert scale interpretation of "moderate." On the other hand, the lowest mean score given by the students was 2.77, which has an equivalent interpretation of "moderate" on the Likert scale. Overall, the students gave a 2.84 mean score for AI anxiety in terms of learning with a corresponding interpretation of "moderate" also on the Likert scale.

Table 3. Level of AI Anxiety in Terms of Job Replacement

Item	Mean	Interpretation
1) I am afraid that an AI technique/product may make us dependent.	3.44	High
2) I am afraid that an AI technique/product may make us even lazier.	3.54	High
3) I am afraid that an AI technique/product may replace humans.	3.50	High
4) I am afraid that the widespread use of humanoid robots will	3.58	High

Item	Mean	Interpretation
take jobs away from people.		
5) I am afraid that if I begin to use AI techniques/products, I will become dependent upon them and lose some of my reasoning skills.	3.49	High
6) I am afraid that AI techniques/products will replace someone's job.	3.65	High
Overall Mean	**3.53**	**High**

Legend: *1.00-1.79=Very low; 1.80-2.59=Low; 2.60-3.39=Moderate; 3.40-4.19= High; 4.20-5.00=Very high*

Table 3 shows the result of the mean computation for respondents' AI anxiety regarding job replacement. It is interesting to note that in this particular subsection, the students gave high scores on each item. Notably, the highest mean generated by this subsection of AI anxiety was 3.65, which falls under the Likert scale interpretation of "high." Also, the student gave the lowest mean score of 3.44, which also falls under the interpretation of "high." For the overall mean, the study obtained 3.53, corresponding to a similar " high " interpretation in the Likert scale.

Table 4. Level of AI Anxiety in terms of Sociotechnical Blindness

Item	Mean	Interpretation
1) I am afraid that an AI technique/product may be misused.	3.72	High
2) I am afraid of various problems potentially associated with an AI technique/product.	3.53	High
3) I am afraid that an AI technique/product may get out of control and malfunction.	3.58	High
4) I am afraid that an AI technique/product may lead to robot autonomy.	3.45	High
Overall Mean	**3.57**	**High**

Legend: *1.00-1.79=Very low; 1.80-2.59=Low; 2.60-3.39=Moderate; 3.40-4.19= High; 4.20-5.00=Very high*

To determine the level of AI anxiety of students in terms of sociotechnical blindness, Table 4 displays the result of the mean computation. One can easily decipher that the students are already anxious in the case of sociotechnical blindness as they generally gave this particular part of the study a high score. The high scores given by them technically translate to high anxiety levels. A closer look at the results shows that the study obtained a 3.72 for the highest mean score and 3.45 for the lowest mean. These mean scores equate to a Likert interpretation of "high." The same also goes for the overall mean for AI anxiety in terms of sociotechnical blindness.

Table 5. Level of AI Anxiety in terms of AI Configuration

Item	Mean	Interpretation
1) I find humanoid AI techniques/products (e.g., humanoid robots) scary.	3.17	Moderate
2) I find humanoid AI techniques/products (e.g., humanoid robots) intimidating.	3.14	Moderate

Item	Mean	Interpretation
3) I don't know why, but humanoid AI techniques/products (e.g., humanoid robots) scare me.	3.07	Moderate
Overall Mean	**3.13**	**Moderate**

Legend: *1.00-1.79=Very low; 1.80-2.59=Low; 2.60-3.39=Moderate; 3.40-4.19= High; 4.20-5.00=Very high*

In terms of the level of AI anxiety of students in the case of AI configuration, Table 5 depicts the result of the mean distribution. As seen from the table, the students gave another modest score for the said subvariable of the study. When we analyze more, the students only gave 3.17 as the highest mean score, followed closely by 3.14, and the lowest mean was 3.07. However, all of the mentioned scores fall under the same interpretation of "moderate." Lastly, even the overall mean of 3.13 by the AI anxiety level of students in terms of AI configuration falls under the same interpretation.

Table 6. Level of AI Self-Efficacy

Item	Mean	Interpretation
1) I can rely on my skills in difficult situations when using AI.	3.10	Moderate
2) I can handle most problems in dealing with artificial intelligence well on my own.	3.04	Moderate
3) I can also usually solve strenuous and complicated tasks when working with artificial intelligence well.	3.09	Moderate
4) I can keep up with the latest innovations in AI applications.	3.03	Moderate
5) Despite the rapid changes in the field of artificial intelligence, I can always keep up to date.	3.03	Moderate
6) Although there are often new AI applications, I manage to always be “up-to-date."	3.05	Moderate
Overall Mean	**3.06**	**Moderate**

Legend: *1.00-1.79=Very low; 1.80-2.59=Low; 2.60-3.39=Moderate; 3.40-4.19= High; 4.20-5.00=Very high*

Table 6 shows the result of the mean distribution for the level of AI self-efficacy among the students. Just like the previous table, the general level of AI self-efficacy among the students was also sensible. A closer look in the table revealed that the students scored 3.10 as the highest mean score and 3.03 as the lowest. The resulting Likert scale interpretation for the mean values was a "moderate" level of AI self-efficacy. Even the overall mean falls under the same interpretation as with the other items of the table.

Table 7. Differences in the Level of AI Anxiety and AI Self-Efficacy among Students when grouped according to Sex

Variables	Sex	N	Mean	SD	*t*	*p*-value
Learning	Female	380	2.88	0.827	1.179	.239
	Male	315	2.80	0.888		
Job Replacement	Female	380	3.67	0.979	3.940*	.000

Variables	Sex	N	Mean	SD	*t*	*p*-value
	Male	315	3.37	0.977		
Sociotechnical	Female	380	3.72	0.997	4.201*	.000
Blindness	Male	315	3.40	1.001		
AI Configuration	Female	380	3.29	1.016	4.555*	.000
	Male	315	2.93	1.009		
AI Anxiety	Female	380	3.39	0.797	4.192*	.000
	Male	315	3.12	0.837		
AI Self-efficacy	Female	380	2.95	0.771	-4.102*	.000
	Male	315	3.19	0.771		

*Note: df=693; *p < .05*

To determine if there is a significant difference in the level of AI anxiety and AI self-efficacy of the students when grouped according to sex, the study performed an independent *t*-test. It is interesting to note in the table that three sub-variables posted affirmative results in terms of AI anxiety. They include job replacement, $t(693)= 3.940$, $p= .000$, sociotechnical blindness, $t(693)= 4.201$, $p= .000$; and AI configuration with $t(693)= 4.555$, $p= .000$. Even the overall AI anxiety result was also the same with $t(693)= 4.192$, $p= .000$. As for the AI self-efficacy of the students, the study yielded $t(693)= -4.102$, $p= .000$ as well. Based on the associated probability values obtained, they are all significant at a .05 alpha significance level. Therefore, it is safe to assume that there is a significant difference in the AI anxiety and AI self-efficacy of the students when grouped according to their sex. However, only the subvariable Learning under AI anxiety did not produce a significant value since $t(693)= 1.179$, $p= .239$. The *p*-value was greater than the alpha significance level of .05. Thus, there is no significant difference in the students' AI anxiety in terms of Learning when grouped according to sex.

Table 8. Differences in the Level of AI Anxiety and AI Self-Efficacy among Students when grouped according to Available Gadgets at Home

Variables	Available Gadgets	N	Mean	SD	*t*	Sig.
Learning	Laptop/PC	461	2.79	0.875	-2.199*	.028
	Smartphone/Tablet	234	2.94	0.807		
Job Replacement	Laptop/PC	461	3.60	1.004	2.392*	.017
	Smartphone/Tablet	234	3.41	0.946		
Sociotechnical	Laptop/PC	461	3.62	1.040	1.716	.087
Blindness	Smartphone/Tablet	234	3.48	0.946		
AI Configuration	Laptop/PC	461	3.11	1.055	-0.663	.508
	Smartphone/Tablet	234	3.16	0.969		
AI Anxiety	Laptop/PC	461	3.28	0.842	0.464	.643
	Smartphone/Tablet	234	3.25	0.791		
AI Self-efficacy	Laptop/PC	461	3.11	0.800	2.285*	.023
	Smartphone/Tablet	234	2.97	0.731		

*Note: df=693; *p < .05*

Table 8 presents the result of the independent *t*-test for the significant differences in the student's level of AI anxiety and AI self-efficacy. There was a significant finding for AI anxiety regarding learning since $t(693) = -2.199$, $p = .028$. The study also found a significant difference in the student's level of AI anxiety regarding job replacement since $t(693) = 2.392$, $p = .017$. The generated *p*-values were lower than the .05 alpha significance level. Hence, it is safe to assume that there is a substantial difference in the student's level of AI anxiety level in terms of learning and job placement when grouped according to sex. On the other hand, the student's level of anxiety in terms of sociotechnical blindness [$t(693) = 1.716$, $p = .087$]; AI configuration, [$t(693) = -0.663$, $p = .508$]; and the overall AI anxiety level of students [$t(693) = 0.464$, $p = .643$] did not yield enough result in order to elicit a significant finding for the study. In addition, a significant result was found for the student's level of AI self-efficacy. The study obtained a $t(693) = 2.285$, $p = .023$, wherein the probability value is lower than the alpha significance level of .05. Therefore, it is safe to conclude that there is a significant difference in the level of AI self-efficacy of students when grouped according to their sex.

Table 9. Differences in the Level of AI Anxiety and AI Self-Efficacy among Students when grouped according to the Use of Any Form of AI in Study or Learning

Variables	Use of Any Form of AI	N	Mean	SD	*t*	Sig.
Learning	Yes	535	2.79	0.863	-3.016*	.003
	No	160	3.02	0.808		
Job Replacement	Yes	535	3.54	1.006	0.277	.782
	No	160	3.51	0.929		
Sociotechnical	Yes	535	3.59	1.011	0.743	.458
Blindness	No	160	3.52	1.011		
AI Configuration	Yes	535	3.11	1.016	- 0.900	.369
	No	160	3.19	1.062		
AI Anxiety	Yes	535	3.26	0.834	- 0.746	.456
	No	160	3.31	0.796		
AI Self-efficacy	Yes	535	3.10	0.767	2.616*	.009
	No	160	2.92	0.810		

*Note: df=693; *p < .05*

Presented in Table 9 is the result of an independent *t*-test for the differences in the level of AI anxiety and AI self-efficacy of students when grouped according to the use of any form of AI in study or learning. One can decipher from the table that the computation generated a significant finding. For the AI anxiety in learning, the study garnered $t(693) = -3.016$, $p = .003$. The generated probability value is significant at a .05 alpha significance level. Thus, it is safe to conclude that there is a significant difference in students' level of AI anxiety in learning when grouped according to the use of any form of AI in study or learning. However, in the case of job replacement [$t(693) = 0.277$, $p = .782$]; sociotechnical blindness [$t(693) = 0.743$, $p = .458$]; AI configuration [$t(693) = -0.900$, $p = .369$]; and the overall AI anxiety [$t(693) = -0.746$, $p = .456$] did not generate enough to produce significant result for the study. The probability values obtained were insignificant at a .05 alpha level of significance. Hence, there is no significant difference in the students' AI anxiety levels when grouped according to any form of AI in study

or learning.The study gained a significant finding regarding the students' AI self-efficacy level. The computation produced $t(693)= 2.616$, $p= .009$, wherein the p-value is lower than the alpha significance level of .05. Thus, it is safe to conclude that there is a significant difference in the level of AI self-efficacy of students when grouped according to the use of any form of AI in study or learning.

Table 10. Differences in the Level of AI Anxiety and AI Self-Efficacy among Students when grouped according to Year Level

Variables		**SS**	**df**	**MS**	***F***	**Sig.**
Learning	Bet. Groups	6.854	3	2.285	3.152*	.024
	Within Groups	500.897	691	0.725		
	Total	507.751	694			
Job Replacement	Bet. Groups	9.262	3	3.087	3.191*	.023
	Within Groups	668.510	691	0.967		
	Total	677.772	694			
Sociotechnical	Bet. Groups	6.521	3	2.174	2.138	.094
Blindness	Within Groups	702.427	691	1.017		
	Total	708.947	694			
AI Configuration	Bet. Groups	6.950	3	2.317	2.209	.086
	Within Groups	724.627	691	1.049		
	Total	731.577	694			
AI Anxiety	Bet. Groups	4.679	3	1.560	2.304	.076
	Within Groups	467.708	691	0.677		
	Total	472.387	694			
AI Self-efficacy	Bet. Groups	1.888	3	0.629	1.034	.377
	Within Groups	420.439	691	0.608		
	Total	422.327	694			

*Note: *p< .05*

Table 10 shows the result of the Analysis of Variance for the differences in the level of AI anxiety and AI self-efficacy when grouped according to year level. In the case of AI anxiety, we observe substantial proof of variance in the terms of Learning [$F(3, 6910= 3.152$, $p= .024$] and job replacement [$F(3, 691)= 3.191$, $p= .023$]. The generated probability values were lower than the alpha significance level of .05. Thus, it is safe to assume that in terms of learning and job replacement, there is a significant difference in the AI anxiety level of students when grouped according to year level. On the other hand, there were not enough results for sociotechnical blindness [$F(3, 691)= 2.138$, $p= .094$]; AI configuration [$F(3, 691)= 2.209$, p .086] and overall AI anxiety level [$F(3, 691)= 2.304$, $p= .076$]. The garnered associated probability values were higher than the .05 alpha significance level. Therefore, it is safe to conclude that there is no significant difference in the overall AI anxiety level of the students when grouped according to year level.The study got $F(3, 691)= 1.034$, $p= .377$. The probability value is greater than the alpha significance level of .05; hence, there is no significant difference in the student's level of AI self-efficacy when grouped according to year level.

Table 11. Differences in the Level of AI Anxiety and AI Self-Efficacy among Students when grouped according to Age

Variables		SS	df	MS	*F*	Sig.
Learning	Bet. Groups	14.379	3	4.793	6.713*	.000
	Within Groups	493.372	691	0.714		
	Total	507.751	694			
Job Replacement	Bet. Groups	3.713	3	1.238	1.269	.284
	Within Groups	674.060	691	0.975		
	Total	677.772	694			
Sociotechnical	Bet. Groups	4.760	3	1.587	1.557	.199
Blindness	Within Groups	704.187	691	1.019		
	Total	708.947	694			
AI Configuration	Bet. Groups	11.588	3	3.863	3.707*	.012
	Within Groups	719.989	691	1.042		
	Total	731.577	694			
AI Anxiety	Bet. Groups	6.547	3	2.182	3.237*	.022
	Within Groups	465.840	691	0.674		
	Total	472.387	694			
AI Self-efficacy	Bet. Groups	1.957	3	0.652	1.072	.360
	Within Groups	420.371	691	0.608		
	Total	422.327	694			

*Note: *p< .05*

Table 11 shows the result of the Analysis of Variance for the differences in the level of AI anxiety and AI self-efficacy among students when grouped according to age. The statistical computation found significant results. For AI anxiety in Learning, the study gained $F(3, 691)= 6.713$, $p= .000$. Regarding AI configuration, the statistics gave $F(3, 691)= 3.707$, p .012. Moreover, for the overall AI anxiety, it yielded $F(3, 691)= 3.237$, $p= .022$. All of the p-values generated were significant at a .05 alpha significance level. Hence, it is safe to conclude that there is a significant difference in the level of AI anxiety among students when grouped according to their age. However, still under the AI anxiety, the sub-variables job replacement [$F(3,691)= 1.269$, $p= .284$] and sociotechnical blindness [$F(3, 691)= 1.557$, $p= .199$] did not yield enough results to produce significant variations in their respective categories. For the students' level of AI self-efficacy, the study statistically produced $F(3, 691)= 1.072$, $p= .360$, wherein the associated probability value was not significant at the .05 alpha significance level.

Table 12. Correlation Matrix between AI Anxiety Subvariables and AI Self-Efficacy

Variable	1	2	3	4	5
1) Learning	1	.443*	.420*	.604*	.215*
		.000	.000	.000	.000
2) Job Replacement		1	.896*	.655*	.083*
			.000	.000	.029

Variable	1	2	3	4	5
3) Sociotechnical Blindness			1	.699*	.096*
				.000	.012
4) AI Configuration				1	.072
					.057
5) AI Self-efficacy					1

*Note: *p< .05*

The study performed a Pearson-r Moment of Correlation to calculate the relationship between the sub-variables of AI anxiety and the students' AI self-efficacy. Table 12 presents the result of the computation. A low association exists between learning, job replacement, and sociotechnical blindness with AI self-efficacy among the respondents. The statistical calculations generated the following results r= .215, *p*= .000 for learning; r= .083, *p*= .029 for job replacement; and r= .096, *p*= .012 for sociotechnical blindness. All of the mentioned probability values were significant at a .05 alpha significance level. Therefore, it is safe to conclude that there was a significant relationship between AI anxiety in learning, job replacement, sociotechnical blindness, and AI self-efficacy among the students.

Table 13. Linear Regression Analysis for the AI Anxiety Factors influencing AI Self-Efficacy

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	Std. Error	Beta		
(Constant)	2.497	.122		20.436	.000
Learning	.252	.043	.276	5.895	.000
Job Replacement	-0.068	.067	- .086	-1.016	.310
Sociotechnical Blindness	.125	.069	.162	1.828	.068
AI Configuration	- .115	.045	- .152	-2.578	.010

Note: F(4, 691)= 10.379, p= .000; R^2= .057

The study performed a linear regression analysis to determine the factors that can influence students' AI self-efficacy. As seen from Table 13, the linear regression analysis generated a statistically significant model [*F*(4, 691)= 10.379, *p*= .000] with an adjected R^2 of .057. This result suggests that learning and configuration account for approximately 5.7% of the variance in the students' AI self-efficacy.

A closer look at the presentation also shows that learning generated a B coefficient of .252 with a standard error of .043. This result indicates that for each additional learning, there is an average increase of .252 units in the students' AI self-efficacy. The same can be said for the AI configuration, where it garnered a B coefficient of -.115 with a standard error of .045, which assumes that for each added configuration, there is an average increase of - .115 units in the students' AI self-efficacy. The results emphasize the significance of learning and configuration as significant determinants of student AI self-efficacy.

Discussion

The main objective of this study is to determine the influence of AI anxiety on students' AI self-efficacy and investigate the possible factors contributing to this. Limna et al. (2022) concluded in their paper that AI technologies have both positive and negative effects on education, and it is critical to prioritize AI in education and implement strategies to meet the needs of students and teachers. The study found some interesting findings essential to the students, faculty, and the institution. To start with, the overall level of AI anxiety among the students is moderate.

Lemay et al. (2020) disclosed that AI anxiety runs within the spectrum and addresses technology readiness among students. The study also found the same result for Learning and AI configuration, which were part of the sub-variables of AI anxiety. Terzi (2020) also found a similar result for learning but not with AI configuration mean results. It yielded a different finding as to the current result of the study. However, in the case of job replacement and sociotechnical blindness, the study found that the students gave it a high response. This result coincides with Terzi's findings in 2020. Moreover, this finding somehow correlates with the article of Hopcan et al. (2023), wherein students expressed anxiety about how AI affects employment rates and social life. A local study by Labrague and colleagues (2023) also shared that students have moderate readiness to learn AI in school.

The students also have moderate remarks on the level of AI self-efficacy. In a study by Kaya et al. (2024), they observed positive attitudes of their study's respondents toward AI. Also, a previous paper by Ayanwale (2023) found that students' self-efficacy toward learning AI positively affects their intention to learn. Significant differences were found in the study as well. In the case of AI anxiety in learning, variations existed in year level, age, available gadgets at home, and use of any form of AI in study or learning. As for job replacement, the study observed differences in sex, available gadgets at home, and year level. In the case of sociotechnical blindness, a significant difference came from sex only. For the AI configuration, significant variations originated from sex and age. For the overall AI anxiety, there were substantial differences in terms of sex and age. Terzi's (2020) study found significant differences in sex for learning, job replacement, and AI configuration. However, for sociotechnical blindness, there was no significant variation in terms of sex.

For the students' AI self-efficacy level, the investigators also found significant differences in sex, available gadgets at home, and the use of any form of AI in study or learning. The study of Kwak et al. (2022) showed no significant difference in students' self-efficacy when grouped according to gender. They also found the same result for the AI education experience. Therefore, these findings contradicted the current study's results on sex and the use of AI in study or learning aspects.

There was also a low positive relationship between learning, job replacement, sociotechnical blindness, and AI self-efficacy among the students. In the paper of Huo et al. (2023), they also found a certain association between AI anxiety and AI Self-efficacy of their respondents. However, Hsu et al. (2023) found a different scenario: AI learning anxiety had a negative relationship with self-efficacy. The linear regression analysis further confirmed the relationships. Also, it was found that learning and AI configuration were significant determinants of students'

AI self-efficacy. A recent paper mentioned that AI learning anxiety significantly predicts AI attitudes (Kaya et al., 2024). Overall, the study showed promising results that can benefit many readers, including students, academicians, faculty, school administrators, the institution, stakeholders, parents, and future researchers. This study's findings also contribute to the growing local literature on AI in the country and are deemed useful to policy-making and other essential matters to regulate the use of AI in schools.

Conclusions

Based on the results and discussion of the study, the investigators at this moment concluded that:

1) The demographic characteristics of the students include a fourth-year, less-than-20-year-old female student with a laptop or PC who has not yet used any form of AI in study or learning.
2) In terms of AI anxiety, the study obtained a moderate level of anxiety for Learning and AI configuration. On the other hand, a high level of AI anxiety came from the other sub-variables, job replacement and sociotechnical blindness. For AI self-efficacy, the study generated a moderate level of self-efficacy among the students.
3) There were significant differences in terms of sex (job replacement, sociotechnical blindness, AI configuration, AI Anxiety level), age (Learning, AI configuration, and AI Anxiety level), year level (Learning and job replacement), available gadgets at home (Learning and job replacement), and use of any AI in study or Learning (Learning).
4) The study also observed significant differences in sex, available gadgets at home, and using any form of AI in study or learning for students' AI self-efficacy.
5) A correlation was also found between learning, job replacement, and sociotechnical blindness with students' AI self-efficacy. The linear regression analysis also confirmed that learning and AI configuration were significant determinants of students' AI self-efficacy.

Recommendations

From the results above, discussions, and conclusions, the investigators recommend the following:

1) Students should realize the essence and reality that technological innovation and development brought them. AI originated in this premise. Recognizing the existence of such a concept is tantamount to adopting and cohabiting with it. Therefore, it is essential that students do not ignore such existence; instead, they try to accept and live with it.
2) Students must equip themselves and keep abreast of AI and its practical usage in learning. Doing so can enhance their adaptability, lessen their anxiety, and improve their self-efficacy later on.
3) Academicians, faculty, and instructors should also help disseminate and utilize AI technology for themselves so that students can appreciate the potential of such technology in their learning experience. They should inform them of the advantages and disadvantages of AI and the proper use of it in learning.
4) The school administration must develop policies regarding the ethical and appropriate use of AI in the school so that everyone is protected and respected.

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