

Research Paper

AI Anxiety, Trust, and Literacy: A Mixed Method Study of AI Attitudes Across Generations

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ABSTRACT

Artificial intelligence (AI) has become a driving force for the new round of industrial transformation across the globe (Wu et al., 2020). This rapid increase of AI has raised important questions pertaining to AIT, AIA, and AIAT across generations (Zubair et al, 2025). This study aimed to examine and compare generational differences in attitudes towards AI among Gen X, Gen Y, and Gen Z. Data was collected through convenience sampling methods which included surveys and semi-structured interviews. Artificial Intelligence Anxiety Scale (AIAS), Short Trust in Automation Scale (S-TIAS), Meta AI Literacy Scale (MAILS), and Artificial Intelligence Attitude Scale (AIAS-4) were used to collect data. Pearson correlation revealed a significant relationship between AI Trust and AI Attitudes and between AI Literacy and AI Attitudes. Kruskal–Wallis Test revealed no generational differences while gender differences were found in AI Trust and AI Anxiety. Reflexive thematic analysis on the data collected through semi-structured interviews were consistent with the correlation analysis whereas there were generational differences in AI trust, AI anxiety and AI literacy. These findings help us gain deeper insights on the mindset of people and elements that need to be considered when designing various AI technologies. Generational gap can also be bridged by addressing the results of the study.

Keywords: Artificial intelligence, Generational Differences, AI Anxiety, Trust in AI, AI Literacy, AI Attitudes, Mixed-Methods

Artificial intelligence (AI) has become a driving force for the new round of industrial transformation across the globe (Wu et al., 2020). According to the 2025 Microsoft report, the second half of 2025 saw 1.2% rise in AI use compared to the first half with about one in six people using AI generative tools worldwide which raised questions pertaining to AI Trust (AIT), AI Anxiety (AIA), AI Literacy (AIL) across different generations (Zubair et al, 2025). Gen X are individuals born between 1965-1980, Gen Y (Millennials) between 1981-1996, and Gen Z between 1997-2012 (Dimock, 2019). Gen X

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adapted to the internet era, Gen Y to smartphones and social media, and Gen Z are now growing up in an AI driven world. Gen X are cautious but are more likely to adapt to AI when it's beneficial. Gen Y sees AI as a tool to amplify their creativity and aid them in completing mundane tasks. Gen Z views AI as an extension of their digital experience and are eager in experimenting. With this change and evolution, individual's acceptance, attitude, and trust towards AI may also vary across generations due to the exposure to technology and their online experiences (Manousaridis, 2025).

With AI integration on rise, it makes people anxious about AI. Johnson and Verdicchio (2017) describe AIA as, "an individual's fear and trepidation evoked when AI is out of control." According to Calm research (2023), 29% of adults feel anxious about AI, and 18% characterized their feelings as fear or dread. 31% stated being optimistic or excited, yet they still expressed concerns about the future defined by AI.

According to Siau and Wang (2018), AIT is defined as, "people's willingness to accept AI, believe in the suggestions, and decisions made, and willingness to depend on such technology." More than half of the people around the globe are unwilling to trust AI which highlights the tension between potential benefits and risks (Gillespie et al., 2025). This shows that even though people are optimistic about the use of AI, there is still fear and worry attached to it.

Long and Magerko (2020) defines AIL as, "an individual's competencies to evaluate AI technologies, communicate and collaborate with AI, and use AI as a tool effectively at home and work." AI literacy like other forms of literacy should begin from childhood. AI literacy correlates with heightened use, trust, acceptance, and engagement. AI literacy is also higher in emerging economies compared to half advanced economies where three-quarters believe they can use AI effectively (Gillespie et al., 2025). This shows that by educating oneself about AI, its limitations, how it works, and its potentiality, one can overcome fear, anxiety, and use AI safely and ethically.

Eagly and Chaiken (1993) defines attitude as, "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavor." Therefore, AI Attitudes (AIAT) means, "an individual's tendency towards AI with some degree of favour or disfavour." This means that some can view AI positively while others would view it negatively. The ones with a negative attitude believe that the negatives outweigh the positives like the ethical concerns relating to security, privacy, job losses, violation of human rights, and data breach (Green, 2020; Gillespie et al., 2021). These challenges along with the unfamiliarity can enhance people's anxiety. This highlights the importance of AIL and the need to promote effective AI use. There's been a rapid takeover of AI in education, work, healthcare, and governance. This also calls for us to address the need to understand generational differences in AI attitudes which will help us to make well-informed decisions, and policies.

REVIEW OF LITERATURE

Scantamburlo et al. (2025) studied AI awareness, attitude, and trust across Europe. Results revealed that European citizens have low knowledge on AI capabilities in various domains and applications. However, AIAT was very positive for more than half of the participants. Furthermore, it revealed that individuals who have higher levels of AIL tend to have more positive AIA which subsequently increases AIT. This highlights that when one's AIL is improved, it can in turn foster more positive perceptions and increase AIT.

The University of Melbourne and KPMG (2025) collaborated to examine trust, attitudes, and AI use across 47 countries. The study revealed that although AI is being widely used by a lot of individuals and its benefits are recognized, the overall trust in AI is relatively low. It identified a significant gap between AI use and the users' critical evaluation of its output. Concerns related to privacy, potential misuse, and ethics were found to negatively influence trust. This emphasizes the need for improved AIL, stronger ethical policies, and responsible AI practices to enhance trust and effective AI use.

A study in 2024 explored the roles of personality traits, AI Anxiety, and demographic factors in AIAT (Kaya et al., 2024). The study hypothesized that high levels of AIA would predict negative AIAT and found it to be true. Results revealed that people with high AIA were less forgiving when it came to the drawbacks of AI. Attitudes towards positive aspects of AI were significantly predicted by one's computer usage and their subjective AI knowledge. They also found that gender, age, and education levels didn't predict AIAT.

Schiavo, Businaro and Zancanaro (2024) studied the influence of literacy and anxiety on acceptance of AI. They found an interrelationship between AIL, AIA and AI Acceptance. The results showed that AI Acceptance was influenced positively by AIL, and negatively impacted by AIA. It showed that enhancing AIL would reduce AIA which in turn will increase AI Acceptance. AIA also served as a complementary partial mediator between AIL and AI Acceptance. This shows that working on increasing AIL can result in a positive step towards AI Acceptance.

A 2024 study explored the relationship between AIAT and AIL among university students (Reyes et al., 2024). The analysis found that students reported positive attitudes towards AI. However, no significant effect was found on their AIL because of their positive attitudes. This suggests that just encouraging a positive attitude is not enough to improve AIL. Addressing ethical concerns, including experiential learning, and engaging with AI technologies can help individuals understand AI more.

Ramirez, Obenza, and Mabayag (2024) investigated the relationship between AIT and AIAT. The study revealed that AIT has a significant influence and is a significant predictor of students' attitude towards AI. This shows that when AIT is fostered and built, it will improve students' attitudes towards AI. This will encourage more active engagement with AI technologies, leading to a wider integration and AI utility. This will translate to a responsible and safe use of AI in society.

Overall, the studies highlight the strong interrelationship between AIL, AIAT, and AIT. Research by Scantamburlo et al. (2025) and the global report by the University of Melbourne and KPMG (2025) indicate that while AI adoption is widespread and attitudes are generally positive, trust in AI remains relatively low. A consistent finding is that higher AI literacy leads to more positive attitudes and greater trust. Studies by Kaya et al. (2024) and Schiavo et al. (2024) demonstrate that higher levels of AIA are associated with more negative attitudes and lower acceptance of AI. Reyes et al. (2024) found that although students may hold positive attitudes toward AI, this doesn't necessarily translate into higher AIL. Additionally, Ramirez et al. (2024) emphasize that trust itself can act as a predictor of attitude, reinforcing the reciprocal relationship between these variables. The literature reveals that AI literacy, trust, attitude, and anxiety are deeply interrelated, with literacy emerging as a key driver in fostering positive attitudes, reducing anxiety, and building trust.

Hypotheses

1. There is no significant relationship between AIT and AIL among Gen X, Gen Y, and Gen Z.
2. There is no significant relationship between AIT and AIA among Gen X, Gen Y, and Gen Z.
3. There is no significant relationship between AIT and AIAT among Gen X, Gen Y, and Gen Z.
4. There is no significant relationship between AIL and AIA among Gen X, Gen Y, and Gen Z.
5. There is no significant relationship between AIL and AIAT among Gen X, Gen Y, and Gen Z.
6. There is no significant relationship between AIA and AIAT among Gen X, Gen Y, and Gen Z.
7. There are no significant differences in AIT, AIL, AIA, and AIAT among Gen X, Gen Y, and Gen Z.
8. There are no significant differences in AIT, AIL, AIA, and AIAT between males and females.

Objectives

- To understand the relationship among AIT, AIL, AIA, and AIAT.
- To compare AIT, AIL, AIA, and AIAT among Gen X, Gen Y, and Gen Z.
- To find the difference in AIT, AIL, AIA, and AIAT between males and females.

METHODOLOGY

Research Design:

The study employed convergent parallel sequential design where the quantitative data was collected through survey method and the qualitative data was collected through semi-structured interviews.

Sample:

A total of 55 participants were included in the quantitative study using convenience sampling: 11 from Gen X, 10 from Gen Y, and 34 from Gen Z. The qualitative study involved 27 participants, comprising 7 Gen X, 10 Gen Y, and 10 Gen Z individuals.

Tools Used:

1. Artificial Intelligence Anxiety Scale (AIAS) (Wang & Wang, 2019): 7-point Likert scale. Internal consistency (Cronbach's α) of the scale was high ($\alpha > .964$).
2. Short Trust in Automation Scale (S-TIAS) (McGrath, Lack, Tisch, Duenser, 2025): 7-point Likert scale. The scale has a good internal consistency of Cronbach's $\alpha = 0.97$.
3. Meta AI Literacy Scale (MAILS) (Carolus, Koch, Straka, Latoschik, & Wienrich, 2023): 11-point Likert scale. Internal consistency (Cronbach's α) of the scale and its subscales were high ($\alpha > .90$).
4. Artificial Intelligence Attitude Scale (AIAS-4) (Grassini, 2023): 10-point Likert scale. Internal consistency (Cronbach's α) of the scale was high ($\alpha > .90$).

Procedure:

Quantitative data on AIT, AIL, AIA, and AIAT were collected using standardized scales via google forms. Informed consent was obtained and participants were debriefed about the study. Data were analyzed in IBM SPSS 25.0 using Pearson correlation and Kruskal–Wallis

tests. Qualitative data were obtained through semi-structured interviews that focused on attitudes, fear and literacy towards AI. It was transcribed using Braun & Clarke's reflexive thematic analysis. The generated codes and themes were validated by a field expert.

RESULTS

Table 1: Means, Standard Deviations, and Pearson Correlations Among AIL, AIT, AIA, and AIAT (N = 55)

Variable	M	SD	1	2	3	4
AIL	100.69	28.55	—	.15	-.01	.31*
AIT	3.13	0.68		—	-.03	.58**
AIA	92.65	25.93			—	-.16
AIAT	6.58	2.32				—

$p < .05^*$, $p < .01^{**}$

Table 1 shows the descriptive statistics i.e., Mean, Standard Deviation and Pearson Correlation of AIL, AIT, AIA, and AIAT. The mean score for AIL was 100.69 (SD = 28.55), AIT was 3.13 (SD = 0.68), AIA was 92.65 (SD = 25.93), and AIAT was 6.58 (SD = 2.32). Pearson correlation indicated a significant positive relationship between AIL and AIAT, $r = .31$, $p < .05$. This shows that individuals with higher AIL show more positive AIAT. Strong positive correlation was found between AIT and AIAT, $r = .58$, $p < .01$. This suggests that greater trust in AI systems is associated with more favorable AIAT.

Therefore, the null hypotheses that there are no significant relationships between AIT and AIL; AIT and AIA; AIL and AIA; and AIA and AIAT were not rejected.

However, the null hypotheses that there are no significant relationships between AIT and AIAT and between AIL and AIAT were rejected.

Table 2: Kruskal–Wallis Test comparing AIL, AIT, AIA, and AIAT across Generations X, Y, and Z

Variable	H	df	p
AIL	1.52	2	.469
AIT	0.82	2	.664
AIA	3.90	2	.143
AIAT	0.54	2	.762

Table 2 shows the Kruskal–Wallis Test comparing AIL, AIT, AIA, and AIAT across Generations X, Y, and Z. The analyses revealed no significant differences across generations for AIL, $H(2) = 1.52$, $p > .05$; AIT, $H(2) = 0.82$, $p > .05$; AIA, $H(2) = 3.90$, $p > .05$; or AIAT, $H(2) = 0.54$, $p > .05$. Kruskal–Wallis H tests were conducted due to non-normal distribution and unequal group sizes across Gen X ($n = 11$), Gen Y ($n = 10$), and Gen Z ($n = 34$). The results indicate that generational difference does not significantly influence levels of AIL, AIT, AIA, or AIAT in the group.

Therefore, the null hypothesis that there are no significant differences in AIT, AIL, AIA, and AIAT between Gen X, Gen Y, and Gen Z was not rejected.

Table 3: Kruskal–Wallis Test comparing AIL, AIT, AIA, and AIAT between males and females

Variable	Male Mean Rank	Female Mean Rank	H	df	p
AIL	28.41	27.08	0.08	1	.772
AIT	34.76	24.16	5.47	1	.019*
AIA	19.71	31.08	6.09	1	.014*
AIAT	29.21	26.72	0.29	1	.588

Table 3 shows the Kruskal–Wallis Test comparing AIL, AIT, AIA, and AIAT between males and females. The analyses revealed significant differences between males and females in AIT, $H(1) = 5.47$, $p < .05$, with males (mean rank = 34.76) reporting higher levels of trust than females (mean rank = 24.16). A significant gender difference was found in AIA, $H(2) = 6.09$, $p < .05$, with females (mean rank = 31.08) reporting higher anxiety than males (mean rank = 19.71). No statistically significant gender differences were observed for AIL, $H(1) = 0.08$, $p > .05$, and AIAT, $H(1) = 0.29$, $p > .05$. Results indicate that gender differences exist only for AIT and AIA. Males show higher trust, while females show higher anxiety.

Therefore, the null hypothesis that there are no significant differences in AIT, AIL, AIA, and AIAT between males and females was rejected, as significant gender differences were observed in AIT and AIA, although no gender differences were found for AIL or AIA.

Table 4: Reflexive Thematic Analysis of Semi-structured Interview

Main Theme	Sub- themes	Definition	Example from the Interview
Generational Literacy Gap	<i>Awareness vs. Usage</i>	High awareness in young adults leading to functional use, versus lower awareness in older adults.	"Young adults are more aware and use AI as conversational agents... Adults and older adults were not aware".
Safety & Trust	<i>The Empathy Deficit Skepticism</i>	The belief that AI's lack of humanness makes it untrustworthy for deep emotional stress. High levels of doubt regarding safety and the mechanical nature of AI	"Whatever improvement you make, AI is always a machine... I don't think it can understand the holistic emotional stress" "I'd recommend it as a supplementary tool... especially for someone seeking a safe space to process thoughts, but not as a replacement"
Limitations	<i>Privacy vs. Bias</i>	Balancing the appeal of anonymous privacy with concerns about biased data.	"The answers from AI were acceptable. It was okay... but it sometimes provides biased or inappropriate answers".
Utility	<i>Supplementary role</i>	Using AI for emotional support when one feels isolated or unable to trust peers.	"In my initial days I was alone and ChatGPT was only there to support me emotionally... for people who can't trust others".

The above table shows the themes generated through reflexive thematic analysis of the interviews regarding general awareness, experience, benefits, effectiveness, ethical and privacy concerns towards AI.

DISCUSSION

The positive correlations observed in the current study align with prior findings which also concluded a positive relationship between AIT and AIAT (Scantamburlo et al., 2025; Aderibigbe et al., 2023); as well as between literacy and attitude (Si, J., 2025).

This research aimed to explore the generational differences in trust, literacy, anxiety and attitudes towards AI use. The findings from the Kruskal-Wallis' test reveal no generational differences in AIT, AIL, AIA and AIAT. This could be due to the widespread AI integration in today's technological world. According to Everett Rogers' Diffusion of Innovations theory (1962), adoption of any new ideas or technology through a social system over time moves through five adopter categories, namely, innovators, early adopters, early majority, late majority and laggards. Gen Z and Gen Y would have first started as innovators and early adopters of AI, with Gen X being the late adopters. But now due to the widespread AI adoption, the majority of the people from the three generations moved into the early majority or late majority stage. According to this theory, when technology becomes normalized, differences between the adopter groups also disappear. Therefore, this can explain the lack of significant generational differences in AIT, AIL, AIA and AIAT.

The results also indicated significant gender differences in AI trust and AI anxiety. Higher AIA levels in females in comparison to males could be because of the increased perception of risk in females due to ethical and privacy concerns compared to males. Previous research shows that perceived privacy risks can be barriers for women in using technology (Kendziorra & Winkler, 2022). This explains why females reported high AIA and lower AIT in comparison to males, indicating a cautious AI approach.

However, the data from the semi-structured interviews reveal contradictory evidence showing that there is a generational difference. Gen X participants had low AIT, AIL and AIAT and high AIA when compared to Gen Y and Gen Z. Our finding that there is a relationship between AIA and AIL helps us understand that providing AIL to Gen X individuals will help them reduce their AIA and have positive AIAT.

Though quantitative findings reveal no significant generational differences, the qualitative data indicate differences that exist at a subjective and experiential level. This can be because quantitative measures tend to generalize responses, sometimes overlooking smaller distinctions, whereas qualitative data identify more nuanced, in-depth perspectives of individuals. Therefore, the findings are not contradictory, but reflect different facets of the generational experience of AI.

CONCLUSION

The study concludes that AIT and AIA are positively associated and AIL and AIA are also positively associated. Though no significant differences were identified quantitatively, qualitative results revealed subtle individual differences in experiences across age groups. Gender differences indicated higher anxiety and lower trust among females which suggests a cautious approach to AI by females. These findings emphasize the importance of enhancing AIL to reduce anxiety and promote a more positive and inclusive engagement with AI.

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Conflict of Interest

The author(s) declared no conflict of interest.

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