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Predictors of AI awareness among EFL learners: gender, English proficiency, ICT usage, and the personality traits

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This study examined English as a Foreign Language (EFL) learners' awareness of artificial intelligence (AI) and its associations with gender, Big Five personality traits, self-assessed English proficiency, and information and communication technology (ICT) usage. A quantitative, cross-sectional survey design was employed, and participants were selected through convenience sampling. Data were collected from 155 EFL university students at a public university in Türkiye during the spring semester of 2024. Statistical analyses were performed using SPSS Version 26.0. A K-means cluster analysis identified two distinct personality profiles—Introverted–Neurotic and Open–Extraverted. A multivariate analysis of variance (MANOVA) was then conducted to examine whether gender, personality profile, English proficiency, and ICT usage predicted differences across four dimensions of AI awareness: Basic Knowledge, Benefit, Bias, and Negative Forecast. No statistically significant differences emerged across demographic or personality factors, suggesting a relatively homogeneous level of AI awareness among EFL learners. Stepwise regression analyses revealed that Openness and Extraversion were significant predictors of overall AI awareness. These findings indicate that personality characteristics—particularly openness to experience—play a meaningful role in shaping learners' engagement with AI technologies in language education.

KEYWORDS

artificial intelligence awareness, Big Five personality traits, English as a foreign language, language proficiency, educational technology

Introduction

In recent years, the swift integration of artificial intelligence (AI) into education has reshaped pedagogical practices and attracted growing scholarly attention. From adaptive learning systems and automated assessments to intelligent tutoring and personalized feedback, AI is redefining how teachers teach and how students engage with knowledge (Vo, 2025; Zawacki-Richter et al., 2019). These developments have opened promising avenues for improving efficiency and learning outcomes in foreign language education (Yuan, 2025; Mohammed and Khalid, 2025). For example, Yuan (2025) demonstrated that adaptive reading environments enriched with biometric feedback improved comprehension, reduced foreign language anxiety, and increased motivation, while Mohammed and Khalid (2025) found that AI-generated writing feedback enhanced

both cognitive and emotional learning outcomes. Taken together, these findings indicate that AI's educational potential extends beyond performance gains, shaping the very affective and motivational dimensions of learning in ways that are central to sustained engagement.

Alongside these technological shifts, individual differences—particularly personality traits—remain central to how learners adopt and use new tools. The Big Five model of personality has long served as a foundational framework for understanding individual differences in psychology and education. The model conceptualizes personality along five broad domains—openness, conscientiousness, extraversion, agreeableness, and neuroticism—originally articulated by *Costa and McCrae (1992)* and later refined by *Goldberg (1993)* and *John and Srivastava (1999)*. These classic works established the theoretical basis for explaining how enduring personality traits shape cognition, motivation, and behavior. Building on this foundation, contemporary research has refined both the measurement and theoretical scope of the Big Five framework. *Soto and John (2017)* introduced the Big Five Inventory-2 (BFI-2), offering a more comprehensive and hierarchically organized representation of personality facets that has been validated across diverse cultures and educational contexts. From a theoretical perspective, *McCrae and Sutin (2018)* proposed that personality traits act as causal dispositions that guide how individuals think, feel, and respond to new experiences. This view supports the notion that traits such as openness and extraversion encourage curiosity, adaptability, and proactive engagement with technological innovation.

Extending this understanding to the field of artificial intelligence, recent empirical evidence indicates that Big Five traits—particularly openness and conscientiousness—along with AI literacy, significantly predict educators' behavioral intentions to adopt AI technologies in teaching (*Ding et al., 2025*). These findings underscore the relevance of personality-based perspectives in examining technology adoption and innovation in educational settings. Drawing from both classic and contemporary perspectives, the present study investigates how EFL learners' personality profiles relate to their awareness of AI across cognitive and attitudinal domains.

However, despite a growing body of research exploring the role of AI in education (*Liu and Wu, 2024; Ma and Chen, 2024; Dogan et al., 2023; Üretmen Karaoğlu and Doğan, 2025; Çınar Yağcı and Aydın Yıldız, 2023*), there remains a lack of critical synthesis connecting these technological innovations to learner psychology. Understanding how personality and background factors shape learners' awareness of AI is thus essential to explain differential engagement with AI-assisted language learning. Recent studies in AI-assisted learning contexts confirm this connection, showing that demographic variables and personality profiles significantly shape learners' attitudes and readiness to use AI tools (*Liu and Wu, 2024; Ma and Chen, 2024*). At the same time, learner and teacher perspectives on AI highlight both opportunities and challenges. On the one hand, AI tools can provide immediate feedback and enhance efficiency; on the other, they raise concerns related to ethics, transparency, and the reduction of human interaction (*Dogan et al., 2023; Üretmen Karaoğlu and Doğan, 2025*). Moreover, issues of trust and reliability continue to surface in learner-centered research, with

some questioning whether conversational AI such as ChatGPT can serve as a dependable partner for language learning (*Çınar Yağcı and Aydın Yıldız, 2023*). Collectively, these studies underscore the need to examine how individual characteristics, especially personality traits, intersect with AI awareness in broader EFL contexts.

Recent evidence further supports the theoretical link between personality traits and technology-mediated language learning. *Liang et al. (2025)* proposed the Online Language Learners' Characteristics Model, which conceptualizes learners' online engagement through five interconnected dimensions—learning strategy, attitude, motivation, causal attribution, and self-efficacy. Using latent profile analysis, their study identified distinct learner profiles (anxious, stable, amiable, and vibrant/responsible) based on Big Five personality traits and demonstrated that these profiles systematically predicted differences in online learning characteristics. This model underscores that personality-driven learner profiles shape cognitive, motivational, and affective behaviors in online settings, offering a strong theoretical basis for examining how personality may influence EFL learners' awareness, perception, and adaptation to AI-based language learning environments.

Despite the surge of interest in AI applications and the established role of personality in language learning, research combining these two strands remains scarce. Empirical evidence is particularly lacking on how personality traits—together with demographic and background factors such as gender, English proficiency, and ICT (Information and Communication Technology) use—predict learners' awareness of AI in foreign language education. Addressing this gap, the present study explores the interplay between personality and AI awareness among EFL learners. By doing so, it aims not only to extend the literature on technology use and learner psychology but also to provide practical insights for designing AI-integrated learning environments that recognize the diversity of learner profiles.

Theoretical framework

Big Five personality

Personality has long been examined as a central construct in psychology and education, providing insight into how individuals think, feel, and behave. Among the most influential models, The Big Five model outlines five broad traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness (*Costa and McCrae, 1985*). Research consistently shows that these traits are associated with differences in learning styles, motivation, and performance across educational settings (*Chamorro-Premuzic and Furnham, 2005; Komarraju et al., 2011; Poropat, 2009*).

Extraversion, defined by sociability, assertiveness, and positive emotionality, has been linked to stronger willingness to communicate and more active participation in oral activities in second language learning (*MacIntyre and Charos, 1996*). Agreeableness, which reflects empathy, cooperation, and trust, supports collaborative work and contributes to positive classroom dynamics (*Komarraju et al., 2011*). Conscientiousness,

encompassing persistence, responsibility, and organization, has been identified as the strongest and most consistent predictor of academic achievement and the adoption of effective learning strategies (Chamorro-Premuzic and Furnham, 2005; Poropat, 2009; Komarraju et al., 2011). Neuroticism, or emotional instability, is typically associated with anxiety, low confidence, and stress, all of which can undermine learners' willingness to communicate in a foreign language (MacIntyre and Charos, 1996). Finally, openness to experience, characterized by curiosity, creativity, and flexibility, has been associated with tolerance of ambiguity and readiness to explore innovative approaches in language education (Chamorro-Premuzic and Furnham, 2005).

Recent studies also suggest that personality traits shape how learners perceive and respond to artificial intelligence (AI) in education. Openness is strongly associated with positive attitudes toward AI-assisted learning, while conscientiousness is linked to more disciplined and purposeful engagement with AI tools (Liu and Wu, 2024; Ma and Chen, 2024). Extraversion and agreeableness support collaborative and social dimensions of AI use, encouraging interaction and cooperative learning (Liu and Wu, 2024; Alsaawi et al., 2025). In contrast, neuroticism is often related to heightened anxiety and reduced trust, which may limit learners' confidence in AI applications (Liu and Wu, 2024; Alsaawi et al., 2025). Furthermore, studies show that AI literacy interacts with affective variables such as self-efficacy and classroom anxiety, which in turn influence willingness to communicate in English (Zhang et al., 2025). Overall, the Big Five framework provides a valuable theoretical lens for understanding how individual personality traits intersect with learners' readiness to adopt AI in foreign language education.

Artificial intelligence in language learning

Artificial intelligence (AI) is increasingly recognized as a transformative force in language education, providing adaptive tools that personalize instruction and deliver timely feedback. Studies demonstrate that AI-supported systems can enhance learner outcomes by tailoring content to individual needs and supplying real-time responses (Li et al., 2025; Yuan, 2025; Vo, 2025). For instance, biometric feedback and adaptive reading applications have been shown to improve comprehension and lower anxiety, illustrating how AI can address both cognitive and affective aspects of learning (Yuan, 2025). More broadly, systematic reviews in higher education highlight AI's wide-ranging applications, including profiling and prediction, assessment and evaluation, adaptive learning systems, and intelligent tutoring, underscoring its potential to reshape pedagogical practices (Zawacki-Richter et al., 2019).

Among the most extensively studied innovations in this area are AI-powered chatbots. Recent reviews confirm that these tools provide learners with greater opportunities for spoken interaction, lower levels of anxiety, and measurable gains in fluency and pronunciation (Du and Daniel, 2024; Koç and Savaş, 2025; Wiboolyasarin et al., 2025). By simulating conversational settings, chatbots allow learners to practice repeatedly in low-stress conditions while receiving corrective feedback, a valuable benefit for students with limited exposure to native speakers or

authentic communicative contexts (Tolstykh and Oshchepkova, 2024). In addition to supporting specific skills, Yang and Rui (2025) reported that AI-enhanced environments reduced psychological barriers such as anxiety and depression while fostering greater engagement. Similarly, Zhang et al. (2025) demonstrated that AI literacy predicts willingness to communicate in English, with self-efficacy and reduced classroom anxiety acting as mediators. These findings highlight that AI affects not only how students learn but also how they experience the learning process. Evidence also points to AI's effectiveness across multiple language domains. Automated writing evaluation supports accuracy and organization, though it is less effective in capturing cultural nuances. Speech evaluation systems promote fluency and pronunciation, listening applications reduce anxiety and improve comprehension, and chatbot-based approaches advance vocabulary development more effectively than traditional methods by reinforcing contextual usage (Kyaw and Jie, 2025). Collectively, these results show AI's potential to influence both skill acquisition and learner experience.

Learner attitudes and AI literacy are equally central to adoption. Alsaawi et al. (2025) found that positive perceptions of AI-based tools increased motivation and readiness, while skepticism and low trust discouraged use. In a similar vein, Aydın (2024) showed that Turkish EFL students regarded AI applications as more engaging and motivating than conventional platforms. Complementing these insights, Uluğ et al. (2025) demonstrated that AI literacy levels vary significantly across demographic groups—including healthcare workers, students, and children—indicating that age and role differences shape how individuals approach AI in learning contexts.

Despite these advances, important challenges remain. Teachers caution that AI cannot replicate the richness of human interaction, and they raise concerns about data ethics and pedagogical control (Üretmen Karaoğlu and Doğan, 2025). Other research also warns of potential risks such as overdependence on AI tools, inequities in access, and insufficient teacher preparedness (Çınar Yağcı and Aydın Yıldız, 2023; Kyaw and Jie, 2025). These issues underscore the importance of positioning AI as a complement to, rather than a replacement for, human instruction.

Overall, the literature suggests that AI can enrich language learning by promoting adaptive support, enhancing motivation, and contributing to learner well-being (Yuan, 2025; Ma and Chen, 2024; Mohammed and Khalid, 2025). Importantly, Mohammed and Khalid (2025) showed that AI-generated feedback on writing improved not only learners' written performance but also their motivation, emotional well-being, and trait emotional intelligence, demonstrating AI's impact across cognitive and affective domains. To maximize these benefits, scholars emphasize the need for a balanced approach that integrates technological innovation with human interaction and ethical awareness (Holmes et al., 2022; Dogan et al., 2023).

AI awareness

Awareness of artificial intelligence (AI) in education refers to learners' understanding of how AI tools function, their benefits, and the potential challenges they may present. This awareness shapes not only learners' readiness to engage with AI-based applications but also their confidence in using such technologies effectively.

Recent studies emphasize that AI awareness plays a mediating role in language learning outcomes. For instance, Zhang et al. (2025) showed that EFL students' AI literacy significantly influenced their willingness to communicate in English, with self-efficacy and reduced classroom anxiety serving as key mediators. Their findings suggest that awareness is not limited to technical knowledge but also extends to emotional and communicative dimensions.

Demographic factors also appear to affect levels of AI awareness. Uluğ et al. (2025) adapted an AI literacy scale into Turkish and applied it across diverse groups, including healthcare workers, students, and children. They found significant differences between these groups, indicating that variables such as age and role shape how individuals perceive and use AI technologies. These results highlight the importance of contextualizing AI awareness when designing educational practices.

Perceptions of usefulness and reliability further contribute to awareness. In the Turkish context, Aydın (2024) reported that EFL learners considered AI-based applications more engaging and motivating than traditional platforms, reflecting a growing recognition of their potential in language education. Similarly, Alsaawi et al. (2025) demonstrated that positive learner attitudes toward AI tools enhanced motivation and readiness, while skepticism and low trust reduced adoption. These findings imply that awareness is closely tied to perceptions of trustworthiness and pedagogical value. At the same time, awareness of ethical considerations remains critical. Holmes et al. (2022) argued that learners and educators must be informed about issues such as fairness, transparency, and accountability to ensure responsible use of AI in education. Without this awareness, risks such as algorithmic bias, privacy violations, and overreliance on automated systems may undermine educational equity.

Recent scholarship conceptualizes AI awareness as a multidimensional construct that extends beyond technical knowledge to include cognitive, affective, and ethical components. According to Arslan and Koçoğlu (2023), who developed the AI Awareness Scale for EFL Learners, the construct captures learners' understanding of how AI systems function (cognitive awareness), their emotional and attitudinal orientations toward AI (affective awareness), and their sensitivity to ethical concerns surrounding its use (ethical awareness). Similarly, Uluğ et al. (2025), in adapting this scale into Turkish, confirmed its three-factor structure—Bias Awareness, Ethical Concerns, and Functional Understanding—demonstrating the consistency of this multidimensional model across cultural contexts. These findings align with broader perspectives in technology education, where awareness of emerging tools encompasses not only knowledge but also perception, emotion, and moral reflection.

Recent studies have expanded the understanding of AI awareness by examining its psychological underpinnings in educational contexts. For example, Asio and Gadia (2024) found that AI literacy and AI self-efficacy significantly predict students' attitudes toward AI, underscoring the interplay between confidence, competence, and acceptance of technology. Similarly, Asio (2025) demonstrated that AI self-efficacy mediates the relationship between students' attitudes and their level of AI literacy, suggesting that learners' belief in their ability to use AI tools strengthens both their technical understanding and emotional readiness for AI-based learning. Complementing these insights,

Ding et al. (2025) showed that openness and conscientiousness—two Big Five traits—together with AI literacy predict educators' adoption of AI technologies in higher education. Collectively, these findings indicate that AI awareness is a multidimensional construct shaped not only by cognitive knowledge but also by affective and dispositional factors, which are particularly relevant in the context of EFL learning where motivation, confidence, and adaptability play key roles. Guided by these frameworks, the present study adopts the view that AI awareness in language education integrates cognitive understanding, emotional engagement, and ethical responsibility toward the use of AI in learning environments.

Personality traits and AI awareness

The Five-Factor Model provides one of the most influential frameworks for understanding personality in educational contexts. Costa and McCrae (1985) identified five broad traits—openness, conscientiousness, extraversion, agreeableness, and neuroticism—that explain differences in how individuals think, feel, and behave. These dimensions have been linked to learning styles, academic performance, and communication behaviors in various studies (Chamorro-Premuzic and Furnham, 2005; Komarraju et al., 2011; Poropat, 2009; MacIntyre and Charos, 1996).

Recent research has examined how these personality characteristics relate to the ways learners perceive and engage with artificial intelligence (AI). Park and Woo (2022) found that openness was the strongest predictor of positive attitudes toward AI, conscientiousness supported functional evaluations of AI applications, and agreeableness was associated with favorable views of AI's social uses. In contrast, neuroticism predicted negative emotional responses such as anxiety and distrust. In second language education, personality has been shown to interact with background factors to influence perceptions of AI. Liu and Wu (2024) reported that both demographic variables and Big Five traits significantly shaped Chinese college students' attitudes toward AI-assisted language learning. Their findings indicated that personality profiles cannot be separated from learners' awareness of how AI tools function in educational settings. Similarly, Ma and Chen (2024) observed that openness and conscientiousness were linked to higher classroom engagement with AI-supported applications, while students high in neuroticism experienced greater anxiety and disengagement. Related evidence from Zhang et al. (2025) demonstrated that students' AI literacy fosters communication willingness through affective mediators like self-efficacy and anxiety reduction. Although their study emphasized literacy rather than personality traits directly, it pointed to psychological variables—such as confidence and anxiety—that overlap with personality in shaping awareness of AI.

In sum, these findings demonstrate that personality traits, particularly openness, conscientiousness, and neuroticism, are key factors in explaining variation in learners' awareness of AI in language education. Integrating personality perspectives into research on AI awareness can therefore provide a more complete understanding of how individual differences affect learners' readiness to engage with emerging technologies.

Although previous research has established strong links between personality traits and learning outcomes (Chamorro-Premuzic and Furnham, 2005; Komarraju et al., 2011; Poropat, 2009), and more recent work has examined learners' engagement with AI in educational contexts (Park and Woo, 2022; Liu and Wu, 2024; Ma and Chen, 2024; Zhang et al., 2025), studies that combine these two lines of inquiry remain scarce. In particular, there is limited evidence on how the Big Five personality dimensions shape learners' awareness of AI in language education. While openness and conscientiousness have been linked to more constructive engagement with AI and neuroticism to heightened anxiety (Park and Woo, 2022; Ma and Chen, 2024), such findings have not been systematically extended to second language learning contexts. Moreover, demographic and background factors—such as gender, self-assessed English proficiency, and ICT use—have rarely been analyzed together with personality traits when explaining variation in AI awareness (Liu and Wu, 2024). Addressing this gap, the present study investigates whether personality traits and selected demographic characteristics can predict differences in EFL learners' awareness of AI. By doing so, it seeks to extend the theoretical understanding of personality in technology adoption and provide practical insights for the design of AI-supported foreign language learning environments that accommodate diverse learner profiles. The study is therefore guided by the following research questions:

RQ1. Are there significant differences in EFL learners' AI awareness across gender, Big Five-based personality profiles, self-assessed English proficiency, and ICT usage?

RQ2. To what extent can the Big Five personality traits predict AI awareness among EFL learners?

Methodology

Research design

This study employed a quantitative, cross-sectional survey design to examine the relationships between personality traits and AI awareness among EFL learners. Quantitative methods were chosen to allow for statistical testing and to identify patterns based on measurable variables (Creswell and Creswell, 2018). A cross-sectional approach was appropriate, as data were collected at a single point in time. The use of a survey enabled the researcher to efficiently reach a broad and diverse group of learners.

Participants

A total of 155 students (66 males, 89 females) participated in the study. All were enrolled in the English Preparatory Program at a public university in Türkiye during the 2023–2024 academic year. These programs aim to develop students' academic English skills—including reading, writing, listening, and speaking—before they begin content-based instruction in English-medium departments. The majority of participants were aged

between 18 and 25 ($n = 153$), with only two students aged 26 or older. Participants self-rated their English proficiency as very weak ($n = 8$), weak ($n = 28$), medium ($n = 88$), good ($n = 26$), or very good ($n = 5$). Daily use of information and communication technology (ICT) was reported as 1–3 h ($n = 26$), 4–6 h ($n = 83$), 7–9 h ($n = 38$), or 10 or more hours ($n = 8$). Participants came from a wide range of academic backgrounds, including engineering, economics, medicine, science, education, and social sciences. A convenience sampling method was used, as participation was limited to students accessible through the English preparatory program at the time of data collection (Table 1).

Data collection instruments

Demographic and background questionnaire

Participants were asked to report their gender, age, daily ICT usage, and self-assessed English proficiency. This form was designed by the researcher and served to contextualize the findings based on relevant learner characteristics.

Big Five personality traits inventory

Personality traits were measured using the Turkish adaptation of the Five-Factor Personality Inventory (Benet-Martinez and John, 1998; Sümer and Sümer, 2005). This scale includes 44 items assessing five traits: Extraversion (8 items), Agreeableness (9 items), Conscientiousness (9 items), Neuroticism (8 items), and Openness to Experience (10 items). Items were rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Negatively worded items were reverse-coded. Cronbach's alpha values in this study ranged from 0.62 to 0.74, consistent with previous Turkish validations of the scale.

AI awareness scale

Artificial intelligence awareness was assessed using the Artificial Intelligence Awareness Scale developed by Arslan and Koçoğlu (2023). This 14-item scale comprises four dimensions: Basic

TABLE 1 Participants' demographic and background information.

Variable	Category	<i>n</i>	%
Gender	Male	66	42.6
	Female	89	57.4
Age	18–25 years	153	98.7
	26 years or older	2	1.3
Self-assessed English proficiency	Very weak	8	5.2
	Weak	28	18.1
	Medium	88	56.8
	Good	26	16.8
	Very good	5	3.2
Daily ICT usage	1–3 h	26	16.8
	4–6 h	83	53.5
	7–9 h	38	24.5
	10 h or more	8	5.2

Knowledge, Benefit, Bias, and Negative Forecast. Each item was rated on a 5-point Likert scale. Negatively worded items were reverse-coded. The overall internal consistency coefficient (Cronbach's alpha) for this study was 0.65, which is considered acceptable for brief scales (Streiner, 2003).

Data collection procedure

The survey was administered via Google Forms during regularly scheduled classes. Students completed the form using their personal devices (e.g., smartphones, tablets, laptops), under the supervision of the researcher to minimize missing data and ensure understanding. Participation was voluntary, and informed consent was obtained in line with ethical approval granted by the university's ethics board. Anonymity and confidentiality were assured throughout the study.

Data analysis

Before conducting the analysis to answer the research questions, tests of univariate normality using the Shapiro–Wilk statistic indicated some deviations from normality for the AI awareness dimensions. However, visual inspection of histograms and Q–Q plots suggested that these deviations were minor and did not substantially violate the normality assumption. Given the robustness of MANOVA to moderate departures from normality in large samples (Field, 2018; Tabachnick and Fidell, 2019), the assumption of normality was considered adequately satisfied.

Then, to address the first research question of the study, a multivariate analysis of variance (MANOVA) was conducted to examine whether EFL learners' gender, Big Five–based personality profiles, self-assessed English proficiency, and ICT usage produced significant group differences in their AI awareness dimensions (Basic Knowledge, Benefit, Bias, and Negative Forecast). Pillai's Trace was used as the multivariate criterion because it is robust to moderate violations of homogeneity of covariance (Tabachnick and Fidell, 2019; Stevens, 2009). Although English proficiency and ICT usage were measured on ordinal self-report scales, they were treated as categorical factors for group comparisons, following recommendations for Likert-type variables with five or more levels (Field, 2018; Tabachnick and Fidell, 2019). Effect sizes were reported using partial η^2 , with values of 0.01, 0.06, and 0.14 interpreted as small, medium, and large, respectively. Because no significant multivariate effects were observed, no follow-up univariate ANOVAs or *post-hoc* tests were conducted. To categorize learners according to their personality tendencies, a K-means cluster analysis was performed on standardized scores of the five Big Five dimensions (agreeableness, neuroticism, extraversion, conscientiousness, and openness). The analysis produced two clearly differentiated clusters, which were subsequently used as categorical personality profile factors in the MANOVA. Detailed cluster centers are reported in the Section "Results."

To address RQ2, a multiple linear regression analysis was conducted to determine the extent to which the Big Five personality traits (openness, conscientiousness, extraversion, agreeableness,

and neuroticism) predicted overall AI awareness. Prior to analysis, multicollinearity was assessed through tolerance and VIF values, all within acceptable ranges (Tolerance 0.80; VIF < 2). Effect sizes were reported using R^2 , adjusted R^2 , and standardized beta coefficients (β). The significance level for all analyses was set at $p < 0.05$ (two-tailed).

Findings

This section presents the findings of the study, structured around the research questions. Before addressing the research questions, descriptive statistics were examined to provide an overview of students' profiles across the Big Five personality traits and the four dimensions of AI awareness. These values (Table 2) offer baseline information about the central tendencies and variability within the sample.

As shown in Table 2, participants scored highest on Agreeableness ($M = 3.70$, $SD = 0.57$) and Openness ($M = 3.66$, $SD = 0.52$) among personality traits, suggesting a generally cooperative and open profile. For AI awareness, the highest mean was observed for Benefit ($M = 3.99$, $SD = 0.77$), indicating that students widely recognized the positive aspects of AI, while Negative Forecast received the lowest mean ($M = 2.70$, $SD = 0.83$), reflecting fewer concerns about AI's potential drawbacks.

Group differences in AI awareness

To examine whether demographic variables (gender, English proficiency, and ICT usage) influenced students' AI awareness, a multivariate analysis of variance (MANOVA) was conducted. MANOVA was deemed appropriate because AI awareness was measured through four interrelated sub-dimensions—Basic Knowledge, Negative Forecast, Benefit, and Bias—and this method allows for testing their combined effects while reducing the risk of Type I error (Tabachnick and Fidell, 2019; Field, 2018). A K-means cluster analysis was carried out to identify learners'

TABLE 2 Descriptive statistics for Big Five personality traits and AI awareness.

Variables	N	Mean	SD
Big Five personality traits			
Neuroticism	155	2.98	0.68
Extraversion	155	3.30	0.72
Conscientiousness	155	3.42	0.64
Openness	155	3.66	0.52
Agreeableness	155	3.70	0.57
AI awareness sub-dimensions			
AI: Basic Knowledge	155	3.56	0.86
AI: Negative Forecast	155	2.70	0.83
AI: Benefit	155	3.99	0.77
AI: Bias	155	3.29	0.85
AI awareness (overall)	155	3.39	0.48

personality profiles based on standardized (z) scores of the Big Five personality traits—agreeableness, neuroticism, extraversion, conscientiousness, and openness. The analysis converged in six iterations and yielded two stable and clearly differentiated clusters. Cluster 1 ($n = 65$) represented an Introverted–Neurotic profile characterized by higher neuroticism and lower agreeableness, extraversion, conscientiousness, and openness, whereas Cluster 2 ($n = 90$) represented an Open–Extraverted profile showing the opposite pattern. ANOVA results confirmed that all five traits significantly differentiated the clusters ($p < 0.001$), supporting the statistical validity and distinctiveness of the two-cluster solution. The standardized mean scores for each trait across clusters are presented in Table 3.

The results of the cluster analysis confirmed that all five personality traits significantly differentiated the two profiles ($p < 0.001$), demonstrating that the clusters were statistically distinct. Using these empirically derived personality profiles (Introverted–Neurotic and Open–Extraverted) together with gender, English proficiency, and ICT usage, a MANOVA was subsequently performed to address RQ1 and examine group differences in AI awareness dimensions (Table 4).

Before performing MANOVA, assumption testing was carried out. The homogeneity of covariance matrices was assessed using Box's M , which was non-significant, Box's $M = 119.412$, $F(90, 2903.361) = 0.959$, $p = 0.589$, indicating that the covariance matrices were equal across groups. The homogeneity of error variances was tested using Levene's test; results were non-significant for Bias [$F(46, 108) = 1.089$, $p = 0.354$], Benefit [$F(46, 108) = 0.975$, $p = 0.528$], and Basic Knowledge [$F(46, 108) = 0.908$, $p = 0.637$], but significant for Negative Forecast [$F(46, 108) = 2.108$, $p = 0.001$]. It should be noted that MANOVA was conducted using Pillai's Trace as the multivariate test statistic in this study due to its robustness to assumption violations (Field, 2018; Tabachnick and Fidell, 2019). No significant main or interaction effects were found ($p > 0.05$). The MANOVA results using Pillai's Trace showed no statistically significant main effects for gender, $V = 0.019$, $F(4, 123) = 0.584$, $p = 0.675$, partial $\eta^2 = 0.019$ (small effect); personality profile, $V = 0.007$, $F(4, 123) = 0.223$, $p = 0.925$, partial $\eta^2 = 0.007$ (small effect); English proficiency, $V = 0.162$, $F(16, 504) = 1.327$, $p = 0.175$, partial $\eta^2 = 0.040$ (small-to-medium effect); or ICT usage, $V = 0.131$, $F(12, 375) = 1.427$, $p = 0.151$, partial $\eta^2 = 0.044$ (small-to-medium effect). None of the two-way interactions reached statistical significance ($ps > 0.05$). In sum, the findings suggest that learners' AI awareness levels did not differ significantly across gender, personality profiles, English proficiency levels, or ICT usage frequencies. However, these non-significant

results should be interpreted with caution, as the statistical power for certain subgroup comparisons was limited (Table 3).

Personality traits and AI awareness

To address the second research question, the relationships between the Big Five personality traits and AI awareness were examined using Pearson correlations, followed by multiple linear regression analyses. This two-step approach allowed us to first explore the strength and direction of bivariate associations and then to identify the predictive contribution of each trait while controlling for overlap.

Pearson correlation coefficients (Table 5) revealed that AI awareness was positively associated with Openness ($r = 0.285$, $p < 0.001$), Extraversion ($r = 0.245$, $p = 0.001$), and Conscientiousness ($r = 0.181$, $p = 0.012$). A significant negative relationship was found with Neuroticism ($r = -0.209$, $p = 0.004$). Agreeableness, however, was not significantly related to AI awareness ($r = 0.061$, $p = 0.225$). These results suggest that students higher in Openness, Extraversion, and Conscientiousness tended to report greater AI awareness, whereas those higher in Neuroticism reported lower awareness.

While correlations indicated general associations, regression analysis was necessary to determine which traits uniquely predicted AI awareness when controlling for the others. A stepwise multiple regression was therefore conducted, as the aim was to identify the most parsimonious set of predictors. Prior to analysis, assumptions were checked and met. Multicollinearity diagnostics confirmed that tolerance values ranged from 0.848 to 0.942 and VIF values from 1.062 to 1.142, indicating no collinearity concerns.

As shown in Table 6, Openness entered the model first, explaining 8.1% of the variance in AI awareness, $F(1,153) = 13.50$, $p < 0.001$. Extraversion was added in the second step, raising the explained variance to 10.8%, $F(2,152) = 9.24$, $p < 0.001$. The ΔR^2 of 0.027 was statistically significant ($p = 0.032$), indicating that Extraversion provided incremental predictive power.

Table 7 displays the coefficients for the regression models. In the final model, both Openness ($B = 0.213$, $SE = 0.074$, $\beta = 0.231$, $p = 0.005$) and Extraversion ($B = 0.117$, $SE = 0.054$, $\beta = 0.174$, $p = 0.032$) were significant positive predictors of AI awareness. The other traits (Conscientiousness, Agreeableness, Neuroticism) did not contribute significantly and were excluded from the model.

Discussion

Before addressing the research questions, the descriptive results offer valuable insight into the general profile of the learners in this study. Among the Big Five traits, participants scored highest on Agreeableness and Openness. This pattern aligns with earlier personality research showing that young adults in academic settings often present cooperative tendencies and a strong inclination toward new experiences (McCrae and Costa, 1997; John and Srivastava, 1999). In language education, Openness is particularly relevant because it reflects curiosity, cognitive flexibility, and willingness to explore unfamiliar practices (Piechurska-Kuciel, 2020; Zhang, 2003). Such qualities are advantageous in digital

TABLE 3 Personality profiles derived from K-means cluster analysis.

Personality trait	Cluster 1	Cluster 2	$F(1, 153)$	p
Agreeableness	-0.57	0.41	46.88	<0.001
Neuroticism	0.68	-0.49	76.72	<0.001
Extraversion	-0.53	0.38	39.59	<0.001
Conscientiousness	-0.60	0.44	54.86	<0.001
Openness	-0.51	0.37	35.19	<0.001

Standardized mean scores of the Big Five personality traits across clusters.

TABLE 4 Multivariate analysis of variance (MANOVA) results (Pillai's Trace).

Effect	Pillai's Trace	F	df1	df2	p	Partial η^2
Gender (sex)	0.019	0.584	4	123	0.675	0.019
Personality profile	0.007	0.223	4	123	0.925	0.007
English proficiency	0.162	1.327	16	504	0.175	0.040
ICT usage	0.131	1.427	12	375	0.151	0.044
Gender and personality	0.037	1.170	4	123	0.327	0.037
English proficiency and gender	0.141	1.150	16	504	0.305	0.035
ICT usage and personality	0.041	0.435	12	375	0.949	0.014
English proficiency and ICT usage	0.364	1.147	44	504	0.245	0.091

TABLE 5 Correlations between AI awareness and personality traits.

Personality trait	r	p
Openness	0.285	0.001*
Extraversion	0.245	0.001*
Conscientiousness	0.181	0.012*
Agreeableness	0.061	0.225
Neuroticism	-0.209	0.004

N = 155. Pearson correlation coefficients (two-tailed). * $p < 0.05$, $p < 0.01$.

TABLE 6 Model summary.

Model	Predictors	R	R ²	Adjusted R ²	F	p
1	Openness	0.285	0.081	0.075	13.50	0.001
2	Openness, extraversion	0.329	0.108	0.097	9.24	0.001

Model 1 includes Openness. Model 2 includes Openness and Extraversion as predictors. $p < 0.05$ indicates statistical significance.

and AI-enhanced learning environments, where adaptability and experimentation support effective engagement. Recent studies reinforce this connection: learners high in openness tend to explore AI-mediated instruction more willingly and appreciate the pedagogical affordances of automation, interactivity, and personalization (Liu and Wu, 2024; Ma and Chen, 2024). Likewise, Alsaawi et al. (2025) reported that openness facilitates exploratory behavior in virtual settings, further supporting the personality profile observed in this study.

The descriptive results of AI awareness also revealed meaningful tendencies. Learners reported the highest scores in the Perceived Benefit dimension, indicating that they view AI as a promising and helpful educational resource. This finding is in line with research in higher education, where students frequently associate AI with efficiency, convenience, and personalized support (Zawacki-Richter et al., 2019; Holmes et al., 2022). In EFL contexts, studies highlight the value of AI tools for promoting autonomy and tailored instruction (Godwin-Jones, 2019; Kukulska-Hulme, 2009; Chen et al., 2020). More recent research confirms AI's potential to enhance both cognitive and affective aspects of learning. Mohammed and Khalid (2025) found that AI-generated writing feedback improved not only performance but also motivation and emotional engagement, illustrating how AI contributes to learner

well-being. Similarly, Yuan (2025) showed that AI-driven biometric feedback systems can reduce anxiety and foster self-regulation—two critical components in foreign language learning.

Conversely, the lowest scores were observed in the Negative Forecast dimension, showing that learners expressed relatively limited concern about the risks of AI. This optimistic stance is consistent with findings among digitally literate learners, who tend to view AI more as an opportunity than a threat (Zawacki-Richter et al., 2019). In the Turkish EFL context, Aydın (2024) similarly reported that students find AI applications more motivating and engaging than traditional tools, with low levels of skepticism or distrust. Although such optimism may encourage adoption, it also indicates a gap in critical digital literacy. Holmes et al. (2022) and Dogan et al. (2023) emphasize the importance of recognizing algorithmic bias, privacy issues, and ethical implications to ensure responsible AI use in education. Without these competencies, learners may overlook important limitations or develop overdependence on automated systems.

Building on this general profile, it becomes important to move beyond learners' overall awareness and examine whether these tendencies translate into meaningful differences in how they understand AI in more specific terms. While descriptives provide a useful snapshot of students' orientations toward technology, the core aim of the study was to investigate whether these orientations—together with demographic and dispositional characteristics—are reflected in measurable variations across the dimensions of AI awareness. This broader context enables a more focused interpretation of the main findings.

For the first research question, the results demonstrated that learners did not differ significantly in their AI awareness according to gender, English proficiency, ICT usage, or personality profiles. Awareness levels across the four dimensions—Basic Knowledge, Benefit, Negative Forecast, and Bias—were largely comparable. This result is noteworthy because earlier work in applied linguistics often highlights the role of background variables in shaping learners' technology-related attitudes. However, recent scholarship suggests that AI exposure has become embedded in many educational systems, leading learners to develop broadly similar perceptions regardless of demographic distinctions. Reviews by Zawacki-Richter et al. (2019) and Holmes et al. (2022) indicate that institutional practices, curricular integration, and public discourse collectively shape how learners interpret AI's role in education. In such contexts, students encounter similar

TABLE 7 Coefficients.

Predictor	B	SE B	β	t	p	95% CI lower	95% CI upper	VIF
Openness (Model 1)	0.263	0.072	0.285	3.67	0.001	0.121	0.404	1.000
Openness (Model 2)	0.213	0.074	0.231	2.87	0.005	0.067	0.360	1.104
Extraversion (Model 2)	0.117	0.054	0.174	2.16	0.032	0.010	0.224	1.104

Unstandardized coefficients (B) and standard errors (SE) are reported alongside standardized coefficients (β). Both predictors (Openness and Extraversion) were statistically significant ($p < 0.001$). VIF, variance inflation factor.

messages about the potential benefits and limitations of AI tools, which may help explain the absence of substantial group differences.

A second explanation emerges from studies conceptualizing AI awareness as a multidimensional construct. Arslan and Koçoğlu (2023) and Uluğ et al. (2025) argue that awareness comprises cognitive understanding of how AI systems function, affective responses such as motivation and confidence, and ethical considerations regarding fairness, transparency, and responsible use. Because these dimensions develop through shared learning environments rather than isolated individual experiences, it is plausible that they converge among learners who participate in the same instructional practices. This interpretation is consistent with findings by Asio and Gadia (2024) and Asio (2025), who showed that AI literacy and self-efficacy—both shaped by educational exposure—strongly influence learners' attitudes toward AI. In this regard, the consistent awareness observed across proficiency and ICT usage levels may reflect the integrative and collective nature of contemporary digital learning experiences.

English proficiency did not significantly predict AI awareness either. While earlier research has associated proficiency with learners' engagement in digital environments and their willingness to communicate (Piechurska-Kuciel, 2020; Zhang, 2003), the current results suggest that understanding AI's functions, benefits, and risks is not necessarily dependent on linguistic competence. Awareness, especially in its ethical and cognitive dimensions, may be more closely connected to general exposure to AI tools and discussions rather than to proficiency-driven performance outcomes. Shared institutional messages about AI's educational role may therefore contribute more to awareness than individual language ability.

The second research question addressed whether personality traits, represented through two cluster profiles, predicted AI awareness. The cluster analysis successfully differentiated learners into Introverted–Neurotic and Open–Extraverted groups, which align with established descriptions of the Big Five model (Costa and McCrae, 1985). In language learning contexts, personality traits have been linked to motivation, communication behaviors, and academic performance (Chamorro-Premuzic and Furnham, 2005; Komarraju et al., 2011; Poropat, 2009; MacIntyre and Charos, 1996). Recent research has extended these associations to AI-related learning, showing that openness and conscientiousness support constructive engagement with AI tools, while neuroticism may contribute to anxiety or mistrust (Liu and Wu, 2024; Ma and Chen, 2024; Park and Woo, 2022). Despite these expectations, the present study found no significant differences in AI awareness between the two personality profiles.

This finding suggests that personality may influence how learners interact with AI—such as their comfort levels, participation, or persistence—but not necessarily how they understand or evaluate it. Awareness involves reflective judgment and exposure to shared educational conditions rather than moment-to-moment behavior, which may reduce the influence of stable personality traits. The work of Zhang et al. (2025), which shows that AI literacy and self-efficacy mediate learners' willingness to communicate through AI systems, also implies that psychological variables related to confidence and technology familiarity may be more important for shaping awareness than dispositional tendencies alone.

Taken together, the findings indicate that AI awareness in this context functions as a collective perspective shaped by common institutional and sociocultural experiences. This interpretation does not diminish the importance of individual differences in language learning; rather, it highlights that awareness—unlike motivation, performance, or engagement—may be less sensitive to demographic or personality variables. As AI continues to become an integral part of educational practice, learners are likely to encounter similar instructional messages, ethical guidelines, and technological tools, which can contribute to a shared baseline of understanding.

These results carry pedagogical significance. Since learners display similar levels of AI awareness, instructional efforts can build on this shared foundation to promote deeper critical reflection. Scholars such as Kukulska-Hulme (2009), Godwin-Jones (2019), and Chen et al. (2020) emphasize the need for digital literacy that goes beyond functional skills and encourages students to examine ethical implications, limitations, and responsible use. In our study, awareness of risks and biases remained moderate, indicating the need for structured activities that foster critical engagement rather than unexamined acceptance of AI technologies. Tasks involving case analyses, ethical discussions, and guided inquiry may help learners develop a more balanced perspective. Rather than tailoring instruction only to demographic or personality differences, educators can adopt strategies that support collective reflection while still allowing space for individual experiences.

In conclusion, this study contributes to the literature by demonstrating that AI awareness does not differ significantly across demographic groups or personality profiles among EFL learners. Awareness appears to be shaped predominantly through shared educational experiences and institutional exposure. Understanding this collective baseline can help educators and researchers design pedagogical interventions that strengthen learners' critical, ethical, and informed use of AI in language learning contexts.

Conclusion and implications

This study examined EFL learners' awareness of artificial intelligence with particular attention to demographic factors and personality traits. The findings revealed that learners' awareness of AI—across its four dimensions of Basic Knowledge, Benefit, Negative Forecast, and Bias—did not differ significantly according to gender, English proficiency, ICT usage, or personality profiles. Overall, students demonstrated a shared and moderately positive level of awareness, perceiving AI as a useful and increasingly familiar part of education. This consistency suggests that learners' understanding of AI is shaped more by common educational and technological experiences than by individual differences.

The results contribute to applied linguistics and educational psychology by showing that AI awareness is a collective rather than a selectively determined construct. While previous studies reported associations between openness, extraversion, or proficiency and positive attitudes toward technology, the present findings indicate that such effects may diminish in learning environments where AI exposure is widespread and institutionalized. This outcome supports the multidimensional conceptualization of AI awareness (Arslan and Koçoğlu, 2023; Uluğ et al., 2025), which views awareness as a combination of cognitive understanding, affective orientation, and ethical reflection. When these dimensions evolve together within shared educational contexts, individual differences exert limited influence. The findings thus highlight the equalizing role of educational and sociocultural environments in shaping how learners conceptualize and evaluate AI.

From a pedagogical perspective, the study underscores the need for structured, reflective, and ethically informed approaches to AI integration in language education. Since students already share a basic level of familiarity with AI, instruction should move beyond functional knowledge toward deeper critical engagement. Teachers can facilitate discussions that help learners analyze not only the advantages but also the ethical, emotional, and pedagogical implications of AI use. Training programs and curricula might therefore focus on developing learners' critical digital literacy—helping them question reliability, fairness, and the broader impact of AI in education. Rather than tailoring instruction solely to demographic or personality profiles, educators should emphasize collaborative and inquiry-based experiences that enhance collective understanding and responsible use of AI in EFL classrooms.

Limitations and future directions

This study, while offering valuable insights into the relationship between personality traits, proficiency, and AI awareness, is not without limitations. The use of self-reported measures and a single-institution sample may restrict the generalizability of the findings. Additionally, the cross-sectional design limits causal interpretation. Future studies could adopt longitudinal approaches, integrate behavioral data on actual AI use, and examine diverse educational contexts to deepen our understanding of how learner differences shape engagement with AI-supported language learning.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving humans were approved by İnönü University, Ethical Commission. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

GG: Writing – review & editing, Methodology, Writing – original draft. İR: Writing – original draft, Data curation, Investigation.

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