

The Use of Artificial Intelligence Tools among University Students and its Association with Personality Traits

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Abstract

Despite constant increase in the use of Artificial Intelligence tools in educational settings, nothing is known about students' personality traits associated with the use of these resources. Thus, the objective of this study was to explore possible links between Artificial Intelligence use and personality traits among university students. A cross-sectional ex-post facto quantitative study was conducted with 1761 undergraduate students ($M_{age} = 20.30$; $SD = 2.76$). Validated questionnaires were administered for data collection, always under the supervision of members of the research team. According to multinomial regression analysis, neuroticism and extraversion were related to sporadic use and frequent use, respectively. Agreeableness increased the odds of using Artificial Intelligence to solve every day doubts and neuroticism to do academic work. Conscientiousness was negatively related to the use of Artificial Intelligence to do academic work and to create fake content. Higher scores in open-

ness increased the likelihood of creating fake content using Artificial Intelligence. These results provide novel information about personal characteristics associated with the use of Artificial Intelligence tools among university students. Educators should consider this information when implementing Artificial Intelligence into their educational strategies.

Keywords: Artificial Intelligence, university students, personality traits.

10.1. Introduction

Artificial Intelligence (AI) was born in the XX century, although it was not until very recently that it became highly accessible to the general population, having an impact on our daily lives and showing the potential to be applied to different dimensions of society (Crompton & Burke, 2023; O’Dea & O’Dea, 2023). It has even been speculated that Artificial Intelligence has the capacity to change people’s behaviors (Gillath et al., 2021). Artificial Intelligence comes with a number of benefits, but it also entails some risks. Its benefits include automatization of mechanical and bureaucratic tasks (Karan & Angadi, 2023) and fast data processing (Alqahtani et al., 2023), whereas the most cited risks are related to privacy concerns (Sarker, 2023) and the hypothetical increase of unemployment (Xie & Wang, 2023). International institutions, such as the European Union, are even laying on the table possible guidelines for regulating Artificial Intelligence (Benvenuti et al., 2023).

Education is one of the fields with the highest use of Artificial Intelligence (Lee, 2023). Students do not perceive it as a risk and stress on the need to include artificial intelligence in digital education (Lozano & Fontao, 2023). In this sense, some experts in the field claim that educational institutions should make use of Artificial Intelligence (Wang et al., 2023) and that future generations of workers should be currently instructed in the use of Artificial Intelligence (Benvenuti et al., 2023). In fact, a new paradigm has been proposed -Positive Artificial Intelligence Education-, aiming at improving people’s well-being through fostering the positive use of Artificial Intelligence in education (Bittencourt et al., 2023). Nevertheless, education should be always adapted to the characteristics of learners, and nothing is known about the

psychological features of students who tend to use Artificial Intelligence. Consequently, the aim of the present study was to analyze the possible relation between the use of Artificial Intelligence tools (AIT) and personality traits among university students.

The most accepted model of personality is the Big Five (Golberg, 1990). It includes five dimensions of personality that range between two extremes, namely: openness, conscientiousness, extraversion, agreeableness and neuroticism. People scoring high in openness stand out in creativity and have a wide variety of interests. Conscientiousness refers to a goal-oriented and structured lifestyle, focusing on details. Extraversion is characterized by sociability and expressiveness. Agreeableness involves kindness by helping and taking care of others. Neuroticism is related to emotional imbalance, expressed by irritability or anxiety. According to a systematic review, these personality dimensions are linked to academic achievement and technology use (Feher & Vernon, 2021). A research project conducted by Berger et al. (2017) with a sample of Swiss university students found that high scores in conscientiousness and low scores in agreeableness predicted immediate responses to smartphone messages. A recent meta-analysis revealed that extraversion is strongly related to social networks use and openness correlates with the use of ICT for educational aims (Joshi et al., 2023). Considering the existing body of research focused on personality traits and technology use, it is necessary to shed light on the relation between personality traits and the use of Artificial Intelligence tools.

Some studies have addressed the relation between personality traits and attitudes towards Artificial Intelligence. For instance, Park and Woo (2022) conducted an online survey in South Korea to explore whether the five dimensions of personality were associated with emotional (positive/negative) and cognitive (sociality/functionality) attitudes towards Artificial Intelligence. They found a relation between neuroticism and negative emotions, as well as sociality towards Artificial Intelligence. Extraversion was also related to negative emotions but linked with a perception of low functionality. The association between personality dimensions and general attitudes towards Artificial Intelligence was also investigated by Schepman and Rodway (2023) in the United Kingdom through an online survey. Their findings showed that extraversion and openness predicted positive atti-

tudes towards Artificial Intelligence, whereas agreeableness and conscientiousness were predictors of negative attitudes. Although these empirical results pave the way to a promising body of research regarding associations between personality and Artificial Intelligence, further evidence is needed to determine how personality traits are related to the use of Artificial Intelligence tools.

The current study

The prevalence of use of Artificial Intelligence tools is rapidly increasing among the general population. They are easily accessible, and its use is normalized, but there is no evidence about the psychological characteristics of people who use these tools. Previous research has linked diverse technology usage with personality traits. In addition, an emergent body of research is focused on personality dimensions associated with attitudes towards Artificial Intelligence. Nonetheless, to the best of our knowledge, the link between personality traits and the use of artificial intelligence tools has not been empirically tested. Consequently, the objective of the present study was twofold: to analyze whether different personality traits are related to the frequency of use of Artificial Intelligence tools (O1); and to identify associations between personality traits and different types of use of Artificial Intelligence tools (O2). Based on existing literature about attitudes towards Artificial Intelligence, it was hypothesized that the use of Artificial Intelligence tools would be more frequent among individuals scoring high in extraversion and openness (H1). Regarding the type of use, it was expected that openness would be linked with using Artificial Intelligence to create content, conscientiousness to support their academic tasks, introversion to interact with someone, and neuroticism to bolster one's own opinions (H2).

10.2. Method

Participants

The sample, involving 1761 participants, was selected by convenience and accessibility. Data from 74 participants were eliminated because they did not give consent (9), they did not have

an appropriate level of the Spanish language (6) or they did not answer the control question correctly (59). The final sample was composed by 1687 individuals from the University of Córdoba (Spain). The participants were enrolled in the university degrees of Primary Education (41%), Early Childhood Education (32%), Psychology (12.8%), Social Education (10.5%), and Double Degree program in Primary Education and English Studies (3.6%). Their mean age was 20.30 years ($SD = 2.76$). Regarding gender, 78.6% of participants self-identified as female, 21.2% as male, 0.2% identified as neither female nor male, and 0.1% identified with both the female and male genders. The participants were distributed in different user profiles depending on the use of AIT they self-reported as follows: 32.7% non-users, 20% experimenter users, 36.3% sporadic users, and 11% frequent users.

Instruments

The use of AIT was measured by an *ad hoc* scale with two items. The first item was *How often have you used Artificial Intelligence tools (ChatGPT, DeepL, Ideogram, etc.) in the last 12 months?* The participants were given a 6-point response scale with the following options: 1 = never, 2 = once, 3 = more than once, but not as often as monthly, 4 = monthly, 5 = weekly, and 6 = every day. The second item was *What have you used these AIT for?* The participants were given the following eight different options, where they could answer as many as they deemed necessary: 1) to solve every day doubts, 2) to look for information to bolster my opinions, 3) need for interaction with someone, 4) to do academic work for me, 5) to solve doubts regarding academic work, 6) to create fake images, 7) to create fake audios, and 8) to create fake videos.

Personality traits were measured by the Big Five Inventory-10 (BFI-10; Rammstedt & John, 2007). It consists of 10 items with 5 response options (1 = strongly disagree, 5 = strongly agree).

Procedure

This study used a cross-sectional *ex-post facto* quantitative research design. Data collection was carried out using self-reported measures through electronic devices, under the supervision of members of the research team.

Faculty members were informed about the study objectives, and the anonymity and confidentiality of their responses, and they were asked to collaborate in the data collection during their regular class hours. Participation was voluntary and individuals were free to decline or withdraw at any stage of data collection. Those who agreed to take part in the study were provided with a QR code to access a Google form and complete the questionnaires within a 10-minute period. This procedure adheres to both international and national law and ethical standards, and it was approved by the Ethical Committee of the University of Córdoba.

Data analysis

Bivariate Pearson's correlations were run including all the study variables. A multinomial regression on AIT use profiles was performed to analyze the relation among each AIT use profile and the personality traits. Finally, six logistic regressions were carried out to study the prediction of each type of AIT use by the personality traits, also including age and gender. The participants were classified in different user profiles: individuals reporting no use of AIT were classified as non-users; those who reported having used AIT once were classified as experimenter users; those who reported using AIT more than once without reaching monthly use or using it monthly were classified as sporadic users; and those who indicated using AIT weekly or daily were classified as frequent users. The gender variable was recoded as female = 1 and male = 2 for regression analysis. For correlation and regression analyses, the items assessing the purposes of AIT use to create fake images, to create fake audios and to create fake videos were coded as a single variable measuring AIT use to create fake content. All these analyses were carried out using SPSS v.25.

10.3. Results

According to Pearson's correlations, the frequency of Artificial Intelligence use was positively related to extraversion ($r = .06$) and male gender ($r = .11$). Using Artificial Intelligence to solve everyday doubts was related to more agreeableness ($r = .08$), low neuroticism ($r = -.07$) and male gender ($r = .12$). Using Artificial In-

telligence to do academic tasks instead of the student him/herself was negatively correlated with conscientiousness ($r = -.16$) and openness ($r = -.08$), and was positively correlated with male gender ($r = .08$). Finally, using Artificial Intelligence to solve doubts about academic tasks and to create fake content was related to female gender ($r = -.11$) and openness ($r = .09$), respectively.

A multinomial regression analysis was run for experienter, sporadic and frequent AIT user profiles predicted by the personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness), age and gender. This analysis showed that being an experienced user was predicted by older age (OR = 1.46); being a sporadic user was predicted by high neuroticism (OR = 1.14) and older age (OR = 1.96); whereas high extraversion (OR = 1.16) and older age (OR = 1.97) predicted being a frequent user.

Logistic regression coefficients predicting the different AIT uses included in this study found that AIT use to solve every day doubts was predicted by high agreeableness (OR = 1.16) and male gender (OR = 1.63). AIT use to do academic work was predicted by low conscientiousness (OR = 0.68), high neuroticism (OR = 1.17), and male gender (OR = 1.57). AIT use to solve doubts regarding academic work was predicted by female gender (OR = .62). Finally, AIT use to create fake content was predicted by low conscientiousness (OR = 0.70), high openness (OR = 1.88) and male gender (OR = 2.35).

10.4. Discussion

Artificial Intelligence tools are highly accessible to the current society for different purposes. However, nothing is known about personality traits associated to the use of these resources. Previous research has found that personality traits predict academic performance (Zell & Lesick, 2022) or a wide variety of online behaviors (Stachl et al., 2020). Thus, the aim of this study was to analyze whether different personality traits are related to the frequency of use of Artificial Intelligence (O1), and to the use of Artificial Intelligence tools for different purposes among university students (O2).

Regarding the first objective, the multinomial regression analyses showed that older age predicts all categories (experienter,

sporadic, and frequent users). Artificial Intelligence is designed to respond to requirements, and such requirements could be more demanding for older students, which may influence their frequency of use. In line with existing literature relating extraversion and Internet use (Blackwell et al., 2017), this study found that a high level of extraversion increases the odds of frequent AIT use. Moreover, extraversion has been related to a positive attitude towards artificial intelligence in a recent study conducted by Schepman and Rodway (2023). Extraversion is characterized by seeking stimulation and the tendency to experiment positive emotions (Costa & McCrae, 1992), which could increase the interest in using Artificial Intelligence tools. Therefore, the link between Artificial Intelligence use and the motivation to explore may explain this high frequency of AIT use among extrovert individuals.

The second objective aimed at exploring the association between personality traits and the use of Artificial Intelligence tools for different purposes. In this sense, the use of Artificial Intelligence tools to solve every day doubts was linked to high agreeableness and low neuroticism. Agreeable people tend to be respectful and calm, thus they could use Artificial Intelligence tools to solve usual discrepancies that emerge in social settings and avoid conflicts (Tehrani & Yamini, 2020). Neurotic individuals can be suspicious of technology and reticent to technological innovation (Özbek et al., 2014). Therefore, they can mistrust the answer provided by Artificial Intelligence.

The use of Artificial Intelligence tools to do academic work instead of the student was negatively related to conscientiousness. The relation between conscientiousness and academic honesty has been reported in a meta-analysis by Lee et al. (2020). According to our results, conscientiousness could be protective against cheating even when Artificial Intelligence provides an easier and more sophisticated possibility to cheat (Crawford et al., 2023). In contrast, elevated levels of neuroticism increased the odds of using Artificial Intelligence to doing academic work. A meta-analysis by Giluk and Postlethwaite (2014) highlighted that there is an inconsistent link between neuroticism and unethical academic behavior. The relation between neuroticism and the use of Artificial Intelligence for academic dishonesty might be affected by other factors, such as self-efficacy (De Feyter et al., 2012). Emotional stability is a precursor of self-efficacy, which is

related to academic performance (Schmitt, 2007) and less academic plagiarism (Fatima et al., 2020). Future studies should explore factors mediating the relation between neuroticism and the use of Artificial Intelligence for academic dishonesty.

Furthermore, openness was negatively associated with using Artificial Intelligence to do academic work instead of the student. Individuals with high scores in openness to experience are characterized by being intelligent, creative, and curious (Peabody & Goldberg, 1989). These characteristics may lead to a preference for doing the work by themselves over the use of artificial methods (Karim et al., 2009). On the other hand, openness was related to a higher use of Artificial Intelligence to create fake content. This is congruent with characteristics shown by opened people, such as creativity and variety of interests (Goldberg, 1990), and with previous research reporting the relation between openness and the spreading of fake news in social media (Shrestha & Spezzano, 2022). In addition to high openness, the use of Artificial Intelligence to create fake content was predicted by low conscientiousness. Similar results were found by Prasmara and Wijaya (2017), who reported that the motivation for faking could be motivated by the preference for new things and the creativity of people with high openness, but it could be prevented by the need of highly conscientious individuals to be honest.

This study has some strengths but also limitations that should be mentioned. Probably, the biggest strength is that we report novel insight into a hot topic nowadays: Artificial Intelligence use by students. Moreover, the large sample size grants robust reliability to our findings. The rigorousness in data collection should be also highlighted, as the participants were supervised by members of the research team at all times. Nevertheless, the sample was selected by convenience and there is an imbalanced gender representation. Moreover, data were collected using self-reports, which may lead to response bias, such as social desirability bias. Finally, the cross-sectional design does not allow establishing chronological links among variables. Future studies should delve into this body of research by testing these findings in representative samples and considering other age ranges. In addition, conducting longitudinal research on the topic would be useful to find mediating factors in the relation between personality traits and artificial intelligence use.

Even with some limitations, our findings have important implications for policy and practice. As different personality traits were found to be related to the use of Artificial Intelligence tools for several purposes, educators should take into account this information when implementing Artificial Intelligence into their educational strategies. Furthermore, these results should be considered to prevent undesirable practices associated with Artificial Intelligence tools, such as fake content production.

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