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Students' Attitude Towards Artificial Intelligence and Its Predictive Factors

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Abstract: *The general objective of this research is to investigate students' attitudes towards artificial intelligence (AI) in relation to a series of socio-demographic data such as age, gender, university year, general level of familiarity with technology, and the attitude of the social group. The purpose is to identify the characteristics of students that could serve as predictive factors for their attitude towards AI and to outline directions for strategies aimed at efficiently managing their relationship with AI products. The results, obtained through the application of the ATTARI-12 scale (Stein, et al., 2024) on a sample of 87 students from three faculties in Bucharest and processed using IBM SPSS Statistics v23, showed statistically significant correlations between the socio-demographic data (age, year of study, and social group attitude) and the attitude toward AI, and that these are also factors that predict students' attitudes towards AI by 82%. The results also highlight that the age group 25-34 has the most open attitude toward AI, and that there are significant differences in this attitude depending on the social group attitude. Although the research objective was achieved, due to the small number of subjects, this study represents a pilot study with associated limitations, such as the inability to generalise conclusions. Instead, the findings serve to guide strategies for the efficient management of AI-related interactions while adhering to ethical principles.*

Keywords: *students; artificial intelligence; predictive factors; familiarity with technology; social group attitude.*

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1. Introduction

Artificial Intelligence (AI) is not a recent concept, but its development in recent times brings new elements. It can now be said that our lives are increasingly mediated by AI. One of the fields in which AI is present is education, where it began to make its mark in the 1960s with the development of tutoring systems that provided individualised lessons using computers. Over the years, expert systems were developed to offer feedback and assess student performance via the Internet. By the 2000s, AI started being integrated into online learning platforms, significantly increasing accessibility to educational materials. Today, AI has evolved to include complex algorithms that create personalised informational structures, such as educational chatbots, customised evaluation methods, etc.

AI offers new opportunities and challenges in education, such as the transition to personalised learning, the restructuring of teachers' roles, and the development of complex educational systems (Baker, Smith, & Anissa, 2019). The impact of AI in education is felt by both students and teachers. The first group has a strong desire to use technology more, meaning access to it should be efficient, as this would make educational resources more accessible. Regarding the second group, they do not have the same desire to use technology as much. However, since the pandemic, changes have made it necessary for them to adapt to its use. Education has been impacted by the changes brought by the pandemic, shifting from traditional teaching methods to online or hybrid formats, and from classic pedagogy to one heavily influenced by technology and its advancements (Flynn, 2021).

The studies emphasise multiple aspects related to the impact of AI in education were highlighted, such as: enabling a faster learning process, allowing teachers to adjust their teaching strategies more easily, providing instant feedback that has an immediate impact on performance, improving access to diverse information, optimising access to courses, and more. Currently, teachers can use chatbots to enhance their interaction with students—offering answers to their many questions, clarifying certain concepts or algorithms, contacting students to share information, helping instructors estimate class sizes, assisting in curriculum planning, and facilitating course or material evaluations (Mailizar, Burg, & Maulina, 2021; Neelakantan, 2022). Students can also leverage these technological advancements to optimise learning. For example, in language learning, they can use "computer-assisted pronunciation training" to understand the correct pronunciation of words and sounds. AI also enables the creation of collaborative or immersive learning environments that enhance relationship dynamics and teamwork. Additionally, 3D modelling brings reality closer, making it easier to grasp for learners. Anti-plagiarism platforms assist in selecting materials for submission to professors, among other uses (Zhang & Aslan, 2021; Taneri, 2020; Sumakul, Hamied, & Sukyadi, 2022; Hutson et al., 2022; Huang, 2023). Both groups—teachers and students—can utilise AI in evaluation, whether for assessing materials, peers, or courses. AI offers a higher degree of objectivity in any type of evaluation compared to human assessment (Chai et al., 2024).

The relationship with AI usage impacts the way we work, interact, carry out activities, and stay connected, thereby influencing all aspects of our lives, including our well-being. Just as wellbeing is discussed in everyday life, with the widespread use of technology, the concept of digital wellbeing has also emerged (Vanden Abeele, 2020). This aspect of digital wellbeing is increasingly mentioned, especially since one of the negative perceptions related to AI is the concern that it will lead to a significant rise in misinformation in our lives.

It thus becomes necessary to integrate AI into our lives, as it is currently a valuable work tool, the field that has seen the most innovations in recent times, the domain that most significantly impacts our lives, the area that generates the most ideas and the most profitable ones for the times we are living in, and the sector experiencing the most dramatic development. This raises the question: what are the most important factors influencing our choices regarding AI, beyond the primary distinction between digital natives and digital immigrants in its usage? Studies show that individuals under the age of 35 tend to use technology more frequently than those over 35, that men use technology more often than women, and that individuals with a higher level of education are

more likely to use technology than those with a lower level of education. Thus, studies show that demographic factors such as age, gender, and education level influence people's attitudes toward AI (Sumakul, Hamied, & Sukyadi, 2022; Omari et al., 2024). The relationship between AI usage and age is not a simple one; on the contrary, it is complex and multidimensional, influencing how individuals interact with technology. This relationship involves our adaptability, education level, and openness to new experiences. It is well known that younger generations are more open to using technology and integrating AI into their lives, whereas older generations tend to be more skeptical about these aspects.

By examining the key factors that influence our choices regarding AI, we can identify differences in attitudes toward AI and, consequently, variations in motivation to use or avoid AI, as well as the extent to which it is adopted. To use something, a person must perceive it as useful for their activities and relatively easy to use. When these two conditions are met, the desire to use it increases and may even lead to its integration into their daily life (Mailizar, Burg, & Maulina, 2021; Yilmaz et al., 2024).

Technology and its use are generally viewed positively, but they also raise concerns. The main worry stems from the rapid pace of AI development and the lack of sufficient legislation on this issue, which brings up the problem of e-safety, not only in terms of browsing but also regarding personal data, accessed information, online treatment, and respect for human rights. Another negative aspect is the fear that people have regarding technology, specifically the concern that they will be replaced by it (Kaya et al., 2024). However, it is noteworthy that many generations understand and accept the presence of AI in their lives. The percentages reflecting this acceptance are over 70% for Millennials and Gen Z and close to 60% for Baby Boomers.

Several authors have been concerned with the use of AI over the years, and several conclusions have emerged that are still considered today. These conclusions highlight that people use technology if it is perceived as useful, easy to use, and controlled, and if the results obtained are in fair proportion to the effort invested. Of course, beyond these general conclusions, information related to the users' age becomes an important factor in usage. However, this general framework has recently taken on new dimensions due to the rapid pace of AI change, and thus its impact on our lives is also increasing. Students view AI in learning with curiosity and considerable openness, especially because it offers them opportunities such as increased access to information, flexible learning, more efficient teamwork, and enhanced communication and collaboration. Beyond these advantages, there are also challenges related to AI that prevent the technology from being consistently accepted or used to its full potential.

All the recent changes, along with their sheer number, are constantly reshaping the educational field, leading to a digital transformation. This makes it even more essential to know how to use devices and adapt to the changes they bring, which is why this topic is consistently introduced at education-related conferences. It therefore becomes interesting to study what shapes our attitude toward AI to develop programs that optimiSe it or shape it in a way that best suits our needs.

2. Research

2.1. The objective of the study

The general objective of the research is to investigate students' attitudes toward AI in relation to various socio-demographic factors such as age, gender, year of university study, general level of familiarity with technology, and social group attitude. The aim is to identify the characteristics of students that may serve as predictors of their attitude toward AI and to outline directions for strategies that ensure effective management of their relationship with AI products.

2.2. Hypotheses

1. It is assumed that students' attitude toward AI is significantly correlated with a range of socio-demographic factors such as age, gender, year of university study, general level of familiarity with technology, and social group attitude and that some of these factors are predictors of their attitude.
2. It is anticipated that students' attitudes toward AI will vary significantly depending on their age group.
3. It is assumed that students' attitudes toward AI will vary significantly depending on the attitude of the social group they belong to.

2.3. Participants

The research subjects – the participants in the research are 87 students from the faculties of psychology, communication, and management in Bucharest, aged between 19 and 43 years (M=29.56, SD=14.26), including 23 males and 64 females. The sample was randomly selected by sending an online data completion form, (sent through a Typeforms link), that the students who wanted to participate in the study completed. Participation in the study was voluntary and anonymous, the only criterion in the selection of the subjects was to be a student. The subjects were informed about the topic and the fact that the results would be confidential and anonymous, used solely for research purposes.

2.4. Instruments

The general objective of the research was investigated using the survey method based on a questionnaire. For this purpose, a questionnaire was used to collect demographic data about the subjects and the "Attitude Towards Artificial Intelligence" scale, called ATTARI-2. The investigative scale identified towards AI has been built by Stein et al. (2024), the authors started the build of the scale from the concepts described in (Schepman & Rodway, 2020) and (Joyce & Kirakowski, 2015). The 12 items of the scale represent the three facets of attitude: cognitive, affective, and behavioural, and the scale contains an equal number of items for each facet/dimension and equally reflects both positive and negative attitudes toward AI. To this scale, two questions referring to the level of familiarity (generally) with technology and the attitude of the social group towards AI were also added.

The scoring of participants' responses is done on a five-point scale (from 1 = strongly disagree up to 5 = strongly agree), with results being reported both at the general level and by dimension. ATTARI-12 was applied and validated on 600 participants from the USA, aged between 19 and 72 years, including 211 females, 273 males, and 4 subjects who did not specify their gender.

As a result of the factor analysis, it was found that the scale, at the general level, explains 79% of the attitude toward AI, with coefficients indicating that it is a unidimensional scale, having very good internal consistency (Cronbach's $\alpha = 0.93$). It also demonstrates convergent validity through a statistically significant positive correlation with scales of attitudes toward specific AI applications (Gnambs & Appel, 2019) ($r = 0.60$), which proves the psychometric characteristics of this scale.

For the present study, the internal consistency of the items on the translated ATTARI-12 scale, following its application to participants in Romania (Cronbach's $\alpha = 0.76$), demonstrated the reliability of the ATTARI-12 scale for drawing valid conclusions.

The level of general familiarity with technology was investigated through a question in which students self-assessed this level using a three-point scale (1 = low, 2 = medium, and 3 = high).

Additionally, *the attitude of the social group the student belongs to* was investigated through a question in which students self-assessed the type of attitude using a three-point scale (1 = closed/unfavourable attitude, 2 = cautious attitude, and 3 = open/favourable attitude).

2.5. The results of the study

For the analysis and processing of the data in this research, IBM SPSS Statistics v 23 was used.

First hypothesis results

To analyse the first hypothesis, which investigates the relationship between students' attitudes toward AI and their socio-demographic characteristics, the procedure for analysing the significance of the Pearson correlation coefficient was initially applied.

Students' attitudes toward AI correlate positively and strongly, with statistical significance ($p < 0.01$) with age ($r = 0.87$), year of study ($r = 0.72$), and the attitude of the social group they belong to ($r = 0.88$). It is also observed that the components of the attitude toward AI (cognitive, affective, and behavioural) correlate positively and significantly ($p < 0.01$) with age, year of study, and the attitude of the social group to which the students belong ($0.51 < r > 0.87$).

Additionally, there are statistically significant correlations ($p < 0.05$) between students' attitudes toward AI and its components, and the socio-demographic characteristics of the students. However, this does not target the objective of the research, and these were not included in the analysis (Table 1).

Table 1. Correlations between attitudes toward AI and the socio-demographic characteristics of the students.

The variables of the research	**AC**	**AA**	**AB**	G	V	AS	GFT	AGS
The attitude towards AI	.85**	.77**	.83**	-.11	.87**	.72**	.21	.88**
The attitude towards AI –cognitive component (AC)		.82**	.74**	-.*20*	.71**	.55**	.25	.72**
The attitude towards AI –affective component (AA)			.77**	-.08	.51**	.87**	.13	.75**
The attitude towards AI –behavioural component(AB)				-.12	.81**	.66**	.11	.75**
Gender (G)					.29	.64**	-.22	.09
Age (V)						.48**	.72**	.45**
Study year AS							.64**	.58**
The level of general familiarity with technology GFT								.22
The attitude of the social group AGS	.72**	.75**	.75**	.09	.73**	45**	.58**	

** Correlation is significant at the 0.01 level (2-tailed)

The results highlight that students' attitudes toward AI are closely linked to age, year of study, and social group affiliation, indicating significant influences on their perception. The cognitive, affective, and behavioural components of attitude also show strong correlations with these characteristics, emphasising the complexity of the interaction between demographic factors and AI perception. Our well-being is influenced by digitalisation, as it has become a constant presence in our lives in recent years. Therefore, it is important to focus not only on well-being in general but also on our specific relationship with AI and, consequently, on digital well-being (Vanden Abeele, 2020).

To identify those socio-demographic characteristics of students that are predictors of their attitude towards AI, the multiple regression procedure was used (since it is based on significant correlations between variables, and such correlations were identified in the previous step). The socio-demographic variables of gender and level of familiarity with technology were not subjected to analysis, as they did not correlate significantly with the attitude toward AI.

The standard analysis method (Enter) was used, taking into account 3 predictor variables (age, university year, and the attitude towards AI of the group the student belongs to) for the attitude towards AI (criterion variable). The evaluation of multicollinearity was carried out by analysing the correlation matrix, which revealed the existence of statistically insignificant correlations ($p>0.01$) between the predictor variables and strongly significant correlations ($p<0.01$) between students' attitude towards AI and age ($r=0.87$), university year ($r=0.72$), and the attitude of the social group ($r=0.88$). These results indicate that there is no issue with multicollinearity and that the predictor variables do not correlate significantly with each other, but do correlate significantly with the criterion variable, which increases the precision of the prediction.

The examination of the multiple correlation coefficient (with a value of $R=0.91$) indicates a strong correlation between the predictor variables and the criterion variable, while the value of R^2 (0.82) shows that 82% of the variation in students' attitudes toward AI is determined by the predictor variables (age, university year, and the attitude of the social group). Through the variance analysis, the significance of R was tested, and the value of F (73.14 at $p=0.01$) indicates that the predictor variables together predict the variation of the criterion variable.

The results suggest that, although predictor variables may be independent, demographic factors play a crucial role in shaping students' perceptions of AI, thereby justifying a deeper understanding of external influences on their attitudes.

The significance of the individual regression coefficients was evaluated using the t-test, and their values (significant at $p<0.05$) reveal that all predictor variables are important for estimating the criterion variable (attitude towards AI) (the results are summarised in Table 2).

Table 2. The degree of contribution of the predictor variable values to the regression line and the significance of the multiple regression.

	Unstandardised coefficients		**Standardised coefficients**	**t**	**p**	**R**	**R^2**	**F**	**p**
Model	B	Std. Error	Beta						
(Constant)	81,87	1,36		40,11	0,01	0.91	0,82	73.14	0,01
age	2,74	0,28	0,29	9,27	0,01				
University year	4,54	0,66	0,15	6,19	0,01				
Social group attitude	-3,06	0,27	-0,43	-11,23	0,01				

Based on these data, the regression equation can be written as: ***Students' attitude toward AI*** *= 81.87 + (2.74) * age + (4.54) * year of study + (-3.06) * social group's attitude*. The reliability of the regression equation's prediction was verified by calculating the bivariate correlation between students' attitudes toward AI and its estimation (pre_1), resulting in $r=0.89$ (a value identical to the multiple correlation coefficient).

The statistical data obtained in this research indicate that there are 3 predictors of the attitude toward AI, which estimate both individually and (especially) together (through their relationship and interaction) this attitude.

The study confirms the initial hypothesis, demonstrating that students' attitudes toward AI are statistically significantly correlated with various socio-demographic factors. Recent studies, especially those involving medical students but not exclusively, highlight that a positive attitude toward AI encourages them to use AI in their studies, academic training, and future professional practice (Sit et al., 2020; Ahmed et al., 2022; Dashti et al., 2024; Omari et al., 2024). Thus, the data collected on the factors influencing students' attitudes toward AI help us identify solutions to enhance adaptability to AI and improve its efficient use across various fields.

Results hypothesis 2

The attitude of students in the research sample toward AI, reported by age categories, was investigated using the statistical procedure ANOVA One-Way (one-way analysis of variance). The results showed that students in the 18-25 age category had the lowest scores on the scale evaluating the attitude toward artificial intelligence (M=31.14, SD=9.27), followed by those in the 35-43 age category (M=38.28, SD=11.85), with the highest score obtained by students in the 26-34 age category (M=43.81, SD=12.87). The differences identified between the three student categories are statistically significant; the F-test result was 12.38 (df=2) with a significance threshold of p=0.007, and the Levene test value (4.57 at p=0.004) shows the lack of homogeneity of variance, so the reporting was done using Post-Hoc Tamhane values (p=0.01).

Thus, it is observed that students in the investigated sample aged 26-34 are the most open to AI, while those in the 18-24 age category are the most skeptical.

Table 3. Variation of students' attitudes towards AI according to age categories

Age categories	**Attitude tower AI**							
	N	**M**	**SD**	**Levene**	**p**	**df**	**F**	**p**
19-24	25	31.14	7,21	4,57	0,004	87 Between group=2 In group =85	12,13	0,007
25-34	28	43.81	12.87					
35-43	34	38.28	11.85					

The graphical representation of the obtained data can be found in the following figure.

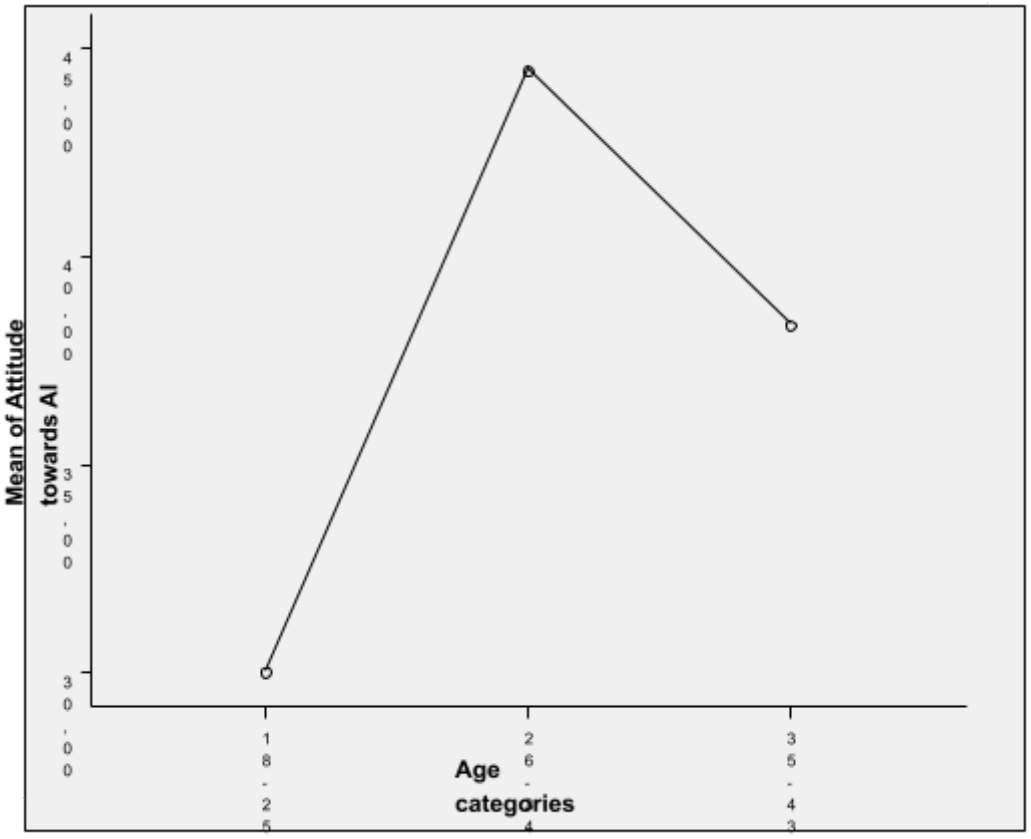

Figure 1. Graphical representation of the averages obtained by the subjects (categorised by age) regarding their attitude toward AI

A possible explanation for these results is that respondents aged 18-24 are less inclined to use AI because, in our country, AI is used to a much lesser extent in high school compared to

university, which impacts their attitude toward AI and, implicitly, their willingness to use it. A student, having transitioned from high school, might be affected by the lack of active use of AI in learning and, thus, have a lower level of familiarity with AI. This can lead to a limited understanding of AI's functions and utilities, distorted perceptions of how it influences our lives, etc. All of these factors contribute to a more reserved or negative attitude toward this technology.

The results obtained in the study show a statistically significant strong correlation between students' attitudes toward AI and age. Additionally, the regression equation indicates that age is a significant predictor of attitude toward AI and that 82% of the variation in students' attitudes toward AI is determined by predictor variables, including age, which confirms this hypothesis.

Results hypothesis 3

The third hypothesis of the research, which investigates whether students' attitudes towards AI vary depending on the attitude of the social group they belong to, was analysed using the statistical procedure ANOVA One-Way (one-way analysis of variance). The data obtained showed that the highest score for students' attitude towards AI (practically the most favourable attitude) is identified in students who have a social group with an open/favourable attitude towards AI (M=1.26, SD=0.3), followed by those who have a social group with a cautious attitude towards AI (M=1.72, SD=0.06), while the lowest score was obtained by students who have a social group with an unfavourable/fearful attitude towards AI (M=2.05, SD=0.07). Since the F-test resulted in a value of 11.08 (df=2) p=0.05, and the Levene test value was 5.13 (p=0.05), indicating a lack of homogeneity of variance, the Post-Hoc Tamhane values (p=0.01) were taken into account, which shows that the differences identified between the three student categories are statistically significant (Table 4).

Table 4. Variation of students' attitudes towards AI according to social group attitude.

The social group's attitude	**Student's attitude towards AI**							
	N	**M**	**SD**	**Levene**	**p**	**df**	**F**	**p**
unfavourable	22	1.26	.03	5,13	0,05	87 Between group=2 In group =85	11,08	0,05
prudent	29	1.72	.06					
open	31	2.05	.07					

For young people, group affiliation is important as it shapes their choices and attitudes. As a result, those in groups that are more open to change, new things, and digitalisation will also have an open attitude toward technology and AI. It is known that the group we belong to shapes our attitudes through the norms it imposes, and the information held and exchanged within the group, which leads to either acceptance or, on the contrary, polarisation of the group. All of these factors influence a person's sense of belonging to the group and their identification with its values, or lack thereof.

The results obtained in this study emphasise that students in social groups with a favourable attitude toward AI also have the most favourable attitude themselves and that differences in attitudes are recorded among students depending on the attitude of the group they belong to, which confirms the hypothesis put forward in the study.

3. Conclusions

The present research was based on a series of studies from the national and international specialised literature regarding the factors that influence students' attitudes (Carmi, 2024; Ungureanu, Prisăcaru, & Glăveanu, 2023), the importance of AI in education (Mena-Guacas et al., 2024; Kaforina, Mulyadi, & Jaya, 2024), and the standards mentioned in the National Strategy for

Artificial Intelligence 2024-2027 (2025), issued by the Ministry of Research, Innovation, and Digitalisation (https://www.mcid.gov.ro).

The objective of this research was to investigate students' attitudes toward AI to a series of socio-demographic data such as age, gender, year of university study, level of general familiarity with technology, and the attitude of their social group, to identify the characteristics of students that would constitute predictive factors for attitudes toward AI and to outline directions for strategies to efficiently manage their relationship with AI products.

The research results showed that students' open, favourable attitude toward AI is directly proportional to age, year of university study, and the attitude of the social group the student belongs to. These socio-demographic variables are also predictive factors for students' attitudes toward AI. Age and year of study, which can be considered indicators of experience and exposure to technology, may play an important role in shaping attitudes toward AI. Additionally, the social group influence highlights the importance of the social context in shaping individual perceptions and attitudes. The study's novelty lies in the fact that, in addition to the usual variables, the year of study was also considered as a correlated variable and a predictor of students' attitudes toward AI. The study confirms the initial hypothesis, demonstrating that students' attitudes toward AI are statistically significantly correlated with a range of socio-demographic data.

Deeper statistical analyses showed that students in the investigated group aged between 26-34 are the most open to AI, while those in the 18-24 age group are the most skeptical, and those in the 35-43 age group have a balanced attitude. These results cannot be drawn as exhaustive conclusions but should be considered with other characteristics that could be mediating factors, such as certain personality traits (extraversion or introversion), family environment characteristics, values like openness to novelty or resistance to change, coping strategies, psychological resilience, etc. (Kaforina, Mulyadi, & Jaya, 2024; Prisăcaru, Glăveanu & Ungureanu, 2024; Glăveanu, Prisăcaru & Ungureanu, 2023; Ungureanu, Prisăcaru, & Glăveanu, 2023).

Additionally, the data showed that students' attitudes toward AI vary in relation to the attitude of the social group they belong to; thus, students with an open attitude toward AI have a social group with an open attitude toward AI, and vice versa, which proves the influence of the group on the personal attitudes of its members and the phenomenon of contagion within the group. The results obtained in this study contributed to confirming, at the national level, the conclusions found in other international studies, which identified correlations between attitudes toward AI and the characteristics of the social group (Stein et al., 2024; Schepman & Rodway, 2020).

To clarify the associated and determining factors of students' attitudes toward AI, the research should be continued in several directions:

- expanding the number of subjects (starting from the main limit of this study);
- balancing the sample in terms of gender to increase the validity of the conclusions drawn;
- the study focused on students, and therefore, professors, who also participate in the educational process, and influence it was not taken into account. By including them in the study, more programs could be developed to optimise the use of AI in the teaching and learning process;
- completing the analysis of the relationship between AI perception and socio-demographic factors by adding other factors such as environment of origin (urban, rural), socio-economic conditions, field of study (IT students compared to medical or psychology students, etc.), concerns related to the impact of AI on recent developments in the field of study, etc;
- attitudes toward AI can change rapidly depending on technological developments and public discourse, and this variable (the sources of information in public discourse about AI) was not included in the study;
- analysing the role of personality and other characteristics such as openness to new things, resistance to change, stress management, etc., to establish a psycho-socio-demographic profile of individuals who would have an open, yet rational and cautious attitude toward AI, respecting ethical principles in the use of AI products.

The most important direction for continuing the research would be, after identifying the profile of the efficient AI user, to develop training programs that enhance users' skills, optimise their ability to adapt to changes in the field, increase their awareness of e-safety issues, as well as developing skills that maintain a balance between dependence and fear. Additionally, the interaction between the components of attitude involves a holistic approach to the study, which deserves to be explored in future research. For these, we aim to expand the sample, deepen and complete the variables included in the study, and supplement the methodology with other types of scales. It is also worth considering the contextualisation of the study, specifically, including the impact of the educational context and the role of professors.

This research suggests not only an acceptance of AI but also a complex level of influence from personal characteristics, inviting a deeper exploration of these relationships in future studies.

In conclusion, considering that the research sample consists of only 87 students, the study has the characteristics of a pilot study. However, the conclusions cannot be generalised to the entire student population, which was the study's main limitation. The results of this research are important because they contribute to identifying the characteristics of the target group and provide guidelines for developing programs that efficiently manage the relationship with AI while respecting ethical principles.

The authors have an equal contribution to this research.

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