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RESEARCH ARTICLE

The Impact of Gender, Seniority, Knowledge, and Interest on Attitudes to Artificial Intelligence

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ABSTRACT Artificial intelligence (AI) has become deeply rooted in our lives, yet uncertainties persist regarding public attitudes to it, particularly among young individuals poised to engage with AI in their future careers. Understanding their perspectives is crucial not only for shaping educational frameworks, but also for assessing students' readiness to navigate the rapidly evolving technological landscape in the modern workspace. This paper examines students' attitudes to AI, as well as their interest in and knowledge about it. An adapted version of the Pew Research Center survey was used in our study to explore how gender and student seniority influence attitudes to AI generally and in specific applications such as facial recognition and self-driving cars. Our aim was to test the effects of these factors on AI attitudes, and to discover how various factors such as socio-demographics, knowledge, and interest may individually or collectively impact on AI attitudes in general, as well as in specific areas such as self-driving cars, facial recognition, or social media algorithms for fake news. We also investigated whether knowledge of AI and interest in it may serve to predict attitudes beyond the impacts of student seniority and gender. Our findings indicate that males self-report greater interest than females, but similar knowledge and general attitudes as female participants. Senior students possessed more AI knowledge compared to freshmen, but similar attitudes towards AI in general and self-driving cars. Interest in AI emerged as a significant predictor of general attitudes to AI and to self-driving cars, suggesting that increased interest correlates with more positive attitudes.

INDEX TERMS Artificial intelligence, education, technological innovation.

I. INTRODUCTION

In today's reality artificial intelligence (AI) shapes our daily routines – from waking up to a personalized news briefing, working alongside intelligent systems that predict and adapt to our needs, to traveling in self-driving cars. However, as AI becomes ubiquitous, gaining a deeper understanding of its societal impact, especially for students about to enter an AI-driven job market, has become imperative. This growing need to gain insight into public perceptions, especially among students, becomes even more crucial in the light of reports such as that compiled by Masley et al. [1] indicating a sharp increase in AI-centric job opportunities. Understanding these perceptions allows for the improvement of AI education, making it a powerful tool for society to adapt to technological changes, as suggested by Seldon et al. [2].

As we explore the complexities of AI's influence on society's future, specific applications of this technology come into sharper focus. For example, self-driving cars and facial recognition technology represent two pivotal areas where AI's promise and challenges are vividly manifested. These technologies are not mere projections, but current realities

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undergoing rapid development and deployment. Understanding public perceptions and addressing the ethical, technical, and regulatory challenges they present is critical.

Numerous studies have analyzed the attitudes (and perceptions), knowledge and interest of students toward artificial intelligence in general and in specific domains such as autonomous vehicles and facial recognition technology.

Juma [3] found that while students have access to AI-capable devices, they lack knowledge about AI and are hesitant to use it for academic assessment. Similarly, a study carried out by Mansor et al. aimed to analyze AI awareness and knowledge among accountancy students to develop their interest in AI [4]. The results show that while students have moderate knowledge of AI and recognize its benefits, many are unaware of their daily use of AI applications, indicating room for improvement in their AI awareness and knowledge.

Research carried out by Dergunova et al. [5] on AI awareness levels among students indicates that although artificial intelligence tools offer advantages in various fields, (e.g., using AI can enhance teaching effectiveness in education), students also highlight their concerns about the disadvantages of AI, including its potential impact on job displacement.

Ghotbi et al. [6] found that 65% of the Japanese students surveyed consider unemployment the primary ethical issue with AI, with a further 13% concerned about its effects on the emotions and rights of humans and robots, leading the researchers to recommend that policymakers and AI developers address job displacement and incorporate emotional considerations into AI design. Amaraz-Lopez et al. [7] reported that students from two universities (economics and education) acknowledge AI's impact on their future careers, with economics students being more concerned about job displacement. Their findings indicate that although senior students are more aware of AI's importance, they are less confident in their ability to adapt it to their professions.

Research conducted among students specializing in Computer Science showed that they are interested in artificial intelligence due to its trendiness, applicability, their personal passion, the potential for future growth, and high salary potential [8]. Nevertheless, some responders (14%) expressed concerns about the negative potential of AI. Furthermore, most of the students (54%) showed interest in learning at the medium AI level, while only a small number of predominantly male students (14%) expressed interest in pursuing advanced areas [8].

A study conducted by Dai et al. [9] focused on primary students in China upon completion of an AI course. While the students in general showed great excitement and considered AI a powerful and useful technology, the male students expressed higher confidence, relevance and readiness for AI than their female peers.

Bewersdorff et al. [10] examined empirical studies on how AI concepts are understood within a formal learning environment. Their findings show that due to a limited understanding of AI at the technical level, numerous misunderstandings and myths about AI persist, e.g., a tendency to attribute human characteristics or attributes to AI systems. The authors pointed out that effective educational programs are crucial for students to comprehend AI, emphasizing understanding over assumptions or fear, and recommend that curricula should address students' biases, misconceptions, and myths pertaining to AI.

Educational programs are crucial for ensuring that learners grasp AI, allowing them to make informed decisions about its societal impact and avoiding misinformation and unwarranted fear.

A self-constructed scale was utilized by Beig and Qasim [11] to assess the attitudes of senior secondary students from Prayagraj (India) towards artificial intelligence. They found significant differences in AI attitudes between male and female students regarding pessimism about AI and AI as a controller, but no significant differences in viewing AI as a way of life or a system. Their findings also showed a significant difference in attitudes based on the amount of time students spent on computers and mobile devices. In their research, Verma et al. examined ICT awareness among students and faculty in two Indian states, finding no significant differences based on residence [12]. The authors suggest that evaluating state diversity in ICT awareness could benefit governmental and educational organizations in understanding the current situation in Indian institutions [12]. Although this study concerns ICT, it is closely related to AI and may prove useful in future research to determine AI awareness.

In his study, Shoufan analyzed student perceptions of generative AI (ChatGPT), focusing on both its potential and challenges [13]. His findings show that while students admire ChatGPT's capabilities and find it useful and engaging, they also note its occasional inaccuracies and believe good background knowledge is required to use it effectively, suggesting a need for improvements [13].

As AI continues to evolve, its application in autonomous vehicles has become a topic of considerable interest and concern. A survey carried out at the University of South Australia revealed that although the majority of students are concerned about cyber security issues and the potential failure of autonomous vehicles, they are open to embracing autonomous vehicles provided there are no financial barriers [14]. Previous research has also indicated that younger male students are more likely to use autonomous vehicles, as highlighted in the findings of Soltani et al. [14].

A survey conducted among University of Alabama students showed that 97% of the participants are aware of autonomous vehicles, while only 41% are familiar with specific automation technologies [15]. Students who are frequent users of Uber or Lyft services are also likely to become users of shared autonomous vehicles in the future [15]. Similarly, the study conducted by Brigitta & Miklós [16] found that students who possessed a better understanding of autonomous vehicle companies and had prior experience with ride-hailing services were more inclined to consider using shared autonomous vehicle services in the future.

To the best of our knowledge, surveys examining students' attitudes to Facial Recognition Technology (FRT) are scarce,so we have presented research conducted on other populations. Surveys conducted in different countries regarding attitudes to AI in FRT have shown that overall, the participants exhibited consistency in their attitudes and the rationales behind them. However, slight differences emerge between countries: individuals in the USA are more accepting of tracking citizens and the use of automatic facial recognition technology by private companies, while displaying less trust in the police utilizing automatic facial recognition compared to individuals in the UK and Australia [17]. Despite its potential to aid policing and improve security, there is substantial public skepticism in terms of privacy, accuracy, and its impact on civil liberties [18], particularly among underrepresented groups [19]. Research conducted by Bragias et al. [20] revealed mostly negative public perceptions towards its use by the police, suggesting that transparency and educational initiatives could mitigate these concerns and foster greater trust and support.

The Pew Research Center report provides an in-depth examination of AI in general and three prominent AI applications in particular: the implementation of facial recognition by law enforcement, the use of computer algorithms by social media platforms to combat misinformation, and the potential integration of driverless passenger vehicles [19]. Additionally, it explores three advancements associated with the convergence of AI, biotechnology, nanotechnology, and other disciplines, which have not been analyzed in our paper. According to this report, Americans are cautious and express concern about the use of these new technologies, as well as discomfort regarding how far these advancements may go in altering fundamental human characteristics and social realities [19].

AI attitudes are also dependent on the socio-cultural context. According to a IPSOS survey conducted in 2022, Chinese citizens display the highest level of positivity towards AI products and services, with 78% agreeing that they offer more benefits than drawbacks, while in France agreement is considerably lower at only 31%, and 35% in the U.S. [21].

To our knowledge, no study has explored students' knowledge, interest and attitudes to AI in general and AI in specific areas in Serbia to date.

A. STUDY AIMS AND RESEARCH QUESTIONS

The aforementioned studies address the complexity of AI using different methodologies and with different focuses, analyzing attitudes, interest in AI, and knowledge of AI in general or in specific domains. The research was mostly conducted among students, with a few exceptions dominantly with FRT [17], [18], [19], [20], [21].

The aim of this study is to explore the interplay between socio-demographic factors (student seniority and gender), knowledge of AI, interest in AI, and attitudes to AI in general and in different fields. More specifically, the study poses three different research questions:

1) Are there any gender differences in attitudes to AI in different fields, knowledge of AI, and interest in AI?

2) Are there any differences between senior and freshmen students in attitudes to AI in different fields, knowledge of AI, and interest in AI?

3) Do knowledge of AI and interest in AI predict attitudes to AI in different fields beyond student seniority and gender?

II. METHODOLOGY

The research was carried out using an online survey consisting of translated and adapted items from a previous survey conducted by the Pew Research Center [19]. The data was collected on a convenience sample of students. The original questionnaires were published in English, but were translated into Serbian by professional translators, and then verified through a back-translation procedure. The entire questionnaire takes approximately 20 minutes to complete, but no limit was set for completion.

A. PARTICIPANTS

Students were chosen for our sample under the assumption that this population is well-acquainted with information technologies and trends in this field [22], as well as for their potential role as future decision makers. Students at the Faculty of Security Studies, University of Belgrade were specifically selected for our research under the assumption that they would be more aware and sensitive to AI risks due to their security-focused education [23]. The power analysis for regression models with medium-sized effect ($f^2 >= 0.15$) and four predictors indicated the sample size should consist of at least 129 participants. Therefore, we recruited 403 students, out of whom 315 (78.2%) were females and 88 (21.8%) were males, significantly exceeding the minimum required sample size. The research was conducted among the students at the Faculty of Security Studies, University of Belgrade enrolled in either the freshman Informatics course or the senior Information Security elective course. This sample also allowed us to explore whether knowledge of, attitudes to and interest in AI change with student seniority, as senior students have more cyber security courses.

B. INSTRUMENTS

The instrument used in this study consisted of translated and adapted items from a survey conducted by the Pew Research Center [19]. The survey comprised three different parts. The first part of the survey was related to socio- demographic variables of gender, age, and university seniority.

The second part referred to the participants' knowledge of the usage of AI and their interest in it. More specifically, the participants answered a total of five questions designed to test their knowledge of AI, while interest was measured by four questions.

The third part of the survey measured attitudes to AI and consisted of four subscales. The first subscale measured

attitudes to AI in general and comprised 13 questions. The second measured attitudes to the facial recognition algorithm and encompassed 5 questions, the third measured attitudes to self-driving cars and consisted of 13 questions, while the final subscale measured attitudes to social media and was made up of 6 questions. The survey used in this research can be examined in Appendix.

C. RESEARCH PROCEDURE

The research was conducted through the online Moodle platform between May 25th and June 2nd, 2023, with the approval of the Faculty of Security Studies at the University of Belgrade. Participation was voluntary and all the participants were free to opt out of the study at any given moment without any consequences. The participants were given a brief introduction to the topic of the study prior to the main part of the research and were debriefed on completion of the survey.

III. RESULTS

The data was analyzed using the Statistical Package for Social Sciences (SPSS) version 25, as well as the Python 3.11 programming language. Firstly, descriptive measures were extracted for all the available variables, where the parameters of the mean and standard deviations were used for the numerical variables, while the frequencies and percentages were used for the categorical variables. Subsequently, Pearson's correlation coefficient, Principal Component Analysis, multiple regression analysis and the t-test for independent samples were used to analyze the data.

A. CONSTRUCTS

To assess item reliability and provide construct validity for the questionnaire employed in this research, Cronbach's alpha and the mean inter-item correlations were calculated first, followed by Principal Component Analysis (PCA) on the related questions using an answering scale appropriate for PCA. PCA was used in order to identify sets of questions which exhibit high inter-correlations, thus facilitating the detection of latent variables which may underlie the participants' answers to the questions. PCA was conducted without component rotations with 25 iterations for convergence, while disregarding all factor loadings below 0.3.

One factorial solution was chosen for each of the four constructs. The general attitude to AI explains 34% of the variance, and the loadings are in the range from 0.322 to 0.747, with Cronbach's alpha for the selected items being $\alpha = 0.84$ with a mean inter-item correlation of $r = 0.27$. The attitudes to self-driving cars factor explains 29% of the variance, with loadings ranging from 0.477 to 0.738, while Cronbach's alpha for the selected items was $\alpha = .78$ and the mean inter-item correlation $r = 0.21$. The attitudes to facial recognition systems factor explains 39% of the variance, with saturation ranging from 0.533 to 0.657. Although Cronbach's alpha for these items was $\alpha = 0.59$, such a result might be a consequence of the lower number of items used in the reliability analysis (5 items). On the other hand, the inter-item correlation was $r = 0.23$. However, the items related to attitudes to AI in social media exhibit low reliability, with Cronbach's alpha being $\alpha = 0.33$ and the mean inter-item correlation $r = 0.08$. Therefore, these items were not analyzed using the PCA algorithm and they were removed from further analysis.

In the next stage, for each of the aforementioned constructs, the corresponding score was calculated as the sum of the individual items with sufficient factor saturation (above 0.3). Additionally, we the total score for *Interest in AI* was also calculated by adding up all the relevant items demonstrating face validity (how much the participants had heard or actively read about AI in different fields), as well as for *Knowledge of AI* by adding up the correct responses to the relevant questions. The basic descriptive statistics for each of these variables are given in Table 1. The table shows that the knowledge test was not skewed, which suggests appropriate discriminative ability for the chosen sample.

TABLE 1. Descriptive statistics for the aggregated variables.

	Min	Max	Mean	SD	SS	SK
Knowledge	0	5	2.75	1.35	-1.31	-2.55*
Interest	4	12	8.27	1.54	1.09	-0.21
General AI	14	63	41.3	9.19	-3.42**	0.37
Facial Recognition	6	17	12.9	2.28	-2.82**	-1.93
Self-Driving Cars	10	34	21.6	5.09	0.87	-2.17*

SD= Standard deviation, SS= Standardized Skewness, SK= Standardized Kurtosis
** - Deviation is significant at the 0.01 level (2-tailed). * - Deviation is significant at 0.05

B. DESCRIPTIVE RESULTS

The participants were asked how much they had read or heard about the usage of AI in different fields. The results show that the participants were predominantly interested in facial recognition technology employed by the police (27.8%), but also in general artificial intelligence (22.8%), and self-driving cars (23.1%). In contrast, 25.3% of the participants had not read or heard anything about computer programs used by social media companies despite their regular interaction with such platforms. This disparity underscores the need to augment the respondents' engagement with and understanding of the diverse facets of artificial intelligence, particularly those related to social media platforms [24].

In terms of the participants' attitudes to the increased use of artificial intelligence in everyday life, 53.8% feel both equally concerned and excited, 34.2% of the participants feel more concerned than excited, while 11.9% feel more excited than concerned.

The participants also reported different levels of concern and excitement when asked about the usage of AI in different

areas of human activities (Table 3). For example, a considerable majority of the participants expressed concern about the prospect of AI being able to discern people's thoughts and behaviors (72.5%) or making significant life decisions on their behalf (69.7%). On the other hand, the participants reported greater excitement related to the ability of AI to perform repetitive tasks, such as household chores (63%), repetitive workplace tasks (54.1%), or managing customer service calls (48.3%). The participants also reported higher levels of excitement regarding the use of AI to diagnose medical problems (51.1%).

When asked about the potential impact of AI on human abilities, the participants mostly expressed higher levels of excitement than concern about such an impact. Specifically, 78.9% of the participants reported greater excitement than concern about the impact of AI on preventing serious diseases or health conditions. 60.3% of the participants expressed excitement about the impact of AI on the human speed and accuracy of processing information, while 47.7% expressed their excitement about the impact of AI on increasing human strength for lifting heavy objects. Furthermore, 42.9% expressed excitement about AI enhancing visual pattern recognition, and 47.7% reported excitement about AI enhancing auditory perception in humans.

As regards facial recognition technology employed by the police, the majority of the participants think it is a good idea for society (59.3%), 18.9% of the participants believe it is a bad idea for society, while 21.8% are unsure. When asked about their opinion on whether this technology might lead to more false arrests, 11.7% of the participants believe this would definitely happen, 35.7% believe it would probably happen, 43.2% believe it would probably not happen, while only 9.4% believe it would definitely not happen. Furthermore, 51.6% of the participants are of the opinion that crime rates would remain the same if the use of facial recognition systems by police were to become widespread, 42.4% believe it would decrease, while only 6% hold the view the crime would increase. In other words, the majority of the participants believe that the employment of such technologies may either have no or a positive effect on crime rates. On the other hand, 39% of the participants believe such technologies would not exert much of an influence on policing, 23.6% believe policing would be less fair, while 37% believe policing would be fairer. Finally, in terms of the participants' beliefs on whether crimes would be solved more quickly and efficiently by employing facial recognition systems, 32.5% believe that would definitely happen, 55.6% believe it would probably happen, 9.2% believe it would not happen, while 2.7% believe it would definitely not happen. In other words, the majority of the participants believe employing such systems would only help to solve crimes.

In the case of self-driving cars, the participants mostly exhibit negative responses to their widespread use and impact on society. More specifically, only 18.1% of the participants viewed the extensive adoption of self-driving cars as beneficial for society, whereas almost half of them (46.7%) deemed it as detrimental for society, while 35.2% were uncertain about such an impact. Furthermore, 56.3% of the participants said that they would like to ride in a self-driving car, while 43.7% reported they would not take up such an opportunity.

When asked about the impact of self-driving cars on the number of injuries and fatalities in traffic accidents, 41.4% of the participants indicated that it would not have a significant influence, 36.5% were of the opinion that such technology would decrease the number of fatalities and injuries, while 22.1% believe those numbers would increase. However, the majority of the participants expressed discomfort (66.5%) about sharing the road with self-driving cars. The participants also articulated their beliefs on the impact of the potential widespread use of self-driving cars on various issues.

Finally, the participants believe that certain categories of autonomous vehicles could be advantageous for specific types of vehicles, such as delivery vehicles, while also indicating potential drawbacks for public transportation and 18-wheeler trucks.

C. THE DIFFERENCES BETWEEN THE MALE AND FEMALE PARTICIPANTS IN THEIR ATTITUDES TO, INTEREST IN, AND KNOWLEDGE OF AI

T-tests were used for independent samples in order to examine any differences between the male and female participants with regards to their knowledge of AI, their interest in AI, as well as their attitudes to AI in different fields. Levene's test was used for testing the assumption of homogeneity of variance and the correction for t statistics was used where the assumption was found to be violated. The results showed that the male participants had a slightly higher interest in AI ($t(401) = 2.38$, $p = 0.018$), while no differences were observed with respect to their knowledge of AI ($t(401) = 1.437$, $p = 0.152$) or their attitudes to AI in general ($t(401) = 1.385$, $p = 0.167$). The female participants had significantly higher scores for their attitudes to AI in facial recognition systems ($t(401) = -2.232$, $p = 0.026$), while the difference was not significant for their attitudes to AI in self-driving cars ($t(401) = 0.898$, $p = 0.37$; Fig. 1).

D. THE DIFFERENCES BETWEEN THE SENIOR AND FRESHMEN STUDENTS IN THEIR ATTITUDES TO, INTEREST IN, AND KNOWLEDGE OF AI

As regards student seniority, the interest in AI did not differ across different student groups ($t(152.376) = -0.349$, $p = 0.727$). However, the senior students exhibited higher knowledge of AI than their freshmen peers ($t(401) = -2.302$, $p = 0.022$). There were no significant differences in the attitudes of the senior and freshmen students to AI in general ($t(401) = 0.847$, $p = 0.397$) or AI in self-driving cars ($t(401) = 1.543$, $p = 0.124$). However, the freshmen students had more positive attitudes towards AI in facial recognition systems ($t(401), = 2.218$, $p = 0.027$; Fig. 2).

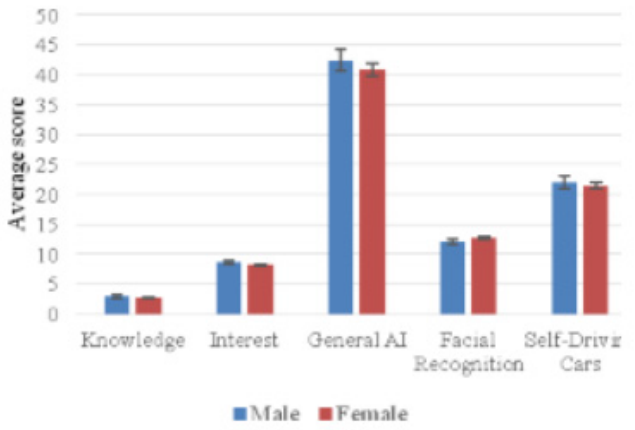

FIGURE 1. The differences between the male and female participants across aggregated variables.

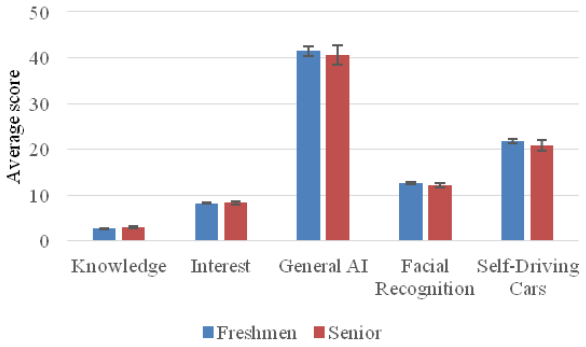

FIGURE 2. The differences between the senior and freshmen students across aggregated variables.

E. THE RELATIONSHIP BETWEEN INTEREST IN AI, KNOWLEDGE OF AI, AND ATTITUDES TO AI

Pearson's correlation was calculated in order to quantify the relationship between knowledge of AI, interest in AI, attitudes to AI in general, attitudes to AI in facial recognition, and attitudes to AI in self-driving cars (Table 2).

TABLE 2. Correlations between the extracted variables.

	Knowledge	Interest	General AI	Facial Recognition
Knowledge	-			
Interest	0.177**			
General AI	0.103*	0.143**		
Facial Recognition	-0.029	0.037	0.09	
Self-Driving Cars	-0.057	0.127*	0.381**	0.253**

Notes: ** - Correlations are significant at the 0.01 level (2-tailed). * - Correlations are significant at the 0.05 level (2-tailed).

Hierarchical multiple linear regression was used to investigate whether interest in AI and knowledge of AI predict attitudes towards AI beyond socio-demographic variables. This allowed us to differentiate between the effects of knowledge of and interest in AI and experiences from the socio-demographic characteristics measured in this research. This model defined gender and student seniority as the variables in the first step, knowledge of AI and interest in AI in the second step, and attitudes to AI in general as the dependent variable. The results of the analysis show there was no significant prediction in the first step of the model ($F(2, 400) = 1.275$ $R^2 = 0.006$, $p = 0.28$, whereas a significant prediction was observed in the second step ($F(4, 398) = 3.248$, $R^2 = 0.032$, $p = 0.012$; Table 3). Furthermore, a significant difference was observed between the models ($F(2, 398) = 5.193$, $R^2_{change} = 0.025$, $p = 0.006$). Interest in AI emerged as the only significant predictor of attitudes to AI in general in the final model, where the increase in interest is related to a corresponding increase in attitudes and vice versa.

TABLE 3. Model coefficients for predicting attitudes to AI in general.

		β	t	p
Model 1	Gender	-0.067	-1.353	0.177
	Student Seniority	-0.040	-0.797	0.426
Model 2	Gender	-0.046	-0.934	0.351
	Student Seniority	-0.052	-1.047	0.296
	Interest	0.123	2.446	0.015
	Knowledge	0.084	1.656	0.099

In the following analysis the same algorithm with the same set of independent variables was utilized in the first and the second model, with the only difference being attitudes to AI in facial recognition as the dependent variable. The results indicate the prediction was significant in both the first ($F(2, 400) = 5.201$, $R^2 = 0.025$, $p = 0.006$) and the second models ($F(4, 398) = 2.905$, $R^2 = 0.028$, $p = .022$), with no significant difference between the models ($F(2, 398) = 0.618$, $R^2_{change} = 0.003$ $p = 0.54$). In both models, only student seniority and gender were significant predictors, while interest in and knowledge of AI did not contribute significantly to the predictions (Table 4).

TABLE 4. Model coefficients for predicting attitudes to AI in facial recognition systems.

		β	t	p
Model 1	Gender	0.115	2.33	0.020
	Student Seniority	-0.114	-2.317	0.021
Model 2	Gender	0.120	2.414	0.016
	Student Seniority	-0.114	-2.282	0.023
	Interest	0.056	1.102	0.271
	Knowledge	-0.017	-.333	0.740

The same procedure was used in the final analysis, with attitudes to AI in self-driving cars as the dependent variable. The first model consisting of gender and student seniority was not significant ($F(2, 400) = 1.543$, $R^2 = 0.008$, $p = .215$),

while the second model was significant ($F(4, 398) = 2.926$, $R^2 = 0.029$, $p = 0.021$; Table 5). The difference between models was also significant ($F(2, 398) = 4.284$, $R^2_{change} = 0.021$, $p = 0.014$). Interest in AI emerged as the only significant predictor of attitudes to AI in self-driving cars in the final model, where the increase in interest is related to a corresponding increase in attitudes and vice versa.

TABLE 5. Model coefficients for predicting attitudes to AI in self-driving cars.

		β	t	p
Model 1	Gender	-0.042	-0.842	0.401
	Student Seniority	-0.075	-1.509	0.132
Model 2	Gender	-0.031	-0.628	0.530
	Student Seniority	-0.069	-1.389	0.166
	Interest	0.138	2.730	0.007
	Knowledge	-0.076	-1.500	0.134

IV. DISCUSSION

In this study of Serbian students, a positive relationship was found between attitudes to AI in general, AI systems in self-driving cars, and AI systems in facial recognition software. A positive relationship between interest in AI and knowledge of AI was also observed. This relationship was to be expected and aligns with the majority of findings on these two variables in different fields [25], [26]. Based on these results, it can be argued that increased familiarity with AI concepts might stimulate curiosity about the field, thus leading to higher interest in AI. However, since the relationship is not causal, it might also suggest that increased levels of interest facilitate students' knowledge through engagement with different sources. The role of demographic variables, interest in and knowledge of AI in predicting attitudes to AI in different areas was also explored. In terms of demographic variables, the male participants expressed higher levels of interest in AI than their female counterparts which is in line with previous research [8], [9]. On the other hand, while the senior students possessed higher levels of knowledge of AI compared to their freshmen peers, the levels of interest did not differ between these two groups. This result was anticipated given that the senior students were more frequently exposed to AI content during their studies.

These two demographic variables were found to be poor predictors of attitudes to AI in most cases. More specifically, the students' gender and seniority contributed to predictions of attitudes to AI in facial recognition systems, but not to AI in general or AI in self-driving cars. Moreover, attitudes to AI in facial recognition systems are predicted only by gender and student seniority in this research, while interest and knowledge turned out not to be significant contributors. The absence of any relationship between knowledge of and attitudes to facial recognition systems suggests that attitudes to certain specific AI applications, such as facial recognition systems, might be related to some other specialized knowledge that is not necessarily addressed in this research. This result aligns somewhat with prior research, but also raises new questions. For example, Kaya and colleagues [27] found that neither age nor gender contributed to predictions regarding AI when included with other variables. However, the scale used in their research did not tackle facial recognition specifically. Other studies suggest that males have more positive attitudes to AI technology than females [28], [29]. Our results also indicate that variables and behaviors other than interest and knowledge might be important when predicting attitudes towards AI in facial recognition systems, which explains why only gender and seniority were significant contributors in this case. Gender could have been overshadowed by predictors other than interest and knowledge, such as trust in AI in facial recognition systems [30], computer-level usage, and openness towards new experiences [27].

Surprisingly, knowledge of AI was correlated only with attitudes to AI in general. Similar outcomes have been reported in a handful of studies (e.g. [27]), but are contrary to other research. For example, Kaya and colleagues [27] reported that higher levels of self-reported knowledge of AI were related to more positive attitudes to AI and vice versa. This result is somewhat expected since individuals with higher levels of knowledge of AI may have direct experience with its applications and thus have more positive attitudes to such systems [32]. Previous research suggests that higher and more nuanced knowledge of AI is more likely related to positive attitudes, which in turn promotes willingness to use such systems [28]. However, Kaya and colleagues used a one-item scale targeting self-assessed AI knowledge, rather than a scale that assesses knowledge of AI among participants more precisely. This research endeavored to measure AI knowledge by posing questions directly related to different AI systems and algorithms. Therefore, the absence of the predictive power of AI might lie not only in utilizing different scales, but also in the inclusion of interest that was rarely assessed in previous research.

Interest in this research was assessed using a scale adapted from the Pew Research Center and targeted the frequency with which the participants had encountered or actively read about AI in different fields. Interest contributed to predicting attitudes to AI in general, thus taking precedence over the correlation between AI knowledge and general attitudes to AI. Furthermore, interest also contributed to predicting attitudes to AI in self-driving cars, but not to AI in facial recognition systems. More specifically, this study suggests that knowledge alone is not sufficient when it comes to shaping more positive attitudes to AI, but that active interest in AI is more crucial. This underscores the need for educational institutions to adopt a more proactive and interactive approach towards enhancing AI education that will boost students' interest in AI. This is supported by previous research indicating that more direct experience with AI systems (which might stem from higher interest in such systems) is related to positive attitudes to them [32]. Interest might also be related to attitudes

to AI through openness to new experiences - a mediation that might be explored in future research. For example, openness to new experiences might lead to higher levels of interest in AI, which in turn could be associated with more positive attitudes to AI through higher levels of innovativeness [33], [34].

To date, this is the first study to assess the interplay between socio-demographic variables, interest in AI, knowledge of AI, and attitudes towards AI in Serbia. Although the methodology employed in this research is rather straightforward, using only one questionnaire translated and adapted to the Serbian language, it should be regarded as the first of its kind in Serbia. However, several limitations are worth mentioning. Firstly, we recruited only students as participants in this research, thus limiting the generalizability of our findings to other populations. Furthermore, we measured interest in AI using face-validity items, while future research may benefit from utilizing scales with extensive psychometric validation, provided such scales for measuring interest in AI exist. Future research could untangle the effects of interest and curiosity on attitudes to AI, as curiosity drives specific and short-term learning, while interest is associated with long-term educational benefits [35]. Research on this topic would also benefit from exploring the interactions between the variables used in this study and other relevant variables, such as levels of technological literacy, openness to new experiences [27], trust in AI [30], comfort with specific AI applications [29], and personal innovativeness [34].

Finally, our future research will further broaden the methodology employed in this field by integrating both quantitative and qualitative data. While current research on this topic extensively uses various questionnaires to measure attitudes towards AI, the qualitative approach has mostly been neglected. Therefore, our future research will use focus groups to identify common themes around attitudes towards AI. This approach will not only serve as qualitative validation of the questionnaires used to measure attitudes towards AI, but will also suggest new topics that could be operationalized as new dimensions and incorporated into existing questionnaires.

V. CONCLUSION

This research is the first study of its kind among Serbian students, providing insightful contributions to the understanding of attitudes to artificial intelligence (AI) by emphasizing the interplay between socio-demographic factors, interest, and knowledge in shaping these attitudes.

Notably, the study highlights higher levels of reported interest in AI from the male participants, while levels of knowledge did not differ significantly between the genders. Conversely, although the senior students demonstrated higher levels of knowledge of AI than their freshmen peers, there were no differences in the levels of interest between these two groups. These two socio-demographic variables were also shown to be poor predictors of attitudes to AI in general and AI in self-driving cars, while interest emerged as the most influential factor.

Moreover, in this study attitudes towards AI in facial recognition systems are predicted *only* by gender and student seniority, whereas interest and knowledge turned out not to be significant contributors to these predictions.

Gaining deeper insights into students' interest in, knowledge of and attitudes to AI empowers educators and policymakers to customize AI technology for effective learning outcomes by addressing specific needs and concerns. The practical implications of this study highlight the need for educational institutions to adopt a more proactive and interactive approach towards enhancing AI education and thereby promoting students' interest in it. This would provide opportunities to tailor educational programs that meet current technological demands while also equipping future generations with the knowledge and ethical framework required to navigate the AI landscape. Our future goals are to analyze the impact of various types of AI educational content on students' knowledge of and interest in AI, as well as their attitudes to it.

APPENDIX

Interest towards AI

1. How much have you heard or read about artificial intelligence?
   a) A lot
   b) A little
   c) Nothing at all
2. How much have you heard or read about computer programs used by social media companies to find false information on their sites?
   a) A lot
   b) A little
   c) Nothing at all
3. How much have you heard or read about facial recognition technology by police?
   a) A lot
   b) A little
   c) Nothing at all
4. How much have you heard or read about driverless passenger vehicles?
   a) A lot
   b) A little
   c) Nothing at all

Knowledge of AI

5. Thinking about customer service, which of the following uses artificial intelligence (AI)
   a) A chatbot that immediately answers customer questions (CORRECT)
   b) An online survey sent to customers that allows them to provide feedback
   c) A contact page with a form available to customers to provide feedback
   d) A detailed Frequently Asked Questions webpage
   e) Not sure
6. When playing music, which of the following uses artificial intelligence (AI)?

a) Using Bluetooth to connect to wireless speakers
b) A playlist recommendation (CORRECT)
c) A wireless internet connection to stream the music
d) Shuffle play from a chosen playlist
e) Not sure

7. When using email, which of the following uses artificial intelligence (AI)?
   a) The email service marking an email as read after the user opens it
   b) The email service allowing the user to schedule an email to send at a specific time in the future
   c) The email service categorizing an email as spam (CORRECT)
   d) The email service sorting emails by time and date
   e) Not sure
8. Thinking about health products, which of the following uses artificial intelligence (AI)?
   a) Wearable fitness trackers that analyze exercise and sleeping patterns (CORRECT)
   b) Thermometers that are placed under someone's tongue to detect a fever
   c) At-home COVID-19 tests
   d) Pulse oximeters that measure a person's oxygen level of the blood
   e) Not sure
9. Thinking about online shopping, which of the following uses artificial intelligence (AI)?
   a) Programming a home thermostat to change temperatures at certain times
   b) A security camera that sends an alert when there is an unrecognized person at the door (CORRECT)
   c) Programming a timer to control when lights in a home turn on and off
   d) An indicator light that turns red when a water filter needs to be replaced
   e) Not sure

General AI

1. Overall, would you say the increased use of artificial intelligence computer programs in daily life makes you feel…
   a) More excited than concerned
   b) More concerned than excited
   c) Equally concerned and excited
2. How excited or concerned would you be if artificial intelligence computer programs could do each of the following (Know people's thoughts and behaviors; Perform household chores; Make important life decisions for people; Diagnose medical problems; Perform repetitive workplace tasks; Handle customer service calls)?
   a) Very excited
   b) Somewhat excited
   c) Equal excitement and concern
   d) Somewhat concerned
   e) Very concerned
3. How excited or concerned would you be about potential new techniques that could change human abilities in the following ways (Slow the aging process to allow the average person to live decades longer; Allow some people to far more quickly and accurately process information; Prevent some people from getting serious diseases or health conditions; Allow some people greatly increased strength for lifting heavy objects; Allow some people to see shapes and patterns in crowded spaces far beyond what the typical person can see today; Allow some people to hear sounds far beyond what the typical person can hear today)?
   a) Very excited
   b) Somewhat excited
   c) Equal excitement and concern
   d) Somewhat concerned
   e) Very concerned

AI in facial recognition systems

1. Do you think the widespread use of facial recognition technology by police would be a…
   a) Good idea for society
   b) Bad idea for society
   c) Not sure
2. If the use of facial recognition technology by police becomes widespread, do you think each of the following would happen? The police would (Make more false arrests; Solve crimes more quickly and efficiently)…
   a) Definitely would happen
   b) Probably would happen
   c) Probably would not happen
   d) Definitely would not happen
3. Do you think the widespread use of facial recognition technology by police will make policing…
   a) More fair
   b) Less fair
   c) Not make much difference
4. If the use of facial recognition technology by police becomes widespread, do you think crime would…
   a) Increase
   b) Decrease
   c) Stay about the same

Self-driving cars

1. Do you think widespread use of driverless passenger vehicles would be a…
   a) Good idea for society
   b) Bad idea for society
   c) Not sure
2. Would you personally want to ride in a driverless passenger vehicle, if you had the opportunity?
   a) Definitely want
   b) Probably want

c) Probably not want
d) Definitely not want

3. If the use of driverless passenger vehicles becomes widespread, do you think each of the following would happen (Older adults and people with disabilities will be able to live more independently; Many people who make their living by driving others or delivering things with passenger vehicles would lose their jobs; Getting from place to place would be less stressful; The computer systems in driverless passenger vehicles would be easily hacked in ways that put safety at risk)?
   a) Definitely would happen
   b) Probably would happen
   c) Probably would not happened
   d) Definitely would not happen
4. If the use of driverless passenger vehicles becomes widespread, do you think that would
   a) Increase the number of people killed or injured in traffic accidents
   b) Decrease the number of people killed or injured in traffic accidents
   c) Not make much difference
5. If the use of driverless passenger vehicles becomes widespread, do you think that would
   a) Increase the gap between higher and lower-income citizens
   b) Decrease the gap between higher and lower-income citizens
   c) Not make much difference
6. If the use of driverless passenger vehicles became widespread, how comfortable would you feel sharing the road with them?
   a) Extremely comfortable
   b) Very comfortable
   c) Somewhat comfortable
   d) Not too comfortable
   e) Not comfortable at all
7. The technology used to operate driverless passenger vehicles could be used for a number of purposes. Would you favor or oppose the use of this technology in each of the following purposes (Taxis and ride-sharing vehicles; 18-wheeler trucks; Buses for public transportation; Delivery vehicles)?
   a) Favor
   b) Oppose
   c) Not sure

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