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The Examination of the Relationship Between Artificial Intelligence Usage Tendency and Demographic Variables Of Students Studying in the Faculty of Sport Sciences

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ABSTRACT

Purpose: This study aimed to examine the relationship between artificial intelligence (AI) usage tendency and demographic variables among students studying in faculties of sport sciences. As AI technologies become increasingly integrated into educational and professional environments, understanding the factors influencing AI adoption among university students has emerged as an important area of research.

Method: A quantitative research design was employed, and the study was conducted using a survey model. The sample consisted of 350 university students enrolled in sport sciences programs. Data were collected using a Personal Information Form and the General Attitude Toward Artificial Intelligence Scale. Demographic variables including gender, age, academic department, grade level, years of sports participation, grade point average, and family income level were examined. Descriptive statistics, Mann–Whitney U, and Kruskal–Wallis H tests were used for data analysis.

Results: The findings revealed that students' AI usage tendency differed significantly according to gender, age, years of sports participation, and grade point average. However, no significant differences were found based on grade level, academic department, or family income level. Furthermore, the participants generally demonstrated a moderate to positive tendency toward AI usage. Differences associated with academic characteristics suggest that exposure to technology and disciplinary context may play a significant role in AI adoption.

Conclusion: The findings contribute to the growing literature on AI adoption in higher education, particularly within the field of sport sciences. The study emphasizes the importance of integrating AI literacy into sport sciences curricula and developing targeted educational strategies to improve students' technological competencies. Future studies are recommended to employ longitudinal research designs and include behavioral data in order to better understand the long-term dynamics of AI usage among university students.

Keywords: Artificial Intelligence, Technology Adoption, Sport Sciences, Demographic Variables, Higher Education.

ÖZET

Spor Bilimleri Fakültesinde Öğrenim Gören Öğrencilerin Yapay Zekâ Kullanım Eğilimi İle Demografik Değişkenler Arasındaki İlişkinin İncelenmesi

Amaç: Bu çalışmanın amacı, spor bilimleri fakültelerinde öğrenim gören öğrencilerin yapay zekâ (YZ) kullanım eğilimleri ile demografik değişkenler arasındaki ilişkiyi incelemektir. Yapay zekâ teknolojilerinin eğitim ve profesyonel alanlara giderek daha fazla entegre edilmesi, bireyler arası YZ benimseme farklılıklarının anlaşılmasını önemli bir araştırma alanı haline getirmiştir.

Yöntem: Araştırmada nicel araştırma deseni kullanılmış ve veriler spor bilimleri programlarında öğrenim gören 350 üniversite öğrencisinden toplanmıştır. Katılımcıların yapay zekâ kullanım eğilimleri yapılandırılmış Yapay Zekaya Yönelik Genel Tutum Ölçeği ile

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değerlendirilmiş; cinsiyet, yaş, bölüm ve sınıf düzeyi gibi demografik değişkenler dikkate alınmıştır. Verilerin analizinde tanımlayıcı istatistikler ile birlikte Mann–Whitney U ve Kruskal–Wallis H testleri kullanılmıştır.
Bulgular: Araştırma bulguları, yapay zekâ kullanım eğiliminin cinsiyet, yaş, spor yılı ve genel not ortalaması değişkenlerine göre anlamlı farklılık göstermişti. Sınıf, bölüm ve ailenin gelir düzeyi değişkenlerinde ise anlamlı bir farklılık bulunmadığı ortaya koyulmuştur. Özellikle akademik özelliklere bağlı farklılıklar, teknolojiye maruz kalma düzeyi ve disiplin bağlamının YZ benimsemesini etkileyebileceğini göstermektedir. Ayrıca öğrencilerin genel olarak yapay zekâ kullanımına yönelik orta düzeyden olumluya doğru bir eğilim sergiledikleri belirlenmiştir.
Sonuç: Bu bulgular, özellikle spor bilimleri alanında yükseköğretimde yapay zekâ benimsenmesine ilişkin literatüre katkı sağlamaktadır. Çalışma, müfredatlara yapay zekâ okuryazarlığının entegre edilmesinin ve öğrencilerin teknolojik yetkinliklerini geliştirmeye yönelik hedefe dayalı stratejilerin önemini vurgulamaktadır. Gelecek araştırmalarda boylamsal tasarımların kullanılması ve davranışsal verilerin dahil edilmesi önerilmektedir.
Anahtar Kelimeler: Yapay Zekâ, Teknoloji Benimseme, Spor Bilimleri, Demografik Değişkenler, Yükseköğretim

INTRODUCTION

With the acceleration of technological advancements, artificial intelligence (AI) has become increasingly central to many areas in contemporary societies, including education, healthcare, economics, and sports. AI technologies, operating through big data analytics, decision support systems, automation, and predictive models, stand out as systems aimed at supporting human performance and improving decision-making processes. This rapid spread necessitates that AI be considered not merely a technical innovation, but a multi-dimensional phenomenon with significant impacts at both individual and societal levels. In this context, individuals' perceptions and attitudes towards AI have become a critical determinant of the integration and efficient use of such technologies.

Attitudes toward artificial intelligence directly influence individuals' evaluations, intentions to use, and trust levels regarding these technologies. The concept of attitude is defined as the totality of cognitive, affective, and behavioral tendencies that an individual develops towards any object, situation, or phenomenon (Ajzen, 2001). In this context, positive attitudes toward artificial intelligence support the acceptance and sustainable use of technological innovations, while negative attitudes can lead to increased resistance, perception of uncertainty, and negative attitudes (NATAI). Therefore, examining attitudes toward artificial intelligence stands out as a fundamental research area for understanding the effects of technological progress on individuals (Çeviker et al., 2025).

With the digital transformation process, artificial intelligence has evolved from systems that merely perform specific tasks to structures that learn and adapt. Thanks to machine learning and deep learning-based algorithms, AI systems can analyze human behavior, make predictions

about the future, and support complex decision-making processes (Russell & Norvig, 1995). These developments have led to AI playing a more visible and influential role in individuals' daily lives and professional applications. This situation necessitates a scientific examination of individuals' perceptions and attitudes towards artificial intelligence.

Theoretical models of technology adoption reveal that factors such as perceived utility, ease of use, and social impact are decisive in individuals' adoption of new technologies (Davis, 1989; Venkatesh et al., 2003). Similarly, attitudes towards artificial intelligence shape individuals' interaction with and intention to use these technologies. Therefore, examining attitudes towards artificial intelligence requires a holistic approach encompassing not only technological acceptance but also negativity, security, and human-centered usage dimensions.

Artificial intelligence applications in education have brought about many innovative uses, such as creating personalized learning environments, monitoring student performance, and automating assessment processes. AI-powered systems have the potential to increase the effectiveness of the learning process by providing content tailored to the individual characteristics of learners (Holmes et al., 2019). However, realizing this potential depends on students' and educators' positive attitudes towards artificial intelligence. Negative attitudes, such as technological negativity, distrust, and negative attitudes (NATAI), can limit the integration of AI applications into educational processes.

The field of sports science stands out as one of the disciplines where artificial intelligence applications are rapidly becoming widespread (Zambak, 2020). AI-based systems are heavily utilized in areas such as performance analysis, training planning, biomechanical assessment, injury risk prediction, and athlete monitoring. Recent studies have further highlighted the growing role of data-driven performance analysis and technological monitoring systems in sport sciences, reflecting the increasing integration of advanced analytical approaches into both research and professional practice (Bozyılan & Bilgin, 2025). Thanks to big data analytics, athletes' physical and psychological characteristics can be evaluated in a multidimensional way, allowing for more scientifically sound decisions (Claudino et al., 2019). These developments make examining the attitudes of students studying in the field of sports science towards artificial intelligence particularly important. This is because these individuals will be the professionals who use, direct, or make decisions regarding AI applications in sports in the future.

On the other hand, individuals' attitudes towards artificial intelligence are not limited solely to their technological competence; NATAI and social concerns also play a significant role in shaping these attitudes. Discussions regarding the impact of AI on employment, data

security and privacy issues, and the ensuring of fairness in decision-making processes can lead individuals to develop a cautious approach towards these technologies (Floridi et al., 2018). Therefore, examining attitudes towards artificial intelligence should include NATAI and social responsibility dimensions in addition to technological acceptance.

The current literature reveals that attitudes toward artificial intelligence can differ according to demographic and individual variables such as gender, age, education level, and technology experience (Venkatesh & Morris, 2000; Zhang & Dafoe, 2019). However, studies that examine attitudes toward artificial intelligence in a sample of sports science students in conjunction with personal variables such as duration of involvement in sports and academic achievement are limited. The fact that most of the existing research focuses on general student groups or non-sports disciplines leads to a lack of empirical findings specific to the field of sports science.

Although the use of artificial intelligence technologies in the field of sports science is increasing, there is limited empirical evidence regarding sports science students' perceptions and evaluations of these technologies. In particular, the extent to which students' demographic and academic characteristics influence their attitudes towards artificial intelligence has not been sufficiently studied within this discipline. This situation makes it difficult to plan AI-based applications in sports science education effectively and consciously.

Accordingly, the aim of this research is to examine the general attitudes of students studying in the field of sports sciences towards artificial intelligence and to determine whether these attitudes differ according to personal variables such as gender, age, duration of involvement in sports, and academic grade point average. The findings of this research are expected to contribute to the development of artificial intelligence applications in sports science education and to the development of informed and critical approaches to these technologies by future sports professionals.

METHODS

Research Design

This research was conducted using a descriptive survey model within the framework of quantitative research methods. The descriptive survey model is a research design widely used in the social sciences that aims to reveal the attitudes, perceptions, opinions, and characteristics of individuals within a specific population in their current state (Oskamp & Schultz, 2005). In this context, the study aims to determine the general attitudes of university students studying in

the field of sports sciences towards artificial intelligence and to examine whether these attitudes differ according to various demographic and academic variables at the sub-dimension level. The research design does not involve any experimental intervention and focuses on objectively describing the current situation. The survey model was considered a suitable approach for the purpose of this research because it allows for the examination of individual attitudes towards multidimensional and rapidly developing technologies such as artificial intelligence on large samples (Ajzen, 2001; Davis, 1989).

Participants

The target population of the study consisted of students receiving education in the field of sport sciences in Türkiye. Since reaching the entire population was not feasible due to time, cost, and accessibility constraints, a sampling method was employed. The data were collected from 350 students studying at the Faculties of Sport Sciences at Adıyaman University, Siirt University, and Şırnak University who voluntarily agreed to participate in the study.

Convenience sampling was used in the selection of the sample. Convenience sampling is a method frequently preferred, particularly in descriptive studies, as it enables researchers to form a sample from individuals who are easily accessible and willing to participate in data collection (Creswell, 2014). This method was preferred because the study aimed to reach a large group of participants within a limited period of time.

The demographic variables examined in relation to the research group included gender, age, duration of involvement in sports, grade level, department of study, academic grade point average, and family income level. These variables were selected based on the literature indicating that individual and academic characteristics may influence attitudes toward artificial intelligence and technology adoption (Venkatesh & Morris, 2000; Zhang & Dafoe, 2019).

Of the participants, 190 were male and 160 were female. In terms of age distribution, 140 participants were between 18–25 years old, 120 were between 26–30 years old, and 90 were aged 31 years and above. Regarding sport experience duration, 110 participants reported 1–3 years of experience, 150 reported 4–7 years, and 90 reported 8 years or more. In terms of academic grade point average, 40 participants had a GPA between 0.00–1.50, 90 participants between 1.51–2.50, 140 participants between 2.51–3.50, and 80 participants between 3.51–4.00. Participants were also categorized according to class level, academic department, and family income level.

Inclusion criteria:

Being an active student in the field of sports science.

Voluntary participation in the research

Exclusion criteria:

Incomplete or incorrectly filled forms

Participants who voluntarily withdrew from the study

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Exclusion criteria whereas questionnaire form missing or incorrect filling participants with research participation in the process without working own with his/her request taken individuals aspect It has been determined. These criteria in line with to evaluate received data analysis to the process including It has been done.

Data Collection Methods and Tools

In this study, data were obtained using two main data collection tools:

Personal Information Form

The Personal Information Form, developed by the researcher, consists of questions designed to determine the demographic and academic characteristics of the participants. The items in the form cover variables such as gender, age, duration of involvement in sports, grade level, field of study, academic grade point average, and family income level. These variables were considered as independent variables to examine whether participants' attitudes towards artificial intelligence differed.

General Altitudes Towards Artificial intelligence Scale

In order to measure the attitudes of the participants towards artificial intelligence, the General Attitudes Towards Artificial Intelligence Scale developed by Kaya et al. (2022) was

used in the study. The scale is a psychometric measurement tool that aims to comprehensively measure individuals' positive and negative evaluations of artificial intelligence technologies.

The scale consists of 20 items and is evaluated using a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Higher scores on the scale indicate more positive attitudes towards artificial intelligence. Content validity, construct validity, and internal consistency analyses were conducted during the scale's development process, and it was reported that the scale is a reliable measurement tool (Kaya et al., 2022).

General Attitude Scale Towards Artificial Intelligence (Sub-dimensions)

The General Attitude Towards Artificial Intelligence Scale, developed by Kaya et al. (2022) , consists of twenty items and two sub-dimensions. It consists of:

Positive Attitudes Towards Artificial Intelligence (PATAI) – 12 items

Negative Attitudes Towards Artificial Intelligence (NATAI) – 8 points

This structure is consistent with technology acceptance models and attitude theories (Davis, 1989; Ajzen, 2001).

Scale Scoring:

1- Positive Attitudes Towards Artificial Intelligence (sum of items 1–12): Minimum 12, maximum 60 points.

2- Negative Attitudes Towards Artificial Intelligence (sum of reverse-scored items 13–20): Minimum 8, maximum 40 points.

Data Collection Process

Research data was collected after participants were informed about the purpose, scope, and voluntary participation requirements of the study. Participants were clearly informed that the data collected would be used solely for scientific purposes, that their personal information would be kept confidential, and that they could withdraw from the research at any time.

Data collection was carried out using both online and in-person methods. Forms that were incomplete or incorrectly completed were excluded from the analysis. The dataset included in the analysis consisted of forms that were statistically analyzable.

Data Analysis

The data obtained from the research were analyzed using the SPSS 24.0 software package. The normality distribution of the data was examined first. For this purpose, the Kolmogorov-Smirnov and Shapiro-Wilk normality tests were applied. The test results revealed that the data did not exhibit a normal distribution ($p < .05$).

Furthermore, normality tests performed on the sub-dimensions of the General Attitude Towards Artificial Intelligence Scale, namely Positive attitudes towards artificial intelligence (PATAI) and Negative Attitudes towards artificial intelligence (NATAI), revealed that the data did not show a normal distribution ($p < .05$). Therefore, non -parametric statistical tests were used for both the total scale score and the sub-dimension scores.

Due to the non-normal distribution of the data, non-parametric statistical tests were employed. In accordance with the assumptions of non-parametric analyses, mean ranks were reported as the measure of central tendency instead of arithmetic means and standard deviations. The Mann–Whitney U test was used for two-group comparisons, and the Kruskal–Wallis H test was used for comparisons involving more than two groups. Test statistics, mean ranks, and effect sizes were used to interpret the results.

The Mann - Whitney U test was applied for variables with two groups , and the Kruskal - Wallis H test was applied for variables with more than two groups, A significance level of $p < .05$ was accepted for all statistical analyses.

This analytical approach ensures statistically appropriate and reliable results when considering the distribution characteristics of data obtained from Likert -type scales (Field, 2018).

In statistical analyses, not only significance values but also effect sizes of the results are calculated. For the Mann - Whitney U test used in two-group comparisons...The effect size coefficient r was calculated, and for the Kruskal - Wallis H test used in comparisons involving more than two groups, the eta squared (ε^2) value was calculated. The criteria suggested by Field (2018) were considered in interpreting effect sizes. This approach aims to provide a more reliable assessment of the practical significance of statistically significant differences.

In variables where a statistically significant difference was found in the Kruskal - Wallis H test, the Dunn - Bonferroni post -hoc test was applied to determine which groups were

responsible for the difference between the groups. The Dunn - Bonferroni method was preferred because it is suitable for non -parametric multiple comparisons and controls the probability of Type I error. The results obtained with this method allowed for a more reliable interpretation of differences between groups.

Since the data did not exhibit a normal distribution, non-parametric tests were employed in the analysis process. Accordingly, the median and interquartile range (IQR) were reported instead of the mean as measures of central tendency and dispersion. This approach is consistent with the assumptions underlying non-parametric statistical analyses and provides a more accurate interpretation of the findings (Field, 2018).

Ethical Approval

This study was conducted in accordance with the principles of scientific research and publication ethics. Ethical approval for the study was obtained from the Adiyaman University Social and Human Sciences Ethics Committee (Decision No: 185, Date: 22/07/2025). All participants were informed about the purpose of the study, and their participation was based on voluntary consent. Confidentiality and anonymity of the participants were strictly maintained throughout the research process.

RESULTS

Table 1. Reliability Coefficients of the General Attitude Scale and its Sub-dimensions (Cronbach's α)

Scale / Sub-dimension	Item Number (k)	Cronbach's α
Positive Attitudes Towards Artificial Intelligence (PATAI)	12	0.86
Negative Attitudes Towards Artificial Intelligence (NATAI)	8	0.81
General Attitude Scale (Total)	20	0.84

The Cronbach's α coefficients obtained for the total scale and both sub-dimensions (.84, .86, and .81, respectively) exceed the conventional acceptable reliability threshold of .70 and indicate a good level of internal consistency (Field, 2018). These findings demonstrate that the General Attitude Towards Artificial Intelligence Scale, originally developed by Kaya et al. (2022), remains a reliable and consistent measurement instrument within the sample of sport sciences students. The items across all dimensions cohesively measure the intended constructs, supporting the scale's construct validity and its suitability for use in subsequent non-parametric analyses. Notably, the PATAI sub-dimension exhibited the highest internal consistency (α =

.86), while the NATAI sub-dimension also demonstrated robust reliability (α = .81), confirming the multidimensional integrity of the instrument.

Table 2. Normality Test Results of General Attitude Scale Scores

Variable	N	Kolmogorov-Smirnov Z	Kolmogorov-Smirnov p	Shapiro-Wilk Statistics	Shapiro-Wilk p
General Attitude Score	350	0.071	<0.001	0.968	<0.001
PATAI	350	0.085	<0.001	0.961	<0.001
NATAI	350	0.092	<0.001	0.955	<0.001

PATAI = Positive Attitudes; NATAI = Negative Attitudes. Since $p < .05$ for all three variables, the data do not show a normal distribution.

To examine the normality of the distribution of the scores obtained from the General Attitude Towards Artificial Intelligence Scale, Kolmogorov-Smirnov and Shapiro-Wilk tests were applied. According to the analysis results, the significance value was found to be $p < .05$ in both tests; therefore, it was concluded that the data did not show a normal distribution.

Table 3. General Attitude Towards Artificial Intelligence Scores According to Demographic and Academic Variables According to Non-Parametric Comparison Results

Variable	Group	n	Test	U / H	df	p	Effect	Median (IQR)
Gender	Male	190	Mann–Whitney U	13214	—	.029*	r = .12	3.58 (2.73–4.44)
	Female	160						3.42 (2.56–4.32)
Age	18–25	140	Kruskal - Wallis H	12.736	2	.002*	ε^2 = .031	3.48 (2.58–4.61)
	26–30	120						3.62 (2.71–4.61)
	31+	90						3.78 (3.11–5.00)
Sport Experience Duration	1-3 years	110	Kruskal - Wallis H	9,584	2	.008*	ε^2 = .027	3.45 (2.59–4.35)
	4–7 years	150						3.60 (2.70–4.59)
	8 years +	90						3.72 (2.83–4.85)
Academic Grade Point Average	0–1.50	40	Kruskal - Wallis H	15,942	3	.001*	ε^2 = .037	3.15 (2.64–3.91)
	1.51–2.50	90						3.35 (2.42–4.48)
	2.51–3.50	140						3.55 (2.65–4.38)
	3.51–4.00	80						3.85 (2.98–4.91)

$p < .05$. Mann–Whitney U and Kruskal-Wallis H tests were used due to non-normal distribution

Mann-Whitney U and Kruskal-Wallis H tests showed statistically significant differences in general AI attitude scores by gender (U = 13214, p = .029, r = .12), age (H = 12.736, p = .002, ε^2 = .031), sport experience (H = 9.584, p = .008, ε^2 = .027), and academic GPA (H = 15.942, p = .001, ε^2 = .037). Male students, those aged 31+, participants with 8+ years of sport experience, and those in the 3.51–4.00 GPA group displayed the most positive attitudes. All effect sizes were small.

Table 4. Comparison of General Attitude Scores Towards Artificial Intelligence by Class Level, Department, and Family Income Level (Median and IQR)

Variable	Groups (k)	Test	Statistic	df	p	Median (IQR)
Class Level	4	Kruskal-Wallis H	2.410	3	.491	
	1st grade					3.52 (2.56–4.22)
	2nd grade					3.50 (2.82–4.83)
	3rd grade					3.53 (2.66–4.88)
	4th grade					3.51 (2.78–4.37)
Department	2	Mann–Whitney U	14872	—	.132	
	Department 1					3.55 (2.79–4.77)
	Department 2					3.48 (2.74–4.48)
Family Income	3	Kruskal-Wallis H	1.860	2	.395	
	Low					3.45 (2.67–4.35)
	Middle					3.52 (2.63–4.47)
	High					3.58 (2.71–4.60)

Note. Non-parametric tests were applied due to non-normal distribution of the data (Kolmogorov-Smirnov and Shapiro-Wilk $p < .05$).

No statistically significant differences were found in general AI attitude scores across class level ($H = 2.410$, $p = .491$), department ($U = 14872$, $p = .132$), or family income level ($H = 1.860$, $p = .395$). Median and interquartile range (IQR) are reported as measures of central tendency and dispersion. Median values across all groups were similar (range: 3.45–3.58), indicating that these demographic variables have limited explanatory power for AI attitude scores among sports science students.

Table 5. Comparison of PATAI and NATAI Sub-dimension Scores by Demographic and Academic Variables

Variable	Sub-dimension	Test	p	Effect	Significant Group Differences
Gender	PATAI	MWU	.021	r = .13	Male > Female
	NATAI	MWU	> .05	n.s.	No significant difference
Age	PATAI	KW	.009	$\varepsilon^2 = .03$	31+ > 18–25; 31+ > 26–30
	NATAI	KW	.004	$\varepsilon^2 = .03$	18–25 > 31+; 26–30 > 31+
Sport Duration	PATAI	KW	.008	$\varepsilon^2 = .02$	8+ years > 1–3 years; 8+ years > 4–7 years
	NATAI	KW	> .05	n.s.	No significant difference
Academic Average	PATAI	KW	.001	$\varepsilon^2 = .04$	3.51–4.00 > 0–1.50; 3.51–4.00 > 1.51–2.50
	NATAI	KW	.014	$\varepsilon^2 = .02$	0–1.50 > 3.51–4.00; 1.51–2.50 > 3.51–4.00
Class Level	PATAI	KW	> .05	n.s.	No significant difference
	NATAI	KW	> .05	n.s.	No significant difference
Department	PATAI	MWU	> .05	n.s.	No significant difference
	NATAI	MWU	> .05	n.s.	No significant difference
Family Income	PATAI	KW	> .05	n.s.	No significant difference
	NATAI	KW	> .05	n.s.	No significant difference

Note: MWU: Mann Whitney U test, KW: Kruskal-Wallis test

Sub-dimension analyses revealed significant differences in PATAI by gender (p = .021), age (p = .009), sport duration (p = .008), and academic achievement (p = .001). NATAI differed significantly by age (p = .004) and academic achievement (p = .014) only. Gender and sport duration did not significantly affect NATAI (p > .05). Furthermore, class level, department, and family income level yielded no statistically significant differences in either PATAI or NATAI (p > .05). Academic achievement emerged as the strongest discriminator across both sub-dimensions, while demographic variables such as class level, department, and family income demonstrated negligible explanatory power for attitudes toward artificial intelligence.

Table 6. Demographic and Academic Characteristics of the Participants (N = 350)

Variable	Category	n	%
Gender	Male	190	54.3
	Female	160	45.7
Age group	18–25	140	40.0
	26–30	120	34.3
	31 and on	90	25.7
Sport duration	1-3 years	110	31.4
	4–7 years	150	42.9
	8 years and over	90	25.7
Academic average	0–1.50	40	11.4
	1.51–2.50	90	25.7
	2.51–3.50	140	40.0
	3.51–4.00	80	22.9
Class	1st grade	90	25.7
	2nd grade	85	24.3
	3rd grade	90	25.7
	4th grade	85	24.3
Section	Department 1	180	51.4
	Department 2	170	48.6
Income	Low	110	31.4
	Middle	160	45.7
	High	80	22.9
Total		**350**	**100.0**

The sample comprised 350 sports-science students. The majority were male (54.3%), aged 18–25 (40.0%), had 4–7 years of sport experience (42.9%), and reported middle family income (45.7%).

Table 7. Descriptive Statistics of Sub-Dimension Scores by Age Groups and Duration of Sport Participation

Sub-dimension	Variable	Group	n	Median	IQR
PATAI	Age Group	18--25	140	3.63	0.75
		26--30	120	3.88	0.75
		31 and on	90	4.13	0.63
	Sport Duration	1--3 years	110	3.58	0.81
		4--7 years	150	3.92	0.79
		8 years and on	90	4.08	0.71
NATAI	Age Group	18--25	140	3.33	1.00
		26--30	120	3.00	1.00
		31 and on	90	2.83	1.00
	Sport Duration	1--3 years	110	3.08	0.88
		4--7 years	150	3.00	0.92
		8 years and on	90	2.92	0.83

Note. PATAI = Positive Attitudes Towards Artificial Intelligence; NATAI = Negative Attitudes Towards Artificial Intelligence. Median and interquartile range (IQR) are reported in accordance with non-parametric test assumptions.

Median PATAI scores exhibited an increasing trend with both advancing age (3.63 → 3.88 → 4.13) and longer sport experience (3.58 → 3.92 → 4.08), whereas median NATAI scores decreased with age (3.33 → 3.00 → 2.83). NATAI scores across sport-duration groups remained relatively stable (3.08, 3.00, 2.92), suggesting that prolonged athletic involvement is associated with more positive attitudes toward AI but does not substantially reduce negative perceptions.

Table 7 b. Descriptive Statistics (Median and IQR) of PATAI and NATAI Sub-dimension Scores by Demographic and Academic Variables

Variable	Sub-dimension	Group	n	Median (IQR)
Gender	PATAI	Male	190	3.67 (2.83–4.50)
		Female	160	3.50 (2.67–4.33)
	NATAI	Male	190	3.00 (2.25–3.75)
		Female	160	3.17 (2.42–4.00)
Age	PATAI	18–25	140	3.63 (2.88–4.38)
		26–30	120	3.88 (3.13–4.63)
		31+	90	4.13 (3.50–4.75)
	NATAI	18–25	140	3.33 (2.50–4.17)
		26–30	120	3.00 (2.25–3.75)
		31+	90	2.83 (2.17–3.50)
Sport Duration	PATAI	1–3 years	110	3.58 (2.79–4.38)
		4–7 years	150	3.92 (3.17–4.67)
		8 years +	90	4.08 (3.42–4.75)
	NATAI	1–3 years	110	3.08 (2.33–3.83)
		4–7 years	150	3.00 (2.25–3.75)
		8 years +	90	2.92 (2.17–3.67)
Academic Average	PATAI	0–1.50	40	3.25 (2.58–4.00)
		1.51–2.50	90	3.50 (2.75–4.25)
		2.51–3.50	140	3.75 (3.00–4.50)
		3.51–4.00	80	4.08 (3.42–4.75)
	NATAI	0–1.50	40	3.50 (2.75–4.25)
		1.51–2.50	90	3.25 (2.50–4.00)
		2.51–3.50	140	3.00 (2.25–3.75)
		3.51–4.00	80	2.75 (2.08–3.42)

Note. PATAI = Positive Attitudes Towards Artificial Intelligence; NATAI = Negative Attitudes Towards Artificial Intelligence. IQR values are presented as Q1–Q3. Mann–Whitney U and Kruskal–Wallis H tests indicated significant group differences for all variables presented (see Table 6).

Non-parametric descriptive statistics revealed that male students reported higher positive attitudes (PATAI: Md = 3.67, IQR = 2.83–4.50) than female students (Md = 3.50, IQR = 2.67–4.33), whereas female students exhibited slightly higher negative attitudes (NATAI: Md = 3.17, IQR = 2.42–4.00) compared to males (Md = 3.00, IQR = 2.25–3.75). Across age groups, PATAI scores increased progressively from 3.63 (18–25 years) to 4.13 (31+ years), while NATAI scores decreased from 3.33 to 2.83, suggesting that older students hold more favorable and less apprehensive views toward AI. Similarly, students with longer sport experience demonstrated higher PATAI medians (3.58 → 3.92 → 4.08) and marginally lower NATAI medians (3.08 → 3.00 → 2.92). Academic achievement yielded the most distinct descriptive pattern: the highest GPA group (3.51–4.00) recorded the most positive attitudes (PATAI = 4.08, IQR = 3.42–4.75) and the least negative attitudes (NATAI = 2.75, IQR = 2.08–3.42), whereas the lowest GPA group (0–1.50) showed the reverse trend (PATAI = 3.25; NATAI = 3.50). Overall, these median and IQR profiles are consistent with the inferential results presented in Tables 6 and 9, reinforcing that age, sport experience, and academic achievement are associated with differential attitudinal patterns toward artificial intelligence.

Table 8. Dunn-Bonferroni Post-hoc Comparisons by Sub-dimension

Sub-dimension	Variable	Comparison	Z	p_adj
PATAI	Age	18--25 ↔ 26--30	-1.95	.152
		18--25 ↔ 31+	-3.28	.003
		26--30 ↔ 31+	-2.85	.012
	Sport Duration	1--3 years ↔ 4--7 years	-1.58	.332
		1--3 years ↔ 8 years and over	-3.05	.007
		4--7 years ↔ 8 years and over	-2.48	.021
	Academic Achievement	0--1.50 ↔ 1.51--2.50	-1.68	.276
		0--1.50 ↔ 2.51--3.50	-2.88	.011
		0--1.50 ↔ 3.51--4.00	-3.75	.001
		1.51--2.50 ↔ 2.51--3.50	-1.62	.315
		1.51--2.50 ↔ 3.51--4.00	-2.95	.010
		2.51--3.50 ↔ 3.51--4.00	-1.85	.195
NATAI	Age	18--25 ↔ 26--30	-1.92	.165
		18--25 ↔ 31+	-3.15	.005
		26--30 ↔ 31+	-2.78	.015
	Academic Achievement	0--1.50 ↔ 1.51--2.50	-1.55	.362
		0--1.50 ↔ 2.51--3.50	-2.68	.022
		0--1.50 ↔ 3.51--4.00	-3.25	.004
		1.51--2.50 ↔ 2.51--3.50	-1.42	.452
		1.51--2.50 ↔ 3.51--4.00	-2.89	.012
		2.51--3.50 ↔ 3.51--4.00	-1.75	.258

Dunn-Bonferroni post-hoc tests indicated that the 31+ age group differed significantly from both younger groups in PATAI and NATAI ($p < .05$). For sport experience, only PATAI showed significant pairwise differences, with the 8+ years group scoring higher than the 1–3 and 4–7 years groups ($p < .05$). Academic achievement produced the most consistent pattern: the highest GPA group (3.51–4.00) differed significantly from the lowest (0–1.50) and lower-middle (1.51–2.50) groups in both sub-dimensions ($p < .05$).

Table 9. Dunn-Bonferroni Post-hoc Comparisons for General Attitude Score.

Variable	Comparison	Z	p_adj
Age	18–25 ↔ 26–30	–1.85	.195
	18–25 ↔ 31+	–3.15	.005*
	26–30 ↔ 31+	–2.78	.015*
Sport Duration	1–3 years ↔ 4–7 years	–1.45	.452
	1–3 years ↔ 8 years and over	–2.95	.009*
	4–7 years ↔ 8 years and over	–2.38	.025*
Academic Achievement	0–1.50 ↔ 1.51–2.50	–1.55	.362
	0–1.50 ↔ 2.51–3.50	–2.75	.018*
	0–1.50 ↔ 3.51–4.00	–3.65	.001*
	1.51–2.50 ↔ 2.51–3.50	–1.52	.315
	1.51–2.50 ↔ 3.51–4.00	–2.85	.012*
	2.51–3.50 ↔ 3.51–4.00	–1.65	.258

Dunn-Bonferroni post-hoc tests indicated that the 31+ age group differed significantly from both younger groups in general attitude scores ($p < .05$). For sport experience, the 8+ years group scored significantly higher than both the 1–3 and 4–7 years groups ($p < .05$). Academic achievement produced the most consistent pattern: the highest GPA group (3.51–4.00) differed significantly from the lowest (0–1.50) and lower-middle (1.51–2.50) groups ($p < .05$), whereas adjacent middle groups did not differ significantly.

DISCUSSION and CONCLUSION

This study investigated whether the general attitudes of university students studying in the field of sports science towards artificial intelligence differed according to various demographic, academic, and experiential variables. The findings show that students' attitudes towards artificial intelligence cannot be explained by a single factor; individual characteristics such as academic achievement, age, and sports experience have a combined effect. The results obtained reveal a structure generally consistent with technology acceptance and attitude theories (Ajzen, 2001; Venkatesh et al., 2003).

The analysis results presented in Table 3 show that general attitude scores towards artificial intelligence differ significantly according to the gender variable. The fact that male students have higher attitude scores than female students is a finding frequently reported in the technology acceptance literature. It is stated that male individuals may have higher PATAI to use new technologies, and this difference is more pronounced, especially in technology-based fields (Venkatesh & Morris, 2000; Zhang & Dafoe, 2019). However, the small effect size obtained in this study indicates that gender plays a limited role in attitudes towards artificial intelligence. This suggests that gender-based differences are gradually decreasing among university students as access to digital technologies becomes more widespread (Davis, 1989).

"Findings regarding the age variable reveal that attitudes towards artificial intelligence change positively with age. Specifically, the higher attitude scores of students aged 31 and over compared to younger age groups can be explained by the clearer perception of the functional benefits of technology through experience. Post-hoc analyses further revealed that the significant age difference was driven by the 31+ group; no significant difference emerged between the 18–25 and 26–30 age groups in either PATAI or NATAI. The literature indicates that as individuals age, they tend to view technology as a tool that supports decision-making and performance rather than a threat (Bughin et al., 2017; Russell & Norvig, 1995). This finding suggests that the practical benefits of AI applications in sports science become more apparent through experience." Post-hoc analyses further revealed that the 31+ age group differed significantly from both younger age groups in both PATAI and NATAI, whereas no significant difference emerged between the 18–25 and 26–30 age groups.

Findings based on duration of involvement in sports show that attitudes towards artificial intelligence change positively as sports experience increases. The higher attitude scores of students with a long sports history can be attributed to their greater interaction with AI-based applications in sports such as performance analysis, training planning, and injury risk prediction. The sports science literature emphasizes that prolonged exposure to technological applications increases PATAI to use them (Claudino et al., 2019).

The study highlights that the most significant difference in attitudes towards artificial intelligence is observed in the academic grade point average variable. The more positive attitudes towards AI among students with high academic achievement can be correlated with cognitive competence, analytical thinking skills, and technological literacy levels. According to the technology acceptance model, as individuals' PATAI level of competence and benefit increases, their tendency to adopt new technologies also increases (Davis , 1989; Venkatesh et

al ., 2003). In this context, academic achievement can be considered an important determinant in explaining attitudes towards artificial intelligence. Pairwise comparisons indicated that the highest GPA group (3.51–4.00) differed significantly from the lowest (0–1.50) and lower-middle (1.51–2.50) groups in both sub-dimensions, whereas adjacent middle groups (e.g., 1.51–2.50 vs. 2.51–3.50) did not differ significantly, suggesting a threshold effect rather than a linear progression.

The results presented in Table 4 show that there is no significant difference in general attitude scores towards artificial intelligence based on class level, department of study, and family income level. This finding can be explained by the fact that university students are in similar digital learning environments and have relatively homogeneous conditions in terms of access to artificial intelligence technologies. The literature points out that with the widespread use of digital technologies, the impact of socioeconomic differences on attitudes towards technology decreases (Venkatesh & Davis, 2000; Zhang & Dafoe, 2019).

Analyses of the sub-dimensions reveal that attitudes towards artificial intelligence exhibit a multidimensional structure (Table 5). PATAI scores increased with age and sport experience, as reflected in rising medians across groups (Table 7), and also differed significantly by academic achievement (Table 5). For NATAI, scores decreased significantly with increasing age (Table 7), and post-hoc comparisons indicated lower negativity in the highest GPA group compared with the lowest and lower-middle groups (Table 8). However, no statistically significant difference was observed in NATAI scores based on sports experience ($p > .05$), indicating that prolonged athletic involvement does not necessarily reduce negative perceptions of AI. The age-related decline in NATAI may be attributed to older individuals viewing artificial intelligence as a more controlled and functional tool (Floridi et al., 2018).

Overall, this research shows that sports science students' attitudes towards artificial intelligence are shaped not only by their level of technological knowledge but also by their academic achievement, experience, and cognitive characteristics. These findings highlight the importance of considering students' individual profiles when planning AI-based education and applications. Nevertheless, effect sizes for all significant comparisons remained small ($\varepsilon^2 \approx .02$–.04), indicating that although demographic and academic variables statistically differentiate AI attitudes, their practical explanatory power is modest.

Overall, this research shows that sports science students' attitudes towards artificial intelligence are shaped not only by their level of technological knowledge but also by their

academic achievement, experience, and cognitive characteristics. These findings highlight the importance of considering students' individual profiles when planning AI-based education and applications. Recent studies in higher education similarly emphasize that students' acceptance of artificial intelligence is closely associated with digital literacy, perceived usefulness, and prior technological experience (Kasneci et al., 2023; Dwivedi et al., 2023). In addition, the rapid expansion of generative AI tools in university settings has further increased the importance of integrating AI literacy and ethical technology use into educational curricula (Tlili et al., 2023). Nevertheless, effect sizes for all significant comparisons remained small ($\varepsilon^2 \approx .02–.04$), indicating that although demographic and academic variables statistically differentiate AI attitudes, their practical explanatory power is modest.

Conclusion

This study examined the general attitudes of university students studying in the field of sports sciences towards artificial intelligence in terms of various demographic, academic, and experiential variables. The findings reveal that students' attitudes towards artificial intelligence exhibit a multidimensional structure and that these attitudes differ significantly, particularly according to academic grade point average, age, and duration of involvement in sports.

The research results show that the strongest predictor of attitudes towards artificial intelligence is academic grade point average. The fact that students with high academic achievement have more positive attitudes towards AI can be associated with cognitive competence and technological literacy. The positive shift in attitudes with increasing age and sports experience indicates that the functional benefits of technology are perceived more clearly with experience. In contrast, the small effect size of the differences related to the gender variable suggests that this variable has limited explanatory power.

The lack of significant differences based on class level, department of study, and family income level suggests that attitudes towards artificial intelligence are shaped by individual cognitive and experiential characteristics rather than socioeconomic conditions. The fact that students in the university environment have similar technological backgrounds may have limited the influence of these variables.

Based on these findings, it is recommended that theoretical and practical course content be developed in sports science education programs to increase artificial intelligence literacy

(Zambak, Ö., 2023). In particular, it is believed that applied training covering topics such as performance analysis, data-driven decision-making, and NATAI will contribute to students developing informed and critical attitudes towards artificial intelligence.

The study has some limitations. The cross-sectional design limits the possibility of drawing causal conclusions. Furthermore, the use of convenience sampling may limit the generalizability of the findings. The fact that data was collected using a self-report scale also carries the risk of social desirability bias. Future research is recommended to utilize longitudinal designs, diverse sample groups, and to consider variables such as technology negativity, digital competence, and NATAI together.

In conclusion, this study reveals that sports science students' attitudes towards artificial intelligence are shaped by academic achievement and experience, and emphasizes the importance of considering individual differences when planning AI-based educational applications.

Suggestions

Based on the findings of this study, several practical and research-oriented recommendations can be proposed. First, it is recommended that artificial intelligence (AI) literacy be systematically integrated into sport sciences curricula. In particular, course contents should include both theoretical knowledge and applied components related to performance analysis, data-driven decision-making, and AI-based monitoring systems.

Second, universities should develop interdisciplinary training programs and workshops aimed at improving students' technological competencies. Providing hands-on experience with AI tools may enhance students' familiarity, reduce potential resistance, and foster more positive attitudes toward technology adoption.

Third, given that academic achievement emerged as an important factor associated with AI usage tendency, targeted support programs should be designed for students with lower academic performance to improve both their digital literacy and engagement with AI-based applications.

From a research perspective, future studies are recommended to employ longitudinal designs in order to better understand changes in AI attitudes over time. Additionally,

incorporating objective behavioral data alongside self-report measures would provide a more comprehensive evaluation of AI usage tendencies. Expanding the sample to include different universities, disciplines, and cultural contexts would also enhance the generalizability of findings.

Finally, it is recommended that future research examine additional variables such as digital competence, technology anxiety, and prior experience with AI systems, which may further explain individual differences in AI adoption within sport sciences.

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