International Journal of
Sports Engineering and Biotechnology

https://ndpapublishing.com/index.php/ijseb/
e-ISSN: 3023-6010

Investigation of Artificial Intelligence Readiness Levels of Physical Education and Sport Sciences Teacher Candidates

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Keywords
Artificial Intelligence
Physical Education
Teacher Candidates

ABSTRACT

The aim of this study was to examine the opinions of sport sciences faculty students on the use of wearable technological products. The aim of this study is to examine the opinions of sport sciences faculty students on the use of wearable technological products. In this direction, a total of 100 students studying at the faculty of sport sciences voluntarily participated in the study. In addition to the personal information form created by the researchers, the attitude scale towards wearable technological sports products (ASTWTSP) was used as a data collection tool. Kruskal Wallis H and Mann Whitney U tests were used for nonparametric data. In the statistical analysis of the data obtained after the study and in determining the differences between the groups, $p<0.05$ value will be considered significant. According to the findings; the total scores of the attitude scale towards wearable technological sports products of the participants did not show a significant difference according to their gender ($U=1192.00$; $p=0.781$; $p>0.05$), did not show a significant difference according to age variable ($X2=0,237$; $p=0,888$; $p>0.05$) and did not show a statistically significant difference according to income variable ($X2=4,516$; $p=0,105$; $p>0.05$). As a result, based on the results obtained from our study and the literature, and considering the various advantages of wearable technological products, it can be stated that wearable technologies are a complement to the complex structure of exercise or sports on individuals.

1. INTRODUCTION

Artificial intelligence (AI) learns by repeatedly performing tasks and provides alternatives to create decision pathways for humans. Scientific and technological developments not only influence changes in teaching content and methods, but also change education, educational models and types of educational systems and organizations [1]. Currently, little is known about the application of modern educational technology or how to manage educational technology problems, how to use existing educational technology results, how to maximize educational resource applications, and how to increase educational efficiency through the overall restructuring of education [2]. Therefore, AI research in educational technology is very important.

The rapid development of AI technology provides a good solution to optimize the physical education (PE) mechanism. In recent years, AI has gradually penetrated into various fields [3]., including education. With the introduction of AI technology into the field of education, AI technology has brought new possibilities for the innovation of traditional education through its powerful data processing and intelligent analysis capabilities.

In the field of physical education, the application of AI technology is developing rapidly, making PE more interactive and targeted, and improving students' engagement and learning effects. AI technology is mainly used for assistance

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How to cite this article
Doğan, M., Burhaein, E., Nadzalan, A. & Phytanza, D. T. P. (2024). Investigation of Artificial Intelligence Readiness Levels of Physical Education and Sport Sciences Teacher Candidates. *Int. J. Sports Eng. Biotech, 2(2), 56-61.*

Research Article/ DOI: 10.5281/zenodo.14568852

in PE teaching process, assessment of students' learning effects, personalized instructional design and classroom interaction. Its main purpose is to increase students' learning interest and exercise effect, which can help teachers optimize their teaching strategies. Emerging AI technology products can become auxiliary tools for PE and help improve the level of PE [4].

In the field of PE, the relationship between teachers and AI is an important research direction. The introduction of AI technology has not only changed the traditional teaching model, but also put forward new requirements for teachers' roles and responsibilities. Teachers need to work with AI technology and use the tools and data provided by the technology to better guide students' learning and education. At the same time, AI technology also improves the overall level of teaching by providing teachers with more teaching resources and support [5].

When studying the optimization of specific PE projects or processes based on AI technology, it is also necessary to investigate the relationship between AI and PE from a macro perspective, which helps to promote the comprehensive development of AI technology in the PE field [6].

examined the principles and uses of AI technology in the PE field and made an in-depth analysis of potential applicable technical areas. AI not only serves as an important auxiliary tool for PE teachers, but also becomes an effective support to promote students' independent development. Through continuous iterative evolution, AI teachers will gradually mature and become more professional. Human teachers need to adapt to the development of technology and learn to use AI tools to improve their teaching skills. Stubbornly doing work that can be accomplished by AI will eventually be replaced by AI. Engaging in more creative work is the direction of future PE teachers [7].

2. MATERIALS AND METHODS

2.1. Participants

The study group consisted of 159 pre-service teachers, 85 female and 74 male, studying at the Faculty of Sports Sciences of a state university in the fall semester of 2024-2025. In this study, 53.5% of the participants were female and 46.5% were male.

Ethical standards were adhered to in this study and the participant provided informed consent in the form of a consent form covering research details, risks, benefits, confidentiality and participant rights. The study strictly adhered to the ethical principles of the Declaration of Helsinki, prioritizing the rights and welfare of the participant in the design, procedures and confidentiality measures.

2.2. Research Model

In line with the objectives of this study, descriptive analysis model used. The descriptive model is an approach that aims to describe an existing event as it is. The person or object that is the subject of the research should be defined in its current conditions and should not be changed or transformed in any way. Whatever is desired to be researched or known is to be obtained. should be studied [8]. The scale technique was utilized for the information obtained in the study.

2.3. Data Collection Tools

Personal Information Form: A questionnaire form was created to obtain information about the age, gender and income levels of the audience.

2.3.1. Artificial Intelligence Readiness Scale for Prospective Teachers

Artificial Intelligence Readiness Scale for Prospective Teachers: This scale was developed by [8] in the context of the constructs in [9] and adapted into Turkish by Özüduğru and Yıdız Durak [10]. Within the scope of this study, it was adapted into Turkish. The scale is a 5-point Likert-type scale. According to the rating scale, 1 is scored as strongly disagree and 5 is scored as strongly agree. This scale consists of 18 items and 4 sub-dimensions. The sub-dimensions are “cognition, ability, vision and ethics in teaching”.

2.4. Statistical Analysis

The data obtained within the scope of the study will be described by using frequency and percentage values for variables measured at the classical level. Kruskal Wallis H and Mann Whitney U tests were used for nonparametric data. The sub-dimensions and total score of the artificial intelligence readiness scale for pre-service teachers were analyzed with Spearman correlation test. In the statistical analysis of the data obtained after the study and in determining the differences between the groups, $P<0.05$ value will be considered significant.

3. RESULTS

Information on gender, age groups and income levels of the participants is given. In this study, 53.5% of the participants were female and 46.5% were male. In terms of age distribution, the 18-21 age group constituted the largest group with 51.6%, while the 26 and over age group

constituted the smallest group with 11.3%. According to the average income levels, 41.5% of the participants were in the income group between 15 thousand-30 thousand TL, while 26.4% were in the income group of 15 thousand TL and below (Table 1).

Table 1. Characteristics of the participants

Variables		Frequency	Percentage
Gender	Female	85	53,5%
	Male	74	46,5%
Age (years)	18-21	82	51,6%
	22-25	59	37,1%
	26 and above	18	11,3%
Monthly income	<15000	42	26,4%
	15000 to 30000	66	41,5%
	>30000	51	32,1%
Total		**100**	**159**

There was no significant difference between the AI readiness scale scores of female and male participants (U=3024.50; p=0.677; p>0.05) (Table 2).

Table 2. Mann Whitney U test results of total score of artificial intelligence readiness scale for pre-service teachers according to gender

Variables		n	Mean Rank	Sum of Ranks	U	Z	p
Gender	**Female**	85	81,42	6920,50	3024,50	-0,416	0,677
	Male	74	78,32	5799,50			

There is a significant difference between the age groups in terms of the total scores of the artificial intelligence readiness scale (X^2=17.514; p=0.001; p<0.05). As a result of the post hoc (bonferroni) test for pairwise comparisons, significant differences were found between the 18-21 age group and both the 22-25 age group and the 26 and over age group (1-2, 1-3). It was observed that the highest readiness scores belonged to the participants in the 26 years and over group (Mean Rank=115.42). This indicates the effect of age on the level of readiness for artificial intelligence (Table 3).

Table 3 Kruskall Wallis H test results of total score of artificial intelligence readiness scale for pre-service teachers according to age variable

Variables		n	Mean Rank	X^2	df	p	Difference
Age (years)	**18-21**	82	67,78	17,514	2	**0,001**	**a-b** **a-c**
	22-25	59	86,18				
	26 and above	18	115,42				

No significant difference was found between income groups in terms of total scores of the AI readiness scale (X^2=0,231; p=0,891; p>0,05). This result shows that income level has no significant effect on pre-service teachers' perceptions of artificial intelligence readiness (Table 4).

There are positive and significant correlations between the sub-dimensions of the AI readiness scale and the total score. "Ability" (r=0.863) and 'Ethics in Teaching' (r=0.832) sub-dimensions have the highest correlation with the total score (Table 5).

Table 4. Kruskall Wallis H test results of total score of artificial intelligence readiness scale for pre-service teachers according to average income variable

	Variables	n	Mean Rank	X^2	df	p	Difference
Monthly income	<15000	42	77,27	0,231	2	**0,891**	-
	15000 to 30000	66	81,63				
	>30000	51	80,14				

Table 5. Spearman correlation analysis results for the sub-dimensions and total score of the artificial intelligence readiness scale for pre-service teachers

		Cognition	Ability	Vision	Ethics in Teaching	TAARSPT Scale
Cognition	**r**	**1**				
	p					
Ability	**r**	,587**	**1**			
	p	**,003**				
Vision	**r**	,499**	,548**	**1**		
	p	**,000**	**,001**			
Ethics in Teaching	**r**	,597**	,608**	,573**	**1**	
	p	**,000**	**,000**	**,000**		
TAARSPT Scale	**r**	,805**	,863**	,738**	,832**	**1**
	p	**,000**	**,000**	**,000**	**,000**	

* Spearman Correlation Test, p<0,05

4. DISCUSSION

Artificial intelligence is effective in many areas. One of these areas is education. Therefore, it has become important to determine the abilities of stakeholders and users in the field of education to use artificial intelligence technology [8]. Therefore, it has become essential to evaluate whether teachers and prospective teachers are ready to use artificial intelligence technologies. In fact, artificial intelligence is developing day by day in learning environments as a powerful tool that supports teachers' efforts to improve and automate feedback given to students, automatically monitor learning progress, evaluate their performance and provide personalized support [8, 11, 12].

According to our study results; here was no significant difference between the AI readiness scale scores of female and male participants (p>0.05). There is a significant difference between the age groups in terms of the total scores of the artificial intelligence readiness scale (p<0.05). As a result of the post hoc (bonferroni) test for pairwise comparisons, significant differences were found between the 18-21 age group and both the 22-25 age group and the 26 and over age group (1-2, 1-3). It was observed that the highest readiness scores belonged to the participants in the 26 years and over group (Mean Rank=115.42). This indicates the effect of age on the level of readiness for artificial intelligence.

Being ready in digital environments has been associated with increasing technology self-efficacy and taking control of their own learning and communication skills [12]. Measuring the level of readiness allows guidance to be provided according to the individual and characteristic features of the individual, to examine the needs of the individual and to make plans, programs and preparations appropriate to these needs [13]. In this context, pre-service teacher education plays an important role, especially for pre-service teachers to successfully integrate rapidly developing technologies into their classes in the future. The aim of this study is to introduce the "Artificial Intelligence Readiness Scale for Pre-service Teachers" to the Turkish literature in order to

measure the artificial intelligence readiness of pre-service teachers.

According to our study results; No significant difference was found between income groups in terms of total scores of the AI readiness scale (p>0,05). This result shows that income level has no significant effect on pre-service teachers' perceptions of artificial intelligence readiness. There are positive and significant correlations between the sub-dimensions of the AI readiness scale and the total score. “Ability” (r=0.863) and ‘Ethics in Teaching’ (r=0.832) sub-dimensions have the highest correlation with the total score.

AI was initially used in game and mathematical principles but it has now spread [1]. The utility of AI applications in modern PE is becoming increasingly clear, as they combine new concepts and theories that have been established by AI developments in related fields [14]. As such, AI has the potential to continue developing in PE, given that a basic theoretical system suitable for this purpose is developed along with convergence with other fields.

The emergence of artificial intelligence technology is expected to lead to changes in various aspects of human life. There are many changes expected in the field of physical education, and since computers equipped with artificial intelligence are more skilled than humans in organizing and communicating information, the role of physical education teachers who deviate from the role of informants may be emphasized. Otherwise, the high level of skill offered by an artificially intelligent physical education teacher may lead to the disappearance of physical education teaching as a human profession. In the era of artificial intelligence, in addition to training in creating and modifying computer algorithms, it is likely that the focus on the most human content and activities will be emphasized, thus defining the role and expertise of teachers [15]. Therefore, in the future age of artificial intelligence, a physical education teacher will teach students using the most basic human activities that artificial intelligence machines cannot use as the main learning content. Future physical education teachers will talk to students about "healthy living through sports", dwell on the "essence of sportsmanship" and "lessons of sports", and explore the "direction in which the world should move through sports". Future physical education teachers will need to interact emotionally with students and act as managers by ensuring that machines work well. The human role of the transmitter of knowledge will diminish. However, the role of teachers who help students learn and create physical activities on their own will become more important.

5. CONCLUSION

Artificial intelligence (AI) is increasingly affecting every aspect of daily life, including education. AI can also provide special support to students through academic sustainability or absenteeism predictions. Although AI research is still in its early stages, we should examine how it evolves over time and how it uses its potential. By using AI in physical education (PE), we can increase its potential use in sports applications and make changes to the nature, visualization, and reproducibility of AI.

To properly understand artificial intelligence, it is necessary to first consider the opportunities and challenges that technology brings to physical education and the dynamic role of scientific and technological innovation. Artificial intelligence should not only be a fair product of modern physical education innovation, but also a complex of human comprehensive ability and imagination. In this way, artificial intelligence stimulates human creative thinking and ability, and reflects its value more clearly. The application of these technologies will undoubtedly affect the development of modern physical education engineering. Artificial intelligence supports educators' decision-making processes by providing real-time classroom status to educators and providing various alternatives to students' problems. It also effectively assists educators in assessment and learning management. Finally, artificial intelligence helps teachers by effectively assisting and reducing the time spent on administrative work, and helps them spend more time on improving the quality of teaching and learning. Using technology in modern physical education classes is the key to achieving modernization in the field of sports education. Therefore, changes in knowledge, ability, education, physical education teachers' perspectives on students, research concepts, classroom concepts and evaluations, and attitudes towards education philosophy will ensure the development of high-quality and innovative sports talents in the information age.

In order to promote the digital intelligence development of physical education, teachers as the main participants in sports need to play a more important role, actively learn and flexibly apply artificial intelligence technology, and play a more important role in promoting the intelligent development of sports. Teacher education also needs adaptive adjustments, not only to guide

teachers to master basic artificial intelligence knowledge and tool use methods, but also to develop interdisciplinary collaboration capabilities, data analysis capabilities, and the ability to cope with technical challenges.

Conflict of Interest

No conflict of interest is declared by tehe authors. In addition, no financial support was received.

Ethics Committee

Ethical standards were adhered to in this study and the participant provided informed consent in the form of a consent form covering research details, risks, benefits, confidentiality and participant rights.

Author Contributions

Study Design, M.D; E.B.; Data Collection, M.D; Statistical Analysis, A. M. N. ; Data Interpretation, M.D; E.B; Manuscript Preparation, A. M. N; D.T.P.P; Literature Search, M.D; E.B; D.T.P.P All authors have read and agreed to the published version of the manuscript.

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