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THE EFFECT OF ARTIFICIAL INTELLIGENCE LITERACY ON THE FUTURE ANXIETY OF PHYSICAL EDUCATION AND SPORTS TEACHER CANDIDATES

O EFEITO DA ALFABETIZAÇÃO EM INTELIGÊNCIA ARTIFICIAL NA ANSIEDADE FUTURA DE CANDIDATOS A PROFESSORES DE EDUCAÇÃO FÍSICA E ESPORTES

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Abstract
In this study, the effect of artificial intelligence literacy levels of physical education and sports teacher candidates on their future anxiety was evaluated by examining them in the context of different variables. The survey method was preferred in collecting data. The survey used in the study consists of three parts: The first part includes questions prepared by the researcher and includes demographic information about the gender, age and grade level of the participants. The second part uses the 'Artificial Intelligence Literacy Scale' developed to measure the artificial intelligence literacy of teacher candidates. In the third part, the 'Future Anxiety Scale' prepared by Geylani and Çiriş-Yıldız (2020) to measure the future anxiety levels of university students was applied. G-Power analysis was performed to determine the sample size to participate in the study and the minimum number of participants was determined. No statistically significant difference was found in the analyzes made according to the gender, age and grade level variables of physical education and sports teacher candidates within the scope of the study. When the relationship between artificial intelligence literacy and future anxiety was analyzed, a positive but very weak correlation was observed. In addition, it was concluded that artificial intelligence literacy has a positive and significant effect on the future anxiety of physical education and sports teacher candidates.

Resumo
Neste estudo, avaliou-se o efeito do nível de alfabetização em inteligência artificial de futuros professores de educação física e esportes sobre sua ansiedade em relação ao futuro, examinando-os no contexto de diferentes variáveis. O método de coleta de dados foi o questionário. O questionário utilizado no estudo consiste em três partes: a primeira parte inclui questões elaboradas pelo pesquisador e contém informações demográficas sobre gênero, idade e nível de escolaridade dos participantes. A segunda parte utiliza a "Escala de Alfabetização em Inteligência Artificial", desenvolvida para mensurar a alfabetização em inteligência artificial dos futuros professores. Na terceira parte, foi aplicada a "Escala de Ansiedade em Relação ao Futuro", elaborada por Geylani e Çiriş-Yıldız (2020), para mensurar os níveis de ansiedade em relação ao futuro de estudantes universitários. A análise do G-Power foi realizada para determinar o tamanho da amostra para participar do estudo e o número mínimo de participantes foi definido. Não foram encontradas diferenças estatisticamente significativas nas análises realizadas de acordo com as variáveis gênero, idade e nível de escolaridade dos futuros professores de educação física e esportes no âmbito do estudo. Ao analisar a relação entre alfabetização em inteligência artificial e ansiedade em relação ao futuro, observou-se uma correlação positiva, porém muito fraca. Além disso, concluiu-se que

Keywords: Artificial Intelligence Literacy. Future Anxiety. Physical Education and Sports.

o conhecimento sobre inteligência artificial tem um efeito positivo e significativo na ansiedade futura dos futuros professores de educação física e esportes.

Palavras-chave: *Alfabetização em Inteligência Artificial. Ansiedade em relação ao Futuro. Educação Física e Esportes.*

1 INTRODUCTION

According to the Organization for Economic Co-operation and Development (2019), AI is rapidly becoming widespread in a number of sectors, including transportation, agriculture, scientific research, healthcare, justice, digital security, financial services, marketing, and advertising. We are entering a period of time where the increasing presence of AI-supported applications and smart devices in daily life is deepening the level of user adoption of technology and turning users into AI natives (Wang, 2023). In short, AI is becoming increasingly important in society (OECD, 2019; Fosso Wamba et al., 2021).

It is difficult to make a general definition of AI. Because the concept of "intelligence" has not been resolved from past to present and AI is used in many areas, making it difficult for us to define AI (Jiang et al., 2022). However, if we were to make a general definition of AI; AI is human-made systems that are produced through a set of algorithms and syntactic programming and try to imitate abilities such as thinking, perceiving, judging, analyzing, and having experience like humans (Çelebi and İnal, 2019).

The human brain, unlike all other living things, has many features such as the ability to think, analyze, reason, and synthesize. Rapid developments in technology reveal that these features of the human brain can also be done by machines. The concept of artificial intelligence, which emerged from this idea, has become an interesting subject in almost every field (Çetin and Aktaş, 2021).

Artificial intelligence can be defined as an advanced information processing technology that can imitate human mental skills. In the literature, it is stated that artificial intelligence has the capacity to perform cognitive processes such as perception, reasoning, comprehension, interpretation, generalization, inference and learning, and can

effectively perform many operations at the same time (Gondal, 2018). With technological developments, the number of artificial intelligence applications has increased, and this has enabled the emergence of various digital solutions that make individuals' daily lives easier. Today, artificial intelligence is actively used in many different sectors, from automatic translation systems to autonomous vehicles, from diagnostic processes in the field of health to sales forecasts and virtual assistants (Komalavalli et al., 2020). This technology, which has become widespread in various fields such as health, industry, education, commerce, finance and transportation, requires individuals to be equipped with certain knowledge and skills in order to adapt to artificial intelligence-based innovations (Wang et al., 2023).

In studies on the history of AI, there is no consensus on where and when the idea of AI first emerged. Some studies on the history of AI base the roots of AI on science fiction novels. According to Buchanan (2005), the roots of AI date back to Baum's Mechanical Man, who thinks, speaks, and moves in his book Ozma of Oz, written in 1907; while according to Haeinlein and Kaplan (2019), it dates back to Isaac Asimov's book Runaround, which includes the Three Laws of Robotics, in 1942. The roots of AI are even based on Cezeri's (1136-1250) robot drawings from about 800 years ago (Coşkun and Gülleroğlu, 2021). Muthukrishnan et al. (2020) base the roots of AI on the first artificial neural network (ANN) model proposed by McCulloch and Pitts in 1943. Although all these searches for AI indicate different dates, the idea of AI was first officially expressed by John McCarthy at the Dartmouth Conference in 1956 (Moor, 2006).

Lee (2020) calls the time period starting with the ANN idea and ending with the Dartmouth Conference as the pre-AI period and suggests that there are six different processes related to the historical development of AI. The golden ages of various breakthroughs and increases and intensity of research in AI studies, stagnation and decreases in investments in AI constitute the winters of AI.

In the Third Golden Age of AI, which began with the birth of the internet and the intelligent agents paradigm in 1994 and includes the present day, AI has become a part of daily life. AI applications, which were once developed on the most powerful computers of the time to solve complex mathematical problems by scientists, are now found in mobile phones, tablets, portable computers, smart watches, and even home appliances. Recently, artificial intelligence tools have not only been limited to major areas such as

industry and health, but have also shown their presence in various areas such as social media, defense, space exploration, transportation and energy management. The most recent example in this regard is ChatGPT. ChatGPT, a natural language processing model developed by OpenAI in November 2022, reached one million users five days after it was launched. Having surpassed the 100 million user threshold just two months after its launch, this application has become one of the fastest-growing digital applications in terms of user numbers as of January 2023 (Lo, 2023). Therefore, it can be said that AI has gained a place in people's daily lives at a speed that no other technological tool has ever reached before.

It is seen that artificial intelligence, which has recently become an indispensable argument in people's daily routines by undergoing a great change and development process with an increasing trend, creates deep and transformative effects in every area of society. This comprehensive integration of artificial intelligence reveals that a new type of literacy has become necessary, which requires individuals to effectively understand artificial intelligence systems, use and critically evaluate artificial intelligence products and services. In this context, the concept of artificial intelligence literacy that has emerged refers to the ability of individuals to effectively use and evaluate artificial intelligence technologies and to appropriately define artificial intelligence-related products within the framework of ethical standards (Tarafdar et al., 2019; Xiao and Bie, 2019; Zhou et al., 2021).

When the definitions of the concept of literacy in the literature are examined, it is emphasized that literacy does not only consist of reading and writing as skills, but also the ability to use them in daily life (Güneş, 2019). From this point of view, artificial intelligence literacy refers to a broad set of competencies that include the social and ethical aspects of artificial intelligence beyond technological skills. This concept enables individuals to understand artificial intelligence technologies, evaluate the potential effects of these technologies, and use artificial intelligence-supported products consciously. Considering the increasing integration of artificial intelligence technologies and the effects of artificial intelligence technologies on human life, it can be said that artificial intelligence is of critical importance (Stembert and Harbers, 2019; Su, 2018).

Over the past 30 years, various types of literacy have been defined, especially in educational research. Although these literacy skills, defined separately from reading and writing skills, may initially seem like the term “too much literacy,” they provide a useful

framework for educators to help students acquire the skill sets they need (Faruqe et al., 2022). Although AI literacy is seen as a sub-branch of digital or technological literacy, it can be said that due to its potential, it can become more important than both these types of literacy and all the types of literacy defined to date. Therefore, the way to effectively use AI technologies, which have started to be used more frequently in every area of our daily lives in the last few years, is to be AI literate individuals. Studies on AI literacy in various languages, especially English, Chinese, and German, are increasing year by year (Long and Magerko, 2020; Wong et al., 2020; Kong and Zhang, 2021; Yi, 2021; Zhao et al., 2022; Çetindamar et al., 2022; Ng et al., 2022; Wang et al., 2023; Pinski and Benlian, 2023).

It is thought that the effective use of artificial intelligence technologies can significantly affect individuals' attitudes and daily usage habits towards these technologies. Therefore, measuring and developing artificial intelligence literacy is of great importance for all humanity to benefit from artificial intelligence technologies in the most efficient way (Lee and Choi, 2017; Luo et al., 2019; Metelskaia et al., 2018).

Nowadays, it has become an argument that artificial intelligence literacy is very important for individuals to be successful in both education and business life. The active use of artificial intelligence tools in various sectors makes artificial intelligence literacy more important for individuals to improve their ability to understand and use these systems. When the literature is examined, it is thought that having Al literacy is a must in order to benefit from the opportunities provided by these technologies and to understand the potential risks (Davenport and Ronanki, 2018; Kandlhofer et al., 2016).

The relationship between teaching professional skills and artificial intelligence literacy is an issue that needs to be addressed with importance in the field of education. Physical education and sports teachers, who have an important duty in terms of popularizing sports and directing every student to sports (Ateş, 2023), play a vital role in the effective and efficient use of artificial intelligence technologies in educational environments. Teachers with artificial intelligence literacy can successfully integrate these technologies into teaching processes and contribute to students' acquisition of these skills. Therefore, it is of critical importance for teachers to increase their competence in the field of artificial intelligence literacy, both for their own professional development and for students to prepare for the future (Kandlhofer et al., 2016).

When the literature is examined, it can be seen that artificial intelligence has an increasing importance in the modern world. Therefore, it can be said that it has become a necessity for individuals to understand the opportunities and challenges of artificial intelligence technologies in this rapidly changing process and to learn how to benefit from these technologies effectively and efficiently. It is thought that the most important role falls on teachers to consciously acquire these skills. It is foreseen that teachers, who are the most important part of education, will be the greatest guides in this regard. It is thought that the artificial intelligence literacy skills to be acquired by teachers will ensure that artificial intelligence applications, which will be used in almost every area of our lives in the future, are not misused starting from young ages and that the possible harms that may arise can be minimized. Adaptation of scales used to measure and evaluate artificial intelligence literacy plays a critical role in teachers gaining these skills. In this context, scales can be defined as a standardized measurement tool used to measure and evaluate a specific subject or feature quantitatively. Scale adaptation studies are important in order to ensure validity and reliability in different cultural and linguistic contexts. Especially in the field of education, the correct adaptation of scales increases the accuracy and reliability of the data obtained by educators and researchers. Adapting the Artificial Intelligence Literacy Scale in this context will enable educators to better understand and use artificial intelligence technologies and facilitate the integration of these technologies into educational processes.

What is anxiety? It can be defined in various ways. According to Tyrer (1999), "Anxiety is a mood or feeling state that is unpleasant in its extreme" or "... an unpleasant emotional response to real or imagined dangers, accompanied by autonomic discharge and subjectively experienced as 'tension,' 'fear,' or 'nervousness'" (Spielberger, 1972). Furthermore, Schlenker and Leary (1982) defined the term as a cognitive-affective response that occurs physiologically and psychologically. Finally, another definition of anxiety by Spielberger (1972) is "an unpleasant emotional state or condition characterized by subjective feelings of tension, apprehension, and worry, and by activation or arousal of the automatic nervous system". In the formal definitions and general knowledge of the term, it is certainly a disorder.

The general definition of anxiety can be understood from these quotes, but as Pitsavos et al. (2006) stated, "Anxiety is a complex emotion, including restlessness, fear, and apprehension..." which makes it difficult to define. Its complexity may be due to its

different forms and how it manifests itself, because it is not only a psychological but also a physiological and behavioral experience (Noyes, 1998). Therefore, these definitions may not be sufficient to fully grasp both the disorder and its place in language learning.

It is therefore possible to start from the very beginning, from its etymology. The word has Greek and Latin roots and derives from the Indo-Germanic word 'angh', which covers two different forms of anxiety: 'distress' and 'long-term distress' (Tyrer, 1999). This means that there are at least two different forms of anxiety, which can be situational, temporary uneasiness, or discomfort felt over a much longer period of time, and which can be related to a characteristic of the person. While other languages, such as French and Spanish, have different words (referring to one of the two forms of anxiety) to be used in the relevant situations, English only uses 'anxiety', which sometimes leads to confusion (Tyrer, 1999). As Zeidner and Matthews (2010) note, early work in the field perceived anxiety to be a “unified concept,” meaning that the power anxiety has over people was recognized and widely studied—however, the concept (anxiety) itself did not receive the same level of awareness and was considered a single, one-sided emotion with a single negative meaning. This meant that anxiety itself (with its facets, variations, etc.) did not receive attention, but the concept (from a one-sided perspective) did.

This perception did not remain for very long, the restructuring was done with the emergence of new components and the late identification of much older ones, which are still inspiring and fundamental for further research and categorization of anxiety. One of these is how Spielberger (1983) distinguished the two forms of anxiety mentioned above (situation-based/transient and longer-lasting discomfort) by labeling them as state anxiety (transient discomfort) and trait anxiety (discomfort) through the State-Trait Anxiety Inventory (STAI) (1972) and the State-Trait Anxiety Inventory for Adults (STAI-AD) (1983). Once we have grasped the basic foundations of anxiety, we can look at how it occurs in a foreign language environment.

Anxiety in language learning has an important place and a slightly different explanation. MacIntyre and Gardner (1994) defined FLA and Second Language Anxiety as the tension, apprehension and restlessness that students feel in foreign or second language learning environments and contexts. The importance of anxiety in language classes has been observed and reported by researchers (Alsowat, 2016; Tran and Moni, 2015). For example, Kasap (2019), after interviewing EFL teachers and anxious students,

found that anxiety has a negative impact on students' class participation, group work and pair work progress.

Similarly, Suciati (2020), after conducting a case study in Jerusalem, found that students were negatively affected by language anxiety in foreign language speaking classes. It also showed that speaking anxiety is influenced by cognitive, emotional, and performance factors. Additionally, after researching previous literature on language anxiety and combining it with his own previous studies, Horwitz (2001) proposed that language anxiety and achievement are related and language anxiety and performance are related. In both cases, anxiety has a negative impact. Therefore, it is a general view that anxiety often negatively affects language learners. However, some studies have found that high-achieving students experience high levels of anxiety; This can be seen as an example of the positively directed effect of anxiety (Onwuegbuzie et al., 1999).

Future anxiety is defined as an individual's excessive worry about a situation or event that is likely to occur in the future. This anxiety may include potential threats, such as a planned new beginning or the loss of a valued person. Future anxiety is defined as a state of fear and apprehension regarding negative or harmful changes that may be encountered in the future (Zaleski et al., 2017).

Anxiety about the future begins to emerge in individuals when they are almost twenty years old, as they begin to find work and have a family. Although thinking about future events is natural for many people, when these thoughts turn into intense and uncontrollable anxiety, they can negatively affect individuals' psychological well-being and daily lives. Future anxiety is defined as an emotional feeling characterized by confusion, distress, uncertainty, poor expectations, fear of the future, and inadequacy in social interaction (Amir et al., 2022).

Future anxiety can directly affect an individual's attitudes towards the future, and as a result of misperceptions about possible events and lack of self-confidence, it can weaken the ability to cope with these situations. This anxiety becomes one of the individual's sources of fear and anxiety about the future. Inconsistencies and negativities in thoughts can make it difficult for an individual to adapt to situations that hinder their future, as past experiences shape the present and the future; this can lead to increased anxiety about the future (Rappaport, 2018).

Future anxiety arises from the combination of various factors such as the individual's inability to adapt to the difficulties they experience, their inability to

distinguish between realistic and inappropriate expectations and their desires. In addition, the fragmentation and disintegration of the family structure, the individual's loss of sense of belonging to the family and society, and the lack of psychological and social security also increase this anxiety. The underdeveloped ability to predict the future and not having sufficient information about the future play an important role in the formation of future anxiety in the individual (Moline, 2017).

Anxiety about the future can also negatively affect an individual's life, behavior, and personality, which can lead to failure and failure to achieve future goals and objectives. The most obvious negative effects include the use of coercive methods in relationships with people and in trusting others, as well as the individual's feeling of loneliness, isolation and confinement to a certain routine, lack of flexibility and self-sufficiency. The effort of others to meet one's needs and secure one's future may also cause the individual to fail to plan their life situations correctly and to give negative reactions that may prevent them from reaching the future. The uncertainty and vagueness of the future leads to a feeling of helplessness and excessive anxiety, especially when the individual feels confused and unable to control his/her future, making the individual unable to think about the future and make plans (Hammad, 2016).

Since every person has a lifestyle, it is sometimes possible to determine a person's future by talking to him and getting answers to some questions. In this way, we are like living the fifth act of a play where the secrets come to light. Since we know the various stages of life, its difficulties and problems, we can make forward-looking statements with this method. Therefore, based on our experience and knowledge of a few facts, we can predict what may happen to pampered children who constantly isolate themselves from others, seek support for themselves, and approach new situations hesitantly. What will a person who aims to receive support from others encounter in the future? Such a person is always indecisive, stands still, or tries to escape from solving vital problems. We know why and how he hesitates to budge or evades solutions to problems because we have observed similar situations thousands of times. It is clear that the person concerned does not aim to progress in life alone, but rather wishes to be pampered. He tries to keep himself away from the big problems of life, and prefers to occupy himself with useless things rather than dwell on useful things. He lacks a sense of sociality, so he sometimes turns into a problem child, someone who is criminally oriented, neurotic, and chooses the

last and most definitive escape by committing suicide. We can now understand all of this better than before (Adler, 2000).

Future anxiety is a state of awareness encompassing uncertainty, apprehension, and fear associated with potential threats to one's future happiness and well-being (Zaleski, 1996). Current anxiety includes various threats to the future, such as failure, accident, illness, and loss of loved ones (Price, 2009). The intensity of people's anxiety about these threats also varies. When the basis of this anxiety is examined, it is seen that the person does not know the future, has negative expectations from the future and has negative experiences (Molin, 1990). Undoubtedly, the future is an enigma for man. It is not possible for a person to control and direct his future. Things that are uncertain and uncontrollable are perceived by people as threats and pressure. At the same time, an individual's previous negative experiences can create a perception that similar experiences may occur in the future. Anxiety about the future can be seen more in the twenties, defined as young adulthood (Sheehan, 1986; Price, 2009). Anxiety may occur in individuals who have negative thoughts or negative experiences regarding the realization of one or more of these determinants, and their existing anxiety may increase. It should not be overlooked that young and qualified individuals experience the most anxiety about the future. As a matter of fact, the development of countries and their ability to build a strong future depend on the actions of the relevant population. It is thought that university students in general and young adults studying at Education Faculties in particular have an important place in society in this regard. Because teachers are considered to be the architects of society. In this context, the existence of teachers who are psychologically and physiologically healthy, in other words, who do not experience anxiety, is of social importance.

This study focused on the artificial intelligence literacy and future concerns of physical education and sports teacher candidates and aimed to measure the effect of artificial intelligence literacy on future concerns.

2 METHOD

2.1 Research model

This descriptive study, which aims to examine the effect of artificial intelligence literacy of physical education and sports teacher candidates on their future anxiety, is in the general screening model. This study, in which quantitative research methods were applied, is a descriptive research type in the cross-sectional survey type, which is "a research approach that aims to describe a past or present situation as it is". Descriptive research is generally conducted to “illuminate a given situation, reveal possible relationships between events, and make evaluations in line with standards” (Creswell, 2014).

2.2 Research group

G-Power analysis was performed to determine the sample number. As a result of the G-Power analysis performed by taking the effect size as 0.05, ά-margin of error as 0.05 and β-margin of error as 0.80, it was anticipated that at least 180 samples would be included in our research. As a result, a total of 409 physical education and sports teacher candidates participated in the research. Demographic information of the research group is given in Table-1.

Table 1

Demographic Characteristics of the Research Group

Variable		n	%
Age	18-20 Years	86	21,0
	21-23 Years	177	43,3
	24 Years and above	146	35,7
	Total	409	100,0
Gender	Female	177	43,3
	Male	232	56,7
	Total	409	100,0
Class Level	1st Class	50	12,2
	2nd Class	61	14,9
	3rd Grade	142	34,7
	4th Grade	156	38,1
	Total	409	100,0

A total of 409 physical education and sports teacher candidates participated in the study, 43.3% of whom were female and 56.7% were male. When the age distribution of the participants was examined, it was seen that 21% were between the ages of 18-20, 43.3% were between the ages of 21-23, and 35.7% were 24 years old and above. When examined according to grade level, 12.2% of the participants were first-year, 14.9% were second-year, 34.7% were third-year, and 38.1% were fourth-year physical education and sports teacher candidates.

2.3 Ethics of the research

Prior to the research, an ethics committee permit dated 10.06.2025 and numbered 336 was obtained from the Ethics Committee of the Dicle University Health Sciences Institute. Ethics rules were followed in the references.

2.4 Data collection tools

The survey technique was used to collect data. The survey used within the scope of the research consists of three parts. The first part of the survey includes questions prepared by the researcher and including demographic information about the gender, age and grade levels of the participants. In the second part, the "Artificial Intelligence Literacy Scale" developed by Wang et al. (2023) was used to determine the artificial intelligence literacy levels of teacher candidates. This scale, consisting of a total of 12 items and four sub-dimensions, is structured as awareness (items 1, 2, 3), usage (items 4, 5, 6), evaluation (items 7, 8, 9) and ethics (items 10, 11, 12). Within the scope of our research, the internal consistency coefficient (Cronbach's Alpha) of the scale was calculated as 0.84. In the third part, the "Future Anxiety Scale" developed by Geylani and Çiriş-Yıldız (2020) to measure the future anxiety levels of university students was applied. This scale consists of two sub-dimensions, “fear of the future” and “hopelessness about the future”, and a total of 19 items. The scale uses a five-point Likert-type rating (1 = Never, ... 5 = Always), with high mean scores indicating high levels of future anxiety, and low mean scores indicating low levels of anxiety. In the current study, the Cronbach Alpha reliability coefficient of this scale was determined as 0.87.

2.5 Data analysis

The data obtained according to the answers given to the scales were analyzed using the SPSS.22 package program. In order to learn how the obtained data was distributed, skewness and kurtosis values were examined. As a result of the normal distribution of the data, t-test for independent groups was applied in the comparison of variables with two groups, and one-way variance analysis ANOVA tests were applied in the comparison of variables with more than two groups. In order to examine the relationship between the artificial intelligence literacy levels and future anxiety levels of Physical Education and Sports Teacher Candidates, the Pearson correlation test was applied. Then, linear regression analysis was performed to examine the effect. In the interpretation of the statistical results, the .05 significance level was considered.

Table 2

Values for the Correlation Relationship between Dependent Variables

r	Relationship
0.00-0.25	Very Weak
0.26-0.49	Weak
0.50-0.69	Medium
0.70-0.89	High
0.90-1.00	Very High

3 FINDINGS

This section of the research includes information on the statistics that emerged based on the answers given by physical education and sports teacher candidates to the scales used in the research.

Table 3

T-Test Results of the Research Group's Artificial Intelligence Literacy and Future Anxiety Levels According to the Gender Variable

Scales and Sub-dimensions	Gender	n	$\bar{X}$	ss	t	df	p
Awareness	**Female**	177	14.38	3.35	1.14	407	0.13
	Male	232	13.97	3.93			
Use	**Female**	177	13.77	2.93	0.38	407	0.01*
	Male	232	13.65	3.71			
Evaluation	**Female**	177	15.27	3.91	0.52	407	0.79
	Male	232	15.06	4.08			

Ethic	**Female**	177	13.72	3.06	0.57	407	0.03*
	Male	232	13.53	3.71			
Artificial Intelligence Literacy (Total)	**Female**	177	57.15	10.59	0.80	407	0.03*
	Male	232	56.19	12.99			
Fear of the Future	**Female**	177	38.37	11.62	2.57	407	0.05
	Male	232	35.17	13.06			
Despair of the Future	**Female**	177	20.91	5.25	-0.48	407	0.06
	Male	232	21.18	5.91			
Future Anxiety Scale	**Female**	177	59.28	12.62	2.25	407	0.78
	Male	232	56.35	13.33			

** p<0.05 significance level*

When examined in terms of gender variable, it was revealed as a result of the analysis that there was a statistically significant difference in the sub-dimensions of the scale and the total score of the scale regarding the artificial intelligence literacy levels of physical education and sports teacher candidates (p<0.05). However, it was seen as a result of the analysis that there was no statistically significant difference in the "Awareness" and "Evaluation" sub-dimensions of the scale (p>0.05).

When examined in terms of gender variable, it was revealed as a result of the analysis that there was no statistically significant difference in the sub-dimensions of the scale and the total score of the scale regarding the future anxiety levels of physical education and sports teacher candidates (p>0.05).

Table 4

ANOVA Test Results for the Research Group's Artificial Intelligence Literacy and Future Anxiety Levels According to the Age Variable

Scale and Sub-Dimensions	Age	n	$\bar{X}$	ss	F	p
Awareness	**18-20 Years Old (1)**	86	13.71	4.05	0.84	0.43
	21-23 Years Old (2)	177	14.33	3.51		
	Ages 24 and above (3)	146	14.18	3.68		
Use	**18-20 Years Old (1)**	86	14.02	3.68	0.73	0.48
	21-23 Years Old (2)	177	13.50	3.19		
	Ages 24 and above (3)	146	13.76	3.45		
Evaluation	**18-20 Years Old (1)**	86	15.03	3.74	0.74	0.48
	21-23 Years Old (2)	177	14.94	3.99		
	Ages 24 and above (3)	146	15.47	4.18		
Ethic	**18-20 Years Old (1)**	86	13.29	3.72	0.53	0.59
	21-23 Years Old (2)	177	13.76	3.32		
	Ages 24 and above (3)	146	13.62	3.42		
	18-20 Years Old (1)	86	56.06	12.63	0.18	0.83

Artificial Intelligence Literacy	**21-23 Years Old (2)**	177	56.53	11.41		
	Ages 24 and above (3)	146	57.03	12.40		
Fear of the Future	**18-20 Years Old (1)**	86	37.00	13.01	0.14	0.87
	21-23 Years Old (2)	177	36.67	12.09		
	Ages 24 and above (3)	146	36.16	12.88		
Despair of the Future	**18-20 Years Old (1)**	86	21.00	5.72	0.30	0.75
	21-23 Years Old (2)	177	20.86	5.42		
	Ages 24 and above (3)	146	21.34	5.83		
Future Anxiety Scale	**18-20 Years Old (1)**	86	58.00	15,15	0.05	0.96
	21-23 Years Old (2)	177	57.54	12.78		
	Ages 24 and above (3)	146	57.62	13.09		

** p<0.05 significance level*

When examined in terms of age variable, it was revealed as a result of the analysis that there was no statistically significant difference in the artificial intelligence literacy levels of physical education and sports teacher candidates in the sub-dimensions of the scale and the total score of the scale (p>0.05).

When examined in terms of age variable, it was revealed as a result of the analysis that there was no statistically significant difference in the sub-dimensions of the scale and the total score of the scale regarding the future anxiety levels of physical education and sports teacher candidates (p>0.05).

Table 5

ANOVA Test Results for the Research Group's Artificial Intelligence Literacy and Future Anxiety Levels According to the Class Level Variable

Scale and Sub-Dimensions	Class Level	n	$\bar{X}$	ss	F	p
Awareness	**1st Grade (1)**	50	13.32	3.56	1.28	0.28
	2nd Grade (2)	61	14.10	3.08		
	3rd Grade (3)	142	14.09	3.83		
	4th Grade (4)	156	14.48	3.80		
Use	**1st Grade (1)**	50	13.88	3.33	0.31	0.82
	2nd Grade (2)	61	13.67	3.23		
	3rd Grade (3)	142	13.86	3.51		
	4th Grade (4)	156	13.51	3.38		
Evaluation	**1st Grade (1)**	50	15,16	3.98	0.95	0.42
	2nd Grade (2)	61	15.44	3.73		
	3rd Grade (3)	142	14.70	3.70		
	4th Grade (4)	156	15.43	4.37		
Ethic	**1st Grade (1)**	50	13.68	3.51	0.30	0.83
	2nd Grade (2)	61	13.67	2.87		
	3rd Grade (3)	142	13.39	3.85		
	4th Grade (4)	156	13.76	3.25		

Artificial Intelligence Literacy	**1st Grade (1)**	50	56.04	12.36	0.27	0.85
	2nd Grade (2)	61	56.89	9.67		
	3rd Grade (3)	142	56.05	12.31		
	4th Grade (4)	156	57.19	12.51		
Fear of the Future	**1st Grade (1)**	50	36.56	12.37	0.59	0.62
	2nd Grade (2)	61	36.67	11.75		
	3rd Grade (3)	142	37.55	13.50		
	4th Grade (4)	156	35.61	12.54		
Despair of the Future	**1st Grade (1)**	50	21.82	5.54	0.71	0.56
	2nd Grade (2)	61	21.03	5.27		
	3rd Grade (3)	142	20.58	4.87		
	4th Grade (4)	156	21.27	6.39		
Future Anxiety Scale	**1st Grade (1)**	50	58.38	13.17	0.30	0.83
	2nd Grade (2)	61	57.70	13.30		
	3rd Grade (3)	142	58.13	13.27		
	4th Grade (4)	156	56.88	12.92		

** p<0.05 significance level*

When examined in terms of class level variable, it was revealed as a result of the analysis that there was no statistically significant difference in the artificial intelligence literacy levels of physical education and sports teacher candidates in the sub-dimensions of the scale and the total score of the scale (p>0.05).

When examined in terms of class level variable, it was revealed as a result of the analysis that there was no statistically significant difference in the sub-dimensions of the scale and the total score of the scale regarding the future anxiety levels of physical education and sports teacher candidates (p>0.05).

Table 6

Simple Correlation Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates

		Artificial Intelligence Anxiety Scale
Future Anxiety Scale	r	0.23**
	p	0.00

*** p<0.01 correlation level*

When the scale scores formed according to the responses given by the participants to the scales were examined, a significant but very weak relationship was found between artificial intelligence literacy and future anxiety. This result showed that there was a limited relationship between the two variables used.

Table 7

Simple Correlation Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to Age Variable

			Artificial Intelligence Anxiety Scale
18-20 Years Old	**Future Anxiety Scale**	r	0,65
		p	0,55
21-23 Years Old	**Future Anxiety Scale**	r	0,24**
		p	0,00
Ages 24 and above	**Future Anxiety Scale**	r	0,36**
		p	0,00

*** p<0.01 correlation level*

According to the answers given to the scales in terms of age variable by the physical education and sports teacher candidates included in the research, no statistically significant relationship was detected between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale for those between the ages of 18-20. In line with the answers given by the physical education and sports teacher candidates between the ages of 21-23, a very weak positive relationship was detected between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale. In line with the answers given by the physical education and sports teacher candidates aged 24 and over, a weak positive relationship was detected between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale.

Table 8

Simple Correlation Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to Gender Variable

			Artificial Intelligence Anxiety Scale
Female	**Future Anxiety Scale**	r	0,18*
		p	0,02
Male	**Future Anxiety Scale**	r	0,27**
		p	0,00

** p<0.05 correlation level*
*** p<0.01 correlation level*

Based on the gender variable responses of physical education and sports teacher candidates participating in the study, a very weak positive correlation was found between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale for female

candidates. Based on the responses of male physical education and sports teacher candidates, a weak positive correlation was found between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale.

Table 9

Simple Correlation Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to Grade Level Variable

			Artificial Intelligence Anxiety Scale
1st Grade	**Future Anxiety Scale**	r	0,32*
		p	0,02
2nd Grade	**Future Anxiety Scale**	r	0,18
		p	0,17
3rd Grade	**Future Anxiety Scale**	r	0,13
		p	0,13
4th Grade	**Future Anxiety Scale**	r	0,33**
		p	0,00

** p<0.05 correlation level*
*** p<0.01 correlation level*

Based on the responses given by the physical education and sports teacher candidates included in the study to the scales in the grade level variable, no statistically significant relationship was found between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale of the 2nd and 3rd grade physical education and sports teacher candidates. Based on the responses given by the 1st and 4th grade physical education and sports teacher candidates, a weak positive relationship was found between the Artificial Intelligence Literacy Scale and the Future Anxiety Scale.

Table 10

Results of Regression Analysis Between Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates

Model	**B**	**Std . Error**	**β**	**t**	**p**
Still	43.20	3.04		14.21	0.00
Artificial Intelligence Literacy	0.26	0.05	0.23	4.85	0.00
R=0.23 R^2_{adj}=0.06 F_0=23.51 p=0.00					

The simple linear regression analysis results shown in Table 10 show that the model for predicting future anxiety is statistically significant. The t-test results for the regression coefficients revealed that artificial intelligence literacy (β=0.23; t=4.85; p=0.00) significantly predicted future anxiety. In addition, it can be stated that artificial intelligence literacy explained 6% of the variance in future anxiety.

Table 11

Regression Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to Age Variable

	Model	B	Std. Error	β	t	p
18-20 Years Old	**Still**	53,61	7,50		7,15	0,00
	Artificial Intelligence Literacy	0,08	0,13	0,07	0,60	0,55
	R=0,07 R^2_{adj}=0,04 $F_{()}$=0,36 p=0,55					
21-23 Years Old	**Still**	42,52	4,74		8,97	0,00
	Artificial Intelligence Literacy	0,27	0,08	0,24	3,23	0,00
	R=0,24 R^2_{adj}=0,06 $F_{()}$=10,45 p=0,00					
Ages 24 and above	**Still**	37,40	4,48		8,36	0,00
	Artificial Intelligence Literacy	0,35	0,08	0,36	4,60	0,00
	R=0,36 R^2_{adj}=0,13 $F_{()}$=21,13 p=0,00					

Table 11 presents the results of the simple linear regression analysis conducted to predict future anxiety in terms of the age variable. As a result of the analysis, it was determined that the regression model was statistically significant for candidates aged 21-23 (β=0.24; t=3.23; p=0.00) and 24 years and older (β=0.36; t=4.60; p=0.00). According to the t-test results regarding the significance of the regression coefficients, artificial intelligence literacy was found to have a significant predictive power on future anxiety. It can be said that artificial intelligence literacy explained 6% of the variance in future anxiety for candidates aged 21-23 and 13% for candidates aged 24 and older.

Table 12

Regression Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to Gender Variable

	Model	B	Std. Error	β	t	p
Female	**Still**	47,38	5,15		9,20	0,00
	Artificial Intelligence Literacy	0,21	0,09	0,18	2,35	0,02
	R=0,18 R^2_{adj}=0,03 $F_{()}$=5,51 p=0,02					
Male	**Still**	41,08	3,76		9,20	0,00
	Artificial Intelligence Literacy	0,27	0,07	0,27	4,17	0,00
	R=0,27 R^2_{adj}=0,07 $F_{()}$=17,36 p=0,00					

Table 12 presents the results of the simple linear regression analysis conducted to predict future anxiety in terms of the gender variable. The analysis determined that the regression model for female (β=0.18; t=2.35; p=0.02) and male (β=0.27; t=4.17; p=0.00) candidates was statistically significant. According to the t-test results for the significance of the regression coefficients, artificial intelligence literacy was found to have significant predictive power on future anxiety. It can be said that artificial intelligence literacy explained 3% of the variance in future anxiety for female candidates and 7% for male candidates.

Table 13

Regression Analysis Results Between Artificial Intelligence Literacy and Future Anxiety Levels of Physical Education and Sports Teacher Candidates According to the Grade Level Variable

	Model	B	Std. Error	β	t	p
1st Grade	**Still**	39,13	8,35		4,69	0,00
	Artificial Intelligence Literacy	0,34	0,15	0,32	2,36	0,02
	R=0,32 R^2_{adj}=0,10 $F_{()}$=5,57 p=0,02					
2nd Grade	**Still**	43,64	10,15		4,30	0,00
	Artificial Intelligence Literacy	0,25	0,18	0,18	1,41	0,16
	R=0,18 R^2_{adj}=0,03 $F_{()}$=1,98 p=0,17					
3rd Grade	**Still**	50,37	5,18		9,72	0,00

	Artificial Intelligence Literacy	0,14	0,09	0,13	1,53	0,13
	R=0,13 R^2_{adj}=0,02 F_0=2,35 p=0,13					
4th Grade	**Still**	37,54	4,60		8,16	0,00
	Artificial Intelligence Literacy	0,34	0,08	0,33	4,30	0,00
	R=0,33 R^2_{adj}=0,11 F_0=18,49 p=0,00					

Table 13 presents the results of the simple linear regression analysis conducted to predict future anxiety in terms of the grade level variable. As a result of the analysis, it was determined that the regression model for 1st grade (β=0.32; t=2.36; p=0.02) and 4th grade (β=0.33; t=4.30; p=0.00) candidates was statistically significant. According to the t-test results regarding the significance of the regression coefficients, artificial intelligence literacy was found to have a significant predictive power on future anxiety. It can be said that artificial intelligence literacy explained 10% of the variance in future anxiety for 1st grade candidates and 11% for 4th grade candidates.

5 DISCUSSION

Artificial intelligence has gained an important place in daily life by reaching a wide range of users due to its potential to simplify daily routines and solve complex problems. As in every field, studies on artificial intelligence applications have accelerated in educational circles and the role of artificial intelligence in learning processes has increased. Ensuring the competence of today's prospective teachers in understanding, using and interacting with artificial intelligence applications has become important. With the development of artificial intelligence, there are positive effects as well as negative effects. One of these is anxiety about the future. In this context, the effect of physical education and sports teacher candidates' artificial intelligence literacy levels on their future anxiety was examined in terms of some variables.

As a result of the evaluations, the artificial intelligence literacy levels of physical education and sports teacher candidates were found to be at a moderate level. In other words, physical education and sports teacher candidates' skills in understanding, using and interacting with artificial intelligence applications are at a moderate level. The future

anxiety levels of physical education and sports teacher candidates were also found to be at a moderate level as a result of the analysis.

In the evaluation made in terms of gender variable, it was determined that the artificial intelligence literacy levels of physical education and sports teacher candidates were at a medium level. The analyses show that there is a statistically significant difference in the total score of the artificial intelligence literacy scale of physical education and sports teacher candidates in terms of gender variable and in the "Ethics" and "Usage" sub-dimensions of the scale. Female physical education and sports teacher candidates have higher artificial intelligence literacy levels than male physical education and sports teacher candidates. This can be interpreted as female physical education and sports teacher candidates having more knowledge in terms of having a basic understanding of artificial intelligence and how to benefit from the potential of this technology. When the literature is examined, Elçiçek (2024) concluded in his study on students that male students have higher artificial intelligence literacy levels. Similarly, a similar result was reached in the study conducted by Sanusi et al. (2022). These two studies differ from the results of our research. In the study conducted by Wang et al. (2023), it was concluded that women's artificial intelligence literacy levels were higher than men. This study is consistent with the results of our research. In the evaluation made in terms of gender variable, it was determined that the future anxiety levels of physical education and sports teacher candidates were at a medium level. The analyses show that no statistically significant difference could be detected in the whole scale and its sub-dimensions in terms of gender variable in line with the answers given by physical education and sports teacher candidates to the future anxiety scale. When the literature is examined, it is concluded that there is a statistical difference depending on the gender variable and that women's future concerns are more than men in these studies (Çelikel and Erkorkmaz, 2008, Serçek and Korkmaz, 2023). These studies are opposite to the results of our study. In the study conducted by Tümkaya et al. (2007), it was found that the anxiety level did not differ in the context of the gender variable, and in the study conducted by Akgün Güdücü and Özerk (2022) in which they examined the future concerns of university students according to the gender variable, they found that there was no statistically significant difference between the anxiety levels and the gender variable. This study is consistent with the results of our research. This situation can be associated with the problems that today's individuals face in social life. Because the

anxiety that causes the future, such as looking for a job, not being able to plan for the future, political and economic conditions, natural disasters, wars, diseases, family problems, etc., have become a common problem for both men and women. It can be considered normal that future anxiety levels do not differ because changing life conditions confront both men and women with similar problems.

In the evaluation made in terms of age variable, it was determined that the artificial intelligence literacy levels of physical education and sports teacher candidates were at a medium level. The analyses show that there is no statistically significant difference in the entirety of the artificial intelligence literacy scale and all sub-dimensions of physical education and sports teacher candidates in terms of age variable. When the literature was examined, Zhou et al. (2022) found in their study that the artificial intelligence literacy rate decreased with increasing age. In another study, it was concluded that especially younger individuals had higher artificial intelligence literacy rates (Zhang and Dafoe, 2020). These studies differ from the results of our research. In the evaluation made in terms of age variable, it was determined that the future anxiety levels of physical education and sports teacher candidates were at a medium level. The analyses show that no statistically significant difference could be detected in the whole scale and its sub-dimensions in line with the answers given by physical education and sports teacher candidates to the future anxiety scale in terms of age variable. When the literature was examined, Rabei et al. (2020) found a statistically significant difference in the future anxiety levels of nurses according to the age variable. According to this study, the level of future anxiety increases with increasing age. Similarly, Arslan et al. (2022) reached a similar conclusion in their studies. These studies differ from the results obtained in our research. Contrary to these studies, Zimbardo and Boyd (1999), Nurmi (1991) and Seginer (2009) concluded that younger individuals have higher future anxiety levels in their studies. This result is consistent with the result obtained in our research.

In the evaluation made in terms of the class level variable, it was determined that the artificial intelligence literacy levels of physical education and sports teacher candidates were at a medium level. The analyses show that there is no statistically significant difference in the entirety of the artificial intelligence literacy scale and all sub-dimensions of physical education and sports teacher candidates in terms of the class level variable. When the literature was examined, it was concluded that the artificial intelligence literacy level decreased as the grade level increased in the study conducted

by Wang et al. (2023) on middle school students. There are also studies that contradict this study. In these studies, it was determined that the artificial intelligence literacy rate increased as the grade level increased (Lee and Perret, 2021; Touretzky et al., 2019; DiPaola and Kumar, 2020; Hitron et al., 2022; Chounta and Avramides, 2021). This study differed from the result obtained in our research. In the evaluation made in terms of the class level variable, it was determined that the artificial intelligence literacy future anxiety levels of physical education and sports teacher candidates were at a medium level. The analyses show that there is no statistically significant difference in the whole scale and all sub-dimensions of physical education and sports teacher candidates' future anxiety in terms of the class level variable. When the literature is examined, Nurmi (1991) concluded in his study that as the class level increases, future anxiety will also increase. Similarly, Zimbardo and Boyd (1999), Seginer (2003) and Trommsdorff (1983) concluded in their studies that the level of future anxiety increases in parallel with the increase in the class level. These studies are opposite to the results obtained in our research.

In line with the main purpose of the research, the analyses conducted to determine the effect of artificial intelligence literacy of physical education and sports teacher candidates on future anxiety have been concluded to predict it at a statistically significant level. When the literature is examined, the number of studies examining the effect of artificial intelligence literacy on future anxiety is limited. In the studies directly related to this subject, it was found that future anxiety levels decreased with the increase in artificial intelligence literacy (Simeonov and Taneva, 2023; Kovanovic et al., 2022). A similar result was obtained in the indirectly related study (Long and Magerko, 2020).

As a result of these analyses, it can be concluded that as artificial intelligence literacy increases, anxiety about the future will also increase. While the increase in artificial intelligence literacy reveals the necessity of keeping up with technology, on the other hand, it causes individuals to have anxiety about the future as a result of the development of artificial intelligence. A parallel result was reached in this study. It has been concluded that increasing artificial intelligence literacy causes an increase in future anxiety among physical education and sports teacher candidates. This study can be conducted in different areas and different results can be achieved.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all participants involved in this study.

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are available from the corresponding author upon request.

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REFERENCES

Adler, A. (2000). Yaşama Sanatı (Çev. Kamuran Şipal) İstanbul: Say Yayıncılık.

Akgün Güdücü, S. ve Özerk, H. (2022). Türkiye'de üniversite öğrencilerinin gelecek kaygılarıyla ilintili olarak 1996-2020 yılları arasında yapılan araştırmaların incelenmesi ve değerlendirilmesi. Sosyal, Beşerî ve İdari Bilim ler Dergisi, 5(6), 748-769.

Alsowat, H. H. (2016). Foreign language anxiety in higher education: A practical framework for reducing FLA. European Scientific Journal, 12(7). http://doi.org/10.19044/esj.2016.v12n7p193.

Amir vd. (2022). Future Anxiety and Its Relation to Life Orientation among Nurses Working in Basrah Hospitals. Council of College of Nursing University of Basra, 13(50), 7-12.

Arslan, B. Ş., Küçük, M., Aydın, G., Akbaş, B. (2022). COVID-19 pandemisinde hemşirelik son sınıf öğrencilerinin kariyer endişeleri ve iş umutları. Current Perspectives on Health Sciences, 3(3), 115-121. doi:10.58208/cphs.1205221.

Ateş, H. (2023). Examination of the Correlation Between Physical Education Teachers' Levels of Happiness and Psychological Well-being (Diyarbakır Province). *Turkish Journal of Sport and Exercise*, *25*(2), 240-247.

Buchanan, B. G. (2005). A (Very) brief history of artificial intelligence. AI magazine, 26(4), 53-60. https://doi.org/10.1609/aimag.v26i4.1848.

Chounta, I. A., & Avramides, K. (2021). Developing artificial intelligence literacy in high school students. In Proceedings of the 16th European Conference on Technology Enhanced Learning (EC-TEL 2021) (pp. 43–55). Springer. https://doi.org/10.1007/978-3-030-86436-1_4.

Coşkun, F., & Gülleroğlu, H. D. (2021). Yapay zekanın tarih içindeki gelişimi ve eğitimde kullanılması. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 54(3), 947 - 966. https://doi.org/doi.org/10.30964/auebfd.916220.

Creswell, J. W. (2014). Araştırma deseni: Nitel, nicel ve karma yöntem yaklaşımları. Selçuk B. Demir (Çev.). Ankara: Eğiten Kitap.

Çelebi, V., & İnal, A. (2019). Yapay Zekâ Bağlamında Etik Problemi. Journal of International Social Research, 12(66).

Çelikel, Ç. F. ve Erkorkmaz, Ü. (2008). Üniversite öğrencilerinde depresif belirtiler ve umutsuzluk düzeyleri ile ilişkili etmenler. Nöropsikiyatri Arşivi, 45(4), 122-129.

Çetin, M. & Aktaş, A. (2021). Yapay zekâ ve eğitimde gelecek senaryoları. OPUS International Journal of Society Researches, 18[Eğitim Bilimleri Özel Sayısı], 4225-4268.

Çetindamar, D., Kitto, K., Wu, M., Zhang, Y., Abedin, B., & Knight, S. (2022). Explicating ai literacy of employees at digital workplaces. IEEE Transactions on Engineering Management, 71, 810 - 823. https://doi.org/10.1109/TEM.2021.3138503.

Davenport, T. H. & Ronanki, R. (2018). Artificial intelligence for the real world. Harvard Business Review 96(1), 108–116.

DiPaola, D., & Kumar, A. (2020). Designing AI literacy curriculum for middle school students. In Proceedings of the 14th International Conference of the Learning Sciences (ICLS 2020) (pp. 2331–2338). International Society of the Learning Sciences. https://repository.isls.org//handle/1/6425.

Elçiçek, M. (2024). Öğrencilerin yapay zekâ okuryazarlığı üzerine bir inceleme. Bilgi ve İletişim Teknolojileri Dergisi, 6(1), 24-35. https://doi.org/10.53694/bited.1460106

Faruqe, F., Watkins, R., & Medsker, L. (2022). Competency model approach to AI literacy: research-based path from initial framework to model. Advances in Artificial Intelligence and Machine Learning, 2(4), 580- 587. https://doi.org/10.48550/arXiv.2108.05809.

Fosso Wamba, S., Bawack, R., Guthrie, C., Queiroz, M., & Carillo, K. (2021). Are we preparing for a good AI society? A bibliometric review and research agenda. Technological Forecasting and Social Change, 164. https://doi.org/10.1016/j.techfore.2020.120482.

Geylani, M. ve Çiriş Yıldız, C. (2022). Üniversite öğrencilerinde gelecek kaygısı ölçeğinin geliştirilmesi: Geçerlik ve güvenirlik çalışması. İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu Dergisi, 10(1), 284-300.

Gondal, K. M. (2018). Yapay zekâ ve eğitim liderliği. Kral Edward Tıp Üniversitesi Yıllıkları, 24(4), 1-2.

Güneş, F. (2019). Okuryazarlık yaklaşımları. The Journal of Limitless Education and Research, 4(3), 224-246.

Haenlein, M., & Kaplan, A. (2019). A brief history of artificial intelligence: On the past, present, and future of artificial intelligence. California Management Review, 61(4), 5-14. https://doi.org/10.1177/0008125619864925.

Hammad. (2023). Future Anxiety and its Relationship to Students' Attitude toward Academic Specialization . Journal of Education and Practice, 7(15), 54-56.

Hitron, T., Levy, M., & Yadin, A. (2022). AI literacy in elementary schools: Students' perceptions of AI and learning outcomes. International Journal of Child-Computer Interaction, 32, 100406. https://doi.org/10.1016/j.ijcci.2022.100406.

Horwitz, E. (2001). Language anxiety and achievement. Annual Review of Applied Linguistics, 21, 112-126. https://doi.org/10.1017/S0267190501000071.

Jiang, Y., Li, X., Luo, H., Yin, ·. S., & Kaynak, O. (2022). Quo vadis artificial intelligence? . Discover Artifcial Intelligence, 2(4). https://doi.org/10.1007/s44163-022-00022-8.

Kandlhofer, M., Steinbauer, G., Hirschmugl-Gaisch, S. & Huber, P. (2016). Artificial intelligence and computer science in education: From kindergarten to university. 2016 IEEE Frontiers in Education Conference (FIE) içinde (s. 1-9). NY: IEEE.

Komalavalli, K., Hemalatha, R. & Dhanalakshmi, S. (2020). Chennai Şehri ve çevresindeki yükseköğrenim öğrencileri arasında akıllı telefonlarda yapay zekâ ve uygulamaları üzerine bir araştırma. Shanlax Uluslararası https://doi.org/10.34293/education.v8i3.2379.

Kong, S. C., & Zhang, G. (2021). A conceptual framework for designing artificial intelligence literacy programmes for educated citizens. 25th Global Chinese Conference on Computers in Education (GCCCE 2021). Hong Kong: Centre for Learning, Teaching and Technology, The Education University of Hong Kong.

Kovanović, V., Joksimović, S., & Gašević, D. (2022). Artificial intelligence in education: Promises and implications for students' well-being. Computers and Education: Artificial Intelligence, 3, 100067. https://doi.org/10.1016/j.caeai.2022.100067.

Lee, S. & Choi, J. (2017). Enhancing user experience with conversational agent for movie recommendation: Effects of self-disclosure and reciprocity. International Journal of Human Computer Studies, 103, 95–105.

Lee, I., & Perret, J. (2021). Artificial intelligence education for K–12: A review of the literature and proposed learning progression. ACM Transactions on Computing Education, 21(4), 1–27. https://doi.org/10.1145/3472349

Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. Education Sciences, 13(4), 410-425. https://doi.org/10.3390/educsci13040410.

Long, D., & Magerko, B. (2020). What is ai literacy? Competencies and design considerations. HI '20: CHI Conference on Human Factors in Computing Systems. Honolulu: Association for Computing Machinery. https://doi.org/10.1145/3313831.3376727.

Luo, X., Tong, S., Fang, Z. & Qu, Z. (2019). Machines versus humans: the impact of AI chatbot disclosure on customer purchases. Nanyang Business School Research Paper, 20(33), 1-30.

MacIntyre, P., & Gregersen, T. (2012). Affect: The role of language anxiety and other emotions in language learning. In S. Mercer, S. Ryan, & M. Williams, (Eds.), Psychology for language learning: Insights from research, theory and practice (pp. 103-118). Palgrave Macmillan. https://doi.org/10.1057/9781137032829_8.

Metelskaia, I., Ignatyeva, O., Denef, S. & Samsonowa, T. (2018). A business model template for AI solutions. Proceedings of the International Conference on Intelligent Science and Technology içinde (s. 35-41). NY: Association for Computing Machinery.

Molin, R. (1990). Future anxiety: Clinical ıssues of child in the latter phases of foster care. Journal of Child & Adolescent Social Work, 7(6), 501-512.

Moline. (2017). Future Anxiety: Clinical Issues of Children in the Latter Phases of Foster Care, Child and Adolescent. 7(6), Social Work Journal.

Moor, J. (2006). The Dartmouth College artificial intelligence conference: The next fifty years. AI Magazine, 27(4), 87-91. https://doi.org/10.1609/aimag.v27i4.1911.

Muthukrishnan, N., Maleki, F., Ovens, K., Reinhold, C., Forghani, B., & Forghani, R. (2020). Brief history of artificial intelligence. Neuroimaging Clin N Am, 30(4), 393-399. https://doi.org/10.1016/j.nic.2020.07.004.

Ng, D. T., Luo, W., Chan, H. M., & Chu, S. K. (2022). Using digital story writing as a pedagogy to develop AI literacy among primary students. Computers and Education: Artificial Intelligence. https://doi.org/10.1016/j.caeai.2022.100054.

Noyes Jr, R., & Hoehn-Saric, R. (1998). The anxiety disorders. Cambridge University Press. https://doi.org/10.1017/CBO9780511663222.

Nurmi, J. E. (1991). How do adolescents see their future? A review of the development of future orientation and planning. Developmental Review, 11(1), 1–59. https://doi.org/10.1016/0273-2297(91)90002-6.

OECD. (2019). Artificial intelligence in society. OECD Publishing.

Onwuegbuzie, A. J., Bailey, P., & Daley, C. E. (1999). Factors associated with foreign language anxiety. Applied Psycholinguistics, 20(2), 217-239. https://doi.org/10.1017/S0142716499002039.

Pinski, M., & Benlian, A. (2023). Ai literacy-towards measuring human competency in artificial intelligence. 56th Hawaii International Conference on System Sciences. Hawaii.

Pitsavos, C., Panagiotakos, D. B., Papageorgiou, C., Tsetsekou, E., Soldatos, C., & Stefanadis, C. (2006). Anxiety in relation to inflammation and coagulation markers, among healthy adults: the ATTICA study. Atherosclerosis, 185(2), 320-326.

Price, B. (2009). Differentiating future time perspective and future anxiety as distinct predictors of ıntimate partner violence [Yayımlanmamış doktora tezi]. Northern Illinois University.

Rabei, S., Ramadan, S., Abdallah, N. (2020). Selfefficacy and future anxiety among students of nursing and education colleges of Helwan University. Middle East Current Psychiatry, 27, 1- 5. doi: 10.1186/s43045-020-00049-6.

Rappaport. (2018). Future Time, Death Anxiety and Life Purpose among Older Adults. Death Studies, 17(4), 369-379. https://doi.org/10.1080/07481189308252631.

Serçek, S. & Korkmaz, M. (2023). Sporda Giyilebilir Teknoloji Üzerine Sistematik Bir Literatür Taraması. *International Journal of Contemporary Educational Studies (IntJCES),* 9 (1).

Serçek, S. & Korkmaz, M. (2023). Turizm Sektöründe Metaverse'ün Kullanımına İlişkin Sistematik Bir Literatür Çalışması, Sosyal, *Beşeri ve İdari Bilimler Dergisi,* 6(5): 701-721.

Sanusi, I. T., Olaleye, S. A., Agbo, F. J., & Chiu, T. K. (2022). The role of learners' competencies in artificial intelligence education. Computers and Education: Artificial Intelligence, 3, 100098.

Seginer, R. (2009). Future orientation: Developmental and ecological perspectives. Springer. https://doi.org/10.1007/978-0-387-89825-9.

Seginer, R. (2003). Adolescents' future orientation: An integrated cultural and ecological perspective. International Journal of Behavioral Development, 27(6), 451–460. https://doi.org/10.1080/01650250344000151.

Sheehan, D. (1986). The anxiety disease. Bantam Books.

Simeonov, D., & Taneva, S. (2023). AI literacy and psychological readiness for an uncertain future: A pilot study among university students. Journal of Technology and Society, 5(2), 55–70.

Spielberger, C. D. (1972). Conceptual and methodological issues in anxiety research. Anxiety: Current Trends in Theory and Research, 2, 481-493. https://doi.org/10.1016/B978-0-12-657402-9.50013-2.

Spielberger, C. D. (1983). State-trait anxiety inventory for adults. APA PsycTests. https://doi.org/10.1037/t06496-000.

Stembert, N. & Harbers, M. (2019). Accounting for the human when designing with AI: Challenges identified. CHI'19-Extended Abstracts, Glasgow, Scotland, UK—May 04-09.

Su, G. (2018). Unemployment in the AI Age. AI Matters 3(4), 35–43.

Suciati, S. (2020). Speaking anxiety in EFL classroom: categories and factors. Edulingua: Jurnal Linguistiks Terapan dan Pendidikan Bahasa Inggris, 7(1), 1-9.

Tarafdar, M., Beath, C. M. & Ross, J. W. (2019). Using AI to enhance business operations. MIT Sloan Management Review, 60(4), 37–44.

Touretzky, D. S., Marghitu, D., Gardner-McCune, C., Martin, F., Seehorn, D., & Yuen, T. T. (2019). Envisioning AI for K-12: What should every child know about AI? In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 33, No. 01, pp. 9795–9799). AAAI Press. https://doi.org/10.1609/aaai.v33i01.33019795.

Tran, T. T. T., & Moni, K. (2015). Management of foreign language anxiety: Insiders' awareness and experiences. Cogent Education, 2(1). https://doi.org/10.1080/2331186X.2014.992593.

Trommsdorff, G. (1983). Future orientation and socialization. International Journal of Psychology, 18(1–4), 381–406. https://doi.org/10.1080/00207598308247493.

Tümkaya, S., Aybek, B. ve Çelik, M. (2007). KPSS'ye girecek öğretmen adaylarındaki umutsuzluk ve durum luk-sürekli kaygı düzeylerini yordayıcı değişkenlerin incelenmesi. Kuram ve Uygulamada Eğitim Bilimleri Dergisi, 7(2), 953974.

Tyrer, P. (1999). Anxiety: A multidisciplinary review. Imperial College Press.

Wang, X., Li, X., & Huang, J. (2023). Junior High School Artificial Intelligence Literacy: Connotation, Evaluation and Promotion Strategy. Open Journal of Social Sciences, 11(5), 33-49.

Wang, B., Rau, P. L. P. & Yuan, T. (2023). Measuring user competence in using artificial intelligence: validity and reliability of artificial intelligence literacy scale. Behaviour & Information Technology, 42(9), 1324-1337.

Wong, G. K., Ma, X., Dillenbourg, P., & Huan, J. (2020). Broadening artificial intelligence education in K-12: Where to start? Association for Computing Machinery, 11(1), 20–29. https://doi.org/10.1145/3381884.

Xiao, W. & Bie, M. (2019). The reform and practice of educational technology major in the age of artificial intelligence 2.0. IOP Conference Series: Materials Science and Engineering, 677(5), 1-4. https://iopscience.iop.org/article/10.1088/1757-899X/677/5/052094/pdf.

Yi, Y. (2021). Establishing the concept of ai literacy: Focusing on competence and purpose. JAHR, 12/2(24), 353-368. https://doi.org/10.21860/j.12.2.8.

Zaleski, Z. (1996). Future anxiety: Concept, measurement, and preliminary research. Personality and Individual Differences, 21(2), 165-174.

Zaleski vd. (2017). Development and validation of the Dark Future scale. ResearchGate, 28(1), 2-5. DOI:10.1177/0961463X16678257.

Zeidner, M., & Matthews, G. (2010). Anxiety 101. Springer Publishing Company.

Zhang, B., & Dafoe, A. (2020). Artificial intelligence: American attitudes and trends. Center for the Governance of AI, Future of Humanity Institute, University of Oxford.

Zhao, L., Wu, X., & Luo, H. (2022). Developing ai literacy for primary and middle school teachers in china: based on a structural equation modeling analysis. Sustainability, 14(21). https://doi.org/10.3390/su142114549.

Zhou, H., Itoh, M. & Kitazaki, S. (2021). How does explanation-based knowledge influence driver take-over in conditional driving automation? IEEE Transactions on Human-Machine Systems, 51(3), 188-197.

Zhou, F., Li, J., & Wu, Y. (2022). Measuring artificial intelligence literacy: Development and validation of a survey instrument. International Journal of Artificial Intelligence in Education, 32(1), 34–60. https://doi.org/10.1007/s40593-021-00252-1.

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. Journal of Personality and Social Psychology, 77(6), 1271–1288. https://doi.org/10.1037/0022-3514.77.6.1271.

Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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