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Attitudes of Football Coaches Toward Artificial Intelligence in the Context of Modern Sports Training

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Abstract:

This study aims to investigate the attitudes of football coaches towards artificial intelligence within the framework of modern sports training and to identify any statistically significant differences in these attitudes. The descriptive method was employed, using a sample of 30 coaches from intermediate-level teams in the regions of Bordj and Setif, selected intentionally.

The research tool consisted of distributing questionnaires to participants, divided into three sections: the first included personal information such as age, academic qualification, and years of experience; While the second and third sections focused on positive and negative attitudes respectively.

The main findings indicate that football coaches hold positive attitudes toward artificial intelligence in the context of modern sports training.

Keywords: Attitudes; coaches; artificial intelligence; modern sports training.

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1. INTRODUCTION

Sports have become one of the modern indicators reflecting the country's progress and its commitment to cultivating the new human being. Global, Olympic, continental, national, and even local sporting events serve as platforms where physical excellence and human ingenuity are manifested through refined athletic performance. When a team reaches the podium, it is a public declaration of an outstanding player, a coach, and scientific knowledge applied under the supervision of qualified and conscious leadership (Al-Jabali, 2001, p15).

Achieving top levels in sports is not a matter of chance but rather the result of applying modern scientific programs and methods. The use of information technology in the sports field has become increasingly crucial due to today's rapid technological advancements-especially with the proliferation of digital devices and equipment. These innovations have enabled individuals to collect, store, categorize, and generate knowledge more effectively, fostering opportunities for innovation, creativity, and improved information management, ultimately leading to higher performance standards.

Some clubs have already adopted innovative technologies, such as FC Finchley, a seventh-tier English club that introduced artificial intelligence by employing a smart assistant robot in the role of an assistant coach. According to reports by The Independent, this AI-powered robot acts as a strategic coach, providing advice to improve the football team. The development of this intelligent robot was undertaken by The Big Bang Fair, an English artificial intelligence development company. The robot was programmed to receive data about players' capabilities, including their speed, dribbling skills, and positioning on the field.

During matches, the advanced robot accompanies the head coach, posing technical questions based on its database and offering strategic guidance regarding optimal gameplay plans and necessary substitutions during the game. The trainer robot functions similarly to Amazon's well-known Alexa voice assistant, responding to spoken queries. FC Finchley plans to begin using this robotic assistant starting with its match against Whitehawk on February 9th, 2019 (Agmad, 2019).

The researchers believe that this new approach can help coaches assess players' adherence to tactical roles during matches and reinforce tactical discipline on the field. It may revolutionize how physical and tactical data are collected and analysed, offering detailed insights to coaches, players, and sports scientists alike.

Given the growing integration of artificial intelligence into modern sports training, this study seeks to explore the nature of football coaches' attitudes toward this emerging technology.

Problem Statement:

Currently, many sports clubs strive to enhance their training programs by adopting effective strategies to improve athletic performance. One such strategy involves leveraging artificial intelligence—an area concerned with developing machines capable of performing tasks perceived as intelligent by humans, utilizing high-tech software and applications tailored for sports environments.

Artificial intelligence is a branch of computer science focused on designing systems that exhibit forms of intelligence. These systems can make useful inferences about complex problems, understand natural language, or interpret perception, among other capabilities typically associated with human intelligence (Sheikh, 2018, p82).

From this perspective, we aim to explore football coaches' attitudes toward artificial intelligence in the context of modern sports training. This leads us to the following general research question:

What is the nature of football coaches' attitudes toward artificial intelligence in the context of modern sports training?

This overarching question gives rise to the following sub-questions:

Do football coaches hold positive attitudes toward artificial intelligence in modern sports training?

Do football coaches hold negative attitudes toward artificial intelligence in modern sports training?

Research Hypotheses:

Football coaches demonstrate positive attitudes toward artificial intelligence in modern sports training.

Football coaches demonstrate negative attitudes toward artificial intelligence in modern sports training.

Objectives of the Study:

This study aims to:

Investigate whether football coaches hold positive attitudes toward artificial intelligence in modern sports training.

Investigate whether football coaches hold negative attitudes toward artificial intelligence in modern sports training.



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Identify overall attitudes of football coaches toward artificial intelligence in the context of modern sports training.

Significance of the Study:

This research seeks to highlight the role of artificial intelligence in sports training by examining the perspectives of specialized professionals football coaches and understanding their attitudes toward this technology.

The study gains significance from the real scientific and cognitive value of artificial intelligence in sports. It also aims to identify key factors influencing coaches' ability to deliver educational and technical content to players, shedding light on ambiguities and truths in the field of coaching. Ultimately, this work contributes to enriching our understanding of modern sports training by analyzing these aspects in practical settings.

2. Defining Concepts and Terms:

2.1 Definition of Attitudes:

Several researchers have defined "attitude" in different ways, and we will present some of the most relevant ones.

Touré (2007,p137) defines attitude as a mental readiness that explains responses to situations linked with an individual's feelings, opinions, values, knowledge, and beliefs. Meanwhile, Thurstone defines it as "a general response of an individual toward a specific object, which includes a certain degree of positivity or negativity associated with the subject of the attitude" (Suleiman, 2005, p23).

-Operational Definition:

The researchers define attitudes operationally as a set of acquired dispositions that express the viewpoint or perspective of sports coaches toward a particular situation-in this case, artificial intelligence-and consequently judge it as either positive or negative.

2.2 Definition of a Coach:

A coach is an educational figure responsible for training and developing athletes, directly influencing their athletic performance. The coach plays a crucial role in shaping the players' personalities in a comprehensive and balanced manner. Therefore, the coach should serve as a role model in both behavior and knowledge. He represents a fundamental and essential factor in the training process. Providing teams with suitable coaches is one of the main challenges faced by players, decision-makers, and club managers alike (Al-Fatih & Al-Sayid, 2002, p 25).

-Operational Definition:

A coach is an individual responsible for managing a sports team, possessing the ability to influence others and characterized by a set of traits and qualities. In this study, the focus is specifically on coaches working with intermediate-level football teams.

2.3 Definition of Artificial Intelligence:

Arnaus (2007) defines artificial intelligence as "a branch of computer science concerned with intelligent computer systems—systems that possess characteristics related to intelligence, decision-making, and behaviors somewhat similar to human behavior in areas such as language, learning, reasoning, and problem-solving" (Arnaus, 2007, p9).

The ability of machines or computer programs to engage in advanced thinking when facing the most complex problems encountered by football coaches, and to provide effective solutions and suggestions (Daylam & all,2023,p485)

-Operational Definition:

Artificial intelligence refers to equipping machines and devices with human-like intelligence through the development of high-tech software and applications in sports training, which are then utilized optimally within sports clubs.

2.3.1 Characteristics of Artificial Intelligence:

Artificial intelligence possesses several key characteristics (An-Najjar, 2010, p169–170):

Solving problems with incomplete information

The ability to think and perceive

Acquiring and applying knowledge

Learning and understanding from past experiences

Applying previous experiences to new situations

Using trial and error to discover new things

Responding quickly to new situations and conditions

Handling complex and difficult cases

Dealing with ambiguous situations in the absence of information

Recognizing the relative importance of elements in presented situations

Providing information to support administrative decisions

2.4 Definition of Sports Training:

Sports training is one of the foundational sciences in physical education and sports. It has its own methods, techniques, and tools that distinguish it from other fields. At the same time, it draws upon various contributing disciplines such as physiology, biology, biomechanics, medicine, psychology, and nutrition (Hassanein



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& Ma'ani, 1998, p7).

Modern scientific sports training is defined as "the educational and developmental processes aimed at preparing athletes and sports teams through strategic planning and practical leadership, with the goal of achieving the highest possible level of performance in a specialized sport and maintaining it for the longest possible period" (Sharbat, 2018, p5).

-Operational Definition:

Modern sports training refers to a set of scientifically-based processes that significantly contribute to changes in athletes and assist coaches in their work.

3. Research Methodology

3.1 Research Approach:

This study adopts the descriptive-analytical method , which aims to explain phenomena as they exist in reality.

3.2 Research Population:

The research population consists of 70 intermediate-level football coaches from the provinces of Bordj Bou Arreridj and Sétif.

3.3 Sample of the Study:

The sample included 30 intermediate-level football coaches selected intentionally from the provinces of Bordj Bou Arreridj and Sétif.

3.4 Data Collection Tools:

The researchers relied on a questionnaire following a preliminary pilot study, as they found it to be the most suitable instrument for data collection in this context.

The questionnaire is divided into three sections:

Section 1: Personal Information – including age, academic qualification, and years of experience (3 items).

Section 2: Positive Attitudes – consisting of 6 statements.

Section 3: Negative Attitudes – consisting of 5 statements.

3.5 Psychometric Properties of the Instrument

3.5.1 Validity of the Tool:

A. Face Validity:

The researchers submitted the initial version of the questionnaire to a group of experts in the field of scientific research and relevant disciplines to assess its clarity, relevance, and appropriateness for measuring the intended constructs.

B. Construct Validity (Internal Consistency):

the correlation coefficients between each item in the “Positive & Negative Attitudes Toward AI” section and the total score. The correlation coefficients ranged from 0.763 to 0.960, which are statistically significant at the 0.01 and 0.05 levels, indicating that the items are valid for measuring the intended construct.

3.5.2 Reliability of the Instrument:

Cronbach’s Alpha Coefficient:

The researchers used Cronbach's alpha to assess the reliability of the questionnaire. The coefficient for the Football Coaches’ Attitudes Toward Artificial Intelligence (AI) section was notably high, ranging from 0.939 to 0.942. This reflects a strong level of internal consistency and reliability, confirming that the questionnaire was suitable for distribution. Furthermore, this allowed the researchers to ensure both the validity and reliability of the research tool, giving them confidence in the accuracy of the study’s findings.

3.6.2 Field Application Procedures:

-Geographic Scope:

The study was conducted among intermediate-level football coaches from the provinces of Bordj Bou Arreridj and Sétif , involving a total of 30 participants.

- Time Frame:

- The research began in May 2024 .
- The preparation of the questionnaire started in June 2024 .
- The questionnaire was distributed between June 3, 2024, and May 17, 2024 (note: there seems to be an inconsistency in the original dates; it is likely meant to be June 3–17, 2024).
- Data analysis and sorting were carried out from June 19, 2021, to July 10, 2021 .

3.6.7 Statistical Methods Used:

The researchers used the SPSS software package (Version 24– Statistical Package for the Social Sciences) and applied the following statistical techniques:

- Percentages and frequencies to describe the sample
- Standard deviation to measure variability and consistency
- Arithmetic mean
- Cronbach’s Alpha coefficient to assess the reliability of the questionnaire items
- Pearson correlation coefficient to examine relationships between variables

4. Results:

4.1 Presentation and Discussion of Study Findings

4.1.1 Answering the First Research Question:

Do football coaches hold positive attitudes toward artificial intelligence in the context of modern sports training?



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To answer this question, the researchers used the arithmetic mean , standard deviation , frequencies , and percentages .

Table 1. Football Coaches' Positive Attitudes Toward Artificial Intelligence in Modern Sports Training

N	Statements	mean	S.T.D	Rank
01	The sports club currently needs AI technology	4.38	1.00	01
02	AI enables the club to achieve better results	4.24	1.00	02
03	AI helps in solving various problems encountered during the training process	3.20	1.05	03
04	AI technology helps coaches save time	3.19	0.56	04
05	AI reduces effort for coaches	2.27	1.09	05
06	Implementing AI technology requires significant financial investment	3.20	1.05	03
All axis paragraphs		3.41	0.95	

Source: Based on SPSS Version 24 outputs

The table shows that the arithmetic mean scores for the respondents' positive attitudes toward AI ranged from 2.27 to 4.38 , with standard deviations ranging from 0.56 to 1.09 .

Based on frequency distributions, percentages, ranking of means, and standard deviations, the following conclusions were drawn:

First Rank: Statement 1: "The sports club currently needs AI technology" received the highest mean score of 4.38 with a standard deviation of 1.00 , indicating that sports clubs today require AI to keep pace with technological advancements.

Second Rank: Statement 2: "AI enables the club to achieve better results" scored a mean of 4.24 with a standard deviation of 1.00 , showing that AI contributes significantly to improving club performance through strategic planning and applications.

Third Rank: Statements 3 and 6 ("AI helps in solving various problems encountered during the training process" and "Implementing AI technology requires significant financial investment") both had a mean of 3.20 with a standard deviation of 1.05 , suggesting that AI plays a major role in problem-solving during training processes.

Fourth Rank: Statement 4: "AI technology helps coaches save time" had a mean

of 3.19 with a standard deviation of 0.56 , indicating that AI effectively saves time and relieves pressure on coaches.

Fifth Rank: Statement 5: "AI reduces effort for coaches" recorded the lowest mean of 2.27 with a standard deviation of 1.09 , implying that AI somewhat reduces physical and mental strain on coaches during training planning.

Overall Mean: The overall mean score for all positive attitude statements was 3.41 with a standard deviation of 0.95 , which is relatively high. Therefore, it can be concluded that football coaches generally hold positive attitudes toward artificial intelligence in the context of modern sports training.

4.1.2 Answering the Second Research Question:

Do football coaches hold negative attitudes toward artificial intelligence in the context of modern sports training?

To answer this, the researchers also used the arithmetic mean , standard deviation , frequencies , and percentages .

Table 2. Football Coaches' Negative Attitudes Toward Artificial Intelligence in Modern Sports Training

N	Statements	mean	S.T.D	Rank
01	AI costs the club a lot of money in the training process	3.16	1.00	02
02	AI creates unemployment among coaches	3.10	1.00	03
03	AI is currently superior to human intelligence among coaches	2.05	1.00	04
04	Sports clubs are not keeping up with these technological developments	4.20	1.06	01
05	AI is not well understood by many coaches	3.10	1.00	03
All axis paragraphs		3.12	1.01	

Source: Based on SPSS Version 24 outputs

The table indicates that the mean scores for negative attitudes toward AI ranged from 2.05 to 4.20 , with standard deviations ranging from 1.00 to 1.06 . Based on frequency distributions, percentages, ranking of means, and standard deviations, the following observations were made:

The fourth statement, "The sports club does not keep pace with these technological developments,"ranked first with an arithmetic mean of 4.20 and a standard deviation of 1.06 . This suggests that sports clubs in Algeria are not keeping up with modern technological advancements such as artificial intelligence. Clear evidence of this is the absence of VAR (Video Assistant Referee) technology in all Algerian



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stadiums.

The first statement, "Artificial intelligence costs the club a lot of money in the training process," ranked second, with an arithmetic mean of 3.16 and a standard deviation of 1.00. This may be attributed to the financial constraints faced by many sports clubs, making it currently unfeasible to adopt AI technologies in Algerian stadiums.

Tied for third place were the second statement, "Artificial intelligence creates unemployment for coaches," and the fifth statement, "Artificial intelligence is not understood by many coaches," both with an arithmetic mean of 3.10 and a standard deviation of 1.00. These results suggest that the introduction of artificial intelligence in sports clubs could lead to job losses among coaches, as AI systems include software and tools that may replace human coaching roles. Moreover, it appears that many coaches lack a clear understanding of artificial intelligence.

The third statement, "Artificial intelligence is currently better than human intelligence for coaches," ranked fourth, with an arithmetic mean of 2.05 and a standard deviation of 1.00. This indicates that coaches believe artificial intelligence is not superior to human intelligence. After all, human intelligence is responsible for creating machines and developing the programs and technologies they use.

The overall arithmetic mean for all statements related to coaches' negative attitudes toward artificial intelligence was 3.12, with a standard deviation of 1.01.

5. Discussion

First Hypothesis: Football Coaches Hold Positive Attitudes Toward Artificial Intelligence in the Context of Modern Sports Training

The overall mean score for the statements measuring coaches' positive attitudes toward artificial intelligence was 3.41 with a standard deviation of 0.84, which indicates a relatively high level of agreement. Based on this result, it can be concluded that football coaches demonstrate positive attitudes toward artificial intelligence within the framework of modern sports training. Therefore, we confirm the validity of our first hypothesis.

This finding is consistent with Mazari (2024) study, which highlights that artificial intelligence is no longer just a futuristic concept in football; rather, it has become an active player on the field, driving transformative changes in training methodologies, talent identification, and even tactical decision-making processes.

Second Hypothesis: Football Coaches Hold Negative Attitudes Toward Artificial Intelligence in the Context of Modern Sports Training

Regarding the second hypothesis, the overall mean score for the statements measuring coaches' negative attitudes toward artificial intelligence was 3.12 with a standard deviation of 0.80 , indicating a moderate level of negative perception. This suggests that while some reservations exist among coaches regarding AI integration, these attitudes are not as pronounced as their positive views.

6. CONCLUSION

Based on the findings presented above, the following conclusions were drawn: Football coaches demonstrate positive attitudes toward artificial intelligence in the context of modern sports training, with an overall mean score of 3.41 and a standard deviation

- The overall arithmetic mean for all statements related to coaches' negative attitudes toward artificial intelligence was 3.12 , with a standard deviation of 1.01 .

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