

The role of artificial intelligence in developing the strategies of training on sport and physical education

دور الذكاء الاصطناعي في تطوير استراتيجيات التكوين والتدريب في تخصص التربية البدنية والرياضية

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Abstract

This study attempts to understand how artificial intelligence (AI) contributes to developing training methods in physical education and sports institutes. The descriptive method and questionnaires were used on a random sample of thirty male and female teachers. Percentages and percentages were used to analyze and interpret the data. The findings indicate that the trainers of the Institute of Physical and Sports Education at the University of Aghouat benefit from the use of artificial intelligence in developing training methods in physical and sports education institutes. Translated with DeepL.com (free version)

Keywords: artificial intelligence; strategies of training; Institute of Sport and Physical Education.

المخلص:

هدفت هذه الدراسة إلى معرفة دور الذكاء الاصطناعي في تطوير استراتيجيات التكوين والتدريب في معاهد التربية البدنية والرياضية، حيث أجريت الدراسة على عينة قصدية وشملت (40) أستاذ وأستاذة، ولتحقيق أهداف الدراسة تم استخدام المنهج الوصفي من خلال توزيع استمارات الاستبيان على أفراد العينة، وتحليل وتفسير النتائج تم الاعتماد على النسبة المئوية واختبار كا2.

ومن أهم النتائج التي تم الوصول إليها وهي: أن للذكاء الاصطناعي دور مهم في مساعدة الأساتذة في تحسين وتطوير استراتيجيات التكوين والتدريب في معهد التربية البدنية والرياضية لجامعة الأغواط.

- الكلمات المفتاحية: الذكاء الاصطناعي، استراتيجيات التكوين والتدريب، معهد التربية البدنية والرياضية.

1. Introduction and problematic of the study:

Currently, the world is witnessing a huge development in the digital technologies, which turned into a cornerstone in many fields, including training and education. In this regard, the artificial intelligence AI is one of the techniques that paved the way for new unprecedented horizons to improve performance and develop innovative strategies in teaching and education. It is not limited to analyzing data, as it can even design innovative solutions that mimic the human thinking, This makes it an effective way to improve both the educational and athletic process.

Sport and physical education is one of the fields where AI plays a vital role thanks to its techniques that improve the training and education methods, develop plans, and provide exact and efficient feedback. For instance, AI applications can analyze the physical movements and identify the mistakes, allowing the athletes and coaches to redress the performance and achieve high efficiency levels. Besides, they can predict the physical injuries through analyzing the body movements and physical efforts; this contributes to protecting the athletes and decreasing the risks.

Despite its big advantages, the use of AI in the educational institutions, mainly in the sport and physical education institutes faces different challenges, such as the low awareness about its importance and role in improving training, the weak infrastructure needed, and the high costs of its applications. Nevertheless, these challenges do not undermine the need to integrate AI in

sport education and training in the higher education institutes (Jones & Smith, 2021, p. 12).

In this context, the sport and physical education institute in the University of Laghouat is a good example to study this topic, and is a fertile ground to study the role of AI in developing the strategies of training and education through focusing on the opportunities that can be invested and the challenges that must be overcome. The University of Laghouat is one of the pioneering institutes in Algeria, as it gathers the academic and sport competencies, making it the suitable place to analyze the role of AI in improving the outputs of sport training and education (Ahmed & El-Khatib, 2022, p. 25).

We found different studies that tackled this question. For example, Mann's (2018) study examines how AI might enhance sport-training methods by analyzing players' physical performance using machine-learning approaches. It found out that AI can design training programs based on the individual performance data; what fosters the efficiency of training and improves the sport results. Besides, the study of Bishop et al. (2020) on the use of AI to prevent the sport injuries through analyzing the movements and predicting the injuries revealed that AI can predict the potential injuries based on the physical movements patterns, and that it helps provide training recommendations to reduce the potential injuries and improve the general performance of the athletes.

Based on what was said, the importance of this emerges, as it aims at finding out the methods of using AI in developing techniques for training at the University of Laghouat- Institute of Sport and Physical Education. In this regard,

we find ourselves obliged to grapple with this questions, “do AI techniques help improve training in the field of sport and physical education?”

2. The general hypothesis:

AI techniques positively contribute to improving training on sport and physical education.

3. Aims of the study:

1. Analyzing the effect of AI on improving the strategies of training on sport and physical education.
2. Discovering the use of AI applications in designing specialized training programs.
3. Identifying the challenges that face the application of AI in the institute of sport and physical education.
4. Suggesting practical solutions to improve the application of AI in the institute of sport and physical education.

4. Importance of the study:

This study sheds light on the increasing role of AI in improving the strategies of training, as it helps design specialized training programs that suit the needs of every athlete, increases the efficiency of the performance, achieves better results, fosters the academic and sport skills, and provides more chances of interacting with the modern techniques and coping with the world sport developments. Besides, the study explores the potentials of designing educational programs and achieving a sustainable development of sport and physical education programs to continuously improve their quality. Moreover, it fosters the practical

comprehension of technology in the academic institutions and provides practical solutions to the local challenges that face the institute of sport and physical education in its path to use AI.

5. Identifying the terms and concepts:

5.1 AI:

It is one of computer sciences branches that aims at creating machines and systems that can mimic the human mental abilities, such as education, thinking, analysis, and decision making through algorithms that empower the machines to process data, acquire knowledge, and improve performance based on experience (Russel & Norvig, 2016, p. 25).

5.2 The Institute of Sport and Physical Education:

It is an educational institution that provides specialized academic and training programs in sport and physical education. It aims at training executives specialized in sports and the physical activities management through educational programs that gather the theoretical and practical sides to improve the physical and educational skills of the students.

6. Methodology:

6.1 The pilot study:

The scientific researches with their different types need a scientific methodology to reach the goals, yield new important information, and reveal truths. In our study, we used the pilot study to explore the role of AI in developing training strategies in the sport and physical education institutes. We faced some difficulties, mainly in data collection, because the informants were

busy and have different experiences. However, the questionnaire's utilization and the cooperative effort aided the data collection procedure.

6.2 Method of the study:

We relied on the descriptive method to collect and analyze data on the role of AI in improving the strategies of training on sport and physical education. This method provides exact description of the phenomena as they are in reality without intervention in the affecting factors. It requires collecting the relevant data and analyzing them in detail to reach exact results that reveal the reality of applying AI techniques in this field.

6.3 The study population:

It covers the teachers of the institute of sport and physical education in the University of Laghouat.

6.4 Sample of the study:

It comprises the thirty instructors at the University of Laghouat's Institute of Sport and Physical Education. They have been chosen on purpose.

6.5 Data collection tools:

After studying the topic, reviewing the literature, and consulting specialists, we decided that the questionnaire is the suitable tool as it saves time and effort.

6.6 The scientific conditions of the tools

In this study, we used the face validity, as we made a primary questionnaire of 20 items and presented it to a group of teachers specialized in sport and physical education to evaluate each item and decide whether it measures what is needed.

- **The tool consistency:**

Table No°1: the coefficient of consistency

Scope	Items	Cronbach's Alpha
Axis	12	0.615

Source: by the authors based on the outputs of SPSS

Table 01 shows that Cronbach's Alpha for the axes of the tool is 0.615, which is high and shows the high consistency. Thus, we can trust the tool in testing the study hypotheses.

The intrinsic validity:

It is measured using this equation:

The quadratic root of the consistency coefficient

$$r = \sqrt{0,615} = 0,784$$

Thus, the validity coefficient is 0.784 and is statistically significant. Therefore, the questionnaire has a high degree of validity and can be applied on the study sample.

6.9 Procedures of the field study:

After adjusting the questionnaire, we executed the practical part of the study and administered the questionnaire hand-to-hand to the 30 informants to collect their views regarding the content of the questionnaire during 01 September and 01 December.

The statistical methods:

SPSS

Cronbach's alpha

The percentages

Chi-square

7. Presentation and analysis of the results:

Table No°2: The statistical processes

Items	Answers	Percentage	Answers	Percentage	Calculated Chi ²	Table Chi ²	Degree of freedom	Significance level
01	Yes	73.3	No	26.7	6.533	3.841	01	0.05
02	Yes	93.3	No	6.7	22.533	3.841	01	0.05
03	Yes	95	No	05	22.533	3.841	01	0.05
04	Yes	73.3	No	26.7	6.533	3.841	01	0.05
05	Yes	43.3	No	56.7	0.533	3.841	01	0.05
06	Yes	93.3	No	6.7	22.533	3.841	01	0.05
07	Yes	46.7	No	53.3	0.133	3.841	01	0.05
08	Yes	26.7	No	73.3	6.533	3.841	01	0.05
09	Yes	86.7	No	13.3	16.133	3.841	01	0.05
10	Yes	83.3	No	16.7	13.333	3.841	01	0.05

11	Yes	60	No	40	1.200	3.841	01	0.05
12	Yes	96.7	No	3.3	26.133	3.841	01	0.05

Source: by the authors based on the outputs of SPSS

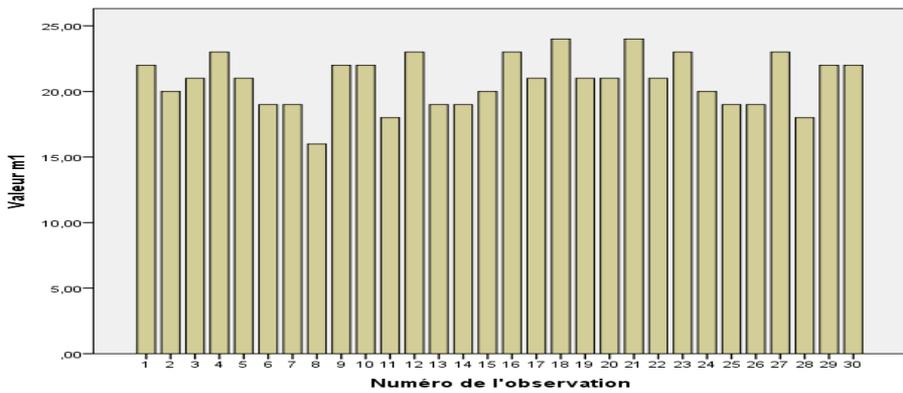


Figure 01: Graph showing the answers in percentages

The study shows that 73.3% of the informants have used AI techniques in training, reflecting a wide use of these techniques in the field. On the other hand, 26.7% said they did not, indicating challenges or lack of resources or awareness. In this regard, the statistical significance (calculated χ^2 6.533) shows the importance of this result. Besides, 93.3% believe that AI can help the students improve their performance, what reflects a wide knowledge about its role in improving skills. The statistical significance (calculated χ^2 22.533) supports this orientation. Furthermore, 95% see that AI can help adapt the training programs to the students' needs, showing the ability of these techniques to

support self-learning, as confirmed by the high significance level (calculated Chi^2 22.533).

Regarding interaction between the students and the teachers, 73.3% see that AI can improve it, reflecting the potential of fostering the learning experience. The statistical significance supports this conclusion (calculated Chi^2 6.533). For the analysis of the students' performance during training, a small rate (43.3%) of the informants use AI while the rest do not, showing the need to raise awareness or provide better resources. The statistical significance (calculated Chi^2 0.533) was not sufficient to confirm the difference. As for the improvement of physical exercises plans, 93.3% confirmed that AI helps improve planning, as supported by the high statistical significance (calculated Chi^2 22.533).

As for the exact and objective evaluation, 46.7% told that AI is efficient, reflecting a variance in the trends and a lack of practical applications. The statistical significance (calculated Chi^2 0.133) was not sufficient to confirm the difference. Concerning the identification of the common mistakes, 26.7% use AI for this purpose, indicating a weak application of this technique in the field. The statistical significance (calculated Chi^2 6.533) confirmed the importance of this gap.

Regarding the monitoring of the student's advance, 86.7% see that AI facilitates the process, reflecting a strong comprehension of the importance of the technique. The statistical significance (calculated Chi^2 16.133) supports this trend. For the improvement of the feedback, 83.3% confirmed the ability of AI thanks to efficient exact responses. The statistical significance (calculated Chi^2 13.333) supports this finding. In addition, 60% pointed to the role of AI in adapting the physical activities to the students' needs, while 40% did not. The

statistical significance (calculated Chi^2 1.200) was not sufficient to support the difference.

Finally, 96.7% see that AI can improve the design of training programs meant for students, reflecting a strong agreement on the importance of this technique in improving education and training. The statistical significance (calculated Chi^2 26.133) support

7. 1. Conclusions and suggestions:

Our findings show agreement with the previous studies regarding the role of AI in improving training, as we found out its importance in adapting the training programs and developing more efficient educational strategies. In addition, the informants confirmed the role of AI in fostering interaction between the students and teachers, and in improving feedback. This study agrees with that of Mann (2018) that showed how AI techniques, such as Machine Learning, can analyze the physical performance to design individual training programs that improve the results. Besides, the study of Lopez et al. (2022) confirmed that AI helps analyze data in an exact way to develop training plans that suit the needs of each athlete separately.

In addition, the study of Bishop et al. (2020) proved the potential of using AI to prevent sport injuries through analyzing the movements and predicting the risks. This supports the role of AI in improving the training strategies and ensuring the safety of athletes. Based on this, the findings of this study show a wide agreement with the previous literature, confirming the ability of AI to support self-learning, improve performance, and foster monitoring and evaluation in sport training.

8. The main recommendations:

1. Fostering the use of AI techniques in the educational institutions:

- Directing the efforts towards providing the necessary materials to apply AI in training through developing the digital infrastructure and providing the suitable training programs.

2. Training educational executives on using AI:

- Holding workshops and training sessions for teachers to equip them with the necessary skills and knowledge to use the modern techniques in education and training.

3. Designing specialized training programs:

- Relying on AI to develop individual training plans that satisfy the athlete students' needs and consider their potentials and abilities.

4. Encouraging scientific research on AI and physical education:

- Supporting the researchers in making in-depth studies on the practical applications of AI to improve the quality of sport education and training.

5. Raising awareness about the role of AI:

- Spreading awareness among students and teachers about the advantages of AI in improving the sport and academic performance through seminars and conferences.

6. Making specialized electronic platforms:

- Establishing electronic platforms that integrate AI techniques and the training materials to facilitate the educational process and foster the learner's experience.

7. Developing smart evaluation tools:

- Using AI in designing exact and objective evaluation tools to analyze the students' performance and identify their strengths and weaknesses.

8. Making partnerships with specialized technical institutions:

- Collaborating with technical companies to develop innovative tools and applications that support the modern training methods in the physical education.

9. Integrating AI in the educational curricula:

- Integrating educational materials on AI in the academic programs to qualify the teachers and students for a better understanding of the techniques.

10. Continuously evaluating the AI applications:

- Monitoring the performance of the systems and techniques used in training to ensure the achievement and development of the goals.

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