

**THE EFFECT OF USING EDUCATIONAL TECHNOLOGY APPLICATIONS IN
PHYSICAL AND SPORTS EDUCATION ON IMPROVING MOTOR LEARNING
FROM THE TEACHERS' PERSPECTIVE (A FIELD STUDY IN MIDDLE
SCHOOLS OF M'SILA PROVINCE, ALGERIA)**

Habib Ali

a.habib@univ-soukahras.dz <https://orcid.org/0009-0008-4644-3305>

University of Souk Ahras

Smara Mohamed

m.smara@univ-soukahras.dz <https://orcid.org/0009-0006-7093-0512>

University of Souk Ahras

Received: 09-01-2026 Accepted: 06-06-2026 Published:09-06-2026

Abstract:

The study aims to examine the role of educational technology applications in enhancing motor learning among physical education students. It adopted the descriptive-analytical method, and a questionnaire was administered to middle school physical education teachers in M'sila Province (175 teachers). The validity and reliability of the instrument were verified using appropriate statistical techniques, such as Cronbach's Alpha and Pearson correlation.

The results showed that the use of technology in teaching ranges from a moderate to a high level. They also revealed a strong and statistically significant positive relationship between the use of technology and the improvement of motor learning. The study confirmed that technological applications contribute to improving learners' acquisition of motor skills.

Key Terms: Educational Technology, Educational Technology Applications, Motor Learning, Physical and Sports Education.

1- Research Problem:

Nations continuously strive to develop their societies in order to keep pace with the rapid and successive global advancements associated with modern civilization, progress, and development. Achieving this objective is largely dependent on science and its technological applications, as technology represents the practical implementation of scientific knowledge. Consequently, transferring and adapting technology to address societal issues within the contemporary social and cultural framework has become an essential requirement, particularly in the field of education. Education is now considered a fundamental pillar for countries aspiring to attain an influential position among developed nations in the era of globalization.

Today's world is characterized by the information age and the communication revolution, which have led to the emergence of innovative educational devices and instructional materials capable of generating substantial improvements in the teaching and learning process. Educational development does not necessarily imply the mere addition of new subjects, programs, tools, or equipment; rather, it depends on the optimal utilization of modern technological innovations and the possibilities offered by educational technology in order to create positive educational outcomes among learners. Advanced and multimedia

instructional technologies are considered products of developments in communication and computer technologies. They constitute modern technological innovations that enable the production of various educational programs, allowing learners flexibility in organizing and managing information according to their individual needs and abilities (Hussein Ibrahim Ali, 2007, pp. 2–3).

Furthermore, the application of technology in education has received considerable attention and has developed rapidly in recent years. There has been significant growth in the integration of these technologies into different learning systems, with many schools, universities, and educational institutions adopting them to improve learning outcomes (Forouz Boroujmand Langroudi, Anne Nguyen, & David Chen, 2015, p. 199).

The educational field has also become characterized by numerous concepts and perspectives whose use has become indispensable in both teaching and learning processes. This evolution is largely attributed to the technological revolution, which has substantially contributed to enhancing educational practices (Sonia Qasimi, 2019, p. 399).

The success of educational institutions in the information age primarily depends on their ability to achieve a qualitative transformation in teacher preparation and professional development, while also overcoming teachers' apprehension toward technology. This is essential to enable educators to effectively interact with younger generations who have become highly accustomed to technological environments (Jinan Sadiq Abdul Razzaq, 2018, p. 1714).

Despite these developments, the integration of educational technology into physical education raises several challenges related to material and human resources, as well as the effectiveness of these technological tools in achieving educational objectives, improving students' motor learning, and enhancing their practical implementation during physical education classes. Accordingly, the researchers raise the following research question:

2-1 General Research Question:

What is the role of using educational technology applications in improving the motor learning of sports skills from the perspective of physical education teachers?

Sub-Questions :

1. To what extent do physical education teachers use educational technology applications in teaching motor skills?
2. What is the impact of educational technology applications on students' acquisition and mastery of motor skills?

2- General Hypothesis:

The use of educational technology applications has a positive and effective impact on improving motor learning among learners from the perspective of teachers.

Sub-Hypotheses :

1. Physical education teachers use educational technology applications at a moderate to high level in teaching motor skills.
2. There is a statistically significant positive relationship between the use of educational technology applications and the improvement of motor learning of sports skills.

3- Study Objectives:

3-1 General Objective:

To identify the role of educational technology applications in improving the motor learning of sports skills from the perspective of physical education teachers.

3-2 Specific Objectives :

1. To determine the extent to which middle school physical education teachers use educational technology applications in teaching motor skills.
2. To examine the relationship between the use of educational technology applications in middle school education and the improvement of learners' motor learning of sports skills from the teachers' perspective.

4- Significance of the Study:

The study of the role of educational technology applications in enhancing motor learning is considered an important topic within the fields of physical education, movement sciences, and sports training. Its significance lies in its contribution to the development of teaching and training methods in line with modern technological advancements, thereby facilitating the achievement of educational objectives more effectively and efficiently.

4-1 Definition of Educational Technology:

The term *educational technology* encompasses two principal concepts: *technology* and *education*. The word *technology* is of Greek origin and is derived from two components: *techne*, meaning art or skill, and *logos*, meaning study or science. It is also associated with the Latin term *texere*, meaning construction or weaving (Mahmoud Al-Haila, 2014, p. 21).

4-2 Educational Technology Applications:

Educational technology applications refer to all modern and innovative instructional devices, educational materials, operational theories, and methods of design, production, and implementation used to support the educational system. They also include every technological innovation that can be effectively and positively integrated into the teaching-learning process with the aim of enhancing learners' ability to learn more efficiently during educational activities (Halima بنت Mohammed, 2020, p. 73).

4-3 Operational Definition:

Operationally, educational technology applications are defined as a set of modern tools, devices, and technological techniques used during physical education classes to facilitate the teaching of motor skills and improve learners' physical and motor performance. These applications involve the use of digital devices, instructional videos, interactive software, motion analysis technologies, and similar educational resources.

4-4 Motor Learning:

Motor learning is defined as the process of change in a learner's motor behavior resulting primarily from actual practice and performance. Such changes are not attributed to temporary conditions such as fatigue, maturation, the use of stimulants, or other short-term factors influencing motor behavior.

It is also described as a set of processes associated with training and experience that lead to relatively permanent changes in an individual's capability to perform motor skills (Wissam Salah & Samer Youssef, 2014, p. 22).

Operational Definition:

Operationally, motor learning refers to the process through which learners acquire and develop motor skills through practice and systematic training under the supervision of a specialized teacher or coach.

4-5 Physical and Sports Education:

According to Butcher, physical education is an integral part of general education that aims to develop well-rounded citizens physically, psychologically, and socially through carefully selected physical activities designed to achieve these educational outcomes (Ben El-Shine Ahmed, 2016, p. 196).

Operational Definition:

Operationally, physical and sports education refers to all programmed physical and sports activities in which learners participate during physical education classes, aiming to improve physical fitness, acquire motor skills, and develop learners' educational and social behaviors.

5- Previous Studies:

5-1 Study of Youssef Fertas et al.

“The Reality of Using Educational Technology in Teaching Physical Education Classes from the Perspective of Secondary School Teachers in the Setif”

This study aimed to identify the reality of using educational technology in teaching physical education classes from the perspective of secondary school teachers in Sétif Province. The researchers adopted the descriptive-analytical approach due to its suitability to the nature of the study. The sample consisted of 30 teachers selected through simple random sampling. A questionnaire and interviews were employed as data collection tools, and the data were statistically processed using the software IBM SPSS Statistics version 25.

The findings revealed that the use of educational technology contributes to the development of sports skills, enhances students' cognitive abilities, and reduces the time and effort exerted during physical education classes. However, according to the teachers, the actual implementation of educational technology in the field remains limited because of insufficient resources and the lack of technological educational tools.

5-2 Study of Mohammed Qasim Jamil (2024).

“The Effect of Smartphone Sports Applications Technology on Learning Some Basic Football Skills”

The study aimed to examine the effect of smartphone sports applications on learning certain basic football skills among first-year middle school students during the 2022/2023 academic year. The researcher employed an experimental design using a single-group approach on a sample of 24 students.

Following the pre-tests, an electronic application containing skill-based exercises—such as ball control, dribbling, and shooting—was implemented within 16 instructional units, conducted twice a week, with each session lasting 40 minutes. Post-tests were then administered.

The researcher concluded that smartphone sports applications play a significant role in developing the variables investigated in the study. Accordingly, it was recommended that sports applications involving skill-oriented exercises compatible with curricular objectives,

particularly in football, should be integrated due to their positive effects on students' psychological and skill-related development.

5-3 Study of Florian Jastrow et al. (2022).

“Potential and Limitations of Digital Media in Physical Education”

This study aimed to analyze research related to the use of digital technology in physical education between 2009 and 2020. The researchers adopted a systematic review methodology.

The results demonstrated that digital technologies—such as interactive media and wearable devices—contribute to improving students' motivation and skill performance. They also have a positive impact on cognitive and social aspects. Nevertheless, one of the major challenges identified was the insufficient preparation of teachers for effectively dealing with educational technologies.

5-4 Study of Alexandra Rodriguez and Ruben Madrigal (2025).

“Technology-Supported Education in Physical Education”

This study examined the impact of using technology in physical education, including virtual reality, artificial intelligence, and gamification techniques.

The findings highlighted several positive outcomes, including:

- Improving student engagement;
- Developing self-learning and self-regulation skills;
- Enhancing the acquisition of motor skills.

The study also emphasized the necessity of designing appropriate instructional strategies to ensure the effective integration of these technologies in physical education contexts.

6- Pilot Study:

The researchers conducted field visits to several middle schools in M'Sila Province with the aim of identifying the study environment and assessing teachers' awareness of the concept of educational technology and its importance in physical and sports education. The pilot study also aimed to examine the validity and reliability of the study questionnaire.

7- Research Methodology:

The study adopted the descriptive method due to its suitability to the nature and objectives of the research topic.

8- Population and Sample of the Study:

The study population consisted of middle school physical education teachers in M'Sila Province, totaling 380 teachers. The pilot sample included 30 teachers, while the main sample consisted of 175 teachers, representing 50% of the study population. The participants were selected using simple random sampling after excluding the pilot study participants.

Following the administration of the questionnaire to the pilot sample and the calculation of the instrument's validity and reliability, the researchers applied the final version of the questionnaire to the remaining study sample.

8-1 Study Delimitations:

The study was conducted during the 2025/2026 academic year in several middle schools located in M'Sila Province.

8-2 Study Instruments:

The study instrument consisted of a questionnaire designed by the researchers. It included two main dimensions:

- A dimension related to the use of educational technology applications;
- A dimension related to motor learning.

Each dimension comprised 10 items, resulting in a total of 20 questionnaire items.

9- Validity and Reliability of the Questionnaire:

9-1 Validity:

Expert Validity:

The questionnaire was submitted to seven specialized university professors in order to evaluate the appropriateness of the questionnaire items and dimensions and to determine their relevance to the objectives of the study.

Internal Consistency Validity:

Pearson's correlation coefficient was calculated between the score of each dimension and the total score of the questionnaire.

Table (1): Pearson Correlation Coefficients for Internal Consistency

Dimension	Correlation Coefficient with Total Score	Sig
Use of Technology Applications	0.88	0.000
Improvement of Motor Learning	0.84	0.000

The results indicate that all correlation coefficients between the questionnaire dimensions and the total score were high and statistically significant ($p < 0.05$), ranging from 0.84 to 0.88.

These findings suggest that the questionnaire items consistently measure the same overall construct, indicating good internal consistency among the dimensions.

Accordingly, the questionnaire demonstrated a high level of internal validity, meaning that its items are coherent, interrelated, and capable of measuring the intended concept in a systematic manner.

Construct Validity :

Table (2): Construct Validity Correlation Coefficients

Relationship	Pearson Correlation (r)	Significance
Technology Use Dimension $\times$ Total Score	0.91	Significant at 0.01
Motor Learning Improvement Dimension $\times$ Total Score	0.93	Significant at 0.01
First Dimension $\times$ Second Dimension	0.76	Significant at 0.01

The results presented in the table reveal strong positive correlations between the questionnaire dimensions and the total score, with correlation coefficients ranging from 0.76 to 0.93. All coefficients were statistically significant at the 0.01 level.

The correlation between the technology use dimension and the total score was particularly high ($r = 0.91$), indicating that this dimension represents a fundamental and influential component of the overall construct measured by the instrument.

Similarly, the motor learning improvement dimension recorded the highest correlation value ($r = 0.93$), reflecting its strong contribution to the overall concept assessed by the questionnaire.

Furthermore, the relationship between the two dimensions was also strong ($r = 0.76$), suggesting logical coherence and conceptual consistency between them within the same theoretical framework of the study.

9-2 Reliability:

Internal Reliability of the Questionnaire (Reliability Analysis)

Table (3): Cronbach's Alpha Coefficients

Dimension	Number of Items	Cronbach's Alpha	Interpretation
Use of Technology Applications	10	0.87	Very Good Reliability
Improvement of Motor Learning	10	0.89	Very Good Reliability
Questionnaire as a Whole	20	0.93	Excellent Reliability

The high Cronbach's Alpha coefficients indicate that the instrument possesses a high degree of internal consistency, as all values exceeded the internationally accepted threshold of 0.70. This confirms that the questionnaire is sufficiently reliable to be confidently used in the main study.

Split-Half Reliability

Table (4): Split-Half Reliability Coefficients

Indicator	Value
Spearman-Brown	0.91
Guttman Split-Half	0.90

The results confirm that the questionnaire maintains a high level of stability when divided into two halves, which further supports the structural reliability of the instrument.

10- Presentation and Analysis of Results

10-1 First Sub-Hypothesis

“Physical education teachers use educational technology applications at a moderate to high level in teaching motor skills.”

Table (5): Results of the One-Sample T-Test

Indicator	Arithmetic Mean	Hypothetical Mean	Standard Deviation	Standard Error	t-value	Sig	Significance Level	Statistical Decision
Value	3.67	3	0.66	0.09	7.1	0.00	0.05	Statistically

					8	0		y Significan t
--	--	--	--	--	---	---	--	----------------------

The results indicate that the mean score for the use of educational technology applications reached 3.67, which is higher than the hypothetical mean of 3 representing the moderate level on the Likert scale.

The One-Sample T-Test showed that the obtained difference was statistically significant ($t = 7.18$), indicating that the use of technology is neither random nor weak, but rather exceeds the moderate level in a clear manner.

Accordingly, it can be concluded that physical education teachers tend to use educational technology applications at a level ranging from moderate to high, with a tendency toward a higher degree of usage.

This finding may be explained by several interrelated factors. First, the integration of technology into the educational process has become a necessity imposed by contemporary developments in the field of education. Second, digital applications assist physical education teachers in explaining motor skills and technical demonstrations more clearly and attractively. Moreover, the use of videos and simulation technologies contributes to improving students' understanding of correct sports movements.

In addition, smartphones and internet access have facilitated the use of educational platforms and various sports applications. Teacher training programs and professional development courses may also play a role in enhancing teachers' use of these technologies. Educational administrations, in many cases, encourage the integration of technological tools within classroom instruction.

Furthermore, the nature of physical education itself often requires visual and interactive methods, making technology an effective and supportive educational tool. Despite this relatively high level of usage, certain obstacles—such as limited resources and insufficient technological equipment—may prevent achieving a very high level of implementation.

Therefore, the moderate-to-high level of technology use reflects a growing awareness of the importance of educational technology, while also indicating the persistence of some practical and logistical challenges.

10-2 Second Sub-Hypothesis:

“There is a statistically significant positive relationship between the use of educational technology applications and the improvement of motor learning of sports skills.”

Table (6): Pearson Correlation Results

Variables	r	r ²	Sig	Significance Level	Statistical Decision
Use of Technology × Improvement of Motor Learning	0.756	0.572	0.000	0.05	Strong Positive Correlation

The results reveal a strong positive correlation between the use of educational technology applications and the improvement of motor learning, as the correlation coefficient reached ($r = 0.756$).

Moreover, the statistical significance value ($\text{Sig} = 0.000$) is lower than 0.05, indicating that the relationship is statistically significant rather than random.

In addition, the coefficient of determination ($r^2 = 0.572$) demonstrates that approximately 57.2% of the variation in motor learning improvement can be attributed to the use of educational technology.

These findings indicate that technology is not merely a supportive factor, but rather a direct and influential component in enhancing the quality of motor learning.

The results may be interpreted through several educational and scientific considerations. Technological applications provide accurate visual demonstrations of sports movements and motor skills, enabling learners to understand correct performance more easily. Educational videos and slow-motion replay also allow students to observe the details of motor performance with greater precision.

Interactive multimedia tools contribute to increasing students' motivation toward participation and learning, which positively affects the acquisition of motor skills. Furthermore, educational technology enables the provision of immediate feedback, allowing learners to identify and correct their mistakes quickly.

These applications also take into account individual differences among learners by enabling self-paced learning according to each student's abilities. In addition, they create an engaging educational environment that combines learning with enjoyment, thereby enhancing concentration and attention during motor activities.

From another perspective, technology assists teachers in diversifying teaching methods and presenting multiple motor performance models. Repetition and continuous observation through technological applications also contribute to consolidating motor skills and improving athletic performance.

Therefore, it can be concluded that educational technology has become an effective means for developing motor learning and enhancing learners' sports performance.

Accordingly, the general hypothesis of the study was confirmed, as the use of educational technology applications has a positive and effective impact on improving motor learning among learners from the teachers' perspective.

11- Suggestions and Recommendations :

- Conduct comparative studies between traditional teaching methods and technology-based instruction in the acquisition of motor skills.
- Expand research on the effects of smartphone applications, virtual reality, and augmented reality on learning various sports skills.
- Investigate the relationship between multimedia use and motivation levels among physical education students.
- Examine the effect of immediate electronic feedback on improving skill performance and reducing motor errors.

- Conduct studies across different age groups to identify differences in responsiveness to educational technology.
- Explore the impact of educational technology on developing creative thinking and decision-making during sports performance.
- Evaluate the effectiveness of e-learning and blended learning in physical education classes.
- Carry out research on the obstacles limiting the use of technology in physical education within educational institutions.
- Investigate the role of artificial intelligence and digital motion analysis in developing sports training and motor learning.
- Expand applied research linking modern technology with improvements in physical fitness and fundamental motor skills.

References :

1. Afrooz Purarjomandlangrudi, Anne Nguyen, & David Chen. (2015). State-of-the-Art of Recent Research on Educational Technologies: A Literature Survey Approach. *International Journal of Arts & Sciences*, 8(6), 199–206. VU Research Repository.
2. Alexandra Martín-Rodríguez, & Rubén Madrigal-Cerezo. (2025). Technology-Enhanced Pedagogy in Physical Education: Bridging Engagement, Learning, and Lifelong Activity. *Education Sciences*, 15(4), 409. <https://doi.org/10.3390/educsci15040409>
3. Ben El-Shine, Ahmed. (2016). Physical and Sports Education and Its Importance in Socialization. *Journal of Humanities and Social Sciences*, Issue 24.
4. Florian Jastrow, Sven Greve, Mareike Thumel, Henrik Diekhoff, & Johannes Süßenbach. (2022). Digital Technology in Physical Education: A Systematic Review of Research from 2009 to 2020. *German Journal of Exercise and Sport Research*, 52, 504–528.
5. Halima Bent Mohammed. (2020). Technological Innovations: Their Concept, Classification, and Methods of Integration into the Educational Process. *Academic Journal of Research and Scientific Publishing*, Issue 18.
6. Hussein Ibrahim Ali. (2007). The Effectiveness of Using Certain Educational Technology Methods on Learning Football Skills among Students of the Faculty of Physical Education in Zagazig (Unpublished doctoral dissertation). Faculty of Physical Education for Boys, Zagazig University, Egypt.
7. Jinan Sadiq Abdul Razzaq. (2018). Innovations in Educational Technology and Their Employment in the Educational Process. In the Ninth International Scientific Conference, Istanbul.
8. Maha Amin Ali, & Khaled Hussein Alwan. (n.d.). The Role of Sports Technological Applications in Teaching Motor Skills and Improving Training in Volleyball. *Journal of Islamic Sciences*, Issue 24.
9. Mohammed Mahmoud Al-Haila. (2014). Educational Technology between Theory and Practice (9th ed.). Amman: Dar Al-Masira.

10. Mohammed Qasim Jamil. (2024). The Effect of Smartphone Sports Applications Technology on Learning Some Basic Football Skills. *Journal of Studies and Research in Physical Education*. <https://doi.org/10.55998>
11. Samer Youssef. (2014). *Motor Learning and Its Applications in Physical and Sports Education*. Beirut, Lebanon: Dar Al-Kotob Al-Ilmiyah.
12. Sonia Qasimi. (2019). The Contribution of Educational Technology to Improving the Educational Process. *Journal of Humanities and Social Sciences*, Issue 52, 398–411.
13. Wissam Salah, & Samer Youssef. (2013). *Motor Learning and Its Applications in Physical and Sports Education*. Beirut, Lebanon: Dar Al-Kotob Al-Ilmiyah.
14. Youssef Fertas. (2024). The Reality of Using Educational Technology in Teaching Physical Education Classes from the Perspective of Secondary School Teachers in Sétif Province. *Journal of Physical Education and Sports*, Vol. 3, No. 1, 01–23.