

## **OPPORTUNITIES AND POSSIBILITIES FOR IMPLEMENTING INFORMATION TECHNOLOGIES IN PHYSICAL EDUCATION AND SPORT IN PRIMARY EDUCATION**

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### **Abstract**

With the evolution of technology, its applicability in various fields has brought significant benefits. It is not surprising that the field of physical education and sport has also progressed considerably thanks to technological innovations. The integration of these improvements within physical education has not only provided substantial benefits, but in some cases revolutionized this competitive sector. Influenced by technological, social and cultural changes, the field of education is facing a new dimension dominated by lifelong learning. For specialists in physical education and sport, this trend is also reflected in the need to improve their instructional-educational process. One modern alternative is the use of information technologies to increase the effectiveness of the teaching process.

### **Introduction**

In recent years, the integration of information technologies in various fields has become an essential element for modernizing and streamlining educational processes. The field of physical education and sport is no exception to this global trend. Information technologies offer numerous opportunities and possibilities that can transform the way physical education classes, sports training and competitions are conducted. Implementing these technologies can bring multiple benefits, from optimizing the teaching and learning process to improving the performance of students and athletes.

The problem of the effectiveness of physical education lessons, of the modernization of education in general, at all levels of education, is nowadays a

requirement of our contemporary society, being a topical concern in almost all countries of the world.

In order to reach an optimal level in the design and implementation of an educational activity, emphasis is placed on the way it is carried out and involves organizational, procedural and material issues.

Researchers Ardelean A. and Mândruț O. state that digital competence is built on essential skills such as using computers to obtain, copy, evaluate, store, produce, present and transmit information. It also includes the ability to participate and communicate effectively in work teams via the Internet or using other available technologies [1, p.33].

Digital competence, by its nature, is both interdisciplinary and transdisciplinary, facilitating integration and application across all school subjects. It serves as a methodological model for all school subjects and for various areas of social practice. Digital competence is also a component of competence for lifelong learning and is an essential methodological dimension of the school curriculum as a whole [1, p. 34].

The author, Balint Ghe. (2009), mentions Cerghit I., who believes that these modern techniques result from the association of certain information-bearing materials and special devices designed to enhance those materials. Their diversity, as well as the information supports they use, is further proof of the concern of educators to make the most of technical products in the school environment. Psychologists' observations show that if the educational material was presented orally only, 70% of it is retained after 3 hours and only 10% after 3 days; if it was presented visually only, of the 72% retained after 3 hours, 20% is retained after 3 days; if it was presented orally and visually, 85% of the data is retained after 3 hours and 65% after 3 days [2].

He believes that the modern means of education have a superior performance not only in the cognitive, demonstrative or evaluative direction, but especially in the area of cultivating feelings and motivation for learning. [2 p.144]

Other authors in the studied literature [2, 10, 18,] note the educational value of forms of instruction through information technologies and emphasize that the use of these means is a way to increase the effectiveness of the instructional-educational process in physical education and sport.

The attention of specialists in the field of physical education and sport should be directed to finding new ways to increase the effectiveness of physical education lessons, as well as to educate students in the spirit of effective and affective participation in lessons [16, 18].

The audio-visual media, TV, Internet, radio, audio cassettes, video techniques, cable transmissions, e-mail, etc., can be used in physical education and sport. [4,13, 17, 18]

It is from the above that the advantages of multimedia in the learning process can be best understood. The new technologies can be constantly integrated into physical education and sport, helping to objectify, standardize and streamline it, with the aim of optimizing the results obtained in lessons and, implicitly, the performance capacity of pupils.

In his doctoral thesis, "The effectiveness of using audiovisual media in physical education lessons with secondary school students", the author Claudiu Mereuță (2008) describes and demonstrates how audio-visual media influence psychomotor stimulation and the ability to receive and assimilate information. He concludes that these media have an important contribution in psycho-motor stimulation of students, improving neuro-motor and sensory abilities [11].

Scientific research in the field of information technology in physical education and sport in primary education explores various aspects related to the integration of technology in the learning and physical development of students. [9]

Studies in the field focus on how technology can enhance the delivery of content in physical education lessons, including the use of mobile devices, software applications, and health monitoring devices to support learning objectives [12].

### **Material-method**

The aim of this research is to explore and analyze the opportunities and possibilities of using information technologies in the field of physical education and sport. By achieving this goal, the research aims to contribute to the modernization and improvement of the quality of physical education, promoting the holistic development of students and athletes in the context of an increasingly digitalized world.

The field of physical education and sport research, as a science, is complex. Like other sciences, it uses general as well as particular, domain-specific methods in its research.

The specific methodology will include:

- Analyzing existing studies and research to identify current trends and practices in the use of information technologies in physical education and sport;
- Examining concrete examples of schools and institutions that have successfully integrated information technologies into their physical education programs;
- Implementing specific technologies in physical education lessons and evaluating their effects on student performance and motivation.

To carry out this study we used the following scientific research methods applied in physical education and sport: the method of specialized bibliographical study, the method of observation, document analysis, the method of pedagogical experiment, the method of interpretation and information processing [14].

The sample for the pedagogical experiment consisted of 40 students, 20 students from 3rd grade A and 20 students from 3rd grade B from the Technological High School "I.Vârnav Liteanu" from Liteni.

## **Results**

The modernization of educational media has made the transition from static intuitive material to computers possible thanks to scientific and technical progress. This progress, through successive generations of educational media, has also meant an increase in the possibilities for making the teaching process more efficient [10, 18].

Researching the literature has given me the opportunity to use various strategies and modern technologies in physical education and sport lessons to optimize the learning and development of primary school students.

Thus, we used mobile apps and wearable devices for monitoring physical activity, online platforms for sharing educational resources and collaboration between students and me, games and virtual simulators to improve skills and strategies in various sports disciplines.

We used virtual simulations to recreate sport experiences and to improve understanding of theoretical concepts, we used augmented reality to provide real-time feedback and to improve sport techniques and performance. We integrated gamification elements into PE lessons to stimulate active participation and involvement of students. We have organized online competitions and challenges to encourage sport and active lifestyles outside the classroom. Social platforms were used to create an environment of mutual support and encouragement among students to practice sport and adopt a healthy lifestyle.

The main objective of this experiment was to analyze how the use of videos, animations and other multimedia materials can improve students' understanding and retention of information. In addition, it aimed to explore the effectiveness of applications and software that provide instant and detailed feedback, helping students to correct and improve their techniques.

The sample for the pedagogical experiment consisted of 40 students, 20 students from 3rd grade A (10 girls and 10 boys) and 20 students from 3rd grade B (10 girls and 10 boys) from the Technological High School "I.Vârnav Liteanu" from Liteni. During the lessons, the students from 3rd grade A benefited from video support materials, techniques and tactics, video recordings of the activities, video

support distributed through WhatsApp and Classroom groups. These resources were implemented to facilitate correct fixation of the concepts.

The practical application of modern technology showed a significant change in the motor parameters of the students included in the pedagogical experiment (Table 1), in both study groups. The tests used are commonly found in the literature and applied in research practice in the field.

For the analysis of the motor parameters, a battery of three tests was used, each one assessing a specific skill: evaluation of lower limb strength by long jump from the spot, throwing the oine ball for athletics - throws and endurance running for 400 meters for endurance evaluation.

Table 1. Centralizer with statistically processed data

Subjects		Sample								
		Standing long jump			Throwing the oisin ball			Endurance running 400 m		
		X	+/-S	Cv%	X	+/-S	Cv%	X	+/-S	Cv%
20 students, experimental group	T.I.	123	16,5	0,13	11,4	3,56	0,31	3,15	0,023	0,007
	T.F	136	14,3	0,10	13,75	3,97	0,28	3,00	0,022	0,006
	<b>D.</b>	<b>13</b>	<b>2,2</b>	<b>0,03</b>	<b>2,57</b>	<b>0,41</b>	<b>0,03</b>	<b>0,15</b>	<b>0,001</b>	<b>0,001</b>
20 pupils, control group	T.I.	124	16,08	0,12	11,45	3,51	0,30	3,14	0,023	0,07
	T.F	124	16,08	0,12	11,60	3,40	0,29	3,14	0,023	0,07
	<b>D.</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0,15</b>	<b>0,09</b>	<b>0,01</b>	<b>0</b>	<b>0</b>	<b>0</b>

Table no.1 contains data on the motor performance of students in the two groups, the experimental and control groups, in three specific tests: the long jump from the spot, the oine ball throw and the 400-meter endurance run.

The parameters measured were mean values (X), standard deviation ( $\pm S$ ) and coefficient of variation (Cv%).

Analysis of the motor indicators, recorded after testing the subjects in the two groups included in the pedagogical experiment, revealed valuable information about the distribution of values and homogeneity of results.

This allowed value comparisons to be made between the control and experimental groups as tested, as follows:

✓ *Standing long jump:*

The experimental group showed a significant improvement from baseline to final test, from 123 to 136, with a small standard deviation and coefficient of variation, indicating a higher homogeneity of performance.

The control group did not show any change, the I.T. and F.T. values are identical, indicating that the absence of multimedia had no effect on performance.

✓ *Throwing the oisin ball:*

The experimental group showed an improvement, from 11.4 to 13.75, with a slight reduction in standard deviation and coefficient of variation, suggesting an increase in performance homogeneity.

The control group showed only a minor improvement from 11.45 to 11.60, with constant values of standard deviation and coefficient of variation.

✓ *Endurance running 400 m:*

The experimental group improved from 3.15 to 3.00, with a small reduction in standard deviation and coefficient of variation.

The control group showed no change, T.I. and T.F. values are identical, indicating that the absence of multimedia materials did not influence the performance.

The values obtained after the application of the initial and final tests, both in girls and boys, in the control and experimental groups, showed a degree of homogeneity of the results for all the measurements carried out during the research.

## **Discussions**

The contemporary school has had the increased opportunity to choose from a much wider range of options and to be able to use a variety of means simultaneously, including modern technology. It is profoundly revolutionizing not only some teaching methods (programmed setting, demonstration, computer-assisted instruction) or principles (intuition principle, principle of backward linking), but even curriculum theory as a whole, with no aspect of the teaching process being untouched by the impact of the computer (from communication/content discovery to teaching style and the teacher-pupil relationship). There is no subject where it cannot be introduced and used with profit, there is no school age group that is not attracted by this "innovation". [2, 5]

In the literature reviewed, the authors Bota A. (2006), Dragnea A., Mate-Teodorescu S. (2002), Epuran M. (2005), Casey A. (2017), Kirk D. (2010), Papastergiou M. (2009), note a number of advantages of using these technologies in physical education lessons, in the instructional-educational process. These sources explore various aspects of the integration of technology in the educational context, focusing particularly on physical education. They provide valuable insights from

different authors on the use of technologies in physical education and highlight the advantages they bring to the instructional-educational process. [3, 4, 6, 7, 8, 15]

In the article "Physical education teachers' subjective theories about integrating information and communication technology (ICT) into physical education", Rolf Kretschmann explores the views and perceptions of physical education teachers about the integration of information and communication technology into physical education classes. In this study many teachers see information and communication technology as a valuable tool for improving teaching and learning in physical education. They believe that information technology can increase student motivation, facilitate instant feedback, and help to demonstrate sport techniques by optimizing lessons through these modern methods and means. [9, p. 68-96]

The hypothesis that the use of information technologies in physical education improves students' motor performance is confirmed by the results. The experimental group showed significant improvements in all three motor tests, in contrast to the control group, where changes were minimal or non-existent.

In comparison with other similar studies, the results of this study confirm the trends observed in the literature regarding the positive impact of information technologies on physical performance. However, methodological differences and uncontrolled variables may influence the results and direct comparability.

The results of this study show that the implementation of information technologies in physical education can bring significant improvements in students' motor performance.

### **Conclusions**

The data indicate that the use of multimedia materials and information technology had a positive impact on the motor performance of students in the experimental group.

In all three tests, the experimental group showed significant improvements compared to the control group, which did not show any noticeable changes.

These results suggest that the integration of information technology in physical education in primary school can significantly contribute to increasing performance and homogenizing results, thus modernizing the educational process and increasing its efficiency.

The integration of information technologies in physical education and sport offers significant opportunities to improve the quality of the educational process and to increase the performance of students and athletes.

Through the use of these technologies, teachers can create lessons that are more engaging, effective and tailored to the individual needs of pupils.

Thus, information technologies not only modernize physical education, but also contribute to better prepared and healthier generations.

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