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EDUCATIO ARTIS GYMNASTICAE

1/2024

STUDIA UNIVERSITATIS BABEŞ-BOLYAI EDUCATIO ARTIS GYMNASTICAE

1/2024
DOI:10.24193/subbeag.69(1)

ISSN (print): 1453-4223;
ISSN (online): 2065-9547; ISSN-L: 1453-4223

PUBLISHED BY BABEŞ-BOLYAI UNIVERSITY

EDITORIAL BOARD:

Address: 7th Pandurilor Street, Cluj-Napoca, Romania, Phone: +40 264 420709,
e-mail: studia.fefs@yahoo.com; http://www.studia.ubbcluj.ro/serii/educatio/index_en.html

YEAR **Volume 69 (LXIX) 2024**
MONTH **MARCH**
ISSUE **1**

PUBLISHED ONLINE: 2024-05-10
PUBLISHED PRINT: 2024-05-30
ISSUE DOI: 10.24193/subbeag.69(1)

S T U D I A

UNIVERSITATIS BABEŞ-BOLYAI EDUCATIO ARTIS GYMNASTICAE

1/2024

CONTENT – SOMMAIRE – INHALT – CUPRINS

STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 5-34
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).01

PHYSICAL EDUCATION TEACHERS' PERCEPTIONS OF THE TEACHING-LEARNING PROCESS OF PHYSICAL EDUCATION IN SCHOOLS WORLDWIDE DURING THE PANDEMIC: A SYSTEMATIC REVIEW OF THE SCIENTIFIC LITERATURE

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Received 2024 February 13; Revised 2024 April 15; Accepted 2024 April 19;
Available online 2024 Mai 10; Available print 2024 Mai 30

ABSTRACT. Introduction: In the context of the COVID-19 pandemic, physical education has undergone major changes in terms of the way is taught in schools. This subject's teachers have faced numerous problems in the process of implementing physical education, and their experiences are explored in numerous studies. **Aim:** The aim of this study is to review research on the teaching-learning process of physical education in schools during the pandemic, from the perspective of physical education teachers. **Methods:** The research is a study of scientific literature. The research was performed using keywords in seven electronic databases. **Results:** The analysis carried out indicates a selection of 57 scientific articles that fit with the chosen eligibility criteria. The articles include research on the physical education teachers' perceptions regarding the teaching-learning process of physical education lessons taught in schools during the pandemic. **Conclusions**: The study synthesizes the experiences of physical education teachers in teaching physical education during the pandemic. The evidence obtained indicates that the common option in carrying out physical education lessons during the pandemic was the online method, although teachers prefer teaching physical education in the traditional way.

Keywords: *physical education during the pandemic, online teaching, physical education teachers' experiences, physical education online*

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REZUMAT. ***Percepţiile profesorilor de educaţie fizică cu privire la procesul de predare-învăţare a educaţiei fizice în şcolile din întreaga lume, în perioada pandemiei: o analiză sistematică a literaturii ştiinţifice.*** **Introducere:** În contextul pandemiei de COVID-19, educaţia fizică a suferit schimbări majore în ceea ce priveşte modul de predare în şcoli. Profesorii de educaţie fizică s-au confruntat cu numeroase probleme în procesul de implementare a educaţiei fizice, iar experienţele acestora sunt cercetate în numeroase studii. **Scop:** Acest studiu are ca scop trecerea în revistă a cercetărilor cu privire la desfăşurare procesului de predare-învăţare a educaţiei fizice în şcoli, în perioada pandemiei, din perspectiva profesorilor de educaţie fizică. **Metode:** Cercetarea este un studiu de literatură ştiinţifică. S-a efectuat o căutare în şapte baze de date electronice folosind cuvinte cheie. **Rezultate:** Analiza realizată indică o selecţie de 57 de articole ştiinţifice care au îndeplinit criteriile de eligibilitate alese. Articolele cuprind cercetări privind percepţiile profesorilor de educaţie fizică cu privire la procesul de predare–învăţare a educaţie fizice în şcoli, în perioada pandemiei. **Concluzii**: Studiul realizează o sintetizare a experienţelor profesorilor de educaţie fizică în predarea educaţiei fizice în perioada pandemiei. Dovezile obţinute indică faptul că varianta cea mai utilizată în realizarea lecţiilor de educaţie fizică în pandemie a fost metoda online, deşi profesorii preferă predarea educaţiei fizice în mod tradiţional.

Cuvinte-cheie: *educaţia fizică în pandemie, predare online, experienţe ale profesorilor de educaţie fizică, educaţia fizică online*

INTRODUCTION

The COVID-19 coronavirus outbreak has created general chaos across the globe. One of the characteristics of this virus was the speed with which it spread, causing a global pandemic. The pandemic has had a significant impact on human life, with strict rules and restrictions imposed on people. They were required to use and get accustomed to wearing protective masks, in both indoor and outdoor spaces, wash their hands very often and maintain social distance. The emergence of this coronavirus implicitly led to the closure of schools globally. Education is an ongoing process that aims at the development of future generations. In order to ensure the continuity of the education of pupils, the teaching-learning process in most schools and educational institutions has shifted to the virtual environment. Many schools quickly adapted to online learning methods. Teachers and students could no longer interact directly, which led to the disruption of the learning process during the pandemic. This disruption in the learning process can potentially lead to a decline in the quality of human resources in the future, both cognitively and affectively (Christian, McCarty, & Brown, 2021).

Thus, during the pandemic, three scenarios which can be applied for the return to learning physical education in schools were discussed (Filiz, & Konukman, 2020). These three scenarios were:

- face-to-face education with strict protocols that must be respected;
- online education;
- hybrid education (traditional and online).

The first alternative of the teaching-learning process of physical education lessons is the one in which the social distance between students and teachers had to be maintained and contact between them should be completely avoided in order to control the risks of virus transmission. This version was quite difficult to achieve in the gyms and on the school sports grounds. A high degree of hygiene and disinfection of people, equipment and sports materials had to be maintained. Traditional physical education lessons were carried out mostly outdoors, respecting social distancing and wearing protective masks (Ihbour, Boumadi, Najimi, & Chigr, 2021; Schembri, Coppola, Tortella, & Lipoma, 2021; Tagare, 2023). The study carried out by Ihbour, et al. (2021) is a guide for physical education teachers who resume teaching their traditional classes. It indicates the measures they must take to prevent the spread of the virus and to carry out the teaching of physical education safely for both teachers and students.

Online teaching was one of the learning alternatives that was used to overcome the problems during the pandemic (Filiz, & Konukman, 2020; Goad, Killian, & Daum, 2021). The learning system has changed, interactively with the help of digital platforms that can connect with digital communication devices (Kucera, do Vale Gomes, Ovens, & Bennett, 2022). During the pandemic, physical education teachers could use these methods in order to guide and stimulate students to do physical exercises at home and to maintain and improve their health. Teacher's use of technology can guide students during online physical education classes (Silva-Filho, et al., 2020).

Researchers Varea, González-Calvo, & García-Monge (2022) analyzed how the teaching-learning process of physical education lessons changed during the pandemic, relying more on digital technologies and individual activities during this period. Thus, some research aims to increase the awareness of physical education teachers when it comes to searching and finding new physical activity programs on different online platforms (Google) (Kutlay, Gönkek, & Köksal, 2022). These exercise programs can be adapted and used by teachers in order to make educational programs more engaging.

Learning physical education is largely based on physical activity, conditioned by movement, being a practical discipline. This subject encountered numerous obstacles during the COVID-19 pandemic. In the teaching-learning

process of physical education, the teachers had to think about the most favorable model of the learning process in such a way that they could help students learn as much as possible, and be active and healthy. This should happen with the right methods and techniques. Teachers must be creative and find the most engaging methods. The creativity of physical education teachers improves their performance in the physical education teaching process (Muzakki, Muammal, & Prakoso, 2021). Thus, the effectiveness of an online program that provides quality physical education for all students is considered. This program is designed based on standard physical education programs, and can be used successfully during the pandemic (Webster, et al., 2021). Using active themes expands and improves physical education, so teachers manage to promote physical activity and students can learn different movement skills even during a pandemic (Bailey & Scheuer, 2022).

At the same time, teachers encountered many obstacles and challenges in carrying out physical education classes. Teachers were overworked because they spend a lot of time to create interesting lessons for this period, they encountered internet connection problems and thought that the implementation of physical education during the pandemic is not effective (Silva, et al., 2021).

The pandemic has produced changes in terms of working conditions and lifestyle of physical education teachers. The majority of them indicate an increase in the volume of work performed, which leads to health, sleep, physical exhaustion and fatigue problems (Bastos, et al., 2022). Teachers are dissatisfied with the amount of work they have to do, with the use of communication tools and with the entire process of online teaching.

According to Varea, & González-Calvo, (2021) there are difficulties in teaching physical education during the pandemic related to teachers' personal feelings, which include low motivation for work, feelings of sadness and depression. Physical education teachers lack physical activity and direct contact with students. In the same context of the pandemic, Temel, et al., (2023) carry out a study that follows the feeling of alienation of physical education teachers in Turkey, during this period.

This pandemic has had a significant impact on the health and physical well-being of physical education teachers. Despite the restrictions imposed by the pandemic, there were some teachers who continued their active lives. Thus, following the physical activity carried out, they maintained a certain mobility and a certain level of health (Aydoğmuş, Yüksel, & Revan, 2022).

Although measures have been taken by the authorities, there is a concern of both students and teachers in the implementation of physical education classes, which can cause their behavior to be more bizarre. Feelings

of anxiety, fear, insecurity were perceived by physical education teachers who are obliged to conduct traditional lessons, i.e. face to face during certain periods of the pandemic. Physical education teachers' feelings of anxiety and stress can negatively affect the education they provide (Dalbudak, & Özkan, 2021; Tagare, 2023).

Physical education teachers were under increasing pressure and workload to cope with online or hybrid physical education during the pandemic (Aperribai, Cortabarria, Aguirre, Verche, & Borges, 2020).

There are numerous studies that were carried out during the pandemic which follow the dramatic effects that the pandemic had on the stress and burnout of physical education teachers. (Feroz, Kundra, Alam, & Alam, 2021; Karakoç, Karakoç, Aktaş, & Arslan, 2021). In their article, Karakoç, Karakoç, Aktaş, & Arslan, (2021) show that physical education teachers have a low level of burnout. The most significant negative effect, however, is the emotional exhaustion they had during the pandemic, when online teaching. They want the resumption of face-to-face physical education learning.

The aim of this study is to provide an overview of the research carried out during the pandemic, related to the teaching of physical education in schools, from the perspectives of physical education teachers.

The **objectives** of this study are:

- to present an updated analysis of the scientific literature regarding the physical education teachers' perceptions of the teaching-learning process of their subject in schools during the pandemic;

- to pursue the identification of research trends, especially the advantages and disadvantages of the process of teaching physical education online.

METHODS AND MATERIALS

Data collection

This review uses a systematic analysis of the majority of literature concerning physical education lessons in schools during the pandemic. For this study, the data is based on: Scopus Database, Web of Science, Springer, Research Gate, Elsevier, ProQuest, Google Scholar. The aim of this study is to provide insights into physical education teachers' perceptions of the physical education teaching-learning process during the COVID-19 pandemic.

For the selection of scientific articles included in this review, the considered topic is physical education during the pandemic. The keywords used for the initial search are: "physical education", "pandemic", "COVID-19", "online teaching", physical

education teachers", "experiences of physical education teachers". Subsequently, a combined search was conducted using these keywords, along with the option to search for them in the abstract. The search period includes publications from January 2020 to October 2023.

Eligibility criteria

The research was conducted through the analysis of titles, followed by abstract analysis, with only articles meeting the eligibility criteria being selected. The eligibility criteria are presented in Table 1.

Table 1. Eligibility criteria

No.	Eligibility criteria
1.	Articles published in academic journals or conference papers
2.	The teaching and learning of physical education for students during the COVID-19 pandemic
3.	Physical education lessons to be conducted traditionally, online, or in hybrid format
4.	Articles published between 01.01.2020 and 30.10.2023
5.	Participants to include primary and/or secondary school physical education teachers and/or high school teachers
6.	To be written in English

Exclusion criteria

The exclusion criteria used in the article selection are presented in Table 2.

Table 2. Exclusion Criteria

No.	Exclusion criteria
1.	Review articles, editorials, books, dissertations, theses, commentaries, letters, abstracts
2.	What is not included in the teaching-learning of physical education during the pandemic
3.	Research related to physical education teachers in colleges or universities
4.	Articles not written for research purposes
5	Participants do not include physical education teachers

RESULTS

An overview of the selection process can be found in the PRISMA diagram in Figure 1. The PRISMA flow diagram is designed for systematic reviews that have involved searches solely in database sources.

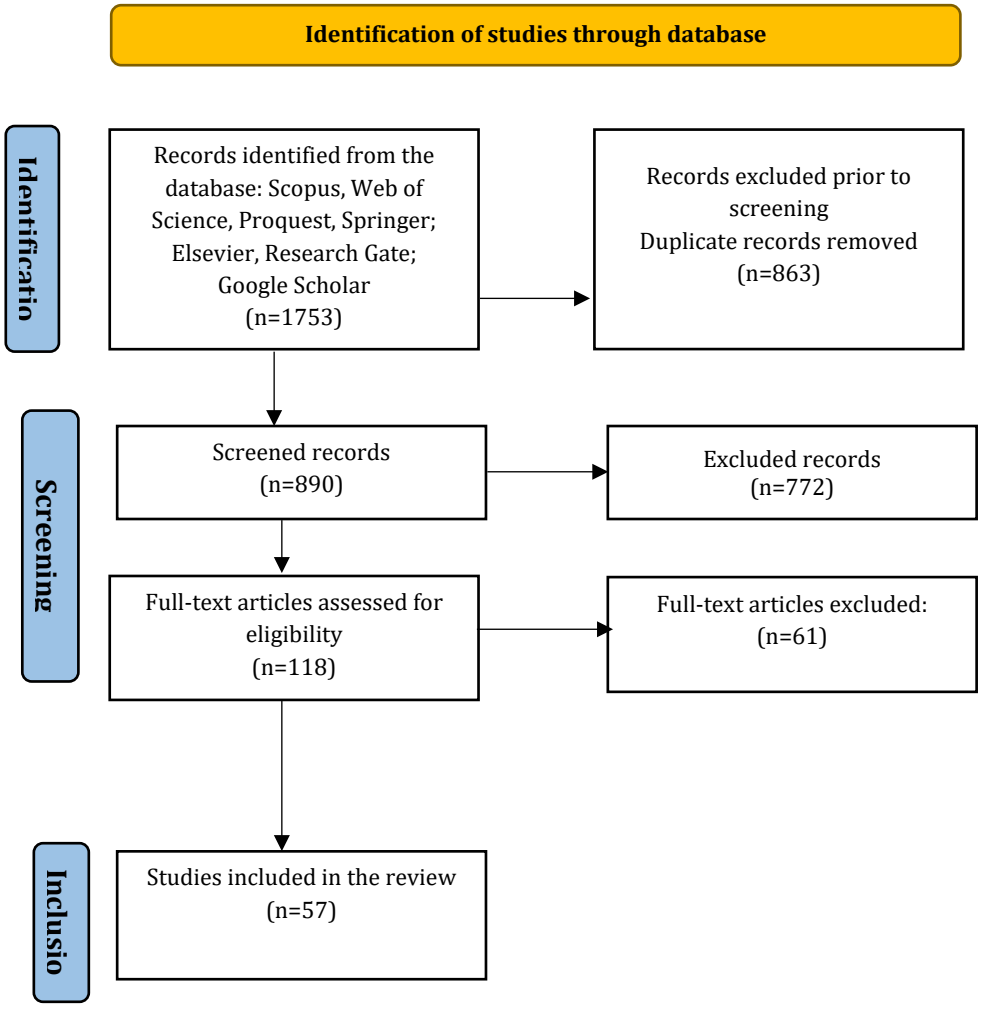

Figure 1. PRISMA diagram

We identified a total of 1753 articles through searches in electronic databases. Out of these, 863 duplicate articles were eliminated. We analyzed the titles and abstracts of the remaining 890 articles, excluding 772 articles that did not meet the eligibility criteria. Additionally, 118 full-text articles were examined, leading to the exclusion of a further 61 articles. Only 57 articles met the eligibility criteria and were included in this review.

Most of the selected articles were published in the year 2021, accounting for 34 scientific publications (59.65%). In 2020, only 2 articles met the eligibility criteria (3.51%). In 2022, 16 articles met the eligibility criteria (28.07%). By the end of October 2023, 5 articles (8.77%) were identified as eligible. The distribution based on the year of publication is illustrated in Figure 2.

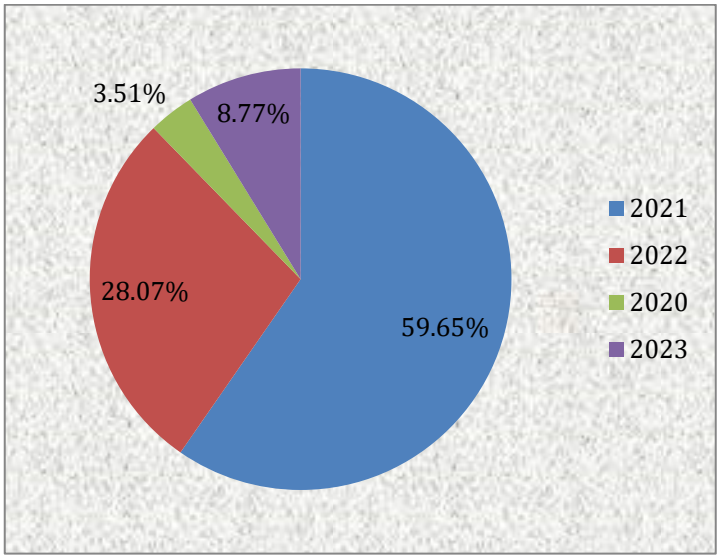

Figure 2. Representation based on the year of publication

Most of the studies were conducted in Asian countries, comprising 22 articles (38.60%). These were then followed by studies conducted in European countries, totaling 19 articles (33.33%). Research from the Americas contributed to 13 studies included in the review (22.81%), with 11 studies conducted in the United States. The review also includes 3 articles, one of them conducted in Australia (1.75%), and the other two conducted in African countries (3.51%). The graphical representation is presented in Figure 3.

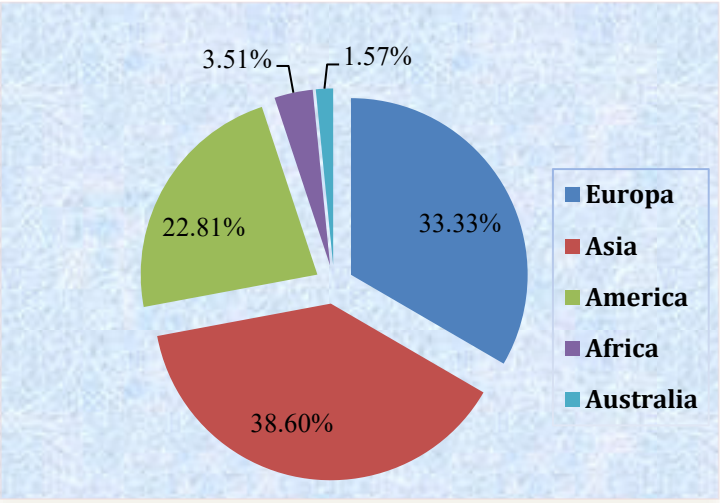

Figure 3. Representation based on the continent where the research was conducted

The period during which the research in the selected studies was conducted can be represented as follows:

-January-August 2020: 20 articles (35.09%)

-September 2020-August 2021: 20 articles (35.09%)

-2021–2022: 3 articles (5.26%)

Additionally, 14 articles (24.56%) only indicate that the research was conducted during the COVID-19 pandemic.

Information regarding sample sizes, participants, age, gender, teaching experience, and methods varied significantly. Some analyzed research studies provided detailed information on all these aspects, while others only superficially presented the specific information.

In some studies, all these details related to sample size (3 articles, 5.26%), the age of teachers (31 articles, 54.39%), their gender (18 articles, 31.58%), teaching experience of teachers (24 articles, 42.11%), and research methods (11 articles, 19.30%) were overlooked.

The sample sizes in the reviewed studies varied from 3 physical education teachers to 4326. Among them, 30 scientific articles (52.63%) had a sample size of 1-100 participating teachers. A sample size of 101-500 physical education teachers was presented in 16 articles (28.07%). More than 501 participating physical education teachers were found in 8 articles (14.04%), while 3 articles did not specify the number of research participants (5.26%).

The variation in the number of participating physical education teachers is illustrated in Figure 4.

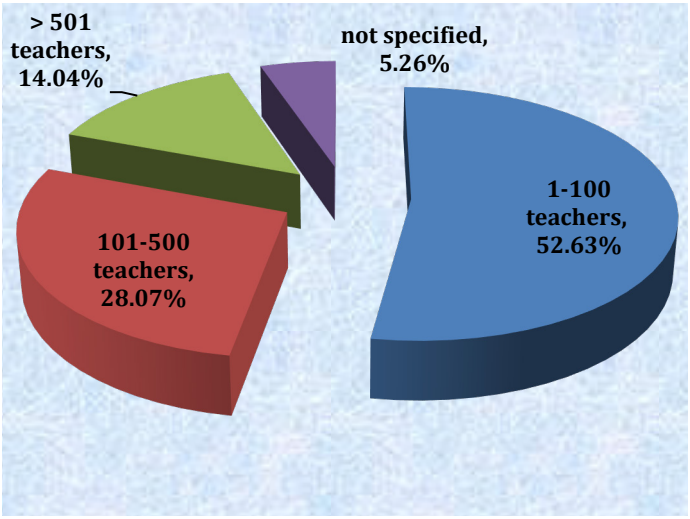

Figure 4. The sample size of the participants

The studied population included the physical education teachers from various educational levels: primary school teachers (8 articles, 14.04%), middle school teachers (3 articles, 5.08%), primary and middle school teachers (15 articles, 26.32%), high school teachers (9 articles, 15.79%), middle and high school teachers (4 articles, 7.02%), physical education teachers from all types of schools (primary, middle, and high school) in 11 articles (19.29%). Seven articles did not specify the type of school where the participating physical education teachers were employed (12.28%).

In the studies included in this review, the type of school where physical education teachers teach is also indicated: public school (22 articles, 38.60%), public and private school (12 articles, 21.05%). The type of school where physical education teachers teach is not specified in 23 scientific articles included in the review (40.35%).

In 26 of the articles included in the review, the age of physical education teachers participating in the research is specified (45.61%). The age of participating teachers ranges from 20 to 65 years old.

The gender of physical education teachers participating in the research is highlighted in 39 articles (68.42%), with female physical education teachers being the majority at 55.49%.

The teaching experience of participants in the research conducted and presented in 33 selected articles (57.89%) ranges from 2 to 35 years.

Qualitative methods (25 articles, 43.86%) are more commonly used than quantitative methods (14 articles, 24.56%), while mixed methods approaches are less frequently applied (4 articles, 7.02%). In 11 articles (19.30%), the research method used is not specified, and 3 studies are cross-sectional (5.26%). Regarding qualitative methods, interviews are the primary data collection tool in all 25 articles. Online semi-structured interviews are most used (16 articles, 64.00%), followed by interviews and focus group discussions (4 articles, 16.00%), interview and documentation (1 article, 4.00%), interview and observation (2 articles, 8.00%), and interview, observation, and documentation (2 articles, 8.00%).

Quantitative studies exclusively used questionnaires for data collection, which were evaluated and reported using descriptive statistics. The questionnaires were conducted online, with researchers utilizing the Google Forms platform. Studies employing both qualitative and quantitative methods use interviews and questionnaires as data collection instruments.

The aim of the studies used in this review is related to the type of teaching and learning physical education, from the perspective of physical education teachers in primary, middle, and high schools during the COVID-19 pandemic. The studies analyze traditional, hybrid, and online teaching of physical education during the pandemic. In the selected articles for this scientific review, the research primarily focuses on online learning of physical education in schools during this controversial period.

Thus, 45 articles (78.94%) focus exclusively on online physical education lessons conducted by physical education teachers, exploring their perceptions and experiences regarding this online teaching and learning process during the pandemic. In four articles (7.02%), traditional face-to-face physical education learning during the pandemic is examined. These articles present the challenges teachers face in ensuring social distancing among students, ensuring their own and students' health safety, and most teachers express feelings of uncertainty and stress. Another six articles (10.53%) investigate the effects of hybrid learning (both traditional and online) in physical education during the COVID-19 pandemic. Two articles (3.51%) address physical education learning in schools that remained open and those that closed during the pandemic. Open schools focus on traditional learning, while closed schools focus on online learning.

In the selected studies, the effectiveness of physical education lessons during the pandemic and the challenges faced by teachers throughout the teaching semesters are analyzed. A total of 17 articles (29.82%) examines the effectiveness of physical education lessons during the pandemic, and 11 articles (19.30%) among them indicate low effectiveness of physical education lessons. From the

perspective of physical education teachers, only studies in 6 articles (10.53%) indicate good effectiveness of lessons during the pandemic.

Most articles indicate that physical education teachers use online platforms for teaching physical education during the pandemic. Thus, 29 articles provide various examples of learning platforms and applications used to facilitate the teaching of physical education lessons. The most used platforms and applications include Google Classroom, Google Meet, YouTube, WhatsApp, etc. To create more engaging physical education lessons, teachers utilize videos, images, and tutorials, as mentioned in 18 articles (31.58%).

Some of the studied articles, the ones which investigate the teaching of physical education during the pandemic, analyze both the positive and negative effects of the teaching and learning process. Thus, 24 articles (42.11%) indicate positive effects such as the lack of time and space constraints, convenience, and program flexibility. One article considers it a positive effect that greater importance is given to the theoretical part of physical education in online teaching. The negative effects of the teaching and learning process of physical education during the pandemic are found in 31 articles (54.39%), representing more than half of the articles included in the review.

The most significant negative effect of the teaching and learning process of physical education, indicated in 15 articles (26.32%) in the review, is the increased workload for teachers in planning and conducting physical education lessons during the pandemic. Lack of motivation, both among students and teachers, is another negative effect of physical education lessons conducted during the pandemic, mentioned in 12 articles (21.05%), as found in the analyzed research studies.

A commonly reported limitation in the teaching and learning process of physical education during the pandemic is the assessment of students' physical activity. Thus, 14 articles (24.56%) in this review indicate either the absence of assessment or the difficulty experienced by teachers in conducting it.

The disadvantages and obstacles encountered in the process of teaching and learning physical education online during the pandemic are also highlighted. A significant disadvantage in using the online mode of physical education teaching is noted in 23 articles (40.35%) of the analyzed papers in this review, and it pertains to the lack of technological means, learning platforms, infrastructure problems, and internet network issues.

In 14 articles (24.56%), another obstacle encountered in the implementation and realization of online physical education learning is highlighted—the lack of knowledge in using technologies by physical education teachers.

Some research included in the articles of this review presents certain effects that the pandemic has had on students' physical education. The most significant effects include reduction in the number of physical education hours (10 articles, 17.54%); low physical activity or physical inactivity, which can lead to health problems for both students and teachers (16 articles, 28.07%). In 9 articles (15.79%) of the review, various strategies used by physical education teachers in online teaching during the pandemic are presented.

During the pandemic, teachers need support and assistance (15 articles, 26.32%). They require more professional development to enhance instructional practices and utilize modern technologies.

DISCUSSIONS

The aim of the study was to identify the most relevant articles investigating the experiences of physical education teachers in the process of teaching and learning physical education in schools during the COVID-19 pandemic. In addition to how they design their lessons and deliver physical education classes to students, the study also identifies the difficulties and obstacles faced by teachers in teaching physical education during the pandemic.

In most of the selected articles for this review, research focuses on the online teaching of physical education by teachers during the pandemic. (Aguinaldo, 2021; Akkaya, 2021; Aldababseh, et al., 2022; Almonacid-Fierro, Vargas-Vitoria, De Carvalho, & Almonacid Fierro, 2021; Alshammari, 2022; Ardiansyah, & Setiawan, 2023; Apriyanto, Fahrudi, & Arifia, 2022; Blegur, Lumba, & Ngongo, 2022; Ben Amotz, et al., 2022; Broto, & Sudardiyono, 2021; Centeio, et al., 2021; Chan, et al., 2021; Coulter, Britton, Manninen, McGrane, & Belton, 2021; Cruickshank, Pill, & Mainsbridge, 2021; D'Agostino, Urtel, Webster, McMullen, & Culp, 2021; Esentürk, Seçer, & İlhan, 2021; Fika, Soegiyanto, & Setyawati, 2021; Friskawati, Karisman, Supriadi, & Stephani, 2021; Foye, & Grenier, 2021; Gandasari, Anugrarista, & Yantiningsih, 2021; Gobbi, Bertollo, Colangelo, Carraro, & di Fronso, 2021; Gutierrez, Tabora, & Gama, 2023; Hartoto, et al., 2022; Ivanova, & Mileva, 2021; Jeong. & So, 2020; Johnson, Daum, & Norris, 2021; Kaya, 2021; Kızılkaya Namlı, & Yücekaya, 2021; Kim, Yu, Park, Ha, & Baek, 2021; Korcz, et al., 2021; Konukman, Filiz, & Ünlü, 2022; Mercier, et al., 2021; Murfay, Beighle, Erwin, Aiello, & Pyszczynski, 2022; Nopembri, Saryono, Listyarini, Muktiani, & Shahril, 2022; Phong, Suong, Bang, &Thuc, 2022; Purnomo, Pramono, & Hanani, 2022; Rahman, Prasetyo, & Mashuri, 2021; Restiana, Rahayu, & Wahyudi, 2021; Sopa, & Pomohaci, 2021; Şahin, 2021; Talaghir, Olaru, & Iconomescu, 2021; Varea, Riccetti, González-Calvo, Siracusa, & García-Monge, 2023; Vilchez, Kruse, Puffer, & Dudovitz, 2021; Wiguno, Heynoek, & Kurniawan, 2021; Williyanto, Masri., Santoso, & Wiyanto, 2020).

Physical education taught in a traditional, face-to-face manner is addressed in four of the articles included in the review. (Kamoga, & Varea, 2022; Kustantri, Sukamti, & Nanda, 2022; Mncube, Uleanya, & Dube, 2021; Hortigüela-Alcalá, Hernando-Garijo, & Pérez-Pueyo, 2021). The research in the first article is conducted in Sweden, a country that chose to keep schools open during the pandemic (Kamoga, & Varea, 2022). Teaching physical education for these teachers was a real challenge as they had to manage physical contact both among students and between students and teachers. Physical education teachers had to ensure social distancing among students and significantly reduce physical contact during physical education classes during the pandemic. Due to the restrictions and rules implemented in schools, physical education teachers are stressed and feel uncertain about planning and conducting lessons.

The results of the research conducted by Kustantri et al. (2022) indicate that traditional learning, albeit limited during the pandemic, is advantageous, especially when using the individual learning model. Despite the significantly reduced number of hours, students manage to develop their skills much more efficiently compared to the online teaching and learning process of physical education.

The third article examines the experiences of primary school physical education teachers in resuming physical education classes (Mncube et al., 2021). Teachers are aware that the stress and traumas of the pandemic will adversely affect the long-term learning of physical education. Although teachers are instructed to take necessary safety measures, the primary schools they belong to are not prepared to implement social distancing and practice hygiene (due to a lack of water).

Hortigüela-Alcalá et al. (2021) present the difficulties faced by physical education teachers due to the strict conditions imposed by the COVID-19 pandemic, such as social distancing measures, wearing protective masks, and hygiene materials that alter their schedule and drastically reduce physical education hours.

Blended learning, which combines online learning and face-to-face learning, is an alternative to online physical education in the school year 2020-2021 and is analyzed in five articles included in this review (Cunha, Martins, Tomaz Luiz., Garibaldi, & Marinho, 2023; Kuhn et al., 2022; López-Fernández, Burgueño, & Gil-Espinosa, 2021; Monguillot, González-Arévalo, Tarragó, & Iglesias, 2022; Simonton, Layne, Brown, & Keith Loupe, 2022) and hybrid learning in the school year 2021-2022 in one article (Nicolosi, Pitrolo, & Alba, 2023).

Researchers López-Fernández et al. (2021) present in their article the perceptions of high school physical education teachers regarding the advantages and disadvantages of blended learning during the pandemic. The teachers, for

the most part, believe that blended learning in physical education does not lead to increased student motivation, results in lower physical activity among students, and causes increased workload for teachers.

In the article by researchers Monguillot et al. (2022), modifications made by physical education teachers in Spain, at the primary and secondary education levels, during the pandemic are presented. These modifications are related to the curriculum content to adhere to pandemic-specific protocols (social distancing, hygiene practices, use of materials, etc.). When utilizing online teaching methods, physical education teachers had to adjust teaching activities and communication with students, incorporating digital technology. Similar challenges were faced by physical education teachers in Brazil (Cunha et al., 2023).

The fifth article pertains to the perceptions of primary school physical education teachers who use the same hybrid learning approach in the teaching of physical education (Simonton, Layne, Brown, & Keith Loupe, 2022). The research indicated that teachers experienced various emotions and stress factors during teaching in the pandemic period. Nevertheless, many teachers reported positive effects of this teaching method, expressing satisfaction with using tailored instructional models, creating new strategies, and generating new lesson ideas.

Nicolosi et al. (2023) indicate that, despite physical education teachers adapting their teaching strategies to the requirements of the pandemic period, they faced difficulties, resulting in few online physical education hours. The lessons delivered were unattractive, and the implementation of motor activities in the virtual environment did not yield favorable results.

The other two articles included in the review address both teaching methods: traditional in open schools and online teaching in closed schools during the pandemic (D'Isanto & D'Elia, 2021; Pavlovic et al., 2021). Both studies indicate similar challenges faced by teachers in open schools, namely implementing social distancing and a drastic reduction in physical education hours. In closed schools, teachers grapple with students' limited access to online learning and a decrease in physical activity.

To conduct the process of online physical education teaching during the pandemic, teachers use numerous and diverse online learning platforms. The selected articles indicate a large and varied number of online environments, platforms, applications, social networks used by physical education teachers for online lesson delivery: Google Classroom, Google Meet, Google Forms, Zoom, WhatsApp, Facebook, Instagram, YouTube, GoNoodle, etc. (Almonacid-Fierro et al., 2021; Apriyanto et al., 2022; Blegur et al., 2022; Centeio et al., 2021; Chan et al., 2021; Cruickshank et al., 2021; Gandasari et al., 2021; Gutierrez et al., 2023;

Fika et al., 2021; Friskawati et al., 2021; Foye & Grenier, 2021; Johnson et al., 2021; Kamoga & Varea, 2022; Kaya, 2021; Kim et al., 2021; Korcz et al., 2021; Konukman et al., 2022; López-Fernández et al., 2021; Mercier et al., 2021; Nicolosi et al., 2023; Nopembri et al., 2022; Pavlovic et al., 2021; Phong et al., 2022; Purnomo et al., 2022; Rahman et al., 2021; Restiana et al., 2021; Vilchez et al., 2021; Wiguno et al., 2021; Williyanto et al., 2020).

Researchers Gandasari et al. (2021) show that primary school physical education teachers most commonly use the WhatsApp application, while elementary school teachers more frequently use Google Classroom. WhatsApp is one of the most used applications due to its ease of use. High school teachers equally use WhatsApp, Google Classroom, and manual methods.

Many physical education teachers use videos in the teaching-learning process, where they can post instructions, checklists, and exercise programs. Videos are employed as instructional material for learning (Aguinaldo, 2021; Almonacid-Fierro et al., 2021; Coulter et al., 2021; Cruickshank et al., 2021; D'Agostino et al., 2021; Fika et al., 2021; Friskawati et al., 2021; Foye & Grenier, 2021; Jeong & So, 2020; Johnson et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Mercier et al., 2021; Murfay et al., 2022; Nicolosi et al., 2023; Purnomo et al., 2022; Restiana et al., 2021; Wiguno et al., 2021; Williyanto et al., 2020). Some teachers assess students' performances using video presentations.

When it comes to online teaching of physical education during the pandemic, only six articles indicate that physical education lessons are effective (Fika et al., 2021; Gutierrez et al., 2023; Mercier et al., 2021; Monguillot et al., 2022; Purnomo et al., 2022; Restiana et al., 2021). In the study conducted by Fika et al. (2021), online teaching of physical education is effective in high schools. Teachers are active and creative, providing students with materials in the form of videos that are attractive and engaging, stimulating students' interest in learning physical education. Similarly, in online learning, physical education teachers need to plan their lessons well in terms of content, implementation, and assessment. Teachers must choose and use the best teaching methods, many utilizing videos and images (Purnomo et al., 2022; Restiana et al., 2021). Despite facing numerous difficulties, most physical education teachers who participated in the research considered the online lessons effective (Gutierrez et al., 2023).

The low efficiency or ineffectiveness of online physical education lessons is a result found in certain selected articles in the review (Aguinaldo, 2021; Alshammari, 2022; Chan et al., 2021; D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Kaya, 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman, Filiz, & Ünlü, 2022; Kuhn et al., 2022; Phong et al., 2022; Sopa & Pomohaci, 2021). In two articles, one by Chan et al. (2021) and the other presented by Phong et al.

(2022), it is noted that physical education teachers believe that online lessons during the pandemic were not effective in acquiring motor skills, in terms of teacher-student interaction, and in promoting physical activity. To increase the efficiency of online physical education teaching during the pandemic, it is necessary for physical education teachers to create lessons that are as simple, attractive, and engaging as possible to motivate students to actively participate in class (Almonacid-Fierro et al., 2021; Centeio et al., 2021; Chan et al., 2021; Esentürk et al., 2021; Foye & Grenier, 2021; Jeong & So, 2020; Kaya, 2021; Kim et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman et al., 2022; Vilchez et al., 2021). Teachers need to be equipped with modern digital technologies to conduct educational lessons (Aguinaldo, 2021).

The effects determined by the online teaching-learning process of physical education during the pandemic, both researched and analyzed in the articles included in the review, encompass both positive effects (Aguinaldo, 2021; Akkaya, 2021; Aldababseh, et al., 2022; Ardiansyah & Setiawan, 2023; Centeio, et al., 2021; Cruickshank, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Fika, et al., 2021; Foye & Grenier, 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kaya, 2021; Kim, et al., 2021; Korcz, et al., 2021; Konukman, et al., 2022; Kuhn, et al., 2022; Mercier, et al., 2021; Monguillot, et al., 2022; Purnomo, et al., 2022; Phong, et al., 2022; Sopa & Pomohaci, 2021; Rahman, et al., 2021; Varea, et al., 2023) and negative effects (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Alshammari, 2022; Ardiansyah & Setiawan, 2023; Blegur, et al., 2022; Centeio, et al., 2021; Chan, et al., 2021; Cruickshank, et al., 2021; Foye & Grenier, 2021; Cunha, et al., 2023; Gobbi, et al., 2021; Ivanova & Mileva, 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kaya, 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Monguillot, et al., 2022; Murfay, et al., 2022; Nicolosi, et al., 2023; Pavlovic, et al., 2021; Phong, et al., 2022; Purnomo, et al., 2022; Rahman, et al., 2021; Restiana, et al., 2021; Sopa & Pomohaci, 2021; Şahin, 2021; Varea, et al., 2023; Vilchez, et al., 2021; Wiguno, et al., 2021).

Physical education teachers who use the online method for delivering physical education lessons during the pandemic consider that the most significant advantages and positive effects of the online method include the absence of time and space limitations, convenience, and schedule flexibility (Aguinaldo, 2021; Gutierrez, et al., 2023; Kaya, 2021; Konukman, et al., 2022). Korcz, et al. (2021) argue that the positive effects of online teaching during the pandemic consist of an attractive way of demonstrating skills, a real-time view of students' performances, and greater independence for students. Some articles indicate that an additional positive effect of implementing online physical education in schools during the pandemic is the improved understanding of the use of digital technology by physical education teachers (Ardiansyah & Setiawan,

2023; Centeio, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Konukman, et al., 2022; Kuhn, et al., 2022; Rahman, et al., 2021). Esentürk, et al. (2021) note that the research analyzed indicates another positive aspect of physical education lessons conducted online during the pandemic: greater emphasis on the theoretical part of physical education. However, another article considers the development of the theoretical aspect of physical education lessons as a negative effect of the teaching-learning process during the pandemic (Rahman, et al., 2021).

One of the commonly encountered negative effects in the studies selected in this review is the significant workload imposed on physical education teachers in preparing online lessons (Akkaya, 2021; Alshammari, 2022; Ardiansyah & Setiawan, 2023; Chan, et al., 2021; Cruickshank, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Konukman, et al., 2022; Monguillot, et al., 2022; Phong, et al., 2022; Varea, et al., 2023). In the study conducted by Kim, et al. (2021), teachers express negative feelings about online teaching and face difficulties in designing online physical education lessons. The uncertainty felt by physical education teachers during the pandemic regarding online teaching is explained by their inability to complete practical lessons (Akkaya, 2021; Esentürk, et al., 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021).

Other negative effects encountered in the articles included in the review regarding online physical education teaching during the pandemic are the teachers' low enthusiasm and reduced motivation to participate in classes or fulfil their duties during online teaching (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Ardiansyah & Setiawan, 2023; Blegur, et al., 2022; Phong, et al., 2022; Esentürk, et al., 2021; Ivanova & Mileva, 2021; Kim, et al., 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Murfay, et al., 2022; Restiana, et al., 2021).

A negative effect of online physical education teaching during the pandemic is the challenge of conducting assessments, which cannot be done directly. The majority of physical education teachers have faced difficulties in implementing the assessment process during this pandemic period (Aguinaldo, 2021; Almonacid-Fierro, et al., 2021; Alshammari, 2022; Blegur, et al., 2022; Centeio, et al., 2021; Cunha, et al., 2023; Esentürk, et al., 2021; Jeong & So, 2020; Kaya, 2021; Kızılkaya Namlı & Yücekaya, 2021; Korcz, et al., 2021; Purnomo, et al., 2022; Sopa & Pomohaci, 2021; Şahin, 2021). The lack of interpersonal relationships and interactions between teachers and students is also considered a negative effect of the online teaching model (Alshammari, 2022; Blegur, et al., 2022; Cunha, et al., 2023; Foye & Grenier, 2021; Gutierrez, et al., 2023; Kim, et al., 2021; Pavlovic, et al., 2021; Phong, et al., 2022).

The most significant barriers to the implementation and use of online physical education teaching during the pandemic, as indicated in the majority of articles included in the study, are: the lack of technological means, infrastructure, and services to facilitate online lessons; network difficulties, and the absence of necessary equipment (laptops, tablets, mobile phones, etc.) (Aguinaldo, 2021; Aldababseh, et al., 2022; Broto & Sudardiyono, 2021; Centeio, et al., 2021; Esentürk, et al., 2021; Fika, et al., 2021; Gandasari, et al., 2021; Gutierrez, et al., 2023; Jeong & So, 2020; Kızılkaya Namlı & Yücekaya, 2021; Konukman, et al., 2022; Korcz, et al., 2021; López-Fernández, et al., 2021; Mercier, et al., 2021; Nicolosi, et al., 2023; Pavlovic, et al., 2021; Purnomo, et al., 2022; Rahman, et al., 2021; Restiana, et al., 2021; Varea, et al., 2023; Vilchez, et al., 2021; Wiguno, et al., 2021; Williyanto, et al., 2020).

Physical education teachers in private schools reported difficulties due to the lack of adequate equipment at home. Those in public schools faced challenges because of students' absence during classes or limited internet access (Konukman, et al., 2022). Some physical education teachers encountered difficulties related to computer, tablet, or smartphone connectivity issues (Konukman, et al., 2022).

In some articles, difficulties in using online physical education teaching during the pandemic are attributed to the lack of technological skills and knowledge among physical education teachers (Ben Amotz et al., 2022; Blegur et al., 2022; Chan et al., 2021; Cunha et al., 2023; Gutierrez et al., 2023; Hartoto et al., 2022; Kaya, 2021; Kim et al., 2021; Konukman et al., 2022; Korcz et al., 2021; López-Fernández et al., 2021; Nicolosi et al., 2023; Phong et al., 2022; Wiguno et al., 2021). One of the included articles suggests that the lack of digital technology usage skills in the online teaching of physical education during the pandemic leads to negative emotions and stress among physical education teachers (Ben Amotz et al., 2022). Similar findings about negative emotions and stress among physical education teachers are reported in the research analysis conducted by Alshammari (2022). These feelings of stress arise from the fear of not being able to correctly implement various applications during the online teaching and learning process of physical education.

A limited number of articles analyze the attitude of physical education teachers based on their age and teaching experience towards the use of digital technologies in online teaching during the pandemic (Friskawati et al., 2021; Gobbi et al., 2021; Hartoto et al., 2022; Ivanova & Mileva, 2021; Nicolosi et al., 2023; Şahin, 2021). There is a relationship between the age of teachers, their teaching experience, and their attitude towards the use of digital technologies in online teaching during the pandemic. Older teachers (aged 41-50) tend to have a negative attitude compared to younger teachers, who exhibit a more positive attitude (Friskawati et al., 2021). Teachers with less experience have better skills in integrating technologies into the learning process and can more

easily develop learning using online platforms (Google Classroom) or other digital applications. Similar conclusions are reached by the researchers Hartoto et al. (2022), who consider that younger teachers perform better in online physical education teaching, experiencing fewer difficulties in using modern technologies. Gobbi et al. (2021) show that younger teachers have higher self-efficacy than those over 50, and self-efficacy decreases with increasing years of teaching experience. One article indicates that there are no differences in the responses of physical education teachers in Bulgaria based on seniority or age (Ivanova & Mileva, 2021). The same was found for physical education teachers in Italy. The research study conducted in this case indicates that there are no significant statistical differences in the online teaching process of physical education based on age groups or teaching experience of the teachers (Nicolosi et al., 2023).

Very few articles present research that analyzes teachers' attitudes toward online physical education teaching during the pandemic based on their gender (Aldababseh et al., 2022; Ben Amotz et al., 2022; D'Agostino et al., 2021; Friskawati et al., 2021; Hartoto et al., 2022; Ivanova & Mileva, 2021; Konukman et al., 2022; Şahin, 2021). Four articles state that there are no differences based on the gender of the teacher in online physical education teaching (Aldababseh et al., 2022; Hartoto et al., 2022; Ivanova & Mileva, 2021; Şahin, 2021). Female teachers have higher efficacy in online teaching in the study conducted by researchers Ben Amotz et al. (2022), while male teachers have a positive attitude towards the use of online learning during the pandemic, according to the research conducted by Friskawati et al. (2021). In the research presented by Konukman et al. (2022), female physical education teachers consider individualized student learning approaches and continuous monitoring as advantages of online lesson implementation. Male teachers see the greater independence of students as an advantage in online teaching. The rate of use of modern technologies was much higher among male teachers than female teachers. Female physical education teachers were less concerned about online teaching and more concerned about the materials used in lessons. Both male and female physical education teachers were concerned about their safety and that of their students.

Physical education during the pandemic poses a challenge that teachers must adapt to and generate strategies to improve the online teaching process (Akkaya, 2021; Almonacid-Fierro et al., 2021; Coulter et al., 2021; D'Agostino et al., 2021; Fika et al., 2021; Foye & Grenier, 2021; Kustantri et al., 2022; Vilchez et al., 2021; Williyanto et al., 2020). One strategy proposed by physical education teachers is the use of non-contact games in online physical education lessons, which encourages understanding of learning and, at the same time, helps students develop problem-solving skills (Akkaya, 2021).

Coulter et al. (2021) present the development of online physical education lessons at home, aiming to provide a source of physical education learning. There is also a good collaboration between teachers and students' parents to ensure the proper utilization of physical education lessons.

One of the articles presents a model for online physical education learning through the implementation of a strategy involving the publication of students' work (Williyanto et al., 2020). This strategy allows for better assessment of students by teachers and, at the same time, increases students' interest in online physical education lessons.

In the study conducted by Kustantri et al. (2022), physical education teachers used various learning models (flipped learning, project-based learning, problem-based learning, and individual learning). The most used method was flipped learning, and the most effective learning model for physical education was individual learning.

The COVID-19 pandemic has significantly impacted the process of teaching and learning physical education. It has led to the marginalization of this discipline, the reduction of physical education lessons due to imposed restrictions, or even the abandonment of physical education classes (Apriyanto et al., 2022; Cruickshank et al., 2021; D'Isanto & D'Elia, 2021; Fika et al., 2021; Foye & Grenier, 2021; Kustantri et al., 2022; Mncube et al., 2021; Nicolosi et al., 2023; Pavlovic et al., 2021; Purnomo et al., 2022). All of these factors have led to physical inactivity or reduced physical activity, both for teachers and students (Almonacid-Fierro et al., 2021; Ardiansyah & Setiawan, 2023; Chan et al., 2021; D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Foye & Grenier, 2021; Korcz et al., 2021; Kustantri et al., 2022; López-Fernández et al., 2021; Murfay et al., 2022; Mncube et al., 2021; Nicolosi et al., 2023; Pavlovic et al., 2021; Phong et al., 2022; Sopa & Pomohaci, 2021; Vilchez et al., 2021). Reduced physical activity and physical inactivity have implications for the health and well-being of both students and teachers (D'Isanto & D'Elia, 2021; Esentürk et al., 2021; Mncube et al., 2021). Physical education teachers believe that the overall endurance levels and the functioning of cardiovascular and respiratory capacities of students have been affected by the inactivity during the pandemic (Sopa & Pomohaci, 2021).

Many articles indicate that physical education teachers need assistance during the pandemic to conduct physical education classes (Aguinaldo, 2021; Alshammari, 2022; Ben Amotz et al., 2022; Centeio et al., 2021; Chan et al., 2021; Cunha et al., 2023; Jeong & So, 2020; Johnson et al., 2021; Kaya, 2021; López-Fernández et al., 2021; Monguillot et al., 2022; Şahin, 2021; Phong et al., 2022; Talaghir et al., 2021; Vilchez et al., 2021).

In most cases, physical education teachers need support and assistance for integrating technologies into online teaching and improving their technological skills for implementing online physical education lessons (Aguinaldo, 2021;

Ben Amotz et al., 2022; Chan et al., 2021; Centeio et al., 2021; Jeong & So, 2020; Johnson et al., 2021; Monguillot et al., 2022; Şahin, 2021; Phong et al., 2022; Vilchez et al., 2021).

In the case of the research conducted by López-Fernández and colleagues (2021), physical education teachers need technical assistance to better manage the large workload required to create more engaging lessons. Results from some articles suggest that teachers require more professional development to improve their skills and knowledge in online physical education teaching, enhancing their effectiveness and helping to reduce stress and anxiety. Anxiety and stress among some teachers stem from their perception that they are not effectively utilizing technology in the online physical education teaching process during the pandemic (Ben Amotz et al., 2022; Kaya, 2021).

CONCLUSIONS

The review study presented provides an overview of research conducted on the delivery of physical education lessons in schools from the perspective of physical education teachers during the pandemic. It is evident that various teaching methods for physical education are employed, with online teaching being predominant. The evidence suggests that the COVID-19 pandemic has had a significant impact on the process of teaching and learning physical education. The studies examined delve into the perceptions of physical education teachers in schools regarding the delivery of physical education during the pandemic.

One primary conclusion drawn from the analyzed articles is that the process of online physical education teaching in schools is considered by teachers as the most suitable alternative during the pandemic. However, this review concludes that this mode of teaching is not always efficient. Another resulting conclusion is that physical education teachers strive to improve the quality of online teaching and learning processes by creating engaging and captivating lessons to attract and motivate students to participate in physical education classes. They make use of various learning platforms and applications, frequently employing videos for information transmission.

The teachers have identified the advantages (lack of time and space constraints, flexibility of the schedule) and disadvantages (significant workload for teachers in lesson preparation, difficulties in the evaluation process of students, diminished enthusiasm due to the lack of interaction between teachers and students, etc.) of the teaching-learning process of physical education during the pandemic.

The review also identifies the difficulties encountered due to the lack of infrastructure, issues arising from network connectivity problems and its improper functioning, as well as problems arising from the absence of adequate equipment. In the case of using the traditional or hybrid models of physical education teaching, challenges arise in ensuring social distancing and maintaining hygiene measures imposed by the pandemic situation.

We hope that this review can serve as a reference point for physical education teachers who can use this valuable information to enhance their teaching style in post-pandemic physical education, whether online or traditional. At the same time, the information can be utilized to refine the didactic process by incorporating more advanced use of digital technology, educational platforms, and modern teaching methods within the traditional physical education lesson.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 35-41
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).02

THE ERECTOR SPINAE MUSCLE, A DETERMINING FACTOR IN THE PATHOLOGICAL BIOMECHANICS OF THE SPINE

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Received 2024 February 07; Revised 2024 March 18; Accepted 2024 March 19;
Available online 2024 Mai 10; Available print 2024 Mai 30

ABSTRACT. Pathological biomechanics of adolescent idiopathic scoliosis is dominated by unilateral erector spinae stiffness. This leads to morpho pathological vertebral changes that aggravate the condition. Manual therapies can be used to correct the asymmetry of the stretch reflexes, and massage techniques can be used to improve the range of motion. Pain is an aggravating factor for biomechanical disorders and can be combated by myofascial techniques. To prevent scoliosis in adults, it is possible to tone the erector spinae muscles (deadlifts and their variations, exercises with free weights, arm and leg ergometer exercises, some aquatic exercises, Pilates isometric exercises performed on a stable surface).

Keywords: *spinal erector muscles, scoliosis prophylaxis*

REZUMAT. ***Mușchiul erector spinal, factor determinat în biomecanica patologică a coloanei vertebrale.*** Biomecanica patologică a scoliozei idiopatice a adolescentului este dominată de rigiditatea unilaterală a erectorului spinal. Aceasta duce la modificări morfopatologice vertebrale ce agravează afecțiunea. Pentru a corecta asimetria reflexelor de întindere pot fi folosite terapiile manuale, iar pentru îmbunătățirea amplitudinii de mișcare, tehnicile de masaj. Durerea este un factor agravant pentru tulburările biomecanice și poate fi combătută prin tehnici miofasciale. Pentru profilaxia scoliozei adultului se poate face tonifierea mușchilor erectori spinali (deadlift și variantele lor, exerciții cu greutăți libere, exerciții la ergometrul de brațe și la cel de picioare, unele exerciții acvatice, exerciții izometrice Pillates executate pe o suprafață stabilă).

Cuvinte-cheie: *mușchi erectori spinali, profilaxie scolioză*

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INTRODUCTION

In the biomechanical asymmetries present in adolescent idiopathic scoliosis, the main role is played by the erector spinae muscles, as shown by the following studies:

a) Patients with scoliosis show pathological changes in walking speed, step length, and peak EMG activation for the erector spinae, biceps femoris, semimembranosus, rectus femoris, gastrocnemius, and tibialis anterior (Garg et al., 2021).

b) In adolescents with idiopathic scoliosis, the gait analysis showed that the frontal pelvic motion and stance phase are significantly reduced, and the duration of the electrical activity of quadratus lumborum, erector spinae and gluteus medius was significantly increased in the group with idiopathic scoliosis of the adolescent compared to the subjects healthy (these muscles have a prolonged activation time) (Kim et al., 2020).

From a biomechanical point of view, the spine with degenerative scoliosis tends to be more rigid and has a lower range of motion in flexion-extension (Rustenburg et al., 2020). In this case, it should be considered that the spinal erectors intervene in the flexion-extension movements of the trunk (Othman et al., 2007). Rigidity of the spine and biomechanics disorders due to anatomic-functional changes in the spinal erectors lead to vertebral pathologies that make the movements of the spine difficult, thus creating a vicious circle. Thus, on an experimental model of scoliosis that used Sprague-Dawley rats, it was demonstrated that asymmetric tensions contribute to asymmetries regarding the expression of proteins and implicitly of the quality of the bone material of the vertebral epiphyseal plates, and such anatomical asymmetries aggravate asymmetric muscle tensions, and thus it creates a vicious circle (Li et al., 2017). Another study revealed that the range of motion of the lumbar vertebrae is limited in the case of changes in their physiological shape (Zhang et al., 2021). Even postoperatively, for scoliosis, biomechanical loading of the sacrum endplate is related to postural balance and newly established spino-pelvic alignment (Pasha et al., 2015). Evidence that the spinal erectors are the main muscles involved in the biomechanical and anatomo-functional disturbances in scoliosis is provided by the literature, in which a case is described in which after 6 months of orthotic treatment, the main thoracolumbar/lumbar structural curve partially corrected, and the amplitude frontal movements of the pelvis and hip increased, thereby improving muscle biomechanics during walking, and the duration of EMG activity of the erector spinae muscles was decreased at the end of treatment, but this was not true for the lumbopelvic muscles (Mahaudens et al., 2014). The applications are in therapy, because in the

thoracic region of the spine, on the convex side of the scoliosis, the shortened and tense erector spinae muscles must be stretched, while in the lumbar region the same maneuver must be performed on the concave side of the scoliosis (Wilczyński, 2021). Moreover, in a patient with spinal myeloid osteosarcoma, myolysis of the erector spinae was found to produce low back pain, protective contracture, and scoliosis (Kawahara et al., 2002). As a result, the present article proposes a review of the possibilities of toning and pain therapy at the erector spinae level, as measures to prevent and treat scoliosis. This is because scoliosis can also occur in adulthood (Ishihara et al., 2020).

Pain therapy

Myofascial techniques can be successfully used to reduce spinal erector stiffness, also having analgesic effects (Devantéry et al., 2023). Devices capable of quantifying the stiffness of the spinal erectors in patients with chronic low back pain have been invented, the pain of this muscle being more pronounced in the sitting position (Li et al., 2022). When designing an exercise program for the spinal erector muscles, it should be considered that they are activated more strongly during forward propulsion in individuals with chronic low back pain than in healthy people (Taylor et al., 2023). However, it should be specified that if inspiratory muscle training is done for patients with low back pain associated with respiratory dysfunction, the activated muscles are multifidus and transverse abdominis (Ahmadnezhad, Yalfani, & Gholami Borujeni, 2020).

Exercises for the erector spinae muscles

In the specialized literature, there are articles that analyze the activation of spinal erectors during physical exercises. Their toning would allow the prevention of scoliosis or the maintenance of the results of therapies to correct the condition. The erector spinae muscles and the quadriceps femoris are activated more strongly than the gluteus maximus and the biceps femoris during the Deadlift and its variants, but still during the Romanian Deadlifts the demand on the spinal erectors is lower (Martín-Fuentes, Oliva-Lozano & Muyor, 2020), which matters for the selection of exercises according to the goal pursued. The greatest activation of the spinal erectors, however, occurs during exercises with free weights (Oliva-Lozano & Muyor, 2020). Both arm and leg ergometers can be training tools for the erector spinae muscle (Shima et al., 2022). In subjects with non-specific low back pain, the squat and bird-dog exercises are the most effective for stimulating the lumbar spinal erectors (Calatayud et al., 2019). Other exercises that also activate the spinal erectors

are leg curl, "good morning", glute-ham raise (McAllister et al., 2014). Aquatic exercises (squat exercises) can also be of real use for toning the spinal erectors, in which case the multifidus, another extensor of the back, also comes into action (Psycharakis et al., 2022). Another method to tone the spinal erectors are isometric Pilates exercises, more effective being those performed on a stable surface than those on the Swiss Ball, and among these those with back extension together with elbow extension (Paz et al., 2014). The T7 and L3 spinal erectors can be selectively activated by back extension exercises (Yoo, 2015).

CONCLUSIONS

1. The central element of the physio pathological chain that characterizes adolescent idiopathic scoliosis is the unilateral stiffness of the erector spinae, and this can lead to anatomical and functional changes in the vertebrae that aggravate the disease.

2. Therapeutically, some manual therapies can be used to correct the asymmetry of the stretch reflexes, myofascial techniques can be used for pain therapy, and massage techniques can be used to increase the range of motion.

3. In order to prevent scoliosis occurring in adulthood, various exercises can be done to tone the erector spinae muscles.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 43-58
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).03

THE INFLUENCE OF PHYSICAL EDUCATION LESSONS IN THE PRACTICAL PREPARATION OF STUDENTS FOR OBTAINING THE DRIVING LICENCE

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Received 2024 March 02; Revised 2024 April 05; Accepted 2024 April 08;
Available online 2024 May 10; Available print 2024 May 10.

ABSTRACT. The purpose of this study is to explore the influence of physical education lessons in the practical preparation of students for obtaining a driving license. In this respect, the exercises used in physical education lessons, systematized and appropriately dosed, help to educate ambition, courage, distributive attention, calmness, tolerance, perseverance, fast thinking, capacity for anticipation, etc. To achieve the purpose of this paper, two questionnaires were developed. The first questionnaire, with 5 questions, was addressed to a number of 50 driving instructors. For the quantification of the answers, they had to refer to a number of 10 students and answer numerically the answer variants of the question, so that the total sum of the answers to be 10. The second questionnaire, with 4 questions, was addressed to students participating in physical education lessons. For all questions, the answers given had to include all answer variants, percentagewise, so that the total sum of the answers to a question to be 100%. The questionnaire was distributed to 50 students who attended the driving school. After analysing the highest percentages obtained from the students' answers, it was found that the low results in the practical test for obtaining the driving license are due to poor motor coordination, due to the fact that students are not able to think fast and to find solutions in situations that arise and finally they are not able to cope with the traffic congestion, especially when there are drivers who do not follow the traffic rules. The analysis of the answers given by the driving instructors to the questions led to the conclusion that students are very rushed and do not have patience to listen to the whole explanation given by the instructor, they have poor distributive attention and poor coordination of motor and intellectual activities.

Keywords: *practical abilities, skills, distributive attention, physical education, driving license, practical preparation*

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REZUMAT. ***Influența lecțiilor de educație fizică în pregătirea practică a elevilor pentru obținerea permisului auto.*** Acest studiu şi-a propus să exploreze influenţa lecţiilor de educaţie fizică în pregătirea practică a elevilor pentru obţinerea permisului auto. În acest sens, exerciţiile folosite în lecţiile de educaţie fizică, sistematizate şi dozate corespunzător, ajută la educarea ambiţiei, curajului, atenţiei distributive, calmului, toleranţei, perseverenţei, gândirii rapide, capacităţii de anticipare etc. Pentru realizarea scopului lucrării au fost elaborate două chestionare. Primul chestionar, cu 5 întrebări, a fost adresat unui număr de 50 instructori auto. Pentru cuantificarea răspunsurilor, aceştia trebuiau să se raporteze la un număr de 10 elevi şi să răspundă numeric la variantele de răspuns ale întrebării, astfel încât suma totală a răspunsurilor să dea 10. Al doilea chestionar, cu 4 întrebări, a fost adresat elevilor care participă la lecţiile de educaţie fizică. La toate întrebările, răspunsurile oferite trebuiau să cuprindă toate variantele de răspuns, procentual, astfel încât suma totală a răspunsurilor la o întrebare să fie 100%. Chestionarul a fost distribuit unui număr de 50 de elevi care au urmat cursurile şcolii de şoferi. După ce au fost analizate cele mai mari procente obţinute la răspunsurile elevilor, s-s constatat că rezultatele slabe la susţinerea probei practice pentru obţinerea permisului auto se datorează unei coordonări motrice deficitare, a faptului că elevii nu sunt capabili să gândească rapid şi să găsească soluţii în situaţiile apărute şi în final nu sunt în stare să se descurce în aglomeraţia din trafic, mai ales atunci când apar şi conducători auto care nu respectă regulile de circulaţie. Analiza răspunsurilor oferite de instructorii auto la întrebările chestionarului, a condus la concluzia că elevii sunt foarte grăbiţi şi nu au răbdare să asculte întreaga explicaţie dată de instructor, că au o slabă atenţie distributivă şi o coordonare redusă a activităţilor motrice cu cele intelectuale.

Cuvinte-cheie: *abilităţi practice, aptitudini, atenţie distributivă, educaţie fizică, permis auto, pregătire practică*

INTRODUCTION

Educational institutions must provide students with the best possible conditions for acquiring knowledge, developing abilities (skills, capabilities, aptitudes) and attitudes needed to adapt and integrate in a constantly changing society. Physical education aims the formation of modern human through multilateral development from a physical, intellectual, ethical, aesthetic point of view, in relation to the demands of the future contemporary society, according to the real aptitudes, on the basis of which the coordinates of the human personality are outlined; benchmarks that concern 5 aspects: sanogenesis, motility, motor skills, mental and attitudinal skills, specialized knowledge (Curticăpean, 2015). According to the Physical Education School Program for grades IX-XII, (2009),

the general objective of Physical Education discipline is to develop bio-psychomotor skills and the ability of students to act on them, in order to maintain optimal health, ensure a harmonious physical development and manifest a motor capacity conducive to professional and social integration. Many young people who turn 18 want to go to the driving school and take the exam to obtain the driving license. However, the driving exam is often difficult to pass. According to the report of the Directorate General for Driving Licenses and Registrations (DGPCI), in 2022, the pass rate for the first exam was 50.5% in Argeş County (Vlad, 2023).

In the process of practical preparation for obtaining the driving license, a lot of knowledge, skills, aptitudes, attitudes and qualities acquired during physical education lessons in pre-university education are also necessary. In order to make the practical training of future drivers as effective as possible, several aspects must be taken into account: distributive attention, memory, fast thinking, listening skills, vigilance, practical skills, hand-foot-eye coordination, reaction (reflexes) and execution speed, physical and mental endurance, anticipation, maintaining concentration over long periods, etc. Reaction speed is a motor skill extremely necessary for drivers. This skill is successfully developed during physical education and sports lessons. In traffic, drivers are required to use reaction speed very often. There is a mental reaction time (the time between perceiving a dangerous situation and making a decision) and a physical reaction time (the time between making a decision and the body's reaction, for example, applying the brake pedal or manipulating the steering wheel to avoid a dangerous situation). Dragnea & Mate-Teodorescu (2002), consider that the literature evidence shows that reaction time is different when using different signals. Thus, at a light signal, the latency time is 180 msec, at a sound signal, 150 msec, at tactile arousal 140 msec, at pain 800 msec. Reactions to different signals can be simple or complex. The simple reaction is a correct response to a previously known signal, but which occurs unexpectedly (e.g., the sound of a gun at the start). This type of reaction is particularly important not only in sport, but also in everyday life (just think about driving a car).

Neculau et al. (2005), state that skills are the relatively stable mental and physical attributes that enable people to perform certain activities successfully. The presence of skills is evidenced by the ease and speed at tasks performing and the high quality of the results (...) There are different typologies of skills. According to the nature of the mental processes involved in skills, we distinguish between sensory skills (visual, auditory, olfactory acuity), psychomotor skills (manual dexterity), intellectual skills (intelligence). Also, psychomotor education in physical education lessons is a huge benefit for future drivers. Constantin (2020) considers that psychomotricity is a complex function that integrates and combines motor and mental elements that determine the regulation of individual behavior, including the participation of various processes and mental functions,

ensuring the proper execution of response to various situations, stimulus. Motricity as a functional substructure of psychomotority is the global name of the muscular reactions through which the movement of the body or its various components is achieved. This quality of movements and especially of some gestures is determined by the way the information is received and interpreted, as well as by the quality of the response act, which is influenced not only by motor factors, but also by cognitive, affective, motivational and volitional factors. It is a complex act, which combines motor and psychic abilities in performing the action, and this act is called a psychomotor act. Studies about movement and the relationship between body and mind are a concern topic in various domains, domains which impose a global vision over the human being. To define the "unitary man", the tendencies imposed the appearance of a new and complex area which can treat /discuss the progress and motor acquisitions of the human being coordinated by mental activity and fulfilled by creative, affective and social development. This is how psychomotricity appeared, as a complex area which responds to human needs according to education, re-education, therapy, an area discerned as an entire system conditioned by the interaction between children and adults, between education and growing up, between movement and mental functions (Talaghir, Berdilă & Iconomescu, 2019).

The elements of psychomotricity are valuable when being integrated in an adapted unitary motric behaviour adaptable at the same time to the different changed situations. Leading one's body presumes the existence of a background filled with qualities structured by practice and adapted to mechanisms of anticipation and control (Moldovan, Enoiu & Albulescu, 2012).

The main components of psychomotricity, according to Epuran (2005), are the following: kinesthetic sensitivity; sense of balance; sense of rhythm and appreciation of short durations; limb coordination - homolateral or heterolateral; eye-hand or eye-foot coordination; general coordination; agility; accuracy and stability of movements; assessing the actions opportunity at different points in time; laterality; body schema; ideomotricity.

We consider that practical preparation for obtaining a driving licence is very similar to motor learning in physical education lessons. Fitts (1964) and Schmidt (1982) cited by Neagu (2010), emphasize the characteristic of three-stage organization of the motor learning process as follows:

- the cognitive or verbal motor stage, where learning is marked by intense cognitive activity. The motor task is entirely new; movements are abrupt and fragmented, the attention demand is maximal, almost completely absorbing all the coordinative resources;

- the motor stage is the second sequence, characterized by a selectivity of motor programs;

- the autonomous stage, the last in the view of the two authors, which is marked by the automation of motor engagement processes.

Before enrolling in driving school, every person must take a compulsory psychological test to assess their driving skills. The psychological test consists of a written examination and a practical examination on a computer with two-foot pedals and two hand buttons, where various tasks received are performed. The aim of the practical examination of the psychological driving test is to check the following: speed of reaction to unexpected situations - focuses on the fast response to unexpected situations on the road; concentrated and distributive attention - as attention is one of the most demanded mental abilities while driving (concentration of attention, keeping several objects in the attention zone simultaneously, as well as the candidate's observational skills are tested); perception of spatial relations and time; psychomotor skills - include coordination and complex reactions, such as hand-foot synchronisation, self-regulation, speed, accuracy, vigilance, fatigue resistance. Thus, to some extent, the personality profile of the subject is also shaped: neuropsychological stability, temperament, risk-taking, conflict, social integration, responsibility, frustration tolerance level (Danco, 2024).

Thinking is the most important distinguishing feature of the human psychic, defining humans as the subject of logical, rational knowledge. It is so because thinking produces substantive changes in the information with which it operates. While other psychic mechanisms produce superficial changes, the nature of the information remaining the same, thinking changes the nature of the information, it makes the leap from the non-essential to the essential, from particular to general, from concrete to abstract, from external - accidental to internal - invariable (Eţco et al., 2007). Attention is the phenomena of selective activation, concentration and orientation of psych-neural energy for optimal mental activity, especially higher sensory and cognitive processes (Buzdugan, 1999). Khan and Hillman (2014), cited by Silva-Capella et al. (2021), consider that attention is a widely studied concept in today's science, especially in recent years. Concentration of attention is manifested by a more stable orientation of mental activity, by mobilizing all the information material held with regard to the object of attention, and by an increase in the intensity of mental activity in relation to the fixed object (Buzdugan, 1999). Distributive attention is, in fact, a person's ability to efficiently perform multiple tasks simultaneously. This type of attention is in high demand among people learning to drive a car, given the fast pace of today's traffic and many tasks that the future driver must perform correctly at the same time. Distributivity of attention represents the simultaneous performance of several activities, with the condition that at least some of them are relatively automated (Buzdugan, 1999). "To be careful" means to be prepared in advance for what you are about to undertake, to be on alert, not to be taken

by surprise, not to be caught off guard, to do the right thing, to orient yourself in advance in the field of events, to control your reactions, etc. (Golu, 2005). Attention is an indispensable mental function at any moment of existence, having the role of self-regulating mental activity on micro-intervals and intermittently. Attention is understood as the function through which the elective orientation and concentration of mental activity on a limited group of defined objects, phenomena and actions is achieved. Without its participation it is not possible for the psychic to perform selective activity, which has repercussions on the clarity of perceptions and their fixation in memory (Caşcaval, 2007). In the psycho-behavioral system, attention is a highly complex activity characterized by the sphere of inputs and outputs. At "input" we are constantly confronted with an avalanche of stimuli, of different modalities (auditory, visual, olfactory, cutaneous-tactile, etc.) and configurations (intensities, frequencies, shapes, colors, tastes, etc.), only some of which carry significant and congruent information about what we are doing at the moment or what we are going to do later, the rest being indifferent or neutral. In the sphere of "output" it is necessary to select from the general repertoire of possible responses the most appropriate reaction at the right time (Golu, 2005).

Popovych et al., (2023), states that in her research A. Nobre (2001) examined the scientific problem of orientation of attention towards a moment of time. This problem is considered in terms of neuropsychology. The research confirmed the possibility of using a time frame for managing selective attention. A non-invasive methodology allowed identifying the involved systems and mechanisms in brain and establishing that an individual is able to direct attention selectively towards different moments of time, improving behavioral indexes. The left frontal lobe is involved in spatial orientation. The neural system through sensori-motor zones connected with anticipation processes facilitates orientation of attention depending on attributes of a stimulus. It is obvious that optimization of behavioral activity through time orientation has an impact on a delay and amplitude of potentials. These potentials, in their turn, have an impact on movement reactions and decisions. The obtained results demonstrate flexibility of the mechanisms of functions of attention in the human brain. Revlin, (2013) cited by Szczypińska M. and Wmikicin M., (2019) considers that at present, attention is specified as the process of focusing on one task or source of stimuli despite distraction. Attention makes it possible to precisely register some aspects of the environment, enables learning and quick reaction.

Memory is the psychic process by which the imprinting, preservation and reactualization of previously acquired cognitive, affective, volitional experience is carried out in the form of recognition or reproduction (Negură & Losîi, 2010). Cosmovici and Iacob (1999) consider that memory is the fundamental psychological function that makes it possible to fix, preserve, recognize and reproduce

psychological phenomena. There is an imagistic memory, ensuring the preservation and reproduction of representations, a verbal-logical memory relating to ideas, an affective memory (creating the possibility of reliving emotions, feelings) and a motor memory (making it possible to form skills and aptitudes). Memory is a quality of thinking that stores learning experiences, and through correlation and accumulation it enables the reproduction of knowledge and skills, formed through motor acts and actions, as faithful as possible to previous actions (Scarlat & Scarlat, 2003).

No activity, including driving, can be carried out with optimum efficiency unless it draws on previous experience in the form of both information structures (images - representations, knowledge, etc.) and operational-executive schemes. The driver makes use in each sequence of the specific informational-instrumental elements developed and learnt previously. Therefore, in regulating driving behaviour, memory becomes an absolutely indispensable component (Cașcaval, 2007). In any learned act there are aspects of stereotypy and variability. For example, in driving a car: starting from the standing position is always done with the same movements, but once out on the road, steering, accelerating and braking depend on the shape of the route and the obstacles encountered. In some activities, monotony and stereotypy prevail, while in others we find a lot of variability (Cosmovici & Iacob, 1999). Driving a vehicle, especially during driving school, is an extremely complex activity. Vehicles have mainly 6 operating controls, 3 hand-operated (gear lever, steering wheel with on-board controls and the emergency brake) and the other 3 foot-operated (clutch pedal, brake pedal and accelerator pedal), constituting the devices that ensure that the car is set in motion, the steering is maintained on the desired trajectory and the speed is reduced to a complete stop (Cantea, 1994). In today's busy traffic and stressful environment, attention during driving is particularly important. (...) Among the main causes of inattention behind the wheel are fatigue, the consumption of alcohol or medicines contraindicated for driving, the drivers suffering due to illness, etc. (Beda, Stoleru, Ene & Diniță, 1984). To the causes mentioned above by the cited authors can be added other current reasons for inattention behind the wheel such as: drug use, smoking, talking on the phone, eating, drinking, arguing with others in the car, nervousness due to heavy traffic, manipulating the radio, changing a CD, etc.

PURPOSE OF THE STUDY

The aim of the study was to explore the influence of physical education lessons in the practical preparation of students for obtaining the driving licence.

MATERIAL & METHODS

The research methods used were specialty literature analysis, questionnaire survey, statistical-mathematical method and graphical method. To achieve the purpose of the study two questionnaires were developed. The first questionnaire, with 5 questions, was addressed to a number of 50 driving instructors. For the quantification of the answers, they had to refer to a number of 10 students and answer numerically to the answer variants of the question, so that the total sum of the answers to be 10. The second questionnaire, with 4 questions, was addressed to students participating in physical education lessons. For all questions, the answers given had to include all answer variants, percentagewise, so that the total sum of the answers to a question to be 100%. The questionnaire was distributed to 50 students who attended the driving school.

RESULTS

After analysing and interpreting the questionnaires we obtained the results presented below. To question 1, addressed to driving instructors - "From your point of view, what is the attitude of students when you explain them what they have to do in traffic or when performing specific manoeuvres?", the following answers were obtained: 26.80% of the students are receptive and attentive to the explanations given by the instructor and when they do not understand something they ask questions; 37.60% are very hurried and do not have the patience to listen to the whole explanation given by the instructor, intervening with questions.

35.60% do not ask questions, even if they do not understand, but wait to be told step by step what to do while driving or performing manoeuvres (figure no.1). To question 2, addressed to driving instructors - "What do you consider is the level of development of distributive attention among the students you are teaching in order to obtain the driving license?" the following results were obtained: 18.60% of students have very good distributive attention, 19.40% - good, 41.40% - poor and 20.60% - very poor. It is noted that the largest share is held by students with poor and very poor distributive attention (figure no. 2).

To question 3 - "What is the main reason for which some students choose to do the driving school on automatic gearbox vehicles, even though they know that this type of license, once obtained, does not allow them to drive manual gearbox vehicles?", the following answers were obtained: 22.80% of students choose this option for commodity; 58.40% due to their inability to use both legs simultaneously; 14.40% because of age and only 4.40% because of medical problems. Thus, it can be observed that more than half of the students (58.40%) choose to do the driving

school on automatic gearbox vehicles due to the difficulty of using both legs at the same time (figure no.3).

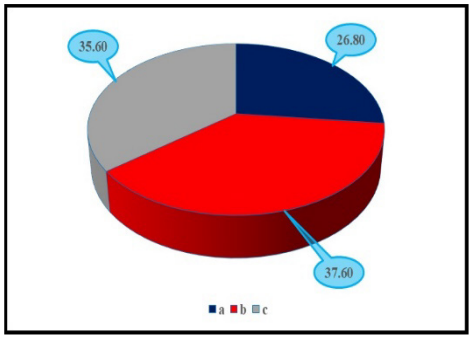

Figure 1. Graphical representation of responses to question 1

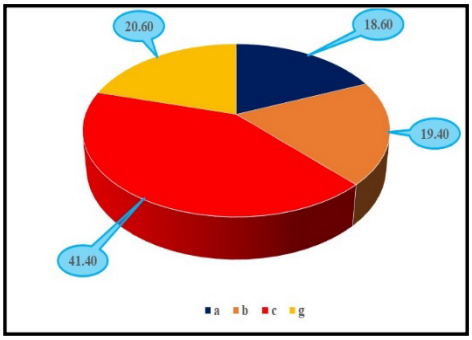

Figure 2. Graphical representation of responses to question 2

Answers given by instructors to question 4 - "For what situations do you have more work to do during the driving lessons in your opinion?" revealed the following: 26.40% - inattention of students; 15.40% - commodity of students; 13.8% - poor theoretical preparation; 44.40% - poor coordination of motor and intellectual activities, more precisely performing several things at the same time (figure no.4).

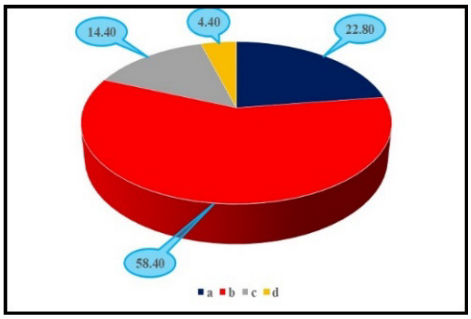

Figure 3. Graphical representation of responses to question 3

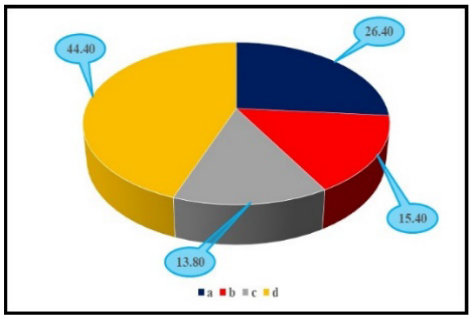

Figure 4. Graphical representation of responses to question 4

To the last question - "Which are the skills that should be improved by your students in order to acknowledge the content of the lessons with maximum efficiency?" The driving instructors consider that in 18.40% of cases practical skills should be developed; 14.20% - listening skills; 36.80% - distributive attention; 15.80% - way of thinking and 14.80% - general attitude. As can be observed, the most deficient skill is distributive attention (figure no. 5).

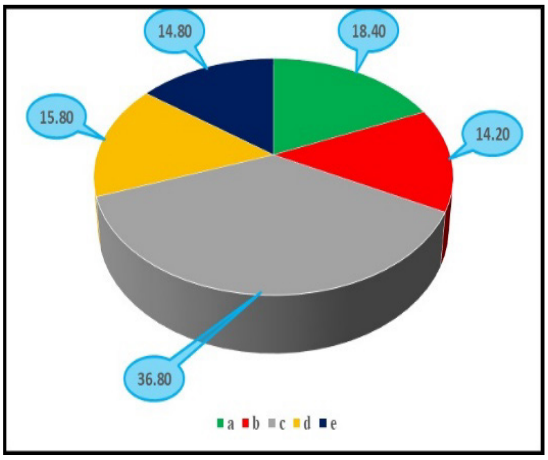

Figure 5. Graphical representation of responses to question 5

To question 1 addressed to the students - "which are the aspects that you find most difficult during the practical preparation lessons for obtaining the driving license?", 25.60% of the students consider that the elements of distributive attention (answer "a"); 32.70% - motor coordination (simultaneous use of hands and feet while making decisions about what to do in the situation encountered (intersection, pedestrian crossing, overtaking, etc. and performing the maneuvers correctly) - (answer „b"); 23.80% - applying theory (traffic legislation) - (answer „c") and 17.90% - maintaining attention and concentration over long periods of time (answer „d"). As can be seen from figures 6a and 6b where the students' answers are recorded, motor coordination (32.70%) is the one that creates the most difficulty for students during practical lessons.

To question 2 „What skills acquired during physical education lessons do you think would help you learn to drive a car more easily?" the students answered as follows: 22.40% - development of quick thinking according to the situations; 21.70% - development of reaction and execution speed; 19.40% - development of coordination; 21.30% - development of distributive attention and 15.2% increase of physical and mental resistance (figures no. 7a and 7b).

To question 3 - "Do you consider that during physical education lessons you carry out enough activities to help you acquire the skills needed to obtain the driving licence?", 36% of students answered affirmative and 64% answered negative. Figures 8a and 8b show the responses of the 50 students who took part in our study.

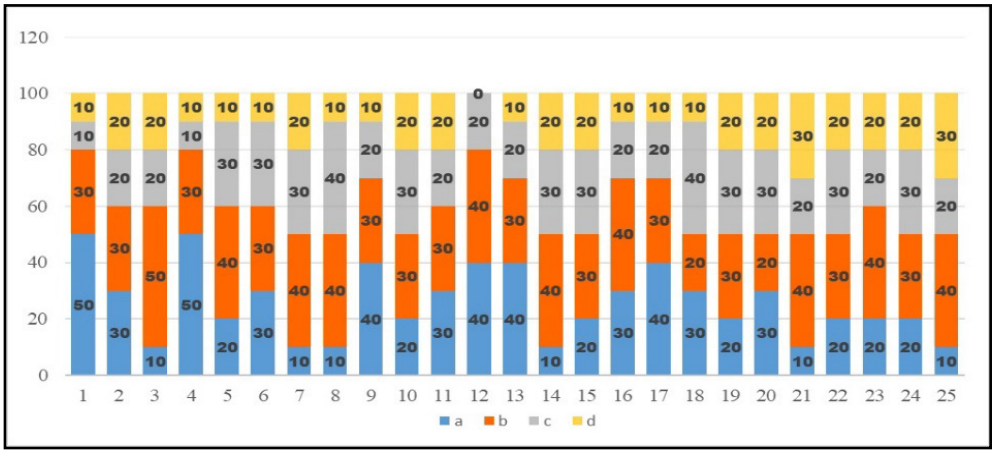

Figure 6a. Graphical representation of students' answers to question 1 (students 1-25)

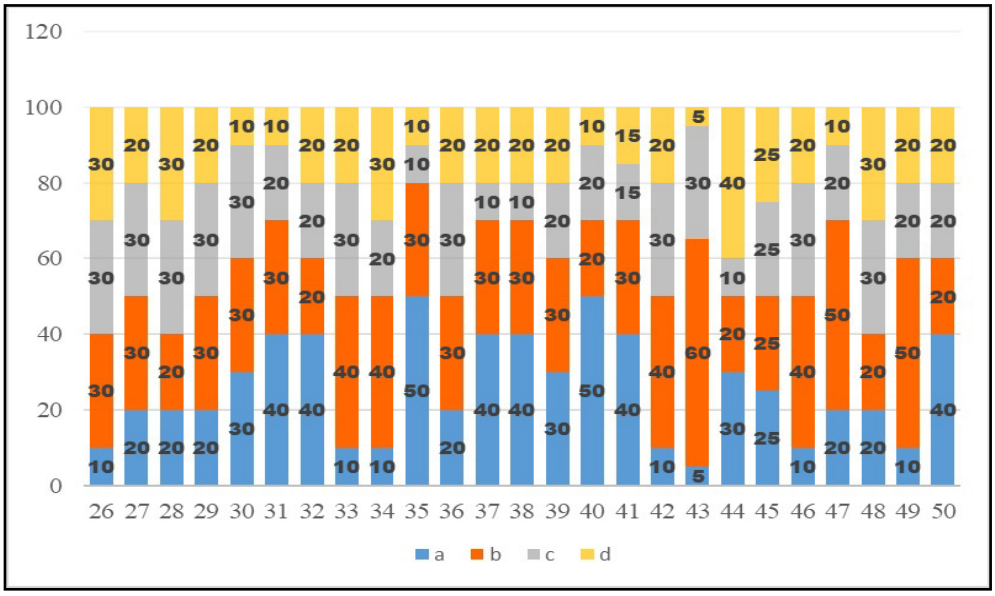

Figure 6b. Graphical representation of students' answers to question 1 (students 26-50)

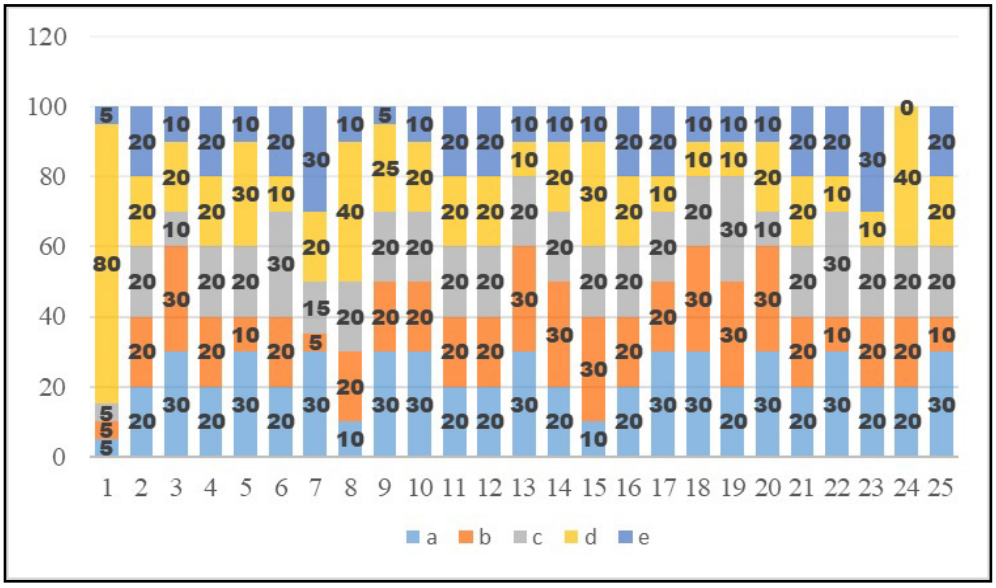

Figure 7a. Graphical representation of students' answers to question 2 (students 1-25)

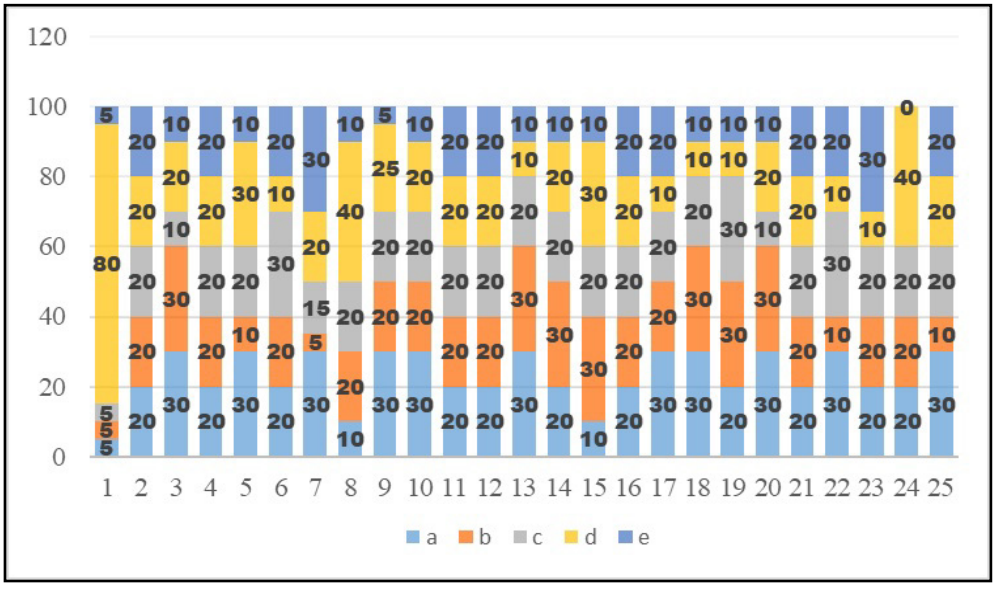

Figure 7b. Graphical representation of students' answers to question 2 (students 26-50)

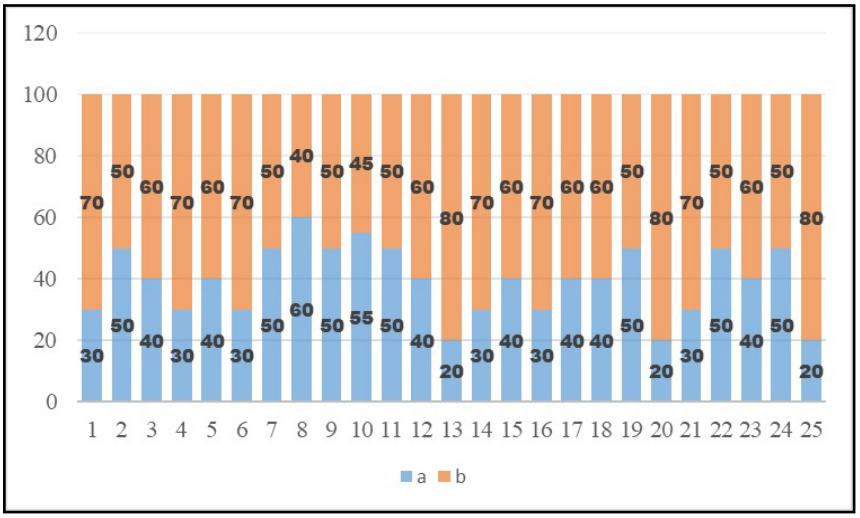

Figure 8a. Graphical representation of students' answers to question 3 (students 1-25)

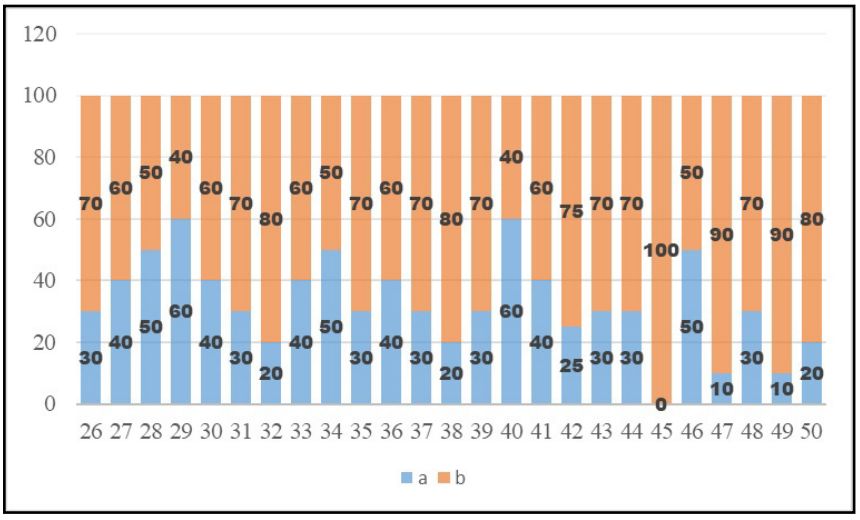

Figure 8b. Graphical representation of students' answers to question 3 (students 26-50)

Students' answers to the last question of the questionnaire - "Which are the factors that tire you most during the driving lessons?" highlight that 31.90% of the students consider that they get tired the most when they perform all the necessary manoeuvres to drive the vehicle properly on the routes indicated by the instructor and follow the traffic rules; 36.30% - traffic congestion and the fact that some

drivers do not follow the traffic rules, 19.50% - the inability to do more things at the same time and 12.30% of the students consider that they get tired the most during driving lessons because they lose their temper when things do not turn the way they should.

DISCUSSION

Driving a car and, especially, the specific conditions in which road traffic takes place today, require from the driver of a motor vehicle, in addition to physical integrity, a number of particularities relating to the mental state of the person concerned. These are, primarily, those skills which facilitate both acknowledging driving the vehicle and practicing this activity in safe conditions (Ciobotaru & Dumitrana, 1990).

The most important condition for a person to learn is attention. No conscious human activity can take place normally without sustained attention. Therefore, the degree of development of attention, of its qualities (stability, concentration, distribution, volume, mobility) is the basic element of learning capacity, which led the Czech pedagogue Comenius to advise educators: "let us speak only for those who listen, let us teach pupils only when they are attentive" (Drăgan & Partenie, 1997). Beda, Stoleru, Ene & Diniță (1984) consider that inattention behind the wheel is frequently caused by emotional anxieties, thoughts, concerns about solving work or family problems, euphoric moods following successes or, on the contrary, worry, anxiety due to failures. In other cases, inattention behind the wheel is caused by the driver's temper. Tests of all kinds fail in some cases to prevent some people becoming drivers, perhaps quality people, but superficial, distracted when they are behind the wheel, and society pays the price for such errors. There are also cases where people have not been taught to educate their attention. It seems curious, but it is true. Even during driving lessons, the instructor has to train and educate his students to pay attention. Not simplistically, in a general way. They have to be taught specifically how to distribute their attention, how much of it should be devoted to the front side, on the lateral or behind the vehicle.

Romania comes first in Europe at the number of car accidents. According to the National Institute of Statistics, more than 70 accidents occur on the country's roads every day. In 2022, an average of 76 accidents occurred every day, which means more than 28,000 accidents in a single year across the country. As a result of these accidents, an average of four Romanians died every day. Most accidents occurred in Bucharest, followed by Iași, Cluj, Constanța, Suceava and Mureș counties (Chirilă, 2023). Knowing these statistics, we realize even more how important it is that, after finalizing driving school, the future driver is theoretically and practically well prepared to be able to drive safely on the road, both for himself and for other traffic participants.

CONCLUSIONS

Analyzing the highest percentages obtained at the students' answers, we notice that the low results in the practical exam for obtaining the driving license are due to poor motor coordination, to the fact that students are not able to think quickly and to find solutions in situations that arise and finally they are not able to cope with the traffic congestion, especially when there are drivers who do not follow the traffic rules. From the analysis of the answers given by the driving instructors to the questions of the questionnaire, we find out that students are very rushed and do not have the patience to listen to the whole explanation given by the instructor, they have poor distributive attention and reduced coordination of motor and intellectual activities. The school curriculum for Physical Education and Sport discipline sets out general and specific competences and allows teachers to use certain teaching aids corresponding to the content provided. Considering the competences to be formed through physical education lessons, it can be concluded that this subject in the curricula is one which contributes to a very large extent to the acquiring of all the elements necessary for the most effective practical preparation of future drivers. Therefore, many of the shortcomings noted in our study can be improved through using, by the teachers, of specific means in the physical education lesson in pre-university education targeting the following aspects: distributive attention, memory, fast thinking, listening skills, vigilance, practical abilities, hand-foot-eye coordination, reaction speed (reflexes) and execution, physical and mental resistance, anticipation ability, maintaining concentration over long periods, etc.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 59-74
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).04

THE CRITICAL THINKING IN PHYSICAL EDUCATION AND SPORTS TEACHERS

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Received 2023 November 17; Revised 2024 January 08; Accepted 2024 January 09; Available online 2024 May 10; Available print 2024 May 10.

ABSTRACT. The inner world of the teacher of physical education and sports has become a determining variable in the understanding and justification of the pedagogical act of these professionals. Thus, the critical thinking of these social actors is presented as a privileged indicator likely to reflect not only the mental processes at stake by these teaching professionals but also the nature of the issues on which they deliberate the most often during the teaching-process learning. The present study tries, first, to describe the form and substance of critical thinking deployed by physical education and sports teachers (PES), then to analyze the relationship of this form of thinking and the teaching process.

Keywords: *Critical Thinking, PHE Teachers, Professionalism inking to the professional status of these teachers.*

INTRODUCTION

In light of the current modernization of information and the terrible technological development that the world is witnessing in all fields in general and in the field of educational curricula in particular, we note that the educational process has become a prominent place among the priorities of this development and this is an issue of interest to the issue of preparing professors and studying their teaching competencies at the present time due to the importance of the role of Professor Guy of the teaching process (Benguenab, 2021), where this preparation

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requires a special priority to demonstrate their abilities, skills and the extent to which they use the art of teaching from developments and changes (Haiman, 2017). This movement has become an effective force in the reality of the wheel of the educational process and in the preparation and preparation of the future teacher and raise his career level, and this process requires a broad and comprehensive view where the necessary competencies are determined for the teacher of sports education to exercise his role to the fullest (Atalah, 2001). Since the change is an important, objective and orderly process, the professor within his class and during his class has been given full freedom to act using what he sees as appropriate educational methods to achieve the technical and scientific competencies required by the good conduct of the course, in addition to the opinions and beliefs that accompany the subject of the lesson. This enabled the professor to employ competencies consistent with his personality and abilities.

Criticism of teachers' unprofessionalism and lack of competence is growing (Gauthier, 1997). This uncomfortable situation in which teachers find themselves invites, for some time now, all school stakeholders to look in depth at the reasons for this state of affairs and explore new avenues to better arm teachers in initial training (Daniel & Cormack, 2001) or in continuous training (Carlier & Paquay, 2000) in order to properly accomplish their task and help the School meet the challenges it faces. However, while the behavioral paradigm has inspired researchers and education professionals for more than a quarter of a century to identify behavioural indicators related to teacher competence and effectiveness, the cognitive-constructivist approach presents itself today as a promising and unavoidable alternative (Crum, 1995; Durand, 1996a, 1996b; Florence, Brunelle & Carlier, 1998; Rémigny, 1998; Tsangaridou & O'Sullivan, 1994, Tsangaridou & Siedentop, 1995). Thus, the focus in this new approach is placed, among other things, on the reflexivity of the teacher and the teacher when they perform their pedagogical act. Researchers and educators in education are showing great interest in taking into account, from now on, the cognitive processes of teachers that are underlying the behaviours observed in the classroom.

The inner world of the teacher and the teacher has become a determining variable in the understanding and justification of the pedagogical act of these professionals. Thus, the critical thinking of these social actors is presented as a privileged indicator likely to make account only of the mental processes at stake by these teaching professionals but also of the nature of the questions on which they deliberate the most often in their professional practice (Gohier et al., 1999; Sebren, 1992; Tsangaridou & O'Sullivan, 1994).

Although Kpazaï and (Attikleme, 2012) indicated the existence of three broad categories of conceptualization of critical thinking in education and training, only the first two conceptions of this form of thinking will be convened in this text. The first conception, that put forward by philosophers, conceives critical thinking as a form of intelligence, a formal or informal argumentative logic, an intellectual capacity deployed by any individual who is concerned to scrutinize the strengths and weaknesses of an argument or the results of a thinking activity. John Dewey, on whom some of the critical thinking work is based, used in the early twentieth century in How we think (Reissue, 1933), the expression of reflexive thought in opposition to a mechanical and spontaneous form of thought. For Dewey, spontaneous thinking appears when an individual agrees to establish an opinion without trying to establish the basis and without trying to look for reasons that support it. Conversely, reflexive or critical thinking, according to (Dewey,1933), is considered to be the result of careful, prolonged, precise examination of a given belief or hypothetical form of knowledge; review in light of the arguments that support them and the conclusions reached. In this line of thinking, (Ennis, 1985) conceives of critical thinking as a form of thinking that causes a person to believe (or not believe) in a certain thing, not because of himself, but because another thing testifies to it, is the evidence or proof, and is the basis of belief**.** McPeck (1981) defines critical thinking as "the ability and propensity to engage in activity with reflective skepticism." For this author, reflexive skepticism aims to establish the true reasons for various beliefs, these adequate reasons depending on epistemological norms. Siegel (1988) agrees by defining the critical thinker as an individual who thinks and acts appropriately for reasons (Paul,1992). Emphasizes that critical thinking is self-guided, disciplined thinking and represents the perfection of thinking appropriate to a certain mode or field of thought. The author distinguishes two forms of critical thinking: 1) weak critical thinking, which is self-centered and therefore serves the interests of a particular individual or group, 2) strong critical thinking, which is sociocentric and takes into account the interests of a diversity of people and has, moreover, integrated into critical thinking skills the values of truth, rationality, autonomy and personal knowledge. Finally, for (Lipman, 1991), critical thinking is a thought that helps an individual to make good judgment, because it is governed by criteria, self-correcting and sensitive to a context. All in all, in the view of philosophers of education, critical thinking is perceived as a process of investigation whose purpose is to explore a situation, a phenomenon, a question or a problem. The product of thought can be a conclusion or a hypothesis and its justification The second conception of critical thinking is that which comes from psychology. For cognitive psychologists, critical thinking is seen as a cognitive or mental process of problem-solving and decision-making. What seems important in critical thinking

research among cognitive psychologists such as Beyer (1987), Brookfield (1987) and Sternberg (1985), it is the identification of the cognitive operations used by an individual when he is faced with a problematic situation. Critical thinking, for the majority of these psychologists, conveys the idea of an active cognitive process that is triggered by a disruptive event and follows at least five steps: 1 (perceived cognitive dissonance), 2 (information search), 3 (linking new elements and dissonance), 4 (formulating and evaluating a new personal theory), 5 (resolving dissonance).

While these educational researchers and trainers promote the importance of this teacher-centred approach to the teaching process-learning, few empirical investigations were interested in the description of critical thinking with regard to the form and substance of this thought deployed in educational interaction in the field of physical education. This would help to understand the real manifestations of critical thinking in the practice of teachers. In this study, using the theories of praxeologists that teachers demonstrate critical thinking (Argyris, 1995; Argyris & Schön, 1976; Schön, 1994, 1996) during their professional act, we seek to identify the characteristics of critical thinking in the practice of physical educators. The questions the study attempts to answer are:

1) what is the form of critical thinking in the educational practice of physical education and sports teachers?

2) What is the purpose (or focus) of the critical thinking of these teachers in the teaching-learning process?

Critical thinking

1) the presence of criteria, 2) sensitivity to context, and 3) self-correction of thought.

For Lipman (1991, 1995), critical thinking is governed by criteria that are rules or principles that underlie judgment. Thus, the teacher does not make an intuitive and free decision. Criteria are therefore essential to critical thinking because they give it weight. As for the second characteristic relating to "sensitivity to context", Lipman (1991, 1995) emphasizes the idea that critical thinking is thinking adaptable to an environment and its main variables. Here the teacher "critical thinker" recognizes, in fact, that the different contexts require different applications of rules, principles and educational acts. Finally, the «autocorrective» character of critical thinking conveys the idea that critical thinking is not rigid but flexible because it is sensitive to its own limits and inclined to correct its mistakes. For the teacher «critical thinker», it is not a weakness to recognize his fallibility and to engage in a conscious modification of his point of view, of the education offered to students for improvement.

Van Manen's levels of reflexivity. The levels of reflexivity of Van Manen (1977) which are three in number (technical, practical and critical) are situated on an evolutionary scale of the reflexive capacity of an individual ranging from the technical aspect (level 1) to the critical aspect (level 3) from rationality to hermeneutics or practicality (level 2). In technical reflexivity (level 1), the thought of the teacher and the teacher are polarized on a questioning limiting to the micro-aspects of the teaching-learning process. Teacher reflection focuses on the best means or appropriate educational strategies to implement to solve an identified pedagogical problem. The main concern of the teacher, at this level of reflexivity, concerns the themes of classroom effectiveness, and this, demonstrated through measurable results. The aims and objectives of teaching are not investigated, nor are their long-term consequences. As for hermeneutic or practical reflexivity (level 2), it encourages teachers to take into account individual and cultural experiences, perceptions, meanings, prejudices, etc., with the aim of guiding or guiding practical action. At this level, attention is focused on a comprehensive interpretation of both the nature and quality of the educational experience and decision-making. The explanation of an event is based on pedagogical principles and also includes contextual factors such as student characteristics, as well as community factors. Reflexivity, at this level, therefore requires contextualization of teaching, local and institutional, on the part of teachers. Here they are expected to reflect on the practical choices they make in teaching. How are these choices, for example, the result of institutional, social and historical influences or constraints? What is implicit in their teaching practices as well as in the norms of the institution? In short, this level of reflection goes beyond the questions of effectiveness associated with particular purposes; it tends towards a thoughtful examination of the influence of the context on learning and teaching and towards a valuable study of competing educational objectives. Finally for Van Manen (1977), the third level of reflexivity, critical reflexivity considers a deliberate reflexivity in educational practice. Here reflective practice implies the presence of a value system that leads to a constant critique of power, institution and repressive forms of authority. At this level, the questioning seeks to combat the repressive distortions in teaching and learning. We are in the presence of an environment without repressive dominance between participants in the educational process. The explanation of a phenomenon or educational situation takes into account political or ethical aspects. It is the highest level of reflexivity, the ideal of rationality that the promotion of educational purposes pursues in self-determination, in the community and in the basic principles of justice, equality and freedom. It is at this level of reflexivity that a teacher can become, according to the expression of Giroux (1988), a «transforming intellectual», that is to say, able to examine the ways in which schooling, in general, and his personal pedagogical practice, more specifically, contribute or fail

to promote a human and just society. This level of reflexivity is therefore expected to enable teachers to transcend everyday experience, that they can imagine what teaching should be without simply accepting it as it is and that these images or projections can help shape their practice and reflection on practice. Thus, the pedagogy of physical and sports education in a critical perspective must lead teachers to question and analyze their practices, and to consider educational alternatives within a political and ethical framework.

METHODOLOGY

Participants

The research strategy

We preferred the qualitative approach because of the methodological limitations of quantitative approaches on the issue. To this end, Van der Maren (1996) argues that quantitative data are certainly essential, particularly for measuring certain behaviours, but they remain insufficient in education because they cannot explain the reasons for the emission of behaviours. The author goes on to say that the qualitative approach allows a more in-depth analysis of the social and individual processes in which choices or decisions are inserted (p.56)

A research strategy focused on the analysis of multiple cases

More and more, in order to better describe, better understand and better explain a phenomenon, qualitative researchers work at the scale of several sites (multisite or multi-case). For Huberman and Miles (1991), the researchers thus increase the generalizability of the results and, consequently, prove that the events and processes observed are not purely idiosyncratic. Obviously, this methodological approach (multisite or multiple cases) gives greater explanatory power of a phenomenon such as it occurs in various environments or contexts than in an approach monosite (or in a case study). Indeed, the fact of choosing several sites (several teachers practicing in various professional environments), gives us a very broad and real portrait of critical thinking.

Data collection and analysis strategies

The preferred analysis approach is that of qualitative analysis in the form of content analysis of the data collected. Three steps were observed by the principal investigator to obtain this corpus: 1) observation of three teaching sessions for each participant in the study. These observed teaching sessions were all filmed on video. 2) A semi-structured interview of sixty to ninety minutes, using the stimulated recall technique, to gain access to the cognitive

processes underlying certain behaviours observed in the classroom. The semi-structured interview that was recorded on videotape took place no later than two days after the teaching. 3) Full transcript of all interviews and coding of verbatims obtained. This coding was done using the frame of reference presented in section 2 and which takes into account the characteristics of critical thinking according to Lipman (1991, 1995) and the levels of reflexivity in teaching of Van Manen (1977).

Semi-structured interviews were based on an interview grid that included questions about the characteristics of critical thinking (the form) and some that relate to the objects of critical thinking. Here are examples of questions related to the characteristics of thinking: 1) What are the limits of this way of teaching or this way of proceeding? 2) Do you often or sometimes correct yourself as a result of the students' motor skills? 3) Why did you do this in this context when earlier you had done this? 4) At this very moment, why did you do this or did you use this? 5) On what criteria do you base your pedagogical actions here? 6) Why did you do this, what are your reasons, your support? Questions 1 and 2 refer to manifestations of self-correction of critical thinking; Questions 3 and 4 refers to "context sensitivity" while questions 5 and 6 refer to "criteria-based" critical thinking.

As for information about the objects (or background) of critical thinking, here are some of the questions asked: 1) What were you thinking when you did this? What did you have in mind? 2) What is for you the most important value of physical education that you sought here, through your pedagogical act?

Each of the verbatims collected from the three interviews relating to the three observed teachings was cut out in order to retain the units containing information likely to be classified on the one hand in one of the characteristics of critical thinking according to Lipman (1991, 1995), and on the other hand, in one of the categories of reflexivity as conceived by Van Manen (1977).

In order to validate the data processing, we submitted a number of coded verbatims to the appreciation of a qualitative researcher and expert in the field of critical thinking. The results were compared between the principal coder and the researcher.

This is very satisfactory if we consider the 85% acceptability threshold proposed by Huberman and Miles (1991).

The participants in the research

In an effort to have a wide range of manifestations of critical thinking in interactive practice among physical education and sports teachers, our sample was drawn from a "contrasted snowball" approach (Van der Maren, 1996). This approach, according to this author, consists in investigating the same population

(here teachers in physical education and sports having at least a baccalaureate in physical education teaching) but being a priori different (age, gender, years of experience, professional culture, etc.) so as to be sensitive to dispersion. Which, in our opinion, will allow to have a better knowledge of the studied phenomenon.

Thus, we worked with two physical education and sports teachers, both male. However, the two do not teach in the same school order: one at the primary level (B1) and the other at the secondary level (A1). If the primary school teacher has eight years of experience and is in a public school, the secondary school teacher also has eight years of experience but in a private institution. Both are from the urban community of Montreal to Quebec, and were chosen on the basis of their volunteerism and availability.

More specifically, the data analysis perspective is one of multiple case studies. Each of the two teachers, in fact, represents a specific case in this research.

RESULTS

Results for Primary School Teacher Case: B1

The form of thought of B1

The following table presents a synthesis of the characteristics of the thought (seen from the angle of its form) of the teacher B1 during the realization of the three observed teachings.

Table 1. The thought form of B1

	Self-correcting thinking	***Contextually sensitive thinking***	**Thinking based on criteria**
Teaching 1	2 units of direction on 4	1 unit of direction on 4	1 unit of direction on 4
Teaching 2	4 sense units on 13	7 sense units on 13	2 sense units on 13
Teaching 3	0 unit of sense on 1	0 unit of sense on 1	1 unit of sense on 1
Total	6 sense units on 18	8 sense units on 18	4 sense units on 18

With regard to the overall data of the teacher's thought B1 (see Table 1), it can be said that the mode of thought used by this teacher, during the interactive phase of the teaching-learning process, is of a critical type in its form. Indeed, out of a total of 18 units of meaning coded in relation to the characteristics of

critical thinking put forward by Lipman (1991, 1995), 30% relate to self-correction, 44% to sensitivity to context and 26% to the underlying criteria the reflexivity of the teacher B1.

The autocorrection character of the thought of B1 is manifested by the adoption, by this teacher, of a not rigid but flexible thought. He shows sensitivity to the limits of his own thinking and is inclined to correct it and/or try another alternative, unplanned, with his students. The two verbatims below are examples of the autocorrective character of B1's thinking.

But here it works so I take advantage of it. For all kinds of reasons it may not work. But here with this 4th year, it's a very interesting age to do with them. I find that very interesting. There are things sometimes I have to go faster but then I took time because I had things to say and the discussion went in the direction I wanted so we continued. For example, when I saw the notion of everywhere... I come back at that time, I take the word of the child so that they understand. But there was a kind of parenthesis where we veered on the rules of movement to one, that I would have done after and not there but since a child to express the notion of everywhere and integrated it so we continued on this. But in this time I always follow up after. I return to the important point I wanted to clarify, namely the notion of space occupancy (B1e2, p.4).

As for the character of the sensitivity to the context, the teacher B1 manifests during the interaction with his pupils a mode of thought which is influenced by variables specific to the place of its intervention (school, school system), at the time of its intervention (beginning or end of a teaching cycle), to the nature of the activity practiced as a means of education (Kinball, basketball, etc.) and to the psycho-psychological characteristics social-motor skills of the students with whom he interacts (their level of comfort with physical activity, level of education, emotional and cognitive characteristics, etc.). The excerpt below gives us a good illustration of the sensitivity to context.

I think a teacher has to adapt. I think that in physical education it is even more true because as soon as you change your environment, everything changes. I teach basketball here, but the gym gives me constraints while if I go to a bigger gym then it's another thing. So I always adapt the rules because there my gym is lower, if I go to another gym everything changes. Yes the pedagogy is still oddly influenced by your surrounding environment. And so you change because if my students can't play as a team, for example, then how I'm going to teach it. Because there's rooms where I can't play basketball as a team when what am I doing *Do I teach it?* Then my pedagogy will take another form. I taught it here more in game situations and I correct them but there I will explain more and then we will do educational. So this is a completely different approach. (B1e1, p.6).

The thought of the teacher B1, during the interaction with his students, is also a thought based on criteria, that is to say on reasons that underlie his educational practice. When reading the verbatims of this teacher, the nature of these criteria is bidirectional: a criterion being more technical, because relating to the quality of the motor response given to an educational task and a second, which is more of the socio-ethical order (general education of pupils, diversity in working groups). The extracts of the verbatims of B1, given below, suggest the presence of criteria in the thought of the teacher B1.

Yes, I have criteria! When I evaluate, it's to see the exercise versus what I showed. Is the exercise well done? Is it well done? Well compared well move. Did the one who won the point really hit the knee in this case? Is the achievement correct? Has he done the right thing? Is he moving? If not, is he able to avoid it or not? Because when we talk about opposition it is the art of avoiding, of foiling or avoiding the opponent. In this case, we try to touch or not to be touched. The task is this. He does or does not do it. Is it well done, yes or no. Those are the criteria I use, namely travel and pretending. Am I able to touch or avoid? (B1e1, p.8).

That is to say, I am still a girl-boy. That is a principle I established earlier this year. If at first you choose a girl, your second choice must be a boy, then the third a girl, etc. They know it but the problem is that when they make their choice they forget in the long run if their previous choice was a girl or a boy, so I remind them every time. It must always be mixed, alternated girl-boy. And also it avoids wars, you know at that age, for me there is no difference between girl or boy. It has to be mixed in teams always. (B1e2, p.2).

The essence of the teacher's thought B1

What is the object of the teacher's thinking during the interactive phase with his students? A synthesis of B1's thinking is presented in Table 2 below.

Table 2. The thought form of B1

	Technical reflexivity	***Practical reflexivity***	***Critical reflexivity***
Teaching 1	5 sense units on 11	6 sense units on 11	0 sense units on 11
Teaching 2	7 sense units on 26	8 sense units on 26	11 sense units on 26
Teaching 3	6 sense units on 8	2 sense units on 8	0 sense units on 8
Total	18 sense units on 45	16 sense units on 45	11 sense units on 45

The data (Table 2) on the background of B1's thinking reveal that, on the whole, this teacher demonstrates a thinking oriented towards several objects of reflection in his educational practice. Table 2 indicates, in fact, that 40% of the objects of his thought in interaction are of a technical nature, 36% of a practical nature and 24% of a critical nature.

The technical reflexivity of the teacher B1 relates essentially to the pedagogical aspects of the teaching-learning process, either to the effectiveness of his teaching act or that relating to the learning of students. Elements of class-group management and learning climate are also part of this order of reflexivity in B1. This type of thought of the teacher is translated in the verbatims below:

Of course, I see the task being done. Is it done right?

Is it badly done? Is there something to correct then I will go see them. But this one especially, it is one of the educational which is the simplest but already at the beginning there were two to three additional questions and I thought I should intervene during the practice. I make sure that the realization is done correctly because I know that by making a quick demonstration as I did (so as not to waste the maximum time) one can always have things to correct, actions to correct and perhaps to show. Some do not understand, some do not move. Some do not understand exactly what needs to be done, we can see. Do they know exactly what to do, which is to move? If someone attacks me, that is to say, comes towards me, can I move? Is there anyone who realizes it? See that, see the difficulties of each other, see if this activity is at their level. Do students understand the concept of opposing or attacking an opponent Do they understand? I make sure that this task is well done to see if it works. (B1e1, p.7).

As for the reflexivity of hermeneutic or practical order, the teacher B1 expresses the concern to take into account, during his teachings, either theoretical pedagogical principles (for example, the importance of pupils' cognitive involvement in their learning, communication in pedagogy) or contextual factors (the time allocated to teaching, the specificity of the teaching environment, the specificity of the educational activity) or either the student characteristics (past experiences of students, emotional and cognitive characteristics of students).

Again, we are in a physical education class, we are here to learn. When I am the teacher I do not referee in the sense of referee of a BB match outside the school. We are in a phase of education, once again, of learning and not of sports competition. This is what drives me: to set up situations and adopt behaviours so that all students learn (B1e2, p.7).

Finally, the B1 teacher expresses a thought incorporating the critical (or politico-ethical) questions of his educational intervention. The analysis of this teacher's verbatims shows that he is concerned, in his teaching, with equity, justice and freedom in his class.

You've seen Grades 6 play basketball. Basketball league is mixed, Grades 5 and 6. God knows there are gaps. I will have children as young as 11 and others as young as 13. The gap is big but the teams will be made equally, it is very important. We are not here to make champions, but we are here to give everyone, equally, the opportunity to invest and learn. This is very, very important (B1e2, p.2)

Yes, that's right, because it's unfair to the receiving team. Do we agree? Because if you say the color of the team that receives after hitting, their reaction speed is decreased, it penalizes them and it is unfair. That's the idea. So as an impact, it's a huge impact. And I have problems with this kind of behavior in managing my group in this game. (B1e2, p.6).

The form of the teacher's thought A1

Table 3, below, presents the synthesis of the form of thought of the teacher A1 during the teaching-learning process of the three observed teachings.

Table 3. The thought form of A1

	Self-correcting thinking	***Thinking sensitive to context***	***Thinking based on criteria***
Teaching 1	5 sense units on 12	5 sense units on 12	2 sense units on 12
Teaching 2	5 sense units on 13	6 sense units on 13	2 sense units on 13
Teaching 3	6 sense units on 10	2 sense units on 10	2 sense units on 10
Total	16 sense units on 35	13 sense units on 35	6 sense units on 35

Table 3 shows that the three characteristics of critical thinking according to Lipman (1991, 1995) are present in A1. Indeed, out of a total of 35 informational units of the form of critical thinking, 46% of these units relate to the character autocorrection, 37% to the sensitivity to the context while only 17% of these units of meaning indicate the criteria on which the teacher's thinking is based. We can say that at the level of form, at least, this teacher demonstrates critical thinking during his teachings. However, we find that the (criteria-based) character has a low percentage. Below are examples of verbatims illustrating respectively the characters (autocorrection), sensitivity to context and "based on criteria of the thought of A1.

I did the 5-to-5 situation here, which I hadn't anticipated before, because the initial situation wasn't working. The students couldn't get organized when I thought they were capable. The initial 3-on-3 situation seemed not to allow them to properly deploy the demarcation behaviours I was working on (A1e2, p.2).

The essence of A1's thought

Table 4 below describes the objects of reflection of A1 during the teaching-process-learning.

Table 4. Levels of reflexivity in A1

	Technical reflexivity	***Practical reflexivity***	***Critical reflexivity***
Teaching 1	18 sense units on21	2 sense units on 21	1 sense units on 21
Teaching 2	13 sense units on 15	2 sense units on 15	0 sense units on 15
Teaching 3	6 sense units on 15	8 sense units on 15	1 sense units on 15
Total	37 sense units on 51	sense units on 51	2 sense units on 51

In view of the reflexivity data of A1 mentioned in Table 4, it is plausible to say that in almost all cases, teacher reflection is directed towards concerns about the effectiveness of the teaching process-learning, or towards the technical dimension of this process. Indeed, out of a total of 51 informational units of the level of reflexivity, 72% relate to the technical level of reflection, 24% to the practical level while 4% are directed towards the critical aspect of reflection. The level of critical reflexivity is almost absent in this teacher. Table 4 indicates that there were only 2 units of meaning out of a total of 51. This shows the virtual absence of this level. Below, verbatims illustrating respectively the technical, practical and critical level of A1 thinking.

I need to see what's going on. I need to walk around and I want them to feel my presence, to feel that I look at everyone in the gym because they are stimulated like that. They are engaged in the task when they feel observed (A1e2, p. 7).

By asking my students to do this transfer, I want to be able to get them thinking in order to make good decisions in the game. It can also be making good decisions in another context, for example, analyzing a situation in life, any situation, being able to develop a critical sense (A1e3, p. 7).

DISCUSSIONS

What can we say about the presence of critical thinking in the interactive phase of the teaching-learning process in these two physical education and sports teachers?

First, when we consider the form of critical thinking, we find that all the characteristics of critical thinking as identified by Lipman (1991, 1995) are present. These two teachers, at this level, demonstrate critical thinking in teaching. Indeed, of a total of 53 informational units of the form 44% relate to the character.

What can be said about the object or the substance of teachers' thinking? The data in Tables 2 and 4 reveal that throughout the teaching-learning process, teachers' objects of thought are of various natures. Indeed, out of a total of 96 informational units relating to the objects of thought, 57% of these relate to the first level of reflexivity (technical reflexivity) of Van Manen (1977), 29% to practical reflexivity while only 14% concern only the critical nature of reflexivity. In view of these data, it is plausible to say that these two teachers are mostly focused on the technical dimension of teaching and learning. Indeed, teachers care more about the effectiveness of their teaching and students' motor learning than about the educational aspect of teaching. Secondary (A1) teachers have a much higher score than their primary (B1) counterparts for this level of reflexivity which is technical. The presence of the practical dimension of reflexivity in these teachers suggests that they are also concerned to incorporate in their practice the theoretical principles of pedagogy but also contextual considerations of the teaching-learning process. However, these teachers show very low critical reflexivity (14%). However, this dimension is decisive not only in the construction of the teacher's competence but also in its professionalism and the evolution of society (Ennis & Chen, 1993; Gohier et al., 1999; Tinning, 1995). Indeed, individuals who demonstrate the critical dimension of reflection are people who are aware of social problems and take steps to be real agents of change in society in a better perspective. I am not saying that the goal of sport or physical education is to stem the enormous social and economic problems of the world. Of course, this is ridiculous. Rather I affirm that as teachers and trainers, we have a responsibility to recognize that our professional practice is often involved in larger social problems and that such recognition comes with a moral responsibility to try to change our practice (Tinning, 1995, p. 24). Moreover, with regard to the development of their competence, these people present themselves as true co-constructors of it. Moreover, we must remember that physical and sports education is a school subject and therefore it finds its legitimacy in the purposes pursued by the school. In short, if for Tinning (1995), the school must contribute to a transformation of society then we think that this role is also the task of teachers of physical education and sports.

CONCLUSION

The results obtained suggest that, on the one hand, these two teachers demonstrate the characteristics of a critical thinking in its form, that is, a self-correcting thinking, sensitive to the context, based on criteria and leading to a judgment; and on the other hand, the object or concern of these teachers is almost centered on elements of technical level and elements of practical level. The main object of reflexivity seems to be only at the micro-aspect level of the teaching-learning process (Tsangaridou, 1993). Analysis of the data reveals that these teachers show little attention to the political and ethical role of teaching and learning. This last data challenges us about the professionalism of these teachers if we consider the social role of any professional (Giroux, 1988; Kirk, 1986). Thus, these results suggest that if nowadays the consideration and development of the cognitive process of teachers in physical education is growing (Carlier, Renard & Paquay, 2000; Paré, 1995), it appears necessary and useful for physical education researchers and trainers to go beyond mere reflection (or simple reflective practice, although it is important) to arrive at a critical reflection that incorporates the political and ethical dimensions of teaching-learning. Taking into account the critical dimension of reflexivity in today's world, an indicator of the professionalism of teachers, because this dimension makes them real social actors.

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Internet source

https://doi.org/10.1177%2F1356336X08095668
https://doi.org/10.2478/afepuc-2021-0005
https://doi.org/10.5937/spes2201055A.

STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 75-86
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).05

STUDY ON THE LINK BETWEEN SELF-ESTEEM AND TEAM IDENTITY AS MAJOR FACTORS IN TACKLING COMPETITIVE ANXIETY IN PERFORMANCE ATHLETES

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Received 2024 March 20; Revised 2024 March 27; Accepted 2024 March 28;
Available online 2024 May 10; Available print 2024 June 30.

ABSTRACT. Sports competition and athletic performance are of major interest in sports psychology. Throughout the history of sports, researchers have sought to identify the modifiable factors that could help those who take part in competition to adapt to it as best as possible. In this study, we will focus on identifying certain psychological factors described in the specialized literature as having a consistent link to decreasing competitive anxiety, while looking for implementable techniques to improve these factors. The aim of this study was to identify effective methods for decreasing competitive anxiety, reaching a state of flow and influencing the dimensions of mindfulness (awareness, refocus, non-judgment). The study included a total number of 27 female subjects and was conducted over a period of 4 months (21.07.2022-21.11.2022). In the study, the subjects were divided into two groups: one working group where the intervention took place and in which 15 female footballers from League 1 were randomly assigned, and one control group with 12 female footballers. The two groups underwent an evaluation aimed at identifying the achievement of the state of flow and the reduction of competitive anxiety after a few mental and physical relaxation exercises. The results of the statistical processing of data show some differences between the two groups in terms of score for the tracked parameters, but also between the results of each group in the pre- and post-tests. However, statistically significant differences between the two groups were obtained only for the state of flow and somatic anxiety. The state of flow, of mental wellbeing, should be considered before, during and after each sports competition, regardless of its level, in order to achieve a satisfactory performance in the world of sports, correlated with the expectations and the training of each athlete.

Keywords: *competitive state anxiety, mindfulness, state of flow*

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REZUMAT. ***Studiu privind legătura dintre stima de sine și identitatea de echipă, ca factori importanți în combaterea anxietății competiționale la sportivii de performanță.*** Competiția sportivă și performanțele unui sportiv constituie un interes major în psihologia sportului. De-a lungul istoriei sportului, cercetătorii au căutat să identifice acei factori modificabili care să îi ajute pe cei care fac parte din competiție să se adapteze cât mai bine la aceasta. În acest studiu vom vorbi despre identificarea anumitor factori psihologici, descriși în literatura de specialitate ca având o legătură consistentă cu scăderea anxietății competiționale și, de asemenea, își mai propune căutarea unor tehnici implementabile de îmbunătățire a acestor factori. Scopul acestui studiu a fost identificarea unor metode eficiente pentru reducerea anxietății competiționale, dobândirea stării de flow și influențarea dimensiunilor de mindfulness (conștientizare, refocalizare, non-judecare). Studiul a inclus un număr total de 27 subiecți de gen feminin și s-a desfășurat pe o perioadă de 4 luni (21.07.2022-21.11.2022). În cadrul studiului, subiecții au fost împărțiți în două loturi: un grup de lucru în care s-a practicat intervenția unde au fost alocate randomizat 15 jucătoare de fotbal feminine din Liga 1 si un grup de control cu 12 jucătoare. Cele 2 grupuri au fost supuse unei evaluări menite să identifice dobândirea stării de flow și reducerea anxietății competiționale post-exerciții de relaxare fizică și mentală. Rezultatele obținute în urma prelucrării statistice a datelor arată existența unor diferențe între scorurile obținute de cele două grupuri în cazul parametrilor urmăriți dar și între rezultatele obținute la pre și respectiv post testare de fiecare dintre grupuri. Cu toate acestea, diferențe semnificative statistic între cele două grupuri, au fost obținute doar în cazul stării de flow și a anxietății somatice. Pentru obținerea unei performanțe satisfăcătoare în lumea sportului, conformă cu așteptările și pregătirea realizată de către fiecare atlet, starea de flow, de bine mental trebuie luată în considerare înainte, în timpul și după fiecare competiție sportivă, indiferent de nivelul acesteia.

Cuvinte-cheie*: anxietate de stare competițională, mindfulness, stare de flow*

INTRODUCTION

Sports competition and athletic performance are of major interest in sports psychology. Throughout the history of sports, researchers have sought to identify the modifiable factors that could help those who take part in competition to adapt to it as best as possible. In this study, we will focus on identifying certain psychological factors described in the specialized literature as having a consistent link to decreasing competitive anxiety, while looking for implementable techniques to improve these factors. In fact, this paper focuses on analyzing the link between an emotion (in this case, competitive anxiety) and emotion management techniques (mindfulness, muscular and mental relaxation).

Psychological factors, such as an athlete's personality or various psychological traits, are of unique importance in sports performance and for high-level success in sports. Psychological resilience (defined as optimal adaptation to various significant sources of stress), the way a person is able to regulate its emotions and a high level of self-confidence are considered important psychological aspects necessary for performance athletes to be able to cope with the high pressure of performance sports (Burns et al., 2022; Liu et al., 2021). Groups are not merely external characteristics of the world that provide a framework for our behavior. Instead, they shape our psychology through their ability to be internalized and to contribute to our sense of self. That is, groups give us a sense of social identity: "the knowledge that [we] belong to certain social groups, together with some emotional and value significance [to us] of the group membership" (Tajfel, 1972, p. 31).

Regarding the techniques for improving psychological traits, a relatively new concept introduced in sports psychology is the concept of mindfulness. The term is defined as the awareness that arises through intentional attention to the present moment and to the unfolding of the experience taking place in the present moment (Kabat-Zinn, 2013). This type of mental training was developed in sports psychology to help athletes increase their ability to pay attention to the present moment and to disregard the various situational distractions. There are studies that emphasize both a direct and positive connection between mindfulness and sports performance, as well as an indirect one (Bagheri et Dana, 2021; Jha et al., 2017). Certain interventions based on the concept of mindfulness support the idea that individuals who are attentive and aware of the task they are performing develop a certain effectiveness in solving it, without automatically and maladaptively reacting to the difficult thoughts and emotions that may accompany the task (Luberto, 2014; Langer et al., 2000; Wallace et al., 2006). Also, there are studies that have highlighted the positive influence that mindfulness training has on mental attitude (Scott-Hamilton et al., 2016), on controlled attention, in the effective management of emotions (Röthlin et al., 2020) and in reducing anxiety (Hut et al., 2021). A concept developed in the previous chapter is that of locus of control (LOC). There are studies showing that mindfulness training can influence locus of control. Mindfulness training can also predict internal LOC (Sulphey, 2016), and Fallby et al. (2006) indicated that individuals with an internal LOC and a high sense of coherence consistently displayed significantly higher mental ability scores. Mindfulness training can alter an individual's locus of control by reorienting his mind from external stimuli to an intrinsic focus, being able thus to manage anxiety of any nature (Speca et al., 2000).

Flow is a state in which one is completely absorbed in an activity, losing self-awareness. Flow and attention involve deep concentration, but only flow involves goal-directed behavior.

There is ample evidence linking flow states to improvements in subjective experience (Nakamura & Csikszentmihalyi, 2002), self-concept (Jackson, Thomas, Marsh, & Smethurst, 2001), happiness (Haworth, 1993) and performance (Jackson & Roberts, 1992). Due to the centrality of the flow experience – the meeting point between peak performance and peak experience – flow has become a highly relevant concept in sport. Sport began to focus on flow research in the early 1990s, the first empirical studies being published in 1992 (e.g., Jackson & Roberts, 1992). A rich literature has developed subsequently on flow in sports, including some fundamental studies.

PURPOSE OF RESEARCH

The purpose of this study was to identify effective methods for decreasing competitive anxiety, reaching the state of flow and influencing the dimensions of mindfulness (awareness, refocus, non-judgment), concepts that have been defined as essential for developing an internal and successful LOC, crucial to achieving satisfactory results in the world of sports competitions.

Research hypotheses

1. There is a statistically significant difference between the experimental group and the control one in the post-test in terms of level of flow.
2. There is a statistically significant difference between the experimental group and the control one in the post-test in terms of mindfulness dimensions' levels (awareness, refocus, non-judgment).
3. There is a statistically significant difference between the experimental group and the control one in the post-test in terms of level of cognitive and somatic anxiety.

Research objectives

1. Identifying any significant difference between the two study groups (the experimental group and the control group) in terms of level of flow.

2. Identifying any significant difference between the two study groups (the experimental group and the control group) in terms of mindfulness dimensions' levels (awareness, refocus, non-judgment).

3. Identifying any significant difference between the two study groups (the experimental group and the control group) in terms of level of cognitive and somatic anxiety.

Research methodology

The study included a total number of 27 female subjects and was conducted over a period of 4 months (21.07.2022-21.11.2022). In the study, the subjects were divided into two groups: one working group where the intervention took place and in which 15 female footballers from League 1 were randomly assigned, and one control group with 12 female footballers.
The two groups underwent an evaluation aimed at identifying the achievement of the state of flow and the reduction of competitive anxiety after a few mental and physical relaxation exercises. These variables were evaluated based on three questionnaires: Mindfulness Inventory for Sport, State of Flow Scale and Questionnaire for Competitive State Anxiety Identification.

The intervention took place over a period of 4 months (21.07.2022-21.11.2022). 15 female footballers from League 1 participated in the intervention, and another 12 footballers made up the control group. The intervention began by completing the competitive anxiety and mindfulness questionnaires. The questionnaires were completed before the start of the intervention and at the end.

The data obtained from the application of the 3 questionnaires were analyzed using the SPSS statistical analysis program. We have applied the ANCOVA test to identify the differences between the two groups regarding the 3 dimensions that were tracked: level of flow, mindfulness, level of cognitive and somatic anxiety.

RESEARCH RESULTS

The results of the statistical processing of data, presented in the tables below (Table 1, Table 2), show some differences between the two groups in terms of score for the tracked parameters, but also between the results of each group in the pre- and post-tests, except for Awareness in the control group (Table 1). However, statistically significant differences ($p<.05$) between the two groups were obtained only for the state of flow ($F = 13.81$, $p<.05$) and somatic anxiety ($F = 4.59$, $p<.05$). In both cases, the effect size is large ($\eta^2=.16$) (Table 2).

Table 1. Descriptive statistics of the variables included in the study

	Experimental *N=15*		**Control** *N=12*	
Variables	*A*	*SD*	*A*	*SD*
Flow pre	140.58	12.33	145.54	18.04
Flow post	146.59	16.78	141	12.16
Awareness pre	25.88	4.60	25.63	2.54
Awareness post	24.88	5.27	25.63	2.76
Non-judgment pre	15.88	6.45	13.27	7.96
Non-judgment post	17.76	4.89	15.72	8.06
Refocus pre	24.65	4.48	25.54	3.35
Refocus post	24.29	4.81	26.45	3.38
Cognitive anxiety pre	15.35	3.67	18	4.04
Cognitive anxiety post	15.12	3.72	17.18	2.31
Somatic anxiety pre	13.35	2.89	18.18	3.65
Somatic anxiety post	11.82	2.62	19.45	5.85

A=average; SD=standard deviation; N=number of participants

Table 2. ANCOVA analysis by controlling pre-test results

Dependent variable	df	F	p-value	Partial η^2
Flow	1	13.81	.04	.16
Awareness	1	.68	.42	.03
Non-judgment	1	.06	.81	.00
Refocus	1	1.45	.24	.06
Cognitive anxiety	1	.43	.52	.02
Somatic anxiety	1	4.59	.04*	.16

*p<.05 **p<.01

Hypothesis no. 1 is confirmed. For the analysis of hypothesis no. 1, we used the Ancova statistical technique, by controlling the score for the Flow variable recorded by the participants in the pre-test. In terms of score, there is a statistically significant difference for the Flow variable between the two groups, control and experimental, F = 13.81, p<.05. The effect size is large, η^2=.16.

Hypothesis no. 2 is not confirmed. For the analysis of hypothesis no. 2, we used the ANCOVA statistical technique, by controlling the score for the Awareness (F = .68, p>.05), Refocus (F = 1.45, p>.05) and Non-judgment (F = .06, p>.05) variables. There is no statistically significant difference in terms of score for the Awareness, Refocus and Non-judgment variables between the two groups, control and experimental.

Hypothesis no. 3 is partially confirmed. For the analysis of hypothesis no. 3, we used the Ancova statistical technique, by controlling the score for the cognitive anxiety and somatic anxiety variables recorded by the participants in pre-test. In terms of score, there is a statistically significant difference for the Somatic Anxiety variable between the two groups, control and experimental, $F = 4.59$, $p<.05$. The effect size is large, $\eta^2=.16$. Regarding cognitive anxiety, there was no statistically significant difference ($F = .43$, $p>.05$).

DISCUSSIONS

As per the results of our research, quasi-normal or logical phenomena can be observed, arising because of the physiological processes of mental and physical repair. The experimental group behaved as we expected and desired. It responded positively and in a satisfactory proportion to the exercises chosen to restore the wellbeing of body and mind. Due to these exercises, the athletes were able to level their anxiety, to balance their body and feel more prepared for the competition in which they were involved. Flow, that state of mental wellbeing, that internal energy of the body that can be channeled toward achieving the desired goals, along with the level of somatic anxiety were greatly improved as a result of introducing the relaxation exercises. Regarding the other psychological parameters chosen to be described in our study, we cannot talk about a statistically significant improvement. It should be noted that the levels of mindfulness (non-judgment, refocus and awareness) and cognitive anxiety cannot be quantified to the same extent as flow and somatic anxiety, as the latter are more about the physical state and the somatic tone of the body, not being connected as much to the psyche and emotions of the participants in the study. As a result of these relaxation and re-centering techniques, personal tone improved significantly from a short-term physical perspective. The emotional side of each participant needs to be studied and addressed for a considerable length of time, with deeper involvement in psychology and by probing the subconscious, for a lasting evolution toward constant performance.

In the study developed by Oguntuase & Sun (2022), the protocols highlighted by Gardner et al. (2007) were used for the intervention group in the MAC program for 8 weeks. The intervention that prescribed mindfulness exercises took place once a week for 50 minutes. The participants in that study were 34 Nigerian footballers who, at post-test, reported higher levels of self-confidence, resilience and emotion control. In another study (Mohammad et al., 2018), 15 footballers between the ages 17 and 20 participated in an experimental group that performed mindfulness exercises. At the end of the intervention, the players

from the group that practiced mindfulness registered a decrease in the level of competitive anxiety. Another study was conducted in Greece (2021), in which female footballers were informed that the intervention that would last approximately eight weeks required them to participate in 30 minutes' mindfulness training sessions 2 times per week, before the training, while also spending 5-10 minutes per day practicing meditation besides these training sessions and participating in evaluations before, during and after completion of the mindfulness program. At the end of the research, there was an improvement in the players' inner speech. Terres et al. (2022) found that mindfulness has positive effects on reducing cognitive anxiety (somatic and cognitive). Öner (2022) noticed that athletes' mindfulness and concentration was positively correlated with awareness, non-judging attitude, reorientation, flow and balance. The study had both male and female footballers as participants. Another article, that also took into account athletes' age, found that older female athletes had an increase in attention from pre-test to post-test, while younger athletes registered a decline. Gómez-Odriozola & Calvete (2021), found that, after being introduced to a mindfulness program, younger adolescents had an increase in depressive affect and somatic symptoms, suggesting that mindfulness interventions have different effects depending on participant's age or developmental stage. Therefore, it may be important to take into account the developmental or psychosocial needs of the athletes when implementing the mindfulness program, even when they are very similar. Additionally, in that study, age was positively associated with program engagement (a more frequent practice of mindfulness skills during training and competition), suggesting that dosing may have played a role in older athletes reporting a greater score of mindfulness. An alternative explanation could be linked to the playing time. It is possible that older and more experienced players had more opportunities to play during competitions and, thus, had more opportunities to apply mindfulness skills. Another notable finding was that age was related to mindfulness as trait/disposition, in that older athletes have higher levels of acceptance (but not awareness), and age as a continuous variable predicted change in acceptance post-intervention. Perhaps with age and/or mindfulness experience, athletes become more open to an "attitude of acceptance, openness and even compassion towards their own experience " (Cardaciotto et al., 2008).

Furthermore, general increases in acceptance may result from psychobiological capacities (e.g., emotion regulation, cognitive control) that continue to develop in young adulthood (Arnett, 2000; Steinberg, 2007). To investigate this further, studies could include measurements of emotional intelligence, positive affect and life satisfaction to better understand age-related differences in mindfulness, as well as changes in mindfulness.

A study that analyzed the effect of the Mindfulness Sports Performance Enhancement (MSPE) method on competitive state anxiety in karate athletes in Surabaya resulted in a significant decrease in competitive anxiety, by 9,25 points (Harita et al., 2022). This condition is supported by the decrease in cognitive anxiety and somatic anxiety by 7.76 and 3.86 points respectively. The decrease was also followed by an increase in self-confidence of 8.21 points. The findings of this study show the importance of continuous mental mindfulness training for improving athletes' performance by overcoming competitive state anxiety. In our study, only somatic anxiety decreased due to the mindfulness program, with no significant results regarding the cognitive anxiety dimension.

In another study investigating whether mindfulness training increases athletes' mindfulness and flow experience and decreases sport-specific anxiety and sport-specific pessimism, the authors (Hamilton & Schutte, 2016) found that cyclists that participated in a mindfulness intervention showed greater increases in mindfulness and flow capacity than participants from the control group. Greater increases in mindfulness in the intervention group between baseline and post-test were linked to greater increases of the flow state. Similarly, the female athletes in our experimental group showed increases in the state of flow at the end of the intervention (post-test).

The same authors (Hamilton & Schutte, 2016) examined the effects of mindfulness practice on anxiety, flow state, pessimism and the ability to perform mindfulness programs. The athletes who practiced mindfulness exercises showed significantly greater increases in mindfulness and flow and significantly greater decreases in pessimism and anxiety than the athletes who didn't practice mindfulness exercises. Increases in the ability to practice mindfulness from baseline to post-test were associated with increases of flow and greater decreases of pessimism. Increases in the flow state were associated with decreases in somatic anxiety and pessimism.

CONCLUSIONS

The more we try to understand psychological training, the more we notice that there are new dimensions to it, areas that we were barely aware existed and that govern our world more than we would have expected. As anyone in their chosen career, every athlete wants to achieve the ultimate and lasting performance, for which he invests everything mentally and physically. Not everyone understands that an athlete allocates energy to the physical act by involving his mind and his emotions, with all the good or the bad, with all the force and intensity of that moment. Consequently, studies aimed at finding an appropriate support and therapy system for athletes are crucial. After accepting

that there are psychological concepts for confronting life's problems, concepts that are taken up during a sport competition, a group of support and appropriate help can be developed for each athlete, in a personalized manner and adapted to the needs of the moment and in the long term.

Anxiety, negative emotions (frustration, fear, defeat, stress) and their psychological impact on sports performance are recognized worldwide, in all circles. We tried to see how we can improve these parameters before a competition from an academic point of view. Those parameters related to mental engagement with the body (such as somatic anxiety and the concept of flow or the appropriate emotional tone, achieved by coordinating physical and emotional energy resources toward improving physical and emotional state) were significantly improved because of yoga exercises. After muscle stretching, body posture correction and breathing coordination, the athletes achieved physical relaxation and cleared the acute stress state, which led to an increase in the level of confidence during the competition, which resulted, as expected, in a proper and satisfying performance for all the athletes involved.

Regarding those concepts strictly related to the human psyche, such as cognitive anxiety and mindfulness, the exercises studied in this experiment did not prove to be sufficient to improve the emotional state of the person in question, especially since this would actually require a long-term intervention, aimed at carefully and patiently identifying the mental problems at the root of chronic stress, finding ways to raise awareness and communicate these disturbing items, as well as implementing lasting therapies for resolving the anxieties and fears of each person involved in that situation.

The key conclusion of this study is that it is beneficial to perform these yoga exercises in order to help an athlete improve his level of performance, by decreasing pre-competition anxiety, reducing the noise of his psyche overcrowded with everyday problems and psychological frustrations accumulated over time and eliminating demoralizing and highly negative emotions, with the aim of achieving a better game. Currently, in this moment, for a desirable result that can increase the level of confidence and satisfaction of the athlete. To achieve the successful athlete of tomorrow.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 87-96
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).06

COMPARATIVE ANALYSIS OF ANGLES IN THE SPINSHOT THROWS TOWARDS THE GOAL IN BEACH HANDBALL

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Received 2024 March 14; Revised 2024 April 20; Accepted 2024 April 21;
Available online 2024 May 10; Available print 2024 June 30.

ABSTRACT. Beach handball game is a dynamic sport with high intensity, conducted on a sand court. The inclusion of this sports branch in the Youth Olympic Games program in 2018 held in Buenos Aires, Argentina, elevated the profile of this international sports branch and underscores an increased need for a multitude of performance factors in this sport. **The research aim.** The research aim was to conduct a comparative analysis of the spinshot technique between an advanced player and a beginner, aiming to gather useful information regarding a technical profile for spinning shots in beach handball and to guide training for enhanced efficiency in this throwing technique. **Objectives.** Objectives encompassed the analysis of video recordings of two players concerning the angles between body segments and between the body and the ground at various moments during the execution of the technique. **Methods and means.** For the analysis of throws, video recordings of the executions were performed on two subjects, both beach handball players – one being an advanced player, and the other a beginner. To measure the parameters to be analyzed, including angular characteristics of body segments at key moments during the execution of the spinning shot technique, and the execution times of the two players, Kinovea software v 0.9.5 was utilized. Additionally, trajectory analysis and execution time were examined. **Results.** In the video analysis of the movement, the force generated by the players is not visible, but it aids in understanding the action and the effects of internal forces (muscle action) and external forces (gravity and friction) on the moving players. The discrepancy between the advanced and beginner players in achieving a half (180^0) spin in the technical procedure of the spinsshot lies in the flight phase. Execution times are close between the two players, but video analysis revealed differences in the quality of their executions regarding the correct implementation of the spinning shot. **Conclusions.**

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The analysis results highlight significant differences in joint amplitude between the two players during spinning shot executions, potentially caused by insufficient muscle group strength, reduced joint mobility, or incorrect mastery of the throwing technique.

Keywords: *beach handball, spinshot, angles movement, kinovea*

REZUMAT ***Analiză comparativă privind unghiurile realizate în aruncarea la poartă din piruetă din jocul de beach handball.*** **Jocul de beach handball este un sport dinamic, cu o intensitate mare, ce se desfăşoară pe un teren de nisip.** Includerea acestei ramuri sportive în programul Jocurilor Olimpice pentru Tineret în 2018 desfăşurate în oraşul Buenos Aires din Argentina, a ridicat profilul acestei ramuri sportive internaţionale şi plasează o necesitate crescută a multitudinii de factori de obţinere a performanţelor în acest sport. **Scopul cercetării.** Scopul acestei cercetări a fost să realizăm o analiză comparativă asupra tehnicii de aruncare la poartă din piruetă a unei jucătoare avansate şi a unei jucătoare începătoare, dar şi pentru dirijarea antrenamentelor în vederea creşterii eficienţei acestui procedeu de aruncare. **Obiective.** Analiza înregistrărilor video a execuţiilor a două sportive din punctul de vedere al unghiurilor dintre segmente ale corpului, dar şi dintre corp şi sol, în diferite momente ale execuţiei procedeului, şi analiza traiectoriei şi a timpului de execuţie. **Metode şi mijloace.** Pentru analiza aruncărilor au fost efectuate înregistrări video ale execuţiilor a doi subiecţi, jucătoare de beach handball – una fiind jucătoare avansată, cealaltă jucătoare începătoare. În vederea măsurării parametrilor ce urmează a fi analizaţi, a caracteristicilor unghiulare ale segmentelor corpului în momentele cheie ale execuţiei procedeului tehnic de aruncare la poartă din piruetă şi a timpilor de execuţie la celor două sportive s-a utilizat software-ul Kinovea v 0.9.5. **Rezultate.** În analiza video a mişcării nu se poate vedea forţa produsă de către sportive, însă ne ajută să înţelegem acţiunea şi efectele forţelor interne (acţiunea muşchilor) şi externe (gravitatea şi fricţiunea) asupra sportivelor aflate în mişcare. Diferenţa dintre jucătoarea avansată şi jucătoarea începătoare la realizarea pe jumătate (180^0) a procedeului tehnic de aruncare la poartă din piruetă o face faza de zbor. Timpii de execuţie sunt apropiaţi între cele două jucătoare, însă prin analiza video am reuşit să observăm şi calitatea execuţiilor a acestora în ceea ce priveşte realizarea corectă a aruncării la poartă din piruetă. **Concluzii.** Rezultatele analizei evidenţiază diferenţe mari de amplitudine articulară între cele două jucătoare în timpul execuţiilor de aruncare la poartă din piruetă, care pot fi cauzate de forţa insuficientă a grupelor musculare implicate, mobilitatea articulară redusă sau însuşirea incorectă a tehnicii de aruncare.

Cuvinte-cheie: *beach handball, aruncarea la poartă din piruetă, unghiurile de mişcare, kinovea*

INTRODUCTION

Beach handball is a dynamic sport characterized by high intensity, conducted on a sand court. The incorporation of this sporting discipline into the Youth Olympic Games program in 2018, held in the city of Buenos Aires, Argentina, elevated the profile of this international sports branch and underscores an augmented necessity of a multitude of performance-acquiring factors within this sport.

Unlike other sports played on sand, such as volleyball and soccer, there is a dearth of scientific research on beach handball to date. Specifically, there is scant data regarding major tournaments like the World and European Championships (Gehrer & Posada, 2010; Gruic et al., 2011; Tezcan, 2013; Skandalis et al., 2017; Zapardiel, 2018). On the other hand, there is a growing interest among specialists in this field for information pertaining to the technical and tactical aspects of beach handball.

Success in beach handball is contingent upon numerous internal and external factors, including anthropometric characteristics, physical capacity, technical and tactical abilities, as well as psychological factors (Ronglan et al., 2006; Srhoj et al., 2002).

An equally underexplored area pertains to the match technique and tactics in beach handball. Most studies have focused on goal-scoring actions and their efficiency, conducted within European or World Championships. Strategies employed in traditional handball cannot be seamlessly applied in beach handball due to the substantial differences in rules and competition format.

Research on the relationship between cognitive functions and specific motor skills of beach handball players indicates that attention, perception, the ability to track multiple objects simultaneously, are positively associated with sprinting, ball control, dribbling, and directional changes (Little & Williams, 2005; Jovanovic et al., 2011; Nesen et al., 2018).

In beach handball competitions, athletes employ various technical procedures for shooting while running or jumping (with or without a spinshot), with the key to performance lying in their efficiency (Wagner et al., 2011; Raeder et al., 2015; Zapardiel & Asin-Izquierdo, 2020).

Mastery of the spinshot throw technique, as well as all other throwing procedures employed by a player, necessitates the accurate and efficient execution of all movements.

We consider it crucial that, to optimize the effectiveness of throws, each player is analyzed from the moment of ground contact until the completion of the throw, including the full rotation (360 degrees). The spinshot throw technique

is highly intricate in its execution. Players must coordinate each step and every segment of their body to execute this technical procedure correctly and efficiently. Consequently, a detailed analysis of movements is necessary, highlighting crucial moments and key points in the executions.

THE RESEARCH AIM

The research aim was to conduct a comparative analysis of the spinshot technique between an advanced player and a beginner, aiming to gather useful information regarding a technical profile for spinning shots in beach handball and to guide training for enhanced efficiency in this throwing technique.

OBJECTIVES

- The analysis of video recordings of the executions of two athletes (novice and advanced) involves examining the angles between body segments as well as between the body and the ground at various stages of the procedure.
- The analysis includes examining the trajectory and rotation time (execution time) of the spinshot throw for both athletes.

METHODS AND MEANS

For the analysis of throws, video recordings of the executions of two subjects, both beach handball players - one being an advanced player, and the other a beginner - were conducted. To measure the parameters to be analyzed, including angular characteristics of body segments at key moments of the technical procedure of the spinshot throw, and the execution times for both athletes, Kinovea v 0.9.5 software was utilized.

The recorded parameters for the specific movement of the spinshot throw towards the goal were as follows:

- The angle between the ground and the lower leg at the moment of propulsion.
- The angle between the thigh and the lower leg at the moment of propulsion.
- The angle between the trunk and the ground at the moment of propulsion.
- The angle between the trunk and the thigh after a 180^0 rotation.
- The execution time.

Landmarks on the subjects' bodies were identified and marked. To obtain data regarding angular amplitude and execution time for both subjects, the software processed these data and provided the necessary information about the areas of interest involved in the spinshot throw in beach handball.

RESULTS

Initially, we analyzed the angles at the level of the lower limbs (propulsion angle, angle between the thigh and lower leg) and the angle between the trunk and thigh at the moment of the step before takeoff, attempting to identify whether the created angles are decisive in the spinshot throw towards the goal.

Fig 1. The differences in angles at the moment of the step

In Figure 1, the angles at the moment of the step for the two beach handball players are represented by different colors.

The propulsion angle is represented by the green color, which differs between the two players. For the advanced player, the angle is 55.1^0, while for the novice player, it is 66.5^0. In theory, a smaller propulsion angle may not generate sufficient lift for executing the spinshot throw towards the goal, with the novice player having a larger angle that allows for an easier execution of the flight phase.

In the video analysis of the movement, the force exerted by the athletes cannot be visually observed. However, it aids in comprehending the action and the effects of internal forces (muscle action) and external forces (gravity and friction) on the athletes in motion.

The angle represented by the red color is the angle between the thigh and lower leg. The advanced player has an angle of 92.7^0, while the novice player has an angle of 96.1^0. The angle between the thigh and lower leg should be smaller, indicating a load and preparation for an efficient takeoff. The advanced player has the capacity to generate a more powerful jump, correlating with the minimal force and power achieved during the landing phase of the jump. The magnitude of this angle is also influenced by the height of the general center of gravity (CGG) relative to the support surface (ground).

The angle between the trunk and the ground (yellow) for the advanced player is 38.3^0, while for the novice player it is 34.2^0. To execute a complete and high rotation, the trunk should not be excessively bent forward. The tendency of the players to take off horizontally rather than vertically is attributed to the small angle between the trunk and the ground at the moment of propulsion. This angle, in turn, is influenced by the position of the center of gravity, which is pushed forward. Stability during the initial landing before the actual jump can provide insights into the optimal conditions for executing the complete procedure by analyzing the force couple.

Fig. 2. The angle between the trunk and thigh before the execution of the throw

The distinction between the advanced and novice players in the halfway (180^0) completion of the technical procedure of the spinshot throw lies in the flight phase. In Figure 2, it can be observed that the advanced player attains the necessary height to finalize the procedure, with her legs pushed upward, and her throwing arm elevated and ready for the ball release. The novice player accomplishes the trunk rotation at 180^0, but her legs lag behind, with the right foot still on the ground, and the throwing arm is not prepared for completion. Equally significant is the angle between the trunk and thigh at the moment of the 180^0 rotation, as a larger angle makes it more challenging to achieve a complete trunk rotation.

The anterior-posterior impulse and the pushing force are parameters that indicate the future position of the players towards the goal during the execution of the procedure, providing precise data on the flight direction and jump height.

Fig. 3. The execution time of the spinshot throw

Execution time and force contribute as significant factors in the completion of the spinshot throw procedure in beach handball.

In addition to the correct technique mastered by each player, the execution speed of a technical finishing procedure towards the goal is crucial in achieving and validating a scored goal. Any tactical attacking action has an ultimate goal, and the player in the position to score must execute the throw as accurately and swiftly as possible, regardless of the chosen technical procedure. Otherwise, they may be intercepted and blocked by a defender.

In Figure 3, we observe similar execution times between the two players, but through video analysis, we managed to discern the quality of their executions concerning the accurate completion of the spinshot throw towards the goal.

DISCUSSIONS

The aim of this study was to identify the angles involved in the spinshot throw towards the goal performed by an advanced player and a novice player. Additionally, the study aimed to guide training sessions to achieve increased efficiency in the procedure. In beach handball, the execution of the spinshot throw towards the goal is crucial for scoring a 2-point goal, and it must be performed with precision to enhance its effectiveness.

The differences in angles at the moment of the step can provide significant insights into how beach handball players manage and execute the spinshot throw towards the goal. These variations may impact the trajectory, accuracy, and force of the throw. Analyzing these differences can contribute to understanding the technical and tactical aspects of the procedure and identifying key points that can be enhanced in the athletes' training regimen.

The obtained results revealed a significant difference between the two players in key moments of their executions. Previous studies (Zapardiel, 2018a; 2018b) have observed that the top team in the final ranking of a U17 women's championship achieved greater total points from spinshot throws. Similar trends were noted in the men's category (Saavedra et al., 2019).

One of the methods employed in the development of jumping ability is plyometrics. Through the application of these types of exercises, an athlete is exposed to levels of tension and contraction speeds that are unprecedented, compelling them to tap into their available energy resources, which are typically underutilized.

Saez de Villareal et al. (2009) highlight that athletes with greater experience in a specific sport discipline respond more effectively to certain combinations of plyometric exercise forms, yielding superior outcomes in jump enhancements. However, this does not imply that athletes in good physical condition cannot derive similar benefits from plyometric methods.

Various studies have indicated that plyometric training has a positive impact on explosive strength during jumping, with Rousanoglou et al. (2014) highlighting a 14% increase in explosive strength after 4 weeks of training.

Various types of vertical jumps have served as models for studying different biomechanical and neurophysiological phenomena. Currently, it is recognized that jump height is a predictor of muscular power, leading to the utilization of various types of vertical jumps to enhance athletes' performance (Bosco et al., 1983; Vandewalle et al., 1987; Wilson et al., 1991; Driss et al., 1998; Radcliffe & Farentinos, 1999; Saez de Villarreal, 2010).

Therefore, the ability to jump, along with the strength and power of the lower extremities, becomes crucial elements in the athlete's performance during the game, encompassing rapid movements, and specific throwing jumps (such as spinshot or inflight shots).

CONCLUSIONS

The aim of the study was to analyze the technique of the spinshot throw towards the goal by comparing the technical executions of an advanced player and a novice player, with the goal of developing and implementing an intervention program to enhance the efficiency of this throwing procedure.

This analysis led to the identification of the muscles involved in the execution of the spinshot throw towards the goal, the manner of their engagement, the execution times, as well as the ground forces required for this execution.

The results of the analysis highlight significant differences in joint amplitude between the two players during the executions of the spinshot throw towards the goal. These differences could be attributed to insufficient strength in the involved muscle groups, reduced joint mobility, or incorrect mastery of the throwing technique.

Stability at the moment of the step is a crucial factor in executing the takeoff; the players' legs should not be too widely spread. Ground instability can result in a loss of propulsion force and hinder vertical takeoff.

Regarding the mechanical work performed through energy consumption, the advanced player achieves a complete rotation during the flight phase compared to the novice player. This aspect is essential for reaching the ball release phase facing the goal.

The flight direction (vertical) and jump height (as high as possible) are crucial variables in executing the spinshot throw towards the goal. These are influenced by the anterior-posterior impulse and ground reaction force, with the advanced player exhibiting a vertical flight direction and significantly higher jump height compared to the novice player.

To enhance the performance of novice players and improve their efficiency in executing the spinshot throw towards the goal, it is necessary to implement a well-structured training program. This program should focus on refining the execution technique, increasing ground forces, while also preventing injuries resulting from incorrect executions.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXIX, 1, 2024, pp. 97-104
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.69(1).07

RELIGION, POLITICS AND MYSTICISM IN ANCIENT SPORT

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Received 2024 February 08; Revised 2024 April 18; Accepted 2024 April 19;
Available online 2024 May 10; Available print 2024 June 30.

ABSTRACT. The history of ancient sports shows us that sports practice was not a secular one but was closely linked to religious faith. Whether we are talking about ancient Greece (Athens, Sparta, etc.), whether we are talking about Latin America or the Far East, the presence of homage and respect towards the gods is seen as something sacred and no one could dispute it. We have researched the religious phenomenon in sports for more than 30 years, and the result is like religion. politics and the arts of war decided the history of the world and civilization. (*Barbos, 2015*). It is proven by ancient writings, but also by archaeological traces, from ancient temples and stadiums dedicated to gods and legendary heroes, such as Hercules, the most famous demigod of the ancient world, who remained in legends as one of those who achieved the most successful sports. This article summarizes some ancient sports competitions, which were strictly related to the respect for the gods, which was rewarded with sports games, such as the Olympic Games of Greece.

Keywords: *Hylozoism, anthropological, animism, secular ritual, sacred ritual, oracle, Delphi, ecotheology, sumo, kyudo.*

REZUMAT. ***Religia, politica si mistica in sportul antic.*** Istoria sporturilor antice ne arată că practica sportivă nu era una laică, ci era strâns legată de credința religioasă. Fie că vorbim de Grecia antică (Atena, Sparta etc.), fie că vorbim de America Latină sau Orientul Îndepărtat, prezența omagiului și a respectului față de zei este văzută ca ceva sacru și nimeni nu l-ar putea contesta. Este dovedit de scrierile antice, dar și de urmele arheologice, din templele și stadioanele antice dedicate zeilor și eroilor legendari, precum Hercule, cel mai faimos semizeu al lumii antice, care a rămas în legende ca unul dintre cei care au realizat cele mai multe. sporturi de succes. Acest articol rezumă câteva

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competiții sportive antice, care erau strict legate de respectul față de zei, care era recompensat cu jocuri sportive, precum Jocurile Olimpice din Grecia. Politica-religia si artele războiului erau inseparabile in toată istoria omenirii, au influențat și practica educației fizice, cat si a sportului.

Cuvinte-cheie: *hilozoism, antropologic, animism, ritual secular, ritual sacru, oracol, Delphi, ecoteologie, sumo, kyudo.*

INTRODUCTION

The study of the anthropology of sport is one of the essential themes of the sociology of sport. Although we live in a modern world, different from the point of view of the standard of living of half a millennium ago, the questions that are asked by anthropologists are also found in modern activity, therefore also in sports.

Sport, as stated by *Lawrence (1982)*, can also be seen as a secular ritual. The history of sports proves to us that the practice of certain movements, the decor, the equipment and the manner of conducting the competitions, fall into religious ritual (Barboș, 2015).

But today's sport, modern sport, is a materialistic form, based strictly on obtaining records, on fitting into statistics, losing the original purpose (Guttmann, 1978).

In the ancient period, when we already have an organization of sports activities, but also in the primitive periods of history, we have archaeological evidence that the practices of magic, fetishes, prayers were part of the competitions in which the people of those times participated (Culin, 1907).

Regardless of which region we are studying, the ancient and medieval period was dominated by *Hylozoism*, the spiritual world, the unseen, is closely related to the material world.

Sports and anthropology

From an anthropological point of view, evidence related to religious practice in ancient sport took different forms depending on the region. Among the many forms of magic, but also of religious beliefs, the most practiced is *animism*. Animism is the belief that objects, places, and creatures possess human forms of existence. In a religious painting that works miracles, it is actually the presence of divinity, with the same qualities as a human, a living being. Gods are found in various forms, in stone, in trees, in the wind or even in the breath of living beings.

Types of ritual

The ritual can be compared to a secret, symbolic form whose message is addressed to the divinity, but accessible to be transmitted only to the initiated (priests, shamans, sorcerers, magicians, etc.). The result of the ritual is defining for society. Failure can lead to the destruction of the community and its disappearance from history, but almost always after a slaughter of the surrounding tribes.

In order not to create confusion when transmitting the message, the ritual can be divided into two:

1. The secular ritual
2. The sacred ritual

In the ancient period, these rituals took place in all environments. The believer did not have to go to the temple, to do a certain ritual, he could also do it at home. He could pray at home, having a small altar dedicated to the gods, especially those gods whose role was to protect the home and family. If there was one or more family members in the house who were going to participate in sports competitions in honor of the gods, then the prayers were accompanied by magic (Stevens, 1988).

Oracle – translated from Latin, "the one who speaks" - is one of the most important figures of the ancient world. The oracle is called upon for any important political, social, or sporting event. Whether we mean Pythia, the oracle of Delphi, or Dione of Epirus or the Sibyls, the oracle is one of the most important personalities of the ancient world. There was no great human community without an oracle. Kings, heroes, simple people or political, military people called on him.

Sports activities that involved magical rituals

The entire ancient and medieval world knew forms of magic, religious rituals, practiced especially in moments of social crisis, but also in moments when participating in sports activities. Even if we refer to a radical Christian medieval period, what forms of witchcraft were present, sometimes even in the bosom of the church, and even more so in the secular world (Peters, 1988).

In the ancient period, sports practice was not a playful form of relaxation, but a form of respect addressed to the gods. The games were not a simple form of relaxation, but one of extremely close communication and connection with the gods, the latter being present and sometimes incarnating in the bodies of the athletes. People practiced sports in honor of the gods, some of whom were responsible for the development of agriculture, the basic form of existence of a people. Each game was a form of recognition, a prayer to the gods who brought prosperity to the believer through rich harvests. The prayer of the earth and its offering bring prosperity to the believer's home.

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Ancient Greece

Ancient Greece is the one that developed the concept of *Ecotheology*. The gods are integrated in nature, in every living body in nature, and the relationship between religion and nature is part of the social life of the Athenian.

Athens knew many competitions dedicated to the gods, and the most famous being the Olympic Games, which were not just simple competitions, but a tribute to the God of Olympus, and the conduct of these competitions was one with a splendor hard to imagine for those times.

Numerous games were dedicated to the gods of Olympus:

The Pythian Games - were held at Delphi, the place most famous in the ancient Hellenic world for its oracles. These games were instituted by the god Apollo himself, as a commemoration of the slaying of the great serpent Python.

The Isthmian Games - were held every two years in Corinth. They were initiated by the demigod Theseus, son of Poseidon, who killed the Minotaur. The games were dedicated to him. Legends of the Nemean games are given by an event in which an army led by Polynices, a son of Oedipus, killed a snake that had killed the infant Opheltes (Snake Man).

The Nemean Games – sports competitions that took place every two years. They are the games that have been reborn, today being practiced in quite a large number. (https://www.traveleuropa.ro/obiective-turistice-corint-jocurile-nemeene/)

All the champions of the races were considered demigods, and statues were erected to them, and the city from which they came had many financial facilities.

Japan

The most famous form of religious competition is *sumo*. It is the only sporting art in the world that still preserves the religious rite today. The Shinto cult, the religion of the Japanese people, is present in sumo competitions, from the beginning of the competitions to its end.

Dedicated to the two Kami (gods), *Takemikazuchi* and *Takeminakata*, every competitive match begins with a religious dance in their honor. They are still present just above the battle surface, *Tsuryane*, which serves as a roof. The green dragon, *Seiryu*, the *kami* (God) that protects the western region of Japan, is present on the roof of *Tsuryane*. The offerings brought to sports competitions: chestnuts, seaweed, salt and holy rice. *Salt* is the substance with which evil spirits are removed from the competitions, that's why the fighters always throw salt over the entire fighting surface.

This is followed by rinsing the mouth and wiping it with a *chiga-gami*, a paper with miraculous powers that will help the fighters become as strong as the wood the paper is made of.

After the wrestling, the sumo tournament is over, there is a religious dance, the *yumitorishiki*, the bow dance, in which the sumo wrestlers pay homage to the gods. This dance used to be called Kagura (Barboș, 2015).

Kyudo, the art of archery, is also a religious act. Even if, seen from the outside, the archer does not seem to be paying attention to the world in which he finds himself, in reality, he is present not only in the physical world, but at the same times in the spiritual world as well. The relationship between the body and the soul is, in Kyudo, closely linked, and the achievement of great performances cannot be done in other nations, the performances remaining only in the Japanese space. The bow is the link between man and his spirit. The arrow is an extension of the archer's will. His thought is sent to the target with the help of the arrow, and throughout its movement towards the target, the arrow does not depend on the archer's thought.

To unite spirit and mind, the archer uses *Hara* (abdomen) breathing techniques, which directs the circulation of air throughout the body. In this way Ki is developed, the power, the force, necessary to carry out the tasks. Although the process seems simple at first glance, still achieving this performance requires going through 8 stages, and only starting with the 7th stage, the *KAI* (meeting) stage, one can talk about the unity of mind and body. The release of the arrow from the archer's hand, *hanare*, represents the moment when the energy of the archer's body is transmitted to the arrow, which in turn sends it to the target (Onuma, & DeProspero, 1985).

China

The famous Shaolin Monastery, which has been training elite fighters for hundreds of years, is based on a physical and spiritual training derived from the Buddhist religion, the Dayana sect. The system was implemented by the famous Bodhidharma, around the year 530, who, after 7 years of waiting at the

monastery gate, is received by the monks, and he will develop a spiritual and physical training system that will lead you to achieve incredible performances .

The Chinese *oracle* is the basis of social activity. Divination in turtle or ox bones offered those interested in the future a way to organize their lives in the coming months. Only after receiving the verdict of an oracle could a decision be made regarding future actions. There were no weddings, no going to war, and no harvest from the field if the oracle's answer was not favorable. Placed at an extremely high temperature, the shape these bones left depicted the future.

These oracles would form the basis for the formation of later Chinese writing (Zhang, 2002).

Poe Divination - another method of divination used in Ancient China, refers to throwing small pieces of wood in the shape of a crescent, and the way they fell gave information about the future of the person concerned. If the curved side of the wood was pointing upwards, then the message from the gods was a negative one, and the believer had to abandon the project he had proposed (Brückner, 1995).

Latin America

Latin America, to this day, preserves religious rituals that have hundreds of years of practice. Witchcraft, magic, etc., have not disappeared, but are an integral part of social life. For example, *Tezcatlipoca* is the patron saint of sorcerers and practitioners of magic to this day, even though in some regions he goes by different names. Its origin lies in the creation myth. *Oxomoco* and *Cipactonal*, the gods who divine in corn kernels are considered to be the first diviners.

In Latin America, the most famous games in which religious rituals were present can be found in the games of the *Olmecs, Toltecs*, and *Aztecs*, who before declaring the games open, held a religious process in which both the athletes and the audience participated (Schroeder, 1955).

The ball game, until the arrival of the Spanish conquistadors in the 16th century, was associated with the ritual of human sacrifice. The origin of the games is found in the creation myth, the *Popol Vuh*. The term de *Popol Vuh* describes the adventures of the twin heroes Hunahpú and Xbalanqué, and a chronicle of the people *K'iche'*.

The games were held only around the temples, where all around were the skulls of those sacrificed over time. Every game began and ended with a series of prayers. All those who lost the competition were sacrificed as food for the gods. The sportsmen, not to be seen in today's sense, were redoing the ball game of the two twin brothers.

Tradition says that Hunahpú and Xbalanqué played the ball game on a field where their father, Hun, from the land of the dead (Xibalba) had also played. But this game was not approved by the gods of the underworld. Invited to participate in the game, the gods accept, but call them to their realm. The two twins manage to overcome all the obstacles set by them, and reach the competition. Enraged, the dark gods asked the brothers to play the ball game. The ball was actually a skull hiding a sharp blade. The two brothers protested and wanted to leave the competition (Coe, 1989).

The gods allow the game to be played with a rubber ball, and in the end they are defeated by the brothers, which angers the gods, who do not view the contest as a game, but as something personal and with envy. to take revenge, the gods sought to kill them, building a furnace, then invited them to enter it. The brothers accepted the invitation and were burned to ashes, which were to be thrown into the river. But this did not lead to the death of the twins, but they were reborn, returning to the mortal world, but without being recognized, and performed a series of miracles, killing and reviving the bodies.

News of their miracles also reached the gods who killed them. The two brothers, in a different form, will not be recognized by the gods of darkness, and the twins avenge their father, so that, in the end, through their ascent to the sky, they become the Sun (Hanahpu) and the Moon (Xbalanque) (Tedlock, 1985).

Also in Latin America, in the Sierra Madre, Mexico, Raramuri, or Tarahumara (foot runners) competition were held in honor of the creator God, Riosi, and his wife, Maria, and their rival, the Raramuri, the Devil. Athletes participate in competition similar to the Greek marathon, but over a distance of 320 km, in a maximum of two days. The running is done after the wild animals they are chasing, and because of their fatigue they collapse, and they can easily be hunted, being killed by strangulation.

There is a custom that these races are also held with a ball, symbol of the earth, which is passed over a distance of at least 170 km (Sanktjohanser, 2016).

CONCLUSIONS

Although the sport practice of the ancient period is much more complex than I have presented in this article, it can be considered as a guide in the study of ancient sport for those who want to study the subject in detail. Practices that today have entered the category of mysticism, subjects that are not studied by the academic world. However, they did exist in the ancient world, and indeed they decided the fate of people and gave political and social verdicts. This remains an open topic, which must be analyzed by both anthropologists and sociologists,

but especially by physical education teachers, in order to understand the phenomenon of sports practice in antiquity, which was not just a simple participation of a group of athletes, but a living tribute to the gods, and the champions identified with the gods.

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