ICTS IN PHYSICAL EDUCATION: CROSSING BETWEEN DIMENSIONS OF TEACHER TRAINING AND THE SCHOOL CONTEXT

TICS NA EDUCAÇÃO FÍSICA: CRUZAMENTO ENTRE DIMENSÕES DA FORMAÇÃO DO PROFESSOR E O CONTEXTO ESCOLAR

TICS EN LA EDUCACIÓN FÍSICA: CRUCE ENTRE DIMENSIONES DE LA FORMACIÓN DEL PROFESOR Y EL CONTEXTO ESCOLAR

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ABSTRACT: The present study aimed to identify possible factors influencing the use of technology by physical education teachers in the school context. One hundred eight elementary school teachers from São Paulo participated in this study. Data was collected using a closed-ended questionnaire, administered through the "Snowball" methodology, and organized into two categories: personal and educational background and school infrastructure. For qualitative variables, frequency distributions were presented. The Chi-Square test was used to assess association, and the McNemar test was used to evaluate whether there were significant changes in the use of technological resources. In summary, the results showed a significant association between teachers' age and the frequency of technology use. Younger teachers tend to use more technological resources compared to the period before the COVID-19 pandemic. Additionally, there was an increase in the use of the internet, digital games, mobile devices, and notebooks as part of the educational landscape.


RESUMO: O presente estudo buscou identificar os possíveis fatores que influenciariam o uso de tecnologias por parte de professores de educação física no contexto escolar. Um total de 108 professores do Ensino Fundamental de São Paulo participaram deste estudo. A coleta de dados aconteceu com a utilização de um questionário com perguntas fechadas, aplicado por meio da metodologia “Bola de Neve” e organizado em duas categorias: pessoais e de formação e infraestrutura escolar. Para as variáveis qualitativas, foram apresentadas as distribuições de frequências. Usou-se o teste Qui-Quadrado para avaliar a associação e o teste de McNemar para avaliar se houve mudanças significativas no uso dos recursos tecnológicos. Em síntese, os resultados demonstraram uma associação significativa entre a idade dos professores e a frequência de uso de tecnologias. Professores mais jovens tendem a utilizar mais recursos tecnológicos em comparação com o período anterior à pandemia da COVID-19. Além disso, observou-se um aumento no uso de internet, jogos digitais, dispositivos móveis e notebooks como parte do cenário educacional.


RESUMEN: El presente estudio buscó identificar los posibles factores que influirían en el uso de tecnologías por parte de profesores de educación física en el contexto escolar. Participaron del estudio 108 profesores de enseñanza primaria de São Paulo. La recolección se realizó mediante el uso de un cuestionario con preguntas cerradas, aplicado a través de la metodología "Bola de Nieve" y organizado en dos categorías: personales y de formación, e infraestructura escolar. Se presentaron análisis de distribuciones de frecuencias para las variables cualitativas. Se utilizó la prueba de Chi-cuadrado para evaluar la asociación y la prueba de McNemar para evaluar si hubo cambios significativos en el uso de los recursos tecnológicos. En resumen, la edad mostró una asociación relacionada con la frecuencia de uso, los profesores más jóvenes demostraron hacer un mayor uso de los recursos tecnológicos, en comparación antes de la pandemia de COVID-19 y se observó un aumento en el uso de internet, juegos digitales, teléfonos móviles y portátiles.

Introduction

Indeed, the curricular component of Physical Education presents several peculiarities related to the use of technology. Specifically, an internal controversy within the field regarding this issue can be identified. On the one hand, the fundamental importance of technology is recognized, especially concerning promoting participation and guiding activities for young people. On the other hand, some professionals believe that using these technologies may contribute to distancing children and youth from bodily practices, which are inherent to the scope of Physical Education intervention.

The reflection on the use of technology has become particularly relevant, especially since the emergence of the COVID-19 pandemic, which imposed a series of challenges on professionals in the school context. Therefore, it is essential to understand how these technologies are applied and, eventually, what difficulties are encountered. Throughout this text, it will be possible to explore the pedagogical challenges faced by teachers related to the social context, the guidelines established in documents, and the need to seek new dialogues within the curricular component of Physical Education.

A study by Souza, Saitsu and Gimenez (2018) consisted of a survey conducted among students in the State Education System of São Paulo, addressing the themes recalled by students after returning from vacation related to the curricular component in question. The results revealed a greater emphasis on the health area in the students' presentations of the topics. Subsequent analysis and discussion identified students' difficulty in listing the essential characteristics of "movement" within the context of the Culture of Movement. This underscores the need for educational research that assists in pedagogical practices to empower students to become critical and self-critical individuals in Physical Education.

Pereira, Silva and Lüdorf (2022), on the other hand, identified in one of their studies the personal relationship of the educator with their pedagogical practices. This implies a more significant concern with the search and reinvention of their teaching actions, according to the changing social contexts, highlighting the need for attitudinal changes on the part of educators.

Given the current demands, the specific characteristics of young individuals, and the unique nature of Physical Education, it becomes necessary to gain a more adequate understanding of how teachers have utilized these technologies. It is essential to emphasize the guidelines provided in the National Common Curricular Base, which foresee Information and Communication Technologies (ICTs) use within the scope of Physical Education. However, teachers need a more comprehensive understanding of this usage (RODRIGUES, GIMENEZ e
DYONISI, 2021).

In light of these considerations, this present study aims to analyze the potential factors associated with using ICTs in the classes taught by Physical Education teachers. As mentioned earlier, this is justified by the fact that guiding documents discuss new objects of knowledge that directly impact teachers' pedagogical practices in the educational context.

Development

Bibliographic research focused on the intersection of Physical Education and Technologies identified several noteworthy studies. For this purpose, 59 works were considered, encompassing research, book chapters, and dissertations. The keywords delineating this search included: "Education - Information and Communication Technology - School Physical Education - Pedagogical Practices - Teacher." This strategy enabled the exploration of different perspectives related to the subject. All this research was conducted through the consultation of CAPES journals, Scielo's database, Educ@, Google Scholar, and scientific journals.

For example, Oliveira and Oliveira (2021) emphasize an innovative concept about students, classifying them as the "audiovisual generation." This characterization encompasses curious individuals, highly motivated and endowed with broad access to information and communication technologies. Technological resources, when incorporated into school projects, contribute to the development of a new educational dynamic. For instance, the concept of Media Education stands out, emerging as a fundamental tool for deciphering modern culture. This term refers to the interconnection between education and communication. The authors argue that, just as the media permeate the thematic units within the context of school Physical Education, it is the teacher's responsibility to assume the role of shaping individuals capable of critically approaching these resources.

Barasuol and Marin (2021) outline that in the present day, there are resources that significantly enhance communication and access to information, notably Information and Communication Technologies (ICTs). These ICTs, through electronic devices, tablets, and smartphones, play a positive and substantial role in the teaching staff's pedagogical action and in the student's education.

On the other hand, Briskievicz, Corrêa and Souza (2021) highlighted a relevant observation regarding the fears and needs of educators, especially those starting their practices.
According to these authors, educators may experience insecurities and the need to learn how to teach at the beginning of their professional journeys, which is a challenging initial phase. In this context, the authors argued that examples of sound pedagogical practices involving Information and Communication Technologies (ICTs) are essential, mainly due to the lack of reference literature on the subject.

Fernando (2017), on the other hand, addressed reflections related to the use of technology in Physical Education classes. His study emphasized that virtual or digital games should not replace practical activities or suppress debates and discussions on social issues. Another crucial point stressed by the author is that the lack of infrastructure in the school unit, when present, should not be a reason for exclusive reliance on ICTs. On the contrary, teachers should promote efficient management of the available physical or digital resources.

Rohden (2017), in his research, used applications such as WhatsApp and Facebook to investigate the use of technology and Exergames in Elementary School Physical Education classes in the municipality of Joinville. The results of this study highlighted the need, in many cases, to recreate teaching methods and adapt to the use of technology to motivate students and provide more engaging classes.

Torres et al. (2016) through research involving 32 teachers from the municipal education system in Fortaleza, identified difficulties in using ICTs related to the lack of school infrastructure, the need for supervision in laboratories, and the need for professionals to become familiar with these tools.

In the study presented by Lima (2020), the Action Research methodology was adopted, with the collaboration of a high school teacher, to introduce Exergames as a pedagogical tool. The study's main objective was to analyze the use of the software ATLAS.ti, which allows for the organization and structuring of content in the research context. The results of this work indicated that positive attitudes by teachers towards the use of technology resulted in student engagement.

Lima, Mendes and Lima (2020) researched teachers' opinions on using Exergames as a technological tool in classes aimed at 3rd-year high school students. Two Xbox One gaming consoles with Kinect were employed as part of the pedagogical approach. As a conclusion of this research, the authors emphasized the importance of considering the use of additional school spaces for Physical Education classes, such as the amphitheater and the library, in addition to traditional sports courts.

Nardon and González (2019) conducted a study in which they separately applied the use
and non-use of Information and Communication Technologies (ICTs) in 3rd-grade elementary school classes. For one group, they provided workbooks containing content aligned with the National Common Curricular Base (BNCC), addressing the theme of games and play from different regions. For the other team, they chose to use technology to explore the same theme.

In this context, the group that utilized technology created an exclusive Facebook group for students titled "Popular and Traditional Games," where the workbook was made available. Both groups were tasked with conducting research with their families on the topic of games, culminating in a final project presentation. However, the group that used technology produced a video, while the others opted for analog production methods.

Throughout the execution of the task, the authors found that students who used Information and Communication Technologies (ICTs) demonstrated more significant commitment, engaging in production activities and classroom participation in a distinct manner. This behavior differed significantly from those students who did not use these tools. As argued by the authors, although the content was delivered uniformly, the results obtained were notably different in terms of the final product and how students engaged with the presented content.

Tahara and Darido (2016) addressed points of great relevance concerning the use of Information and Communication Technologies in the context of the curricular component of Physical Education. Their work highlighted that the debate on this topic is progressing through discussions and reflections on using technological tools in Physical Education classes.

Despite several works dealing with the intersection between school Physical Education and ICTs, there is a noticeable scarcity of studies investigating the possible reasons why Physical Education teachers adopt the use of technology. Therefore, the purpose of this study is to identify how technologies are employed and to ascertain whether there is an association between the frequency and the amount of time dedicated to the use of these technologies with variables such as the teacher's training time, age, gender, years of professional experience, the institution where they obtained their training, and the profile of the school in which they work.

**Methodological Procedure**

The study was characterized as quantitative, exploratory research employing a questionnaire disseminated through the "Snowball sampling" methodology. Following Vinuto's approach (2014), this methodology involves using "seed" individuals to assist in conducting the research, thus expanding its reach and deepening the understanding of the subject while also
allowing for the development of approaches for subsequent phases of the study.

As Gatti (2004), highlighted, quantitative education research is considered a scarce practice, suggesting the need to employ "numbers" to provide greater clarity to data and stimulate discussions among educational scholars on the subject. This quantitative approach facilitates the orientation of subsequent analyses. Gil (2018) argues that the exploratory approach aims to facilitate the discovery of answers, especially when formulating hypotheses is not yet feasible in the initial stages of research.

Data collection took place over 20 days, spanning from May 2022 to June 2022, with Physical Education teachers who teach classes in the early and late elementary school years. "Seed" teachers were selected to assist in the questionnaire's dissemination. The questionnaire was developed and made available through the Google Forms platform, consisting of closed-ended questions covering the following topics:

- Personal and educational characteristics of the respondents;
- Availability of primary resources, such as space, materials, and technological resources offered by the institution where they work;
- Use of technological resources in the daily life of the teacher;
- Application of technological resources in Physical Education classes;
- Challenges faced in using these technologies at school, including the context of the COVID-19 pandemic - before, during, and after the return to in-person classes.

The teachers who participated in the research agreed to sign the Informed and Voluntary Consent Form and subsequently responded to a screening questionnaire. This aimed to ensure that only professionals who met the predefined criteria and could not interfere with the results were included in the study.

The main participation criteria in the research included having a degree in Physical Education and currently teaching classes in the early and late years of elementary school, whether in public or private schools in various states of São Paulo.
Analysis and Discussion

Data collection involved the participation of 143 teachers who responded to the questionnaire. However, nineteen participants did not have a degree in Physical Education, 15 were not teaching the Physical Education subject, and one was not involved in preparing the curricular component. Therefore, 108 teachers were considered in the count and analysis of the results.

The Chi-Square\(^3\) test was employed to assess the association between teachers' demographic and educational variables with the frequency of technological resource usage and the use of social networks. Additionally, the non-parametric McNemar\(^4\) test was used to check for significant changes in the use of technical resources before, during, and after the COVID-19 pandemic, emphasizing the return to in-person classes. The software used for the analyses was the open-source R software, version 4.0.2, and the adopted significance level was 5%.

The analyses were subdivided into categories to provide a more in-depth understanding of the obtained results. It is worth noting that the main parameters considered in this study included the use of technological resources and social networks, the application of these technological resources in Physical Education classes, the evolution of technical resource usage before, during, and after the COVID-19 pandemic, as well as the association between the frequency of technological resource and social network usage and the demographic and educational characteristics of the participants.

Usage of technological resources and social networks

Regarding the frequency of using specialized resources and social networks in the daily lives of teachers (as shown in Table 1), only 7 (6.5%) and 4 (3.8%) teachers, respectively, stated that they do not use these tools.

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\(^3\)The chi-square test is a comprehensive, suitable, and efficient method for analyzing qualitative variables encompassing two or more categories (BASSETTO, 2021).

\(^4\) The non-parametric McNemar test is applied to dichotomous variables, variables that only have two values (for example, yes/no) (FIRMINO, 2015).
Table 1 - Frequency of usage of technological resources and social networks in the teacher's daily life

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Technological resources n (%)</th>
<th>Social networks n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not use</td>
<td>4 (3.7)</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>I used to use, but I no longer do</td>
<td>3 (2.8)</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>Yes, infrequently</td>
<td>22 (20.4)</td>
<td>27 (25)</td>
</tr>
<tr>
<td>Yes, sporadically</td>
<td>17 (15.7)</td>
<td>11 (10.2)</td>
</tr>
<tr>
<td>Yes, frequently</td>
<td>62 (57.4)</td>
<td>66 (61.1)</td>
</tr>
<tr>
<td>Total</td>
<td>108 (100)</td>
<td>108 (100)</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

Regarding the purpose of the daily use of technological resources and social networks, it was found that 91 teachers (84.3%) used technical resources, while 90 educators (83.3%) turned to social networks to conduct research related to their professional area, as detailed in Table 2.

Table 2 - Purpose of using technological resources and social networks in the teacher's daily life

<table>
<thead>
<tr>
<th>Purpose of use</th>
<th>Technological resources n (%)</th>
<th>Social networks n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I conduct research related to my professional field</td>
<td>91 (84.3)</td>
<td>90 (83.3)</td>
</tr>
<tr>
<td>I conduct research unrelated to my professional practice</td>
<td>50 (46.3)</td>
<td>46 (42.6)</td>
</tr>
<tr>
<td>I use it for relaxation</td>
<td>50 (46.3)</td>
<td>71 (65.7)</td>
</tr>
<tr>
<td>Exchange of pedagogical proposals with teachers in the field</td>
<td>51 (47.2)</td>
<td>51 (47.2)</td>
</tr>
<tr>
<td>I use it differently from the options presented</td>
<td>26 (24.1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>I do not use</td>
<td>0 (0)</td>
<td>2 (1.9)</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

The Internet was identified as the most widely used technological resource in daily activities, mentioned by 99 teachers (91.7%). In second place, mobile devices such as cell phones had an adoption rate of 79 teachers (73.1%), as shown in Table 3.
Table 3 - Technological resources used in the teacher's daily life

<table>
<thead>
<tr>
<th>Technological resource used in everyday life</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td>99 (91.7)</td>
</tr>
<tr>
<td>Cell phone</td>
<td>79 (73.1)</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>64 (59.3)</td>
</tr>
<tr>
<td>Laptops</td>
<td>59 (54.6)</td>
</tr>
<tr>
<td>Mobile data</td>
<td>59 (54.6)</td>
</tr>
<tr>
<td>Computer</td>
<td>48 (44.4)</td>
</tr>
<tr>
<td>Television</td>
<td>45 (41.7)</td>
</tr>
<tr>
<td>Digital games</td>
<td>18 (16.7)</td>
</tr>
<tr>
<td>Tablets</td>
<td>11 (10.2)</td>
</tr>
<tr>
<td>Videogames</td>
<td>6 (5.6)</td>
</tr>
<tr>
<td>Others</td>
<td>3 (2.8)</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

The use of social networks, such as Instagram (84), Facebook (70), and WhatsApp (67), was identified as the most frequent in the daily lives of teachers, as shown in Table 4.

Table 4 - Use of social networks in the daily life of teachers

<table>
<thead>
<tr>
<th>Social networks</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instagram</td>
<td>84 (77.8)</td>
</tr>
<tr>
<td>Facebook</td>
<td>70 (64.8)</td>
</tr>
<tr>
<td>WhatsApp</td>
<td>67 (62)</td>
</tr>
<tr>
<td>Telegram</td>
<td>24 (22.2)</td>
</tr>
<tr>
<td>Pinterest</td>
<td>18 (16.7)</td>
</tr>
<tr>
<td>Tik Tok</td>
<td>14 (13)</td>
</tr>
<tr>
<td>Twitter</td>
<td>6 (5.6)</td>
</tr>
<tr>
<td>Kwai</td>
<td>6 (5.6)</td>
</tr>
<tr>
<td>Others</td>
<td>5 (4.6)</td>
</tr>
<tr>
<td>Snapchat</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>I don't use social media</td>
<td>2 (1.9)</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

The results presented have allowed the identification of the use of technological resources by teachers, with a focus on specific tools used more frequently. According to Maddalena, Junior and Teixeira (2020), using memes as a pedagogical instrument highlights the need to (re)think digital possibilities, especially during the pandemic. This raises a relevant discussion that supports using new educational processes as a strategy and alternative to
enhance interactions between educators and students in the teaching and learning process.

Santos, Ferrete and Alves (2021), emphasize the importance of teachers' engagement with digital environments, even considering that schools often face challenges in internet access. This promotes reflection and the need for more appropriate training, integrating technology into their educational practices.

Matias et al. (2018), emphasize the potential of social networks as evaluative tools and facilitators of discussions, as well as promoting content diversification. This will motivate students and, consequently, enhance the curricular component of Physical Education. Additionally, such resources and tools foster greater student engagement, as they already demonstrate more interest and familiarity with Information and Communication Technologies (ICTs).

The applicability of technological resources in physical education classes

One hundred and six teachers considered using technical resources as a powerful pedagogical tool in physical education classes. The same percentage valued the use of these resources not only in physical education classes but also throughout the school (as shown in Table 5).

Table 5 - Degree of agreement with statements related to the applicability of technological resources in physical education classes

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Agree Completely</th>
<th>Disagree</th>
<th>Disagree Completely</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I assess the school's infrastructure where I teach as suitable for physical education classes</td>
<td>56 (51.9)</td>
<td>18 (16.7)</td>
<td>28 (25.9)</td>
<td>6 (5.6)</td>
<td>108 (100)</td>
</tr>
<tr>
<td>The data/internet package used in the school environment is satisfactory</td>
<td>41 (38)</td>
<td>9 (8.3)</td>
<td>34 (31.5)</td>
<td>24 (22.2)</td>
<td>108 (100)</td>
</tr>
<tr>
<td>Wi-Fi is available for teachers, students, and staff in the school environment</td>
<td>41 (38)</td>
<td>8 (7.4)</td>
<td>36 (33.3)</td>
<td>23 (21.3)</td>
<td>108 (100)</td>
</tr>
</tbody>
</table>
I am familiar with the use of technologies

72 (66.7) 28 (25.9) 6 (5.6) 2 (1.9) 108 (100)

I have an interest in using technological resources in the physical education curriculum

65 (60.2) 40 (37) 3 (2.8) 0 (0) 108 (100)

I have the time available to create lessons that use technological resources

59 (54.6) 11 (10.2) 34 (31.5) 4 (3.7) 108 (100)

Source: Elaborated by the authors.

Regarding the difficulties encountered in using technologies at school (as presented in Table 6), the results revealed the following: 68.6% of teachers assessed the school's infrastructure where they work as suitable for physical education classes; 92.6% were familiar with the use of technologies; 97.2% expressed an interest in using technological resources in the physical education curriculum; 64.8% had the time available to create lessons that use technical resources.

On the other hand, 53.7% of teachers disagreed that the data/internet package used in the school environment was satisfactory, and another 54.6% disagreed that Wi-Fi was available for use by teachers, students, and staff in the school environment.

**Table 6 - Degree of agreement with statements about difficulties using technology at school**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree</th>
<th>Agree Completely</th>
<th>Disagree</th>
<th>Disagree Completely</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I evaluate the school's infrastructure where I teach as suitable for Physical Education classes</td>
<td>56 (51.9)</td>
<td>18 (16.7)</td>
<td>28 (25.9)</td>
<td>6 (5.6)</td>
<td>108 (100)</td>
</tr>
<tr>
<td>The data/internet package used in the school environment is satisfactory</td>
<td>41 (38)</td>
<td>9 (8.3)</td>
<td>34 (31.5)</td>
<td>24 (22.2)</td>
<td>108 (100)</td>
</tr>
</tbody>
</table>
Wi-Fi is available for teachers, students, and staff in the school environment

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>21.3%</th>
<th>21.3%</th>
<th>21.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>41</td>
<td>8</td>
<td>36</td>
<td>23</td>
<td>108</td>
</tr>
</tbody>
</table>

I am familiar with the use of technology

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>33.3%</th>
<th>33.3%</th>
<th>33.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72</td>
<td>28</td>
<td>25.9%</td>
<td>25.9%</td>
<td>108</td>
</tr>
</tbody>
</table>

I have an interest in using technological resources in the Physical Education curriculum

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>31.5%</th>
<th>31.5%</th>
<th>31.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>40</td>
<td>36.6%</td>
<td>36.6%</td>
<td>108</td>
</tr>
</tbody>
</table>

I have the time available to create lessons that use technological resources

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>21.3%</th>
<th>21.3%</th>
<th>21.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59</td>
<td>11</td>
<td>54.6%</td>
<td>54.6%</td>
<td>108</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

Conceição and Ferreira (2022) emphasize the role of technological resources in classes, highlighting that, since these resources are part of daily life, they play a crucial role in communication, allowing the sharing of diverse perspectives and promoting critical-reflexive thinking among young citizens. Therefore, the extensive use of these resources in education becomes ideal. However, the authors point out the difficulties in using these resources, attributed to factors such as lack of teacher training, limited availability of technological resources, and quality accessibility for the school community.

Scherer and Brito (2020), address the same obstacles related to infrastructure, connectivity, and lack of maintenance of technological resources, which sometimes result in the disposal of these resources. Teachers found that by using some of the possibilities offered by Information and Communication Technologies (ICTs), they could monitor students more formatively, identify necessary interventions, and facilitate content creation.
Use of technological resources before and during the COVID-19 pandemic and after the return to in-person classes

Fifty-eight percent of the teachers disagreed with the idea that they only identified the use of technological resources during the pandemic, and 37% disagreed with the statement that the frequency of using these resources today is comparable to the frequency of service during the COVID-19 pandemic (as shown in Table 7).

Table 7 - Comparison of the use of technological resources

<table>
<thead>
<tr>
<th>Regarding the frequency of using technical resources today</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I assess that my use can be compared to the</td>
<td></td>
</tr>
<tr>
<td>Period before the pandemic</td>
<td>31 (28.7)</td>
</tr>
<tr>
<td>Period after the return of students to in-person</td>
<td>37 (34.3)</td>
</tr>
<tr>
<td>Period during the pandemic</td>
<td>40 (37)</td>
</tr>
<tr>
<td>Total</td>
<td>108 (100)</td>
</tr>
</tbody>
</table>

Source: Elaborated by the authors.

It was possible to assess how the number of teachers who used a specific technological resource (such as a computer, notebook, Wi-Fi, among others) at different times (before the pandemic, during the pandemic, and after the return of in-person classes) varied over other periods. Regarding the use of the Internet, 91 teachers reported its use before the pandemic, while 17 reported not using it in their classes. During the pandemic, 14 out of the 17 teachers (82%) who previously did not use it started using it, and only 1 (1.1%) of those who used it before stopped using it. During the COVID-19 pandemic, 4 teachers reported not using the Internet, while 104 reported using it. Therefore, according to the data, there was a significant increase in Internet use during the COVID-19 pandemic. The "p" value indicates whether the change in the use of resources over the compared periods was statistically significant. "P" values less than 0.05 show that the difference in the use of resources was substantial.

When comparing the use of technological resources before and during the COVID-19 pandemic, it is possible to see that there was a significant increase in the use of the Internet (p=0.002), digital games (p<0.001), students' cell phones (p<0.001), laptops (p<0.001) and Wi-Fi (p=0.007).

When comparing the use of technological resources during the COVID-19 pandemic with the service after the return of in-person classes, a significant decrease in the use of digital games (p=0.010) and students' cell phones (p=0.002) is noted. However, there was a
considerable increase in the use of home televisions \((p=0.003)\). When comparing the use of technological resources before the COVID-19 pandemic and after the return of in-person classes, there was a significant increase in the use of laptops \((p=0.002)\) and Wi-Fi \((p=0.014)\).

Studies conducted by Leite et al. (2022), addressed the teaching model adopted by many schools during the pandemic, namely remote learning. This mode of education revealed the need for improvement in human and technological resources. According to the participants' reports, many only became aware of some help for physical education classes under the influence of the social context. Furthermore, they stated that they felt "lost" and unprepared in the face of the compulsive use of these resources and tools.

Silva et al. (2021), addressed in their study programs and laws that promote work and the use of technologies in schools, such as the Plano Nacional de Educação (National Education Plan) and the Programa Um Computador por Aluno (One Computer per Student Program). The piece highlights evidence, mentioned earlier in this article, of the lack of training for expanding the repertoire and use of technological tools. This often hinders the initial contact of teachers and students since not everyone has the infrastructure of resources and specialized tools at their homes that contribute to their development in the digital world.

It is important to note that physical education plays an active and influential role in social interaction, whether in performing bodily movements in the classroom or during remote learning when teachers and students do not have personal but virtual contact. Therefore, there has been a movement in the search for theoretical and practical approaches facilitated by using ICTs, which played a supportive role in highlighting such practices.

**Association of the frequency of technology resources and social media usage with teachers' demographic and educational characteristics**

The statistical data analysis and the p-value below 0.05, established a significant association between the studied variables. It was possible to identify a significant association between the age of teachers and the frequency of technology resource usage \((p=0.035)\). However, those who do not use or are used to but no longer do belong to the age group of 51 years or older \((57\%)\).

When analyzing those who use technology resources sporadically, with low frequency, or very frequently, it was observed that 64% and 52% fall into the age group between 36 and 50 years, respectively. Therefore, teachers who use technology resources are generally younger compared to those who do not use these means. No significant association with social media
usage frequency was identified regarding demographic variables and teachers' education.

Corrêa and Lima (2021) addressed the issue of the moving body and its historical changes in their studies, highlighting that introducing technological resources allowed for a redefinition of concepts and new approaches regarding the use of various specialized tools. It is important to emphasize that the teacher's presence is irreplaceable, as using digital resources assists in their teaching practices but does not replace them.

Oliveira and Oliveira (2021) analyzed the non-use of technological resources, emphasizing that ignoring social media, which is part of the cultural repertoire, hampers the students' teaching and learning process. They highlight that technology enables the search and construction of new knowledge, opening up new perspectives in digital education.

**Final considerations**

Based on the discussions presented earlier, favorable results were observed regarding using Information and Communication Technologies (ICTs). The study revealed that 93.5% and 96.2% of the participants use technological resources and social media, respectively. However, it is essential to note that these results do not eliminate the need for ongoing attention to investments and research in this area. It is necessary to revisit education, update concepts, and present new possibilities to teachers, encouraging them to continue enhancing digital tools, especially in the context of the physical education curriculum.

Considering the demographic factors and the teachers' education, it was observed that only the variable of age showed a significant association with the frequency of technology resource usage. This demonstrates that younger teachers are the ones who use these resources more frequently, while older teachers tend not to do so. However, it is essential to emphasize that, despite the greater familiarity of younger teachers, as evidenced in this study, it is crucial to promote training and provide support to more youthful and more experienced educators, regardless of age and years of experience.

Regarding demographic aspects and teacher education, no significant association was identified with the frequency of social media usage. This indicates that the type of higher education institution attended or the location where educators work does not interfere with the decision to use or not use technological resources.

Regarding the use of technological resources during the COVID-19 pandemic, a significant increase in the use of the internet and digital games, students' cell phones, notebooks,
and Wi-Fi was observed compared to the period before the pandemic. When analyzing the usage after the return to in-person classes, a decrease in the use of digital games and students' cell phones was noted, but there was an increase in the use of home televisions. These data highlight a significant increase in the use of notebooks and Wi-Fi when comparing the period before the pandemic with the post-pandemic period.

Thus, based on the findings, the pandemic caused a kind of technological revolution regarding the use and dissemination of various and more diversified specialized tools in education. It is also emphasized that the purpose of this study is directly related to the use of technologies as support for pedagogical practices in physical education classes, without losing sight of the importance of the teacher as a fundamental mediator in the process of forming individuals capable of identifying, accessing, and producing different technologies critically, reflectively, and ethically, understanding the importance of technology for life and society as a whole.

Future studies should focus on the impacts of using these technologies on student learning and engagement and their long-term outcomes. It is also essential to investigate how this topic is addressed in physical education teacher education and primary education (GIMENEZ, 2011; GIMENEZ; SILVA, 2014), considering the need to guide educational practices in contexts of great uncertainty and with urgent demands.

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