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Special Issue

Promotion of Health and Active Behaviors through Physical Education and In-school Physical Activity

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Youth is a key stage of life for the promotion, development, and structuring of healthy habits that are likely to be maintained in adulthood. However, according to the (WHO, 2024), approximately 50% of mental health issues appear already in early ages, and 1 of every 6 adolescents is at least overweight. Among the leading causes of the worsening of health in children and adolescents, most international associations mention lack of Physical Activity (PA) along with sedentary behaviors (WHO, 2024), up to 81% of youth not meeting the recommended weekly PA time (Guthold et al., 2020). Indeed, recent studies have pointed out a significant increase in the daily sedentary time among young populations, at the same time as daily PA dropped (Sun & Yuan, 2024). Sedentary behaviors represent an independent risk factor for health issues in youth and adults alike, particularly when concerning the time spent seated (Henschel et al., 2017), which is known to reduce/remove the benefits obtained by any PA carried out during a given day. A major contribution to total sedentary time comes from the so-called "occupational sitting time" (time spent sitting due to work/education reasons), whose detrimental effects may be lowered by including bouts of PA in one's daily routine (Gao et al., 2024).

Keeping in mind that kids currently spend 8 or more hours daily sitting (Bauman et al., 2018), the concept of "occupational sitting time" becomes particularly important in school contexts. On the one hand, schools are considered as an essential setting for the promotion of health in youth (Langford et al., 2014) for two main reasons: firstly, most national educational curricula include "health" as a main objective of education at any level (Langford et al., 2014); secondly, school attendance rates are close to 100% in primary and secondary education (UNESCO, 2024), hence, most youth can potentially be involved in school-based health programs. On the other hand, data from several studies show that youth spend most of their school days in sedentary behaviors (Kuzik et al., 2022), with data on sitting time oscillating between 50% and 90% of the total school-day time (Arundell et al., 2016).

This special issue, entitled "Promotion of Health and Active Behaviors through Physical Education and In-school Physical Activity", aims at gathering research on programs and activities carried out within the school context from any region of the world, and at any educational level, with the aim of counteracting the detrimental effects of sedentary behaviors and sitting time and promoting healthy active habits in young populations. I am honored to have been given the opportunity to edit this collection of works from many different educational realities around the world, which is a testament of the efforts that researchers and practitioners are putting into delivering more opportunities for school-aged kids to be healthy and learn life-long active habits that will benefit them also in their future adulthood.

The first paper of this collection, "Physical education and sports teachers' perceptions to benefit from web 2.0 tools in face-to-face education after emergency remote teaching process: a mixed method research", authored by Can…, aimed to assess the perceived efficacy of using remote-teaching and online tools, such as Web 2.0, which grew in importance during the Covid-19 emergency, for face-to-face teaching processes. Implementing a mixed method based on questionnaires and interviews, the authors analyzed PE and sports teachers' perception and competence in using Web 2.0 in their presential practices. Findings from this study highlight that, despite the emergency distant teaching being currently over, distance-teaching tools may still be of use to teachers in their daily work.

The second paper of this special issue is "Physical Activity Intervention Program in Nature with University Students Under COVID-19 Mobility Restrictions", whose authors, Molina-Salmerón, González-Ruiz, Fuentesal-García, Fernández-Ortiz, and Baños, aimed to test a PA-sport program carried out in the nature on university students' life satisfaction, emotional intelligence, and anxiety. The work was conducted during Covid-19 restrictions and put into evidence that PA in nature may help students improve their life satisfaction, emotional attention, and state anxiety, although it resulted ineffective towards trait anxiety and other emotion-related variables.

The study entitled "Enhancing Cognitive Function through Physical Education: the Impact of Physical Education Activity on Attention and Focus" was conducted in Italy by Giuriato and Lovecchio. The authors proposed to examine the effect of an "enhanced PE program" on attentional skills in Italian middle school students. The implementation of the enhanced program, focused on cooperative activities that stimulated students at a cognitive level, resulted in students showing faster and more accurate attention parameters compared to those involved in the traditional PE curriculum.

As a conclusion, the authors mention the vital role of school PA and PE for the cognitive growth of youngsters.

The fourth paper, "Quality of life and its association with physical activity, physical fitness, and enjoyment of physical education in youth: a study on gender differences", authored by Prünster, Niedermeier, Greier, Cocca, and Ruedl, assessed the key role of schools, and particularly PE, for the promotion of health in youth in response to the health-damaging effects from the Covid-19 pandemic. The findings from this work show that students' enjoyment of PE is essential for Health-related quality of life in youth.

In the fifth work, "Boredom or Fun? Impact of Perception of Physical Education Class on Leisure-Time Physical Activity in Mexican Children", Zamarripa, Martínez-Hernández and Núñez Rocha aimed at understanding the role of PE, as well as other students' self-perceptions, on school-aged children's participation in daily PA. The authors conclude that, seeing the significant relationship between students' feeling of satisfaction/fun and PA levels, PE curricula should include strategies to stimulate said feelings during the tasks.

The sixth work, a study entitled "Communicative Self-confidence and Motivation: an Educational Experience of Linguistic Immersion and Leisure in Nature" and authored by Fuentesal-García, González-Peño, García-Hernández, and Evelia-Franco and carried out with Secondary Education students from Spain, examined how natural environments, where kids can move and express themselves freely, may facilitate the students' learning process in the subject of "English as a second language". Outcomes from this research show that the use of natural environments can help students reduce their language anxiety and create a positive motivational climate.

The seventh and work, "Validation of the Teachers' Personal and Professional Skills Questionnaire in the Czech Physical Education Setting", by Cocca, Ciesralová, Cocca, Greier, Uchytil, and Ruedl, aimed at validating a novel instrument for assessing students' perceived quality of teaching in Physical Education (PE), with emphasis on teachers' hard and soft skills. The Teachers' Personal and Professional Skills Questionnaire is unique in that it unifies the measurement of both professional knowledge and teachers' ability to connect at a socio-psychological level with their students, and its validation is an essential scientific step towards its use in educational settings.

Sincerely

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CONTENT

Full research paper

PHYSICAL EDUCATION AND SPORTS TEACHERS' PERCEPTIONS OF BENEFITING FROM WEB 2.0 TOOLS IN FACE-TO-FACE EDUCATION AFTER THE EMERGENCY REMOTE TEACHING PROCESS: A MIXED METHOD RESEARCH

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ABSTRACT

This study aims to explore the perceptions of physical education and sports teachers regarding the use of Web 2.0 tools, which they employed during the COVID-19 emergency remote teaching process, in face-to-face education. A mixed-method approach was utilized, incorporating individual in-depth interviews and a survey administered to physical education and sports teachers working in public schools during the spring semester of the 2021-2022 academic year. The study revealed that teachers generally have a positive attitude toward integrating Web 2.0 tools into face-to-face education, leveraging competencies they developed during the emergency remote teaching process. The findings indicate that teachers' competencies in utilizing Web 2.0 tools in face-to-face education were at a moderate level. Furthermore, younger teachers, those with postgraduate education, and those who had received prior training on Web 2.0 tools exhibited higher levels of competence. Based on the results, recommendations are provided to further enhance teachers' competency levels and perceptions of Web 2.0 tools.

KEYWORDS

Distance education, mixed-method research, perceived usefulness of educational technology, physical education and sports teachers, Web 2.0 tools

HOW TO CITE

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Highlights

- *It is essential that teachers' technological pedagogical content knowledge is sufficient in crises that educational institutions may experience.*
- *Using innovative learning-teaching approaches diversified with technological tools rather than traditional learning-teaching methods will enable students to learn meaningfully.*
- *The technological pedagogical content knowledge levels of physical education and sports teachers and teacher candidates should be improved.*

INTRODUCTION

During the emergency remote teaching process, which lasted for three academic semesters in Turkey, physical education and sports lessons-comprising both theoretical and practical components were transferred from in-person classrooms to the Education Information Network (EIN), a Web 2.0 tool launched by the Turkish Ministry of National Education (MNE) in 2010. MNE implemented EIN in 2010 to incorporate distance education into formal schooling. EIN includes a wide range of educational resources such as courses, exams, live lessons, e-books, e-journals, worksheets, portfolios, and professional development videos (MNE, 2019), enabling both teachers and students to engage without restrictions on time and location (MNE, 2018). Prior to the COVID-19 pandemic, physical

education and sports teachers rarely utilized virtual classroom platforms (EIN, Edmodo, Google Classroom, etc.), which are examples of Web 2.0 tools (Özen et al., 2016). However, during the pandemic, these teachers actively employed Web 2.0 tools, following MNE directives, to ensure that students continued to engage in health-related physical activities and achieved movement competence. During this period, although some challenges were encountered in achieving the physical education and sports learning outcomes related to movement competence (Çetin et al., 2021; Valeriajeong Varea et al., 2020), it was observed that Web 2.0 tools were more effective in supporting knowledge-based gains. The utilization of Web 2.0 tools in physical education and sports lessons yielded two significant outcomes. Firstly, there was a notable enhancement in the technical knowledge of physical education and sports teachers (Çetin et al., 2021; Godoi et al., 2020; Esentürk Seçer & İlhan, 2021; Jeong & So, 2020). Secondly, these tools contributed to the long-term retention of students' knowledge gains (Keskin & Uğraş, 2022; Çetin et al., 2021; Yıldız & Bektaş, 2020). Although the emergency remote teaching period has concluded, there remains a need for research exploring whether the technical competencies acquired by physical education and sports teachers during the pandemic have been sustained in the post-pandemic era. The unique contribution of this study lies in its in-depth examination of the perceptions of physical education and sports teachers who employed Web 2.0 tools during the emergency remote teaching process, focusing on their continued use of these tools in face-to-face education. To address this, a mixed-methods approach was employed, centered on the competencies of physical education and sports teachers to integrate Web 2.0 tools into face-to-face instruction following the emergency remote teaching period. A scale measuring Web 2.0 tool usage competence was administered as part of the quantitative component, while a semi-structured interview form was utilized to qualitatively explore teachers' perceptions regarding the application of these tools in face-to-face education post-emergency remote teaching. This dual-method design provides a comprehensive understanding of the ongoing integration of Web 2.0 tools in physical education and sports instruction.

Education during the Emergency Remote Teaching Process Worldwide

On March 11, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a global pandemic. In response to the pandemic, numerous countries implemented social restrictions to safeguard public health (Weeden & Cornwell, 2020). As part of these measures, schools were closed in 194 countries, affecting all levels of education from preschool to higher education (Miks & McIlwaine, 2020; TEDMEM, 2020). In nations where schools were entirely shut down, educational institutions sought to identify appropriate technologies and methodologies to sustain teaching and learning activities. Consequently, many countries leveraged existing distance education infrastructures and adopted TV- and radio-based distance learning solutions. Additionally, innovative instructional approaches such as the blended learning model, hybrid learning model, and flipped classroom model began to gain traction in the literature, particularly in countries aiming to avoid complete school closures (Filiz & Gökmen, 2022; Uysal Toroman & Kısa, 2022).

With the implementation of social restrictions to curb the spread of COVID-19, the introduction of vaccination programs, and the widespread availability of rapid antigen testing, the number of countries maintaining fully open schools rose significantly by March 2021 (TEDMEM, 2021). This shift marked a gradual transition from emergency remote teaching to more stable and hybrid educational practices, reflecting the global effort to balance public health concerns with the need for continuous education.

Education in Turkey during the Emergency Remote Teaching Process

As part of the social restrictions implemented in response to the COVID-19 pandemic, face-to-face education in Turkey was suspended on March 16, 2020, and the emergency remote teaching process officially commenced on March 23, 2020. This process spanned approximately one and a half years, lasting from March 23, 2020, to September 6, 2021. During this period, educational programs under the MNE, which were originally designed for face-to-face classroom settings, had to be rapidly adapted to asynchronous and synchronous online formats due to the pandemic.

In the emergency remote teaching process, courses in Turkey were delivered through the EIN and EIN TV, utilizing both asynchronous and synchronous methods. Although an attempt was made to transition back to face-to-face education on September 21, 2020, the subsequent rise in COVID-19 cases necessitated a return to emergency remote teaching just one month later. Finally, on September 6, 2021, face-to-face education resumed at all educational levels nationwide (MNE, 2021). This period highlighted the challenges and adaptability of Turkey's education system in responding to the unprecedented disruptions caused by the pandemic.

Differences between Emergency Remote Teaching and Distance Education

In literature, emergency remote teaching activities implemented during the pandemic have often been evaluated within the framework of pre-existing distance education (Akbana et al., 2021; Bozkurt & Sharma, 2020; Hodges et al., 2020; Toquero, 2020; Shim & Lee, 2020). However, it is crucial to distinguish between distance education and emergency remote teaching to establish a scientific and methodological foundation for addressing similar situations in the future.

Distance education has evolved parallel with technological advancements since the 1700s and represents a well-established educational practice. It incorporates various empirically supported learning models, such as the blended learning model, flipped classroom model, and hybrid learning model. The primary goal of distance education is to create a flexible structure that complements face-to-face education, considering student needs, the teacher's technological pedagogical content knowledge (Koehler & Mishra, 2009), and the available technological infrastructure.

In contrast, emergency remote teaching refers to teaching activities conducted using existing technological infrastructure

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to ensure continuity in education when face-to-face instruction is not feasible. Unlike distance education, which is carefully planned and designed, emergency remote teaching is a temporary solution implemented in response to crises. Emergency remote teaching, which gained prominence during the COVID-19 pandemic, underscores the necessity of systematic preparation for future crises -such as natural disasters or pandemics- that may disrupt education. This distinction highlights the importance of developing robust frameworks and strategies to ensure educational resilience in facing unforeseen challenges.

Web 2.0 Tools

Web 2.0 tools, a subset of information and communication technologies, were pivotal in facilitating the emergency remote teaching process. These tools encompass various applications, including virtual classrooms, educational digital content, and various communication platforms that enable interaction between students and teachers. The effectiveness of Web 2.0 tools lies in their ability to foster collaboration, idea sharing, information exchange, and knowledge transformation among users through Internet-based platforms without requiring specialized software installation or advanced technical expertise (Jimoyiannis, 2015). Various and quite a large number of Web 2.0 tools according to their purpose of use: virtual classroom applications (EIN, Edmodo, etc.), test and puzzle creation tools (Kahoot!, etc.), board creation tools (Padlet, etc.), poster and cartoon creation tools (Make Beliefs Comix, etc.), story and book writing applications (Pixton etc.), interactive presentation tools (Prezi, etc.), information poster and infographic preparation tools (Visme, etc.), photo/video/film editing applications (ThingLink, Adobe, etc.). At the same time, Web 2.0 tools can be easily accessed from websites (Çelik, 2020).

Web 2.0 Tools in Physical Education and Sports Lessons

The literature offers various suggestions on the effects of using Web 2.0 tools in physical education and sports lessons on learning outcomes (Can & Kerkez, 2022b; Chen & Xia, 2012; Feng, 2009; Gustiawati & Agung Susilo Yuda Irawan, 2020; Isaqovich et al., 2024; Tan & Li, 2009). For instance, YouTube, one of the most widely used Web 2.0 tools, allows videos demonstrating sportive skills to be slowed down, paused, zoomed, or accelerated. This functionality aligns with the cognitive theory of multimedia learning (Mayer, 2002), enabling students to form lasting mental representations of movements through the combination of visuals and auditory explanations (Chen & Xia, 2012).

Additionally, teachers can use Web 2.0 tools to facilitate discussions on topics such as fair play behavior. By presenting students with a problem or scenario, teachers can encourage them to engage in debates and propose solutions using collaborative platforms. For example, a teacher might create a discussion forum using Web 2.0 tools where students can share their perspectives and argue for specific solutions. Gustiawati and Agung Susilo Yuda Irawan (2020) highlighted that tools like Kahoot! are particularly effective for assessing theoretical knowledge in physical education and sports, such as concepts, principles, strategies, tactics, and rules, engagingly and interactively.

Beyond the suggestions in the literature, numerous innovative ways exist to integrate Web 2.0 tools into physical education and sports lessons to enhance learning outcomes. For example, YouTube can be used to analyze sports skills and create instructional content. Teachers can upload videos demonstrating techniques, drills, or game strategies, adding annotations or voiceovers to explain key concepts. This allows students to revisit lessons at their own pace, reinforcing their understanding.

Platforms like Google Classroom or Edmodo can be utilized to create interactive assignments and discussions. After watching a tutorial on a specific sports skill, teachers can ask students to upload their own videos demonstrating the skill. These videos can then be reviewed and commented on by peers, fostering collaborative learning and peer feedback. Additionally, these platforms support the creation of quizzes, surveys, or polls, enabling students to reflect on their progress and receive instant feedback, thereby increasing engagement in the learning process.

Another innovative approach involves using blogging platforms such as WordPress or Blogger. Teachers can encourage students to write reflective blog posts about their learning experiences, challenges, and achievements in physical education. This helps students articulate their thoughts and allows them to share experiences and comment on their peers' reflections, creating a supportive and interactive learning community.

In summary, Web 2.0 tools offer many possibilities for enhancing physical education and sports lessons, from skill demonstration and theoretical assessment to collaborative learning and reflective practice. By leveraging these tools, educators can create more engaging, interactive, and effective learning experiences for their students.

By leveraging these tools, educators can create more engaging, interactive, and effective learning experiences for their students. This process encourages critical thinking and self-assessment, improving students' understanding of their physical fitness journey. For instance, teachers can use Google Earth or YouTube to take students on virtual field trips to famous sports stadiums or historical events in sports. Students can virtually visit iconic locations like the Olympic Stadium or watch documentaries on significant international sports events, fostering a broader understanding of sports culture and global teamwork.

Teachers can also organize fitness challenges where students track their steps, distance, or activities using apps like Strava, Fitbit, or Google Fit. These apps allow students to participate in challenges such as a "Run the World" event, where they collectively track their distance to simulate running a race around the globe. Such tools promote physical activity while fostering motivation and friendly competition among students.

Edpuzzle is another valuable tool that enables teachers to make video lessons interactive by embedding quizzes or reflection points within the video. For example, teachers can upload a video on sports techniques or game strategies

and include questions that students must answer as they watch. This feature encourages active learning and ensures students engage deeply with the content.

Web 2.0 tools like Padlet or Trello can organize and facilitate group projects. Students can create mood boards or mind maps about different sports or fitness topics, compiling videos, articles, and images to share with the class. Teachers can assign projects on topics such as sports strategies, history, or the importance of teamwork, promoting communication and collaboration among students.

In addition to using Kahoot! for assessing theoretical knowledge, teachers can utilize Quizlet to create flashcards or quizzes that help students memorize key terminology and concepts related to physical education, such as muscle groups, sports rules, or movement techniques. These tools provide an interactive, fun, and competitive way to engage students and reinforce learning.

Teachers can also encourage peer-to-peer feedback by having students upload videos of themselves performing sports skills (e.g., dribbling a basketball or executing a gymnastics move) to platforms like Flipgrid or Seesaw. Peers can then provide constructive feedback, which helps them develop critical thinking and communication skills while improving their own performance.

By integrating these Web 2.0 tools into physical education, teachers can enhance students' technical and theoretical knowledge and foster engagement, collaboration, and self-reflection. This approach creates a well-rounded and dynamic learning experience that prepares students for physical and intellectual growth in sports and fitness.

MATERIAL AND METHODS

This study employed a mixed method utilizing both quantitative and qualitative data collection tools and techniques. The aim was to address the limitations inherent in using only one method and to strengthen the interpretation of the results (Creswell & Plano Clark, 2011). In mixed methods design, quantitative and qualitative data can be collected simultaneously or sequentially (Johnson and Onwuegbuzie, 2004). The simultaneous mixed method design allows for integrating data obtained from quantitative and qualitative tools within a single study, enabling the verification, support, or cross-validation of findings (Creswell et al., 2003; Baki & Gökçek, 2012). In line with this approach, the study adopted the simultaneous triangulation pattern introduced by Creswell (2003). This design facilitated the concurrent collection of quantitative and qualitative data, which were then analyzed separately. During the interpretation phase, the findings from both datasets were combined to provide a comprehensive understanding of the research problem. This integration of methods ensured a more robust and nuanced analysis, enhancing the validity and reliability of the study's conclusions.

Main Goals

The primary goal of this study was to explore the perceptions of physical education and sports teachers who utilized Web 2.0 tools during the emergency remote teaching process and to examine how these tools could be integrated into face-to-face teaching.

From this overarching goal, the following specific objectives were derived:

- To investigate whether proficiency in using Web 2.0 tools differs among physical education and sports teachers based on variables such as gender, age, years of professional experience, educational background, and prior Web 2.0 training, using a scale study.
- To examine the importance attributed to Web 2.0 tools by physical education and sports teachers after the emergency remote teaching process through individual in-depth interviews.
- To explore whether teachers' subjective perceptions of using Web 2.0 tools, as revealed in in-depth interviews, vary according to factors such as gender, age, educational level, and type of school.
- To assess the consistency between the data obtained from the analysis of scale results and the findings from individual in-depth interviews.

These objectives aim to provide a comprehensive understanding of how Web 2.0 tools are perceived and utilized by physical education and sports teachers, both during and after the emergency remote teaching period, while also identifying potential variations and consistencies in their experiences and attitudes.

Participants

The data and characteristics of the sample participating in the study are presented below. The sample for this study was selected from secondary and high school physical education and sports teachers working in public schools in Muğla province, affiliated with MNE, during the spring semester of the 2021-2022 academic year. The simultaneous mixed-method sampling approach was adopted to create the sampling framework, commonly used in mixed-method designs. This approach combines probabilistic and purposive sampling strategies (Baki & Gökçek, 2012).

The scale was distributed to the entire target population (universe) of participants in this study. After excluding incompletely answered scales, a valid sample of 173 physical education and sports teachers was obtained. Participation in the study was voluntary. In terms of gender distribution, 73 women (42.2%) and 100 men (57.8%) completed the scale. The mean age of the participants was 44 years (SD = 8.4), with ages ranging from 22 to 65 years.

Individual In-depth Interview Participants

To collect qualitative data, seven physical education and sports teachers (3 female, 4 male) who were actively involved in the emergency remote teaching process and did not participate in the scale survey were interviewed. Convenience sampling was also utilized in this phase. The sample size for the qualitative portion of the study was determined based on reaching the data saturation point, where no new information emerged from the interviews (n = 7) (Guest et al., 2006).

	Descriptive information	Groups	*n*	%
Characteristics of quantitative section participants	Sex	Female	73	42.2
		Male	100	57.8
	Age	22-30	10	5.8
		31-35	14	8.1
		36-40	25	14.5
		41-45	40	23.1
		46-50	48	27.7
		51 and above	36	20.8
	Years of professional service	0-5 years	15	8.7
		6-10 years	22	12.7
		11-15 years	27	15.6
		16-20 years	31	17.9
		More than 20 years	78	45.1
	Education level	Bachelor's degree	143	82.7
		Postgraduate	30	16.8
	Web 2.0 education	Yes	124	71.7
		No	49	28.3
	Total		173	100.0

Table 1: Descriptive information of the quantitative section participants, 2021-2022 (source: own elaboration)

		Sex	Age	Educational level	Type of school
Characteristics of qualitative section participants	P1	Female	46	Bachelor's degree	Secondary school
	P2	Female	49	Master	High school
	P3	Male	33	Master	Secondary school
	P4	Male	48	Bachelor's degree	Secondary school
	P5	Female	52	Bachelor's degree	Secondary school
	P6	Male	45	Doctorate	High school
	P7	Male	43	Bachelor's degree	Secondary school

Table 2: Descriptive information of the qualitative section participants, 2021-2022 (source: own elaboration)

The mean age of the female physical education and sports teachers (3 female) participating in the research was 49 (SD = 3.0), while the mean age of the male physical education and sports teachers (4 male) was 42 (SD = 6.5). The mean age of the total participants was 45 (SD = 6.09).

Techniques and Instruments

In this study, ethical approval was obtained from the Muğla Sıtkı Koçman University, Medical and Health Sciences Ethics Committee-2 (Sports and Health) on May 9, 2022, with decision number 61, prior to data collection. Additionally, the study adhered to all ethical guidelines and principles throughout the research process.

Scale

In the quantitative part of the research, the descriptive information form (5 questions) and the "Web 2.0 Tools Usage Competency Scale" (WTUCS) developed by Çelik (2020) were used. The descriptive information form, created based on the literature, includes five questions (gender, age, years of professional experience, education level, and Web 2.0 training). The WTUCS is a single-dimensional, 5-point Likert-type scale consisting of 39 items. Participants responded to the scale items using the following options: "1 = Never, 2 = Rarely, 3 = Occasionally, 4 = Often, 5 = Always." the scores obtained from the measurement tool range between 39 and 195, with scores interpreted as "low" (39–91), "medium" (92–144), and "high" (145 and above). The Cronbach's Alpha coefficient for the WTUCS was determined to be.98, and the same reliability coefficient (.98) was observed for the scale applied in this study. The electronic data collection tool and consent form were prepared using Google Drive Forms and distributed to physical education and sports teachers via email through the Provincial Directorate of National Education.

Individual In-depth Interview

The qualitative part of the study utilized individual in-depth interview techniques. In this approach, in addition to the questions prepared in advance by the researcher, follow-up sub-questions were also asked to explore responses in greater detail (Hatch, 2002). The interviews were conducted in a room provided by the school administration deemed suitable for face-to-face meetings. After contacting the physical education and sports teachers, they were informed about the purpose of the research and the data collection process. They were then asked to complete a consent form and a voluntary participation form for participation in the qualitative study. After completing the descriptive information form by the physical education and sports teachers, in-depth individual interviews were conducted with seven teachers using a semi-structured question form

(5 questions). They were then asked to complete a consent form and a voluntary participation form for participation in the qualitative study. After completing the descriptive information form by the physical education and sports teachers, in-depth individual interviews were conducted with seven teachers using a semi-structured question form (5 questions).

1. What are the impacts of using Web 2.0 tools during the emergency remote teaching process on your professional development and teaching methods?
2. How would you describe your competency in using Web 2.0 tools during the emergency remote teaching process, and what challenges did you encounter during this period?
3. In your opinion, how did the use of Web 2.0 tools in emergency remote teaching affect the attainment of physical education and sports lesson objectives?
4. How do you think the experience of using Web 2.0 tools during the emergency remote teaching process influenced your ability to use these tools in face-to-face education?
5. What are your thoughts and suggestions regarding the continued use of Web 2.0 tools in education in the future?

These questions aimed to explore teachers' experiences, challenges, and perceptions regarding using Web 2.0 tools during and after the emergency remote teaching process, as well as their views on the future integration of these tools in education.

Analysis of Data

The data analysis was divided into two parts, as the research was conducted using a simultaneous triangulation design. This study analyzed quantitative and qualitative data sets separately, and the findings were interpreted together. For the quantitative data analysis, the Kolmogorov-Smirnov test was first applied to determine the normality of the distribution. In addition to descriptive statistics, parametric tests such as the t-test and one-way analysis of variance (ANOVA) were applied to independent groups, depending on the normality of the distribution.

Content analysis was used for the qualitative data analysis. By combining the quantitative and qualitative findings, which were analyzed separately, the perceptions of physical education and sports teachers regarding using Web 2.0 tools in face-to-face teaching, based on their experience and knowledge gained during the emergency remote teaching process, were interpreted. This integrated approach provided a comprehensive understanding of the research problem.

RESULTS

The findings of the research are presented below in the quantitative and qualitative sections.

Results of the scale on competence in using Web 2.0 tools

The findings indicate that physical education and sports teachers have a medium level of competence in using Web 2.0 tools, with a mean WTUCS score of 93.19 (±27.40). The skewness and kurtosis values for the total score of the scale fell within the range of +1.50 to -1.50, as suggested in the literature. This indicates that the total scores obtained from the scale follow a normal distribution (Tabachnick & Fidell, 2013).

It was found that the mean WTUCS scores of physical education and sports teachers did not differ statistically significantly based on the gender variable [$t(171) = 1.043$; $p > .05$]. However, it is noteworthy that female teachers had slightly higher competency scores than male teachers (see Table 3).

	Df	*F*	*p*	The difference
WTUCS score averages	5	3.872	.002*	21-30 > 46-50 41-45 > 46-50
	167			
	172			

Table 3: Examination of the research group's WTUCS scores according to age variable, 2021-2022 (source: own elaboration)

It was found that the mean WTUCS scores of physical education and sports teachers differed statistically significantly based on the age variable [$F(5\text{-}167) = 3.872$, $p < 0.05$]. To identify the source of the differences between groups, the Gabriel test, one of the post-hoc analyses, was applied (see Table 4). The results of this test revealed two significant differences: first, between the 21–30 and 46–50 age groups, with the 21–30 age group showing higher WTUCS scores, and second, between the 41–45 and 46–50 age groups, with the 41–45 age group demonstrating higher scores.

	Df	F	p
WTUCS score averages	4	.467	.760
	168		
	172		

Table 4: Examination of the WTUCS scores of the research group according to the years of professional service variable, 2021-2022 (source: own elaboration)

No statistically significant difference was found in the mean WTUCS scores of physical education and sports teachers based on the variable of years of professional service [$F(4\text{-}168) = .467$, $p > 0.05$] (see Table 4).

A statistically significant difference was found in the mean WTUCS scores of physical education and sports teachers based on the variable of education level [$t(170) = 1.043$; $p < 0.05$] (see Table 5).

A significant difference was found in the mean WTUCS scores of physical education and sports teachers based on the variable of participation in Web 2.0 training [$t(171) = 2.246$; $p < 0.05$] (see Table 6).

Education level	n	$\bar{X}$	Ss	t	Df	p
Bachelor's degree	144	89.20	22.91	-4.534	170	.000*
Postgraduate	29	113.24	38.07			

Table 5: Examination of the WTUCS scores of the research group according to the level of education variable, 2021-2022 (source: own elaboration)

Web 2.0 education	n	$\bar{X}$	Ss	t	Df	p
Yes	124	96.10	28.43	2.246	171	.026*
No	49	85.83	23.28			

Table 6: Examination of the research group's WTUCS scores according to the variable of Web 2.0 education status, 2021-2022 (source: own elaboration)

Individual In-depth Interview Results

The coding of the data and the grouping by themes allowed us to explore the content expressed about the aspects of the topic discussed. Textual quotations support the key ideas of the discourse. In this case, the three themes previously described were used.

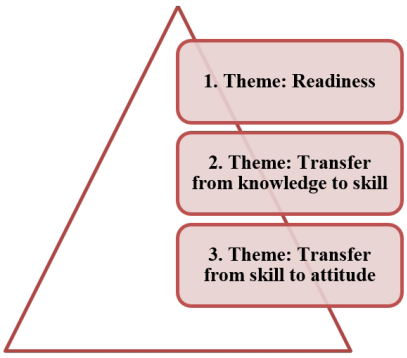

Figure 1: Qualitative data analysis themes, 2021-2022 (source: own elaboration)

The theme of readiness reflects the extent to which physical education and sports teachers were prepared to use Web 2.0 tools during the emergency remote teaching process and the measures taken by MNE to support this transition.

The theme of transfer from knowledge to skill examines whether teachers successfully applied the Web 2.0 tool competencies they acquired during remote teaching to their face-to-face instruction.

Finally, the theme of transfer from skill to attitude captures teachers' willingness and motivation to continue using Web 2.0 tools in face-to-face education, demonstrating their long-term commitment to integrating technology into their teaching practices.

Theme 1: Readiness

Within this theme, participants discussed two key aspects of readiness for using Web 2.0 tools during the emergency remote teaching process: individual readiness and MNE readiness.

Participants noted that personal effort and collaboration with colleagues improved their individual readiness. They emphasized how their ability to use Web 2.0 tools developed as a necessity rather than a pre-existing skill. Meanwhile, at the institutional level, the readiness of MNE was questioned, as teachers reported challenges in accessing technological devices, stable internet connections, and adequate resources. To address these issues, they highlighted the need for structured training programs, increased access to technological tools, and broader internet coverage.

Individual Readiness

The following participant statements illustrate the experiences of teachers in developing their individual readiness for Web 2.0 tools:

"Before the pandemic, I rarely used technology in physical education and sports classes. However, through research and exchanging information with other teachers, we adapted our lessons for distance education. I realized many of my colleagues also lacked technological proficiency, but we all had to learn quickly. My main focus was finding ways to make learning fun and physically engaging for students using Web 2.0 tools. It was a great learning experience." (P1)

"Initially, I thought I couldn't use technology at all. But I had to learn—there was no other choice. Our generation was introduced to technology much later in life, making learning it more challenging than younger generations. However, I see teaching as a responsibility and felt obligated to improve my skills. One of my main motivations was reducing students' inactivity, so I researched better ways to integrate technology into my lessons." (P2)

"Because of my age, I have always been familiar with phones and computers, making using Web 2.0 tools easier. During the remote teaching process, I watched YouTube tutorials on how to effectively use Web 2.0 tools and tried to integrate the materials I created into my lessons." (P3)

"When the pandemic began, my colleagues and I exchanged ideas frequently. We constantly shared how we managed our lessons and which platforms we found useful. One of our

friends discovered a website with excellent information on distance education, and we all benefited significantly from its resources." (P5)

Readiness of the Ministry of National Education

Participants also expressed concerns regarding MNE's preparedness for emergency remote teaching. The following statements highlight the institutional challenges they faced:

"…Even though all education had to be conducted online during the emergency remote teaching period, we received no formal training on using these technologies, Web 2.0 tools, or creating digital course content…" (P1)

"…The Ministry of National Education provided 8 GB of internet data to access the Education Information Network (EIN) for all courses, but this was not sufficient during the pandemic. Since I found EIN's content inadequate for high school students, I supplemented my lessons with professional sports videos from YouTube…" (P2)

"…I work in a rural area, and many of my students do not have computers. Even those who had computers often lacked a stable internet connection. A significant number of students had neither a computer nor internet access at home, which made online education extremely challenging…" (P3)

"…Providing in-service training on Web 2.0 tools during the pandemic would have been highly beneficial…" (P6)

These findings highlight that while individual teachers made efforts to improve their technological skills, systemic limitations -such as inadequate infrastructure, lack of training, and insufficient internet access- posed significant obstacles to effective remote teaching.

Theme 2: Transfer from Knowledge to Skill

Within this theme, physical education and sports teachers stated that they continue to use the Web 2.0 tools they adopted during emergency remote teaching in face-to-face education as well.

"…During the pandemic, I started recording exercise videos on my phone, demonstrating the correct movements, and sharing them with my students via WhatsApp. I have continued this practice in face-to-face teaching because I don't want my students to be physically active for only two hours a week. I assign homework through these videos, such as practicing a specific exercise once a day. During the pandemic, I also encouraged my students to download a pedometer app on their smartphones. Even after returning to in-person classes, I ask them to send me their daily step counts via WhatsApp, and I include this data in their course performance evaluation…" (P2)

Another teacher emphasized the benefits of digital tools when outdoor activities were not possible:

"…For four weeks, due to rainy weather, we couldn't conduct lessons outside in the schoolyard, so we had to hold classes indoors. I used the smartboard to present content I had prepared on platforms like Popplet, Wordwall, Kahoot!, and PowerPoint, which I learned to use during the pandemic. This way, I was able to introduce students to a variety of sports disciplines, even in a classroom setting…" (P4)

Similarly, a teacher highlighted how video-based learning continues to enhance students' understanding of sports skills:

"…During the pandemic, I noticed that students enjoyed watching videos of athletes. I decided to carry this approach into face-to-face teaching. When bad weather forces us indoors, we watch YouTube videos of professional athletes demonstrating the skill I am teaching. When we are outside in the garden, I reference these videos while demonstrating the movements myself…" (P5)

These statements illustrate how physical education and sports teachers have successfully integrated Web 2.0 tools into their in-person instruction, enhancing engagement and continuity in learning.

Theme 3: Transfer from Skill to Attitude

The participants expressed a positive attitude toward the increased use of Web 2.0 tools in physical education and sports lessons. One teacher emphasized the need for professional development in this area:

"…I think we are significantly lacking in the use of technology in physical education and sports lessons. Especially when we transitioned back to face-to-face teaching, I requested in-service training on Web 2.0 tools for my school's physical education and sports program. I want to reach students as a teacher who follows and applies technology rather than falling behind in knowledge and innovation…" (P1)

Another participant highlighted the practical benefits of Web 2.0 tools for skill development:

"…I think using Web 2.0 tools is effective in physical education and sports lessons. When my students struggle to perform a skill correctly, I send them instructional videos via WhatsApp so they can watch and practice at home. I want to learn and use platforms that will further enhance this type of education…" (P2)

Similarly, a teacher pointed out the necessity of integrating technology to align with students' digital habits:

"…Children today are constantly exposed to screens in their daily lives. As physical education and sports teachers, we need to expand our knowledge to incorporate technological applications and make our lessons more engaging…" (P3)

Another participant emphasized the role of Web 2.0 tools in teaching theoretical aspects of sports:

"…Using Web 2.0 tools is essential for explaining game rules, sports equipment, and extreme sports. These tools allow students to visualize key details -such as field dimensions, pole heights, or ball weights- that they might never encounter otherwise…" (P7)

These statements collectively underscore the participants' recognition of Web 2.0 tools as valuable resources for enhancing physical education and sports instruction.

Triangulation of Data

Physical education and sports teachers generally stated that they lacked sufficient competence in using Web 2.0 tools before the emergency remote teaching process. One teacher reflected, *"I was very far from using technology in physical education and sports classes before the pandemic."* However, during the emergency remote teaching period, teachers reported developing their competence through personal efforts and collaboration with colleagues. As one teacher noted, *"As a result of my research and sharing information with other teachers, we*

tried to transfer our lessons to students in distance education." These statements suggest that physical education and sports teachers successfully transferred their knowledge and skills acquired during the emergency remote teaching process to face-to-face instruction.

The results of the post-pandemic survey further support this finding. One teacher described their evolving practice: *"I took exercise videos with the camera during the distance education process. I started sharing them in class groups via WhatsApp. I continue to share my exercise videos in face-to-face education to increase my students' movement time."* As revealed by the scale, the medium level of competence in using Web 2.0 tools among physical education and sports teachers aligns with these qualitative findings. Despite the increase in their competence, teachers reported familiarity with only a limited number of Web 2.0 tools.

Teachers also acknowledged the benefits of Web 2.0 tools in achieving course objectives during emergency remote teaching. Consequently, many expressed a need for in-service training to further develop their skills in face-to-face education. One teacher stated, *"When we switched to face-to-face education, I requested in-service training on using Web 2.0 tools at my school. I want to reach students as teachers who can follow and apply technology instead of falling behind it."* This indicates that teachers who gained experience with Web 2.0 tools during the remote teaching period developed a positive attitude toward their use in face-to-face education. Another teacher affirmed this perspective: *"I think that the use of Web 2.0 tools is effective in face-to-face education."* This finding reinforces the idea that knowledge and skill acquisition are key precursors to attitude development.

Quantitative data further revealed that teachers with postgraduate education demonstrated higher competence in using Web 2.0 tools compared to those with only a bachelor's degree. This was also supported by qualitative findings, as one teacher explained: *"Graduate education allowed us to closely follow technological developments and benefit from computers. Therefore, I learned to use Web 2.0 tools more easily than my colleagues."*

Additionally, younger physical education and sports teachers reported using a wider variety of Web 2.0 tools than their older counterparts, both during and after the emergency remote teaching process. One younger teacher observed: *"I've seen middle-aged and older teachers struggle to adapt to technology. We even have teachers who still use touch-tone phones. I could use Web 2.0 tools because, at my age, I was more engaged with phones and computers."* This qualitative finding is consistent with the scale results.

Furthermore, teachers who had received prior training on Web 2.0 tools before the pandemic highlighted the benefits of such training during the emergency remote teaching process. One teacher shared: *"I learned how to prepare digital content related to many sports branches from a magazine prepared by an expert physical education and sports teacher, as well as from the accompanying CDs. Following this magazine during the pandemic was very useful."*

In conclusion, the quantitative results were found to be consistent with the qualitative themes, reinforcing the alignment between teachers' self-reported experiences and measured competencies.

DISCUSSION

This study examined physical education and sports teachers' perceptions of using Web 2.0 tools in face-to-face education following the emergency remote teaching process. The quantitative findings indicate significant differences in teachers' proficiency in using Web 2.0 tools based on various independent variables.

Overall, the study found that physical education and sports teachers demonstrated a moderate level of competence in using Web 2.0 tools. Eyüp (2022), using the WTUCS, reported that Turkish teachers' proficiency scores were below the medium level (78.78±39.96). In contrast to this study's findings, Wallace et al. (2022) evaluated physical education and sports teachers' competencies in Web 2.0 tools as low, attributing this to their general perception of digital technology proficiency. Similarly, Kovalevskaya et al. (2021) found that teachers faced challenges in producing content with Web 2.0 tools in face-to-face teaching. The moderate WTUCS scores in this study may be attributed to teachers' self-improvement during the pandemic. Supporting this, Godoi et al. (2020) noted that the emergency remote teaching process provided learning opportunities for physical education teachers regarding educational technologies, including Web 2.0 tools.

Gender and Web 2.0 Competence

The study found that gender influences teachers' competencies in Web 2.0 tools, though the statistical difference was insignificant. Findings indicate that female physical education and sports teachers scored higher in competency. Yaman (2008) similarly noted that female teachers used educational technologies, including Web 2.0 tools, more than their male counterparts. Consistently, Eyüp (2022) and Atalmış & Şimşek (2022), using WTUCS, found no statistically significant difference in gender, aligning with this study. However, some studies indicate that male teachers use technological tools more frequently (Tou et al., 2019). The higher Web 2.0 competence among female teachers in this study may be linked to their greater engagement with information technologies for professional development (TÜİK, 2022).

Age and Web 2.0 Competence

Age was found to be a significant factor in teachers' use of Web 2.0 tools. Teachers aged 21-30 exhibited higher competence compared to those aged 41 and above. Similar findings regarding younger teachers' positive attitudes toward educational technologies exist in the literature (Barahona et al., 2020; İpekli & Titrek, 2022; Keleş, 2022; Özcan & Saraç, 2020). However, contrary findings suggest that teachers over 41 use Web 2.0 tools more effectively in their lessons (Korkmaz, 2021; Tou et al., 2019). The higher competence among younger teachers in this study may be due to their exposure to up-to-date educational technologies during their undergraduate education.

Education Level and Web 2.0 Competence

The study observed differences in Web 2.0 tool competence based on teachers' education levels. Those with postgraduate education demonstrated higher proficiency than those with

only a bachelor's degree. This aligns with research showing that postgraduate physical education teachers use Web 2.0 tools more effectively (Can & Kerkez, 2022a; Keleş, 2022; Yaman, 2008). Higher education levels may encourage more frequent and effective use of technology.

Web 2.0 Training and Competence

Quantitative findings show that teachers who received Web 2.0 training had higher competence than those who did not. Yaman (2008) similarly noted that teachers benefiting from in-service training used Web 2.0 tools more effectively. These findings suggest that such training is valuable for improving teachers' ability to integrate Web 2.0 tools into their teaching practices.

Readiness for Web 2.0 Tools

The qualitative analysis identified "readiness" as a key theme. Under the sub-theme "individual readiness," it was found that teachers initially lacked sufficient knowledge and skills in Web 2.0 tools during the emergency remote teaching process. However, they improved through personal efforts and consultations with colleagues, consistent with findings from Godoi, Kawashima, & Gomes (2020). Despite this, teachers mentioned only a few well-known Web 2.0 tools, a pattern also noted by Keskin & Uğraş (2022). Their study found that teachers' self-efficacy beliefs about Web 2.0 content development were high in quantitative measures, but qualitative findings showed they had extensive knowledge of only a few tools. Similarly, Ünlü & Süel (2014) reported high self-efficacy among pre-service physical education teachers in computer use.

Regarding the "readiness of the Ministry of National Education," teachers working in rural areas reported difficulties in accessing technological devices, the internet, and educational resources. Similar studies confirm that rural teachers face challenges using distance education applications due to insufficient technological infrastructure (Hernandez & Dearcos, 2022; Mercier et al., 2021).

Transfer of Knowledge to Skill

The study found that teachers successfully transferred their knowledge of Web 2.0 tools acquired during the pandemic to face-to-face education. This aligns with the quantitative finding that teachers use Web 2.0 tools at a moderate level. However, a literature review revealed a lack of studies explicitly addressing this knowledge-to-skill transfer. Since developing beliefs is an essential step in shaping attitudes, this transfer process may serve as a foundation for attitude development. Keskin & Uğraş (2022) found that physical education teachers had high self-efficacy beliefs about Web 2.0 tools, though their knowledge was limited to a few frequently used tools. Similarly, Uğraş & Aslan (2022) associated teachers' ability to create educational content with Web 2.0 tools with their strong professional belief levels.

Transfer from Skill to Attitude

The final theme of the research was the transfer from skill to attitude. The analysis showed that teachers' knowledge and skills significantly influenced their attitudes toward using Web 2.0 tools in face-to-face education. While qualitative studies on this topic are scarce, quantitative findings indicate that teachers have a positive attitude toward Web 2.0 tools (Keskin & Uğraş, 2022; Keleş, 2022; Korkmaz, 2021; Osmanovic et al., 2020).

Limitations

The use of a mixed-methods approach in this study is considered one of its strengths. However, the research also has certain limitations. The sample consisted of physical education and sports teachers working in public schools in Muğla province, making it geographically restricted and reflective only of teachers from this specific region. As a result, the findings may have limited generalizability beyond this area.

Additionally, data collection was conducted solely during the spring semester of the 2021-2022 academic year, meaning that teachers' experiences with Web 2.0 tools are tied to a specific and limited time frame. Furthermore, the challenges and educational needs teachers encounter during the emergency remote teaching process may be unique to that period, and future needs could differ.

These limitations may affect the generalizability and accuracy of the study's findings. Therefore, future research should test the results with a larger and more diverse sample and under different conditions to enhance their applicability.

CONCLUSION

This study has shown that physical education and sports teachers have a positive attitude toward applying the competencies they developed in using Web 2.0 tools -gained through their efforts and consultations with colleagues during the emergency remote teaching process- to face-to-face education. It was observed that their competence in using Web 2.0 tools during face-to-face education following the emergency remote teaching period was at a moderate level. Furthermore, teachers with postgraduate education, younger teachers, and those who had previously trained on Web 2.0 tools demonstrated higher levels of competence in utilizing these tools.

Suggestions

Although the emergency remote teaching process has enhanced physical education and sports teachers' competence in using Web 2.0 tools, they still need to familiarize themselves with a wider variety of these tools. Therefore, it is recommended that in-service training programs incorporate comprehensive instruction on various Web 2.0 tools. Additionally, course materials designed by experts in accordance with MNE's regulations and enriched with Web 2.0 tools can be made available to physical education and sports teachers.

However, obtaining qualitative findings proved to be challenging for researchers. For this reason, further qualitative research is recommended to explore teachers' readiness and Web 2.0 tool usage transferability. Field studies can also be conducted to assess how physical education and sports teachers integrate Web 2.0 tools into their classes.

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PHYSICAL ACTIVITY INTERVENTION PROGRAM IN NATURE WITH UNIVERSITY STUDENTS UNDER COVID-19 MOBILITY RESTRICTIONS

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ABSTRACT

Objective: This study aimed to evaluate the effects of a physical-sports activity program in nature on life satisfaction, emotional intelligence, and anxiety in university students during COVID-19 mobility restrictions.

Methods: a controlled trial was conducted involving 40 students from the Faculty of Sport Sciences, randomly assigned to either an experimental group (EG; *n* = 20) or a control group (CG; *n* = 20). The EG participated in an intervention program based on outdoor physical sports activities, while the CG did not engage in any additional activities. The intervention was implemented within the context of restrictions imposed by the COVID-19 pandemic, and assessments were conducted before (pre-test) and after (post-test) the program.

Results: the analyses revealed statistically significant improvements in the experimental group in life satisfaction, emotional attention, and state anxiety compared to the control group. No significant differences were found in emotional clarity, emotional repair, or trait anxiety.

Conclusion: the results suggest that engaging in physical sports activities in nature, even under confinement circumstances, positively affects life satisfaction and certain aspects of emotional intelligence and anxiety in university students.

KEYWORDS

Anxiety, emotional intelligence, life satisfaction, physical activity, natural environment, and mountaineering

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Highlights

- *The study evaluated the effects of a nature-based physical activity program on university students during COVID-19 mobility restrictions.*
- *Participants in the experimental group showed significant improvements in life satisfaction, emotional attention, and reduced state anxiety.*
- *No significant differences were found in emotional clarity, emotional repair, or trait anxiety between the experimental and control groups.*
- *Findings highlight the psychological benefits of physical activity in natural environments during periods of confinement and stress.*
- *Universities are encouraged to implement nature-based physical activity programs to enhance students' psychological well-being.*

INTRODUCTION

The recent global situation experienced by society in relation to the COVID-19 pandemic led to serious confinement restrictions that have generated significant consequences for people's psychological health. Several studies corroborate the emergence of different psychological conditions in a large part of the population [Liu et al., 2020; Moreno-Proaño, 2020; Nicolini, 2020]. Among the psychological variables on which the influence of confinement has been focused are stress, anxiety, depression, emotional intelligence, and dissatisfaction with life, among others [Prieto-Molinari et al., 2020; Cedeño et al., 2020].

Life Satisfaction

Satisfaction with life (SWL) is a global assessment of the achievements obtained and what remains for us to obtain throughout life (Cassà et al., 2018). The Theory of the Subjective Well-being of Diener and Emmons (1985) is one of the theories that analyze the satisfaction with the life of individuals. This construct is composed of two dimensions: the dimension cognitive and the dimension affective. Of this form, the perception of the subjective well-being of a subject will depend on the combination of the cognitive process (perceptions of dissatisfaction and satisfaction in life) and of two affective processes (affect negative and positive), according to Diener and Emmons (1985).

"In this context, the Covid-19 pandemic has caused a decrease in the satisfaction with the life of university students (Krause et al., 2021; Nikolis et al., 2021; Rettew et al., 2021). The scientific literature has examined the activities that the students carried out in their free time to cope with the emergency situation, seeking to improve their general psychological well-being." Thus, activities such as listening to music, practicing yoga and meditation, engaging in physical activity and sports (PAS), Watching movies or series, and engaging in virtual socialization were among the resources most frequently employed by students to enhance their life satisfaction during the pandemic (Bartos et al., 2021; Finnerty et al., 2021; Krause et al., 2021). Of these PAS, outdoor physical activity emerged as the most desired activity. Indeed, several studies have shown that engaging in PAS improved life satisfaction during this period (Faulkner et al., 2020; Ha et al., 2022;). Furthermore, recent research highlights that emotional skills such as emotional management and regulation play a significant role in increasing life satisfaction and facilitating more adaptive responses to adverse situations. However, to date, no studies have analyzed subjective well-being in university students following a PAS intervention program in a natural environment during the COVID-19 pandemic.

Emotional Intelligence

Emotional intelligence is defined by Salovey and Mayer (1997) as "the ability to perceive, appraise, and express emotions accurately; the ability to access and/or generate feelings that facilitate thought; the ability to understand emotions and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth." For Goleman (2008), the term emotional intelligence is understood as the capacity to self-motivate, regulate our emotional states, and attempt to prevent distress caused by a problem from hindering daily life, further encompassing the ability to trust and empathize with others. Emotional intelligence can be studied through three factors, according to Salovey and Mayer (1997), which are emotional attention, defined as the attentiveness we pay to our own emotional states; emotional clarity, which consists of understanding our feelings; and lastly, emotional repair, which is the ability to address and ameliorate negative emotional states. During the pandemic, emotional intelligence was negatively associated with various psychological disorders in university students. In fact, those students with higher levels of emotional intelligence not only reported lower stress levels but also demonstrated greater psychological well-being, self-control, and emotional regulation (García-Álvarez et al., 2021; Kökçam et al., 2022), aiding in the development of more effective study habits during periods of lockdown. Furthermore, individuals who participated in a program focused on enhancing emotional intelligence during the lockdown and pandemic period exhibited lower levels of state anxiety (SA), depression, and suicidal ideation (Persich et al., 2021). Similarly, research has shown that individuals who maintained a healthy lifestyle (e.g., engaging in physical activity, consuming a healthy diet, obtaining adequate sunlight exposure, among others) during the COVID-19 pandemic experienced reduced anxiety levels and increased levels of emotional intelligence and life satisfaction (Sfeir et al., 2022). However, we believe that the scientific literature regarding the implementation of PAS and its impact on the emotional intelligence of university students is limited. To our knowledge, no studies have implemented a PAS nature-based in this population.

It is interesting to mention that research conducted prior to the pandemic already demonstrated a relationship between PAS in nature and emotional intelligence, with physically active university students scoring higher in emotional clarity and repair than their more sedentary counterparts (Ozcorta et al., 2015; Vaquero-Solís et al., 2020). Engaging in PAS within a natural environment presents a greater challenge and sense of adventure, generating distinct sensations that lead to an increase in adrenaline. This occurs within a more dynamic and uncertain environment, where individuals can learn to better manage emotions and confront potentially complex situations in the future (De la Torre, 2018). In this way, individuals with higher emotional intelligence often simultaneously possess a greater connection to nature (Villegas et al., 2016).

Anxiety

According to Spielberger (1966t), anxiety is an unpleasant emotional reaction produced by an external stimulus that the individual perceives as threatening, leading to physiological and behavioral changes in the subject. Furthermore, according to this author, a distinction can be made between state anxiety (SA) and trait anxiety (TA). SA, defined as a transient, temporary state within the human organism, is characterized by subjectively perceived feelings of tension and by hyperactivity of the autonomic nervous system. In contrast, TA refers to a more stable and enduring disposition over time, producing an anxious propensity in individuals to perceive situations as threatening, elevating their SA.

The COVID-19 pandemic led to many university students experiencing high levels of SA and TA, resulting in an increase in negative emotions and a reduction in levels of academic self-efficacy (Alemany-Arrebola et al., 2020), in addition to high levels of academic burnout (Fernández-Castillo, 2021 Along these lines, students who engaged in higher levels of PAS experienced reduced levels of SA (Amekran & El Hangouche, 2022 Several studies conducted with adult populations in different countries worldwide found that individuals who engaged in PAS during the pandemic showed lower levels of SA (Frontini et al., 2021; Meira et al., 2020; Reigal et al., 2021). Furthermore, Frontini et al. (2021) suggested that reducing TA required decreasing SA by increasing levels of PAS during the pandemic. It is worth noting

that research conducted before the pandemic already demonstrated that engaging in PAS reduced levels of both SA and TA (Herrera et al., 2013; McMahon et al., 2016). Moreover, even greater benefits can be achieved if this PAS is performed in a natural environment. It has been shown that outdoor activities provide greater feelings of revitalization, enhancing psychological well-being (Alkahtani, 2019; Byrka & Ryczko, 2018; Daviu-Fuster, 2020; Legrand, 2018; Olafsdottir et al., 2018).

Purpose of the Study

Scientific literature has demonstrated that PAS can improve our anxiety levels (both state and trait), emotional intelligence (attention, clarity, and repair), and life satisfaction. However, analyzing what changes may occur in these psychological variables after implementing a nature-based PAS program during a pandemic and lockdown situation would be interesting. Therefore, this study aims to evaluate the effects of a nature-based PAS program on life satisfaction, emotional intelligence, and anxiety in university students during COVID-19 mobility restrictions. Based on the reviewed literature, the following hypotheses are generated from the objective of this study:

- Hypothesis 1 (H1): Participation in the nature-based physical activity program will increase life satisfaction levels in participants.
- Hypothesis 2 (H2): Participation in the nature-based physical activity program will increase emotional intelligence scores in participants.
- Hypothesis 3 (H3): Participation in the nature-based physical activity program will decrease levels of both SA and TA in participants.

METHOD

This study, titled "Physical Activity Intervention Program in Nature During Times of COVID-19," was reported following the CONSORT checklist guidelines.

Design

A quasi-experimental design was employed with university students, establishing two groups: an experimental group (EG) consisting of students enrolled in the Mountaineering course at the Faculty of Sport Sciences and a control group (CG) consisting of students from the Faculty of Sport Sciences not enrolled in the Mountaineering course. These two groups were established to investigate whether there were differences between sports science students who were going to participate in a nature-based PAS intervention program and those who were not but belonged to the same faculty.

In early February 2021, as in-person classes gradually resumed amidst a nationwide lockdown in Spain, an invitation to participate in a scientific study was extended to the student community of the Faculty of Sport Sciences. In mid-February, participants were informed that the study pertained to the analysis of various psychological variables during the COVID-19 pandemic. No further details were provided, nor were the purpose or objectives of the study disclosed, thereby blinding participants to the study's hypotheses. The first measurement was conducted in the third week of February. The intervention program was implemented in mid-March 2021, with the second measurement taking place immediately upon completion of the program.

Inclusion and Exclusion Criteria

Table 1 shows the number of subjects who participated in the study: 40 people, 17 women (M_{age} = 22.88; SD = 1.32) and 23 Men (M_{age} = 22.13; SD = 1.29). A total of 20 students participated in the EG (M_{age} = 22.25; SD = 1.45) of whom 7 met the selection criteria (M_{age} = 22.71; SD = 1.50) and 13 boys (M_{age} = 22.00; SD = 1.41). The CG sample was made up of a total of 20 participants (M_{age} = 22.65; SD = 1.23), 10 irls (M_{age} = 23.00; SD = 1.25), and 10 boys (M_{age} = 22.30; SD = 1.16).

	Sex	No. of participants	*M*	*SD*
Total	Girls	17	22.88	1.32
	Boys	23	22.13	1.29
EG	Girls	7	22.71	1.50
	Boys	13	22.00	1.41
CG	Girls	10	23.00	1.25
	Boys	10	22.30	1.16

Table 1: Participant Distribution (2022)

Inclusion and Exclusion Criteria

Recruited participants had to meet the prerequisite of being undergraduate students at the Faculty of Sport Sciences and provide signed informed consent. This requirement established two selection criteria for participants depending on the study group (EG, CG). As a general criterion, responding to only one of the measurements (pre-test or post-test) resulted in exclusion, as participation in both was mandatory. Figure 1 illustrates the specific criteria for each study group:

- EG: As an inclusion criterion, participants in this group had to be undergraduate students at the Faculty of Sport Sciences enrolled in the elective Mountaineering course and willing to participate in a 5-day multi-adventure trip in Huelva involving physical activity in a natural environment. Participation in this trip was not mandatory. Three of the 23 volunteers initially intending to participate in the 5-day activity withdrew. Two tested positive for COVID-19 or were required to self-isolate due to contact with a positive individual in the days preceding the activity, while the third was unable to attend due to a traumatic injury. The exclusion criterion for this group was non-attendance at the multi-adventure activity, even if the questionnaires had been completed.

- CG: the inclusion criterion for this second group was being an undergraduate student at the Faculty of Sport Sciences who was not enrolled in the Mountaineering course. Following the initial call for study participation, 29 volunteers expressed interest. Of these, six did not complete one of the measurement points. From the remaining 23, the first 20 participants to complete the surveys during the second measurement point were selected, ensuring homogeneity in the number of participants for each group.

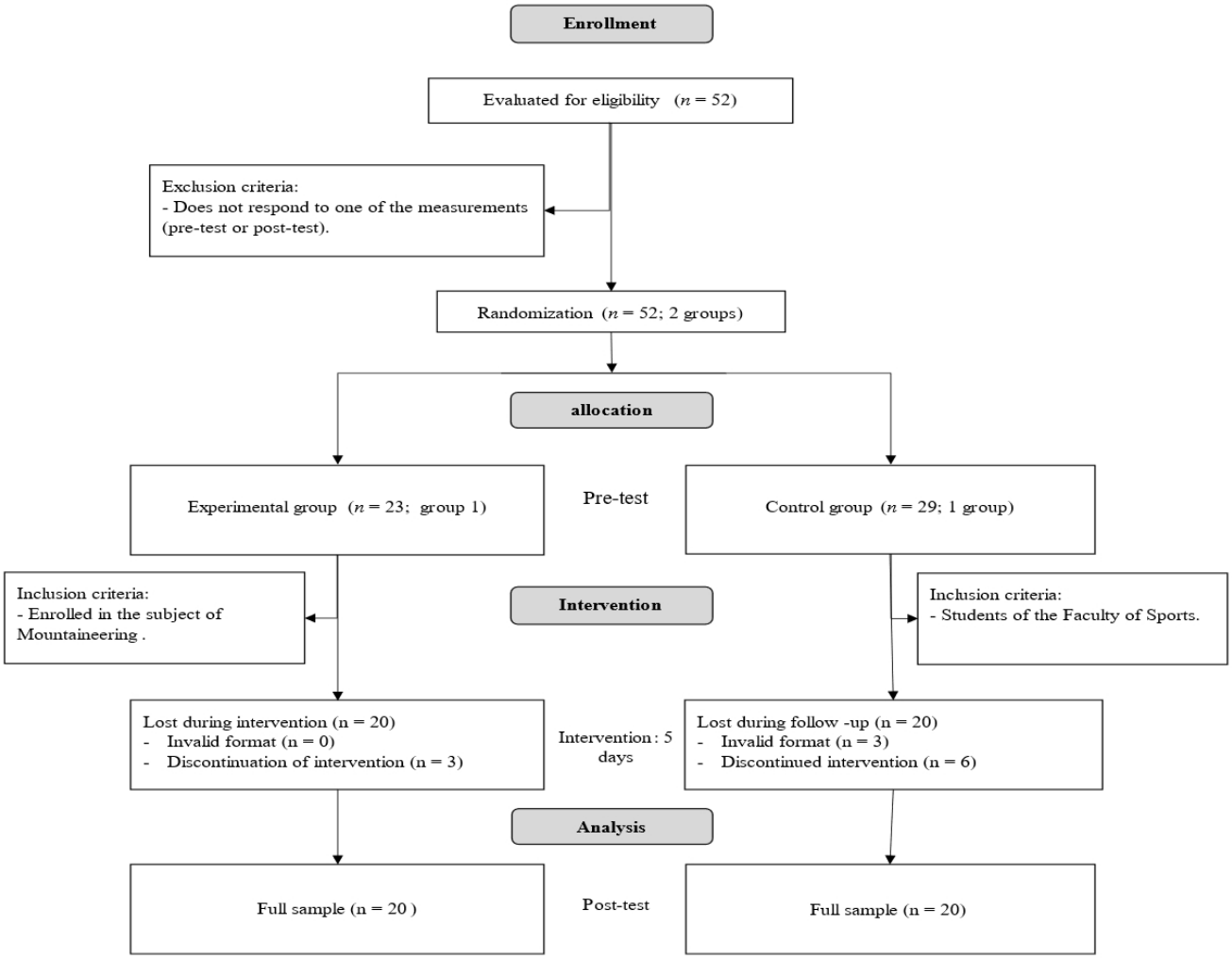

Figure 1: Flow chart of the progress of the quasi-experimental study, 2022

Instruments

To carry out this research, the following instruments have been used: To measure satisfaction with life (SWL), the Spanish version was validated by Atienza et al. (2000) from the original version by Diener et al. (1985). This instrument consists of 5 items that measure students' overall perception of their life satisfaction. The scale was preceded by the phrase, "Indicate your level of agreement or disagreement…". Responses were recorded on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating greater life satisfaction. The final score was obtained by summing the five items, yielding a total score range of 5 to 25 points. Based on Diener et al. (1985), score interpretation follows these cut-off points: 5-9: Very dissatisfied, 10-14: Slightly dissatisfied, 15-19: Moderately satisfied, 20-25: Very satisfied. An example item is «If I could live my life over, I would change almost nothing».

The Spanish adaptation (Fernández-Berrocal et al., 2004) of the original Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) was used to computer emotional intelligence. The scale measures the level of perceived emotional intelligence through 24 items, distributed across three subscales of 8 items each, which assess emotional attention, clarity of feelings, and emotional repair. The scale used preceded the introductory phrase: "Below you will find some statements about your emotions and feelings…". Responses were collected on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), and scores were obtained by summing the items within each subscale. Interpretation follows the cut-off points suggested by Fernández-Berrocal et al. (2004): Emotional attention: Low (< 24), Adequate (24-35), Excessive (>35); Emotional clarity: Inadequate (< 28), Adequate (≥ 28); Emotional repair: Inadequate (< 26), Adequate (≥ 26). The emotional attention subscale expresses the degree to which individuals notice and think about their feelings (e.g., "I pay a lot of attention to how I feel"). The clarity of feelings subscale assesses the ability

to understand one's own mood (e.g., "I am usually very clear about my feelings"). The emotional repair subscale evaluates the degree to which individuals moderate and regulate their feelings (e.g., "When I am sad, I try to think of pleasant things").

To measure anxiety, the Spanish adaptation of the State-Trait Anxiety Inventory, validated by Seisdedos (1982), was utilized from the original version of the *State-Trait Anxiety Inventory, STAI* (Spielberger et al., 1970). The STAI This self-report instrument comprises 40 items designed to assess two independent anxiety concepts: state anxiety (a transient emotional condition) and trait anxiety (a relatively stable anxiety predisposition). The temporal frame of reference for state anxiety is "right now, at this moment" (20 items), while for trait anxiety, it is "generally, on most occasions" (20 items). Each subscale consists of 20 items rated on a 4-point Likert scale (1 = almost never/not at all, 4 = very often/almost always). The final score for each subscale was obtained by summing the responses, ranging from 20 to 80 points. Higher scores indicate higher anxiety levels and the following cut-off points were established (Spielberger et al., 1970; Seisdedos, 1982): 20-39: Low anxiety, 40-59: Moderate anxiety, 60-80: High anxiety. An example item for the state anxiety subscale is "I feel upset," and for the trait anxiety subscale, "I miss out on things because I can't make up my mind quickly enough."

Procedure

Participants in both research groups (EG, CG) provided signed informed consent and a declaration of their rights as study participants based on the Declaration of Helsinki (World Medical Association, 2013). Additionally, approval was obtained from the corresponding institutional ethics committees; the University of Granada approved the study under number 621/CEIH. Upon acceptance of the study conditions and prior to the intervention program, a Google Form containing the selected measurement scales was created. Subsequently, a timeframe was established for participants to complete the pre-test in each research group. The EG group participated in the five-day intervention program two weeks after the pre-test. The post-test was then administered to all participants in both the EG and CG groups immediately following the conclusion of the EG group's intervention program, with a 24-hour window for completion.

Intervention Program

To conduct the research, a specific intervention program was developed based on the learning objectives for students enrolled in the Mountaineering course at the Faculty of Sport Sciences (see Table 1). The intervention program was designed and planned by the principal investigator and five instructors, all specialists in the field. Regarding implementation, the principal investigator did not participate, and the instructors were blinded to the research objectives to prevent potential bias. The intervention description, following the TIDieR guidelines (Hoffman et al., 2014), can be found in Table 2. The program was designed for five days due to two factors: 1) mobility restrictions imposed by the Spanish government due to the COVID-19 pandemic and 2) students' inability to miss extended periods of other courses, as the program was conducted during the academic semester. During the intervention program, participants were not informed of the specific activities they would be undertaking, although they were aware that the activities would take place in a natural environment. The intervention consisted of the following activities: Day 1) Canyoning; Day 2) setup and dismantling of vertical techniques, rappelling practice, module on pulleys and zip lines; Day 3) climbing module (ascending, climbing, and rappelling) and team building module (outdoor training, team building applied to vertical techniques and mountaineering); Day 4) via ferrata module, indoor survival technique module, and outdoor survival technique module with orientation; and Day 5) adventure racing module. Ultimately, the intervention program had two objectives: first, to facilitate the learning of content outlined in the Mountaineering course syllabus, and second, to analyze the study variables described previously.

Nº	Item	Content
1	*Short name*	PAS intervention program for adventure sports in university students in times of COVID-19.
2	*Why?*	Mindfulness activities are proposed as a training program that combines exercises to become aware of stimuli in the present moment, involving intention, attention, and attitude. Full attention to the present moment provides students with a more efficient response to what happens in the classroom.
3	*What? (materials)*	Research measurement instruments: – Test *SWL* to evaluate satisfaction with life. – Test *TMMS* to evaluate emotional intelligence. – Test *STAI* to measure anxiety. Materials used in the intervention program: – Related to adventure sports. • Rope hoist systems. • Semi-static and static ropes. • Descenders: Grigri, eight, ATC. • Safety helmets. • Neoprenes. • Harnesses. • Pulleys. • Drop dissipators. • Climbing blocker. • Anchor bags. • Climbing shoes. • Compasses. • Recreational physical education material will be used to work on content related to team building. • Material to work on contents related to survival, such as flint, water filters, cords, thermal blankets, and plastics.
4	*What? (procedures)*	Intervention program: – Pre-test: • Test SWL to evaluate life satisfaction. • Test TMMS to evaluate emotional intelligence. • Test STAI to measure anxiety. – 1st day of intervention: • Canyoning: the departure to Andévalo Aventuras began in Santa Bárbara de las Casas (Huelva). On the way, a stop was made, and canyoning was practiced at the Calzadilla Ravine in Almadén de la Plata. There, a group of instructors specializing in said activity was waiting. • Climbing Puebla de Guzmán • Via Ferrata el Morante in Calañas – 2nd day of intervention: • Vertical Techniques: In Santa Bárbara de las Casas, students received instruction on various setup, dismantling, and safety techniques through a module on rope hoist systems and zip lines. – 3rd day of intervention: • Módulo de escalada: En la Puebla de Guzmán (Huelva), se impartieron contenidos relacionados con la escalada y el rapel. Se enseñó a los estudiantes la técnica específica a tener en cuenta en la escalada, los descensores que se pueden utilizar en el rapel y los bloqueadores a usar en técnicas verticales. – 4th day of intervention: • Via Ferrata, Survival, and Orientation Module: a) In the morning, in Calañas, safety elements related to via ferratas were explained, followed by a practical session on the Morante via ferrata route. b) At midday, in Santa Bárbara de las Casas, survival skills were taught, including fire-starting using fire steel, water filtration techniques, and shelter construction. c) In the afternoon, in Santa Bárbara de las Casas, instruction was provided on orientation and compass use. – 5th day of intervention: • Adventure Racing Module: a) In Santa Bárbara de las Casas, students applied the knowledge and skills acquired throughout the program in a circuit set up around the El Andévalo hill. – Pos-test: final evaluation. • Test SWL to evaluate life satisfaction. • Test TMMS to evaluate emotional intelligence. • Test STAI to measure anxiety.
5	*Who? (provided)*	The pre-test and post-test were administered by the principal investigator, who has five years of experience in university teaching and research. The intervention program was implemented by five specialist instructors who were blinded to the research objectives. The intervention program was conducted primarily in the El Ándévalo hills in March 2021, adhering to the study's inclusion criteria.
6	*How?*	The specialist instructors conducted the selected activities each day based on logistical considerations. All members of the EG participated in all activities concurrently.

Nº	Item	Content
7	*Where?*	The intervention's headquarters were at Andévalo Aventuras, located in Santa Bárbara de las Casas. Activities were also carried out in Calañas, Puebla de Guzmán, and Almadén de la Plata.
8	*When and how much?*	Due to regional lockdown restrictions, participants were requested to complete the pre-test within a maximum of 48 hours via a Google Forms link. The pre-test was administered two weeks before the intervention program's implementation. The activities were carried out during the second week of March 2021.
9	*Adaptation Considerations*	Each activity was adapted to the students' skill level, as it involved highly specific challenges that required participants to overcome personal fears and limitations.
10	*Modifications*	No modifications to the intervention program were necessary as weather conditions remained favorable.
11	*How good (planned)*	The principal investigator oversaw the intervention. Five specialist instructors and the principal investigator, who also specializes in the field, conducted the intervention program. While the principal investigator participated in designing the intervention program, they did not assist in its implementation to minimize potential research bias. Upon completion of the intervention, each student completed the questionnaire containing the measurement scales again, with a 24-hour time limit for submission.
12	*How good? (Real)*	The program was developed as planned, and the effects were verified.

Table 2: Description of the intervention according to the TIDIER guide, 2022.

Statistical Analysis

To resolve this study's objective, the groups' homogeneity was preliminarily analyzed, and the Student's *t*-test was performed for independent samples with the data collected in the first measurement (EG vs. CG). Subsequently, Box's *M* test was conducted to assess the homogeneity of variance-covariance matrices. An independent samples *t*-test was employed on post-test data to compare differences between the EG and CG following the intervention program. Effect sizes (Cohen's *d*) were calculated, considering the intervals reported by Cohen (1988): 0.1 to 0.3, small effect; 0.3 to 0.5, medium effect; 0.5 to higher scores, large effect. All analyses were performed using SPSS Statistics 27.0.

RESULTS

Preliminary Analysis

To analyze potential differences in life satisfaction, emotional intelligence, and anxiety levels between the two groups (EG and CG), a comparison of means was conducted using pre-test data (see Table 3). Box's *M* test was applied to assess the homogeneity of variance-covariance matrices. Results indicated homogeneity for all variables: life satisfaction ($F = .244$, $df = 1$, $p = .621$); emotional attention ($F = .016$, $df = 1$, $p = .899$); emotional clarity ($F = 1.338$, $df = 1$, $p = .247$); emotional repair ($F = .052$, $df = 1$, $p = .820$); EA ($F = .679$, $df = 1$, $p = .410$); and RA ($F = .722$, $df = 1$, $p = .396$). It is important to note that violations of this assumption have minimal impact when group sizes are approximately equal (Hair et al., 1999).

	EG		CG		*p*	*t*	*df*	*d*	95% Confidence Interval (*CI*)	
	M	*SD*	*M*	*SD*					Lower	Upper
SWL	4.16	.55	3.86	.49	.074	1.837	38	.581	-.056	1.211
EA	3.55	.68	3.43	.70	.568	.575	38	.182	-.440	.802
CE	3.89	.54	3.67	.71	.281	1.094	38	.346	-.281	.968
RE	3.97	.68	3.65	.64	.133	1.533	38	.485	-.147	1.111
SA	36.75	9.01	36.55	10.92	.950	0.63	38	.020	-.600	.640
RA	42.35	7.73	44.70	9.42	.394	-.863	38	-.273	-.894	.352

*Note: SWL = Satisfaction with live; EA = Emotional attention; EC = Emotional clarity; RE = Emotional repair; SA = State anxiety; TA = Trait anxiety; d = Effect size; *(p < .05), **(p < .01)*

Table 3: Independent Samples *t*-test. Pre-test. 2022.

Post-test Analysis for Independent Samples

As shown in Table 4, the means and standard deviations for the study variables are presented for both the EG and CG at the post-test. Compared to the CG, the EG demonstrated statistically significant improvements in life satisfaction and emotional attention and a decrease in state anxiety levels. No statistically significant differences were found between groups for trait anxiety, emotional clarity, or emotional repair.

	EG		CG		p	t	df	d	95% Confidence Interval (CI)	
	M	SD	M	SD					Lower	Upper
SWL	4.27	.43	3.95	.45	.027*	2.297	38	.727	.081	1.363
EA	3.85	.64	3.44	.62	.045*	2.070	38	.654	.013	1.262
CE	4.02	.52	3.75	.76	.199	1.308	38	.414	-.216	1.038
RE	3.97	.66	3.70	.68	.213	1.268	38	.401	-.228	1.025
SA	29.30	7.53	36.40	8.78	.009**	-2.746	38	-.868	-1.513	-.213
RA	41.15	8.17	43.95	9.34	.319	-1.009	38	-.319	-.941	.307

*Note: SWL= Satisfaction with live; EA = Emotional attention; EC = Emotional clarity; RE = Emotional repair; SA = State anxiety; TA = Trait anxiety; d = Effect size; *(p < .05), **(p < .01)*

Table 4: Independent samples *t*-test. Post test. 2022.

Analysis for Related Simples

Table 5 presents the means and standard deviations for the study variables, comparing the effects of the intervention program for both the EG and CG. The EG showed statistically significant improvement in SA and non-significant improvement in EC. Conversely, SA significantly decreased. However, no significant changes were observed in the CG.

Experimental Group										
	Pre		Post		p	t	df	d	95% Confidence Interval (CI)	
	M	SD	M	SD					Lower	Upper
SWL	4.16	.55	4.27	.43	.237	-1.222	19	-.273	-.717	.177
EA	3.55	.68	3.85	.64	.004*	-3.222	19	-.721	-.702	.173
CE	3.89	.54	4.02	.52	.065	-1.961	19	-.438	-.893	.026
RE	3.97	.68	3.97	.66	.928	.092	19	.021	-.418	.459
SA	36.75	9.01	29.3	7.53	.000**	4.160	19	.930	.394	1.449
RA	42.35	7.73	41.15	8.17	.420	-1.961	19	.184	-.260	.624
Control Group										
	Pre		Post		p	t	df	d	95% Confidence Interval (CI)	
	M	SD	M	SD					Lower	Upper
SWL	3.86	.49	3.95	.45	.186	-1.371	19	-.307	-.752	.146
EA	3.43	.70	3.44	.62	.920	-.102	19	-.023	-.461	.416
CE	3.67	.71	3.75	.76	.412	-.838	19	-.187	-.627	.257
RE	3.65	.64	3.70	.68	.651	-.459	19	-.103	-.541	.338
SA	36.55	10.92	36.40	8.78	.886	.145	19	.032	-.406	.470
RA	44.70	9.42	43.95	9.34	.468	.741	19	.166	-.278	.605

*Note: SWL = Satisfaction with live; EA = Emotional attention; EC = Emotional clarity; RE = Emotional repair; SA = State anxiety; TA = Trait anxiety; d = Effect size; *(p < .05), **(p < .01)*

Table 5: Paired samples *t*-test, 2022

DISCUSSION

Numerous studies have highlighted the importance of PAS in natural environments for improving various psychological variables in a pre-COVID-19 pandemic context (Alkahtani et al., 2019; Byrka & Ryczko, 2018; Calogiuri et al., 2015; Calogiuri et al., 2016; Olafsdottir et al., 2018; Turner & Stevinson, 2017). However, to our knowledge, no studies have been conducted during the pandemic and the period of perimeter lockdown. This study aimed to analyze the effects of a physical activity program in nature on life satisfaction, emotional intelligence, and anxiety.

Focusing on the analysis of mean comparisons for independent samples, this study found a statistically significant difference in life satisfaction, being higher in the experimental group compared to the control group at the post-test. These results are consistent with previous findings from studies conducted before the pandemic (Olafsdottir et al., 2018; Turner & Stevinson, 2017). Similarly, secondary school students who receive this type of content have been shown to report higher levels of satisfaction with physical education classes (Baena-Extremera & Granero-Gallegos, 2015). This could be explained by the fact that physical activities undertaken in natural environments tend to generate feelings of revitalization (Daviu-Fuster, 2020) and have a greater potential for restoring negative emotions, in addition to fostering a positive connection with the natural environment (Calogiuri et al., 2016). Consistent with this, Calogiuri et al. (2015) found that when dance classes are held outdoors, participants report increased positive emotions and psychological well-being compared to classes held indoors.

Regarding the dimensions of emotional intelligence, the results

showed a statistically significant improvement in EA in emotion management compared to the CG. The emotional clarity dimension also increased, although not significantly. It is worth noting that these results were observed in both the independent samples t-test and the paired samples t-test. Several studies have found that engaging in PAS in natural environments enhances emotional intelligence (De la Torre, 2018; Villegas et al., 2016), However, these studies are limited in number and analyze emotional intelligence unidimensionally. Other research exploring the impact of PAS on emotional intelligence has found that students with higher levels of PAS score better across all three dimensions of emotional intelligence, particularly in emotional attention and repair (Acebes-Sánchez et al., 2019; Ubago-Jiménez et al., 2021). This could be because PAS is a mechanism that develops different emotions (Acebes-Sánchez et al., 2019), such as facing challenges, collaborating as part of a team, or competing with oneself (Ubago-Jiménez et al., 2019). Thus, physical activity generates different contexts that help to self-regulate and modulate mood changes (Kerr & Kuk, 2001). This emotional regulation could be further enhanced in individuals who are surrounded by natural environments, away from urban settings (Bratman et al., 2019; Gritzka et al., 2020; Roberts et al., 2019). This predisposition to better understand our feelings and what they mean when we engage in PAS in nature may be due to the fact that in this environment, we have more time to reflect and think about ourselves without the disturbance of other people, sounds, etc., that would interrupt us in an urban environment and diminish this level of emotional attention (Villegas et al., 2016).

Regarding the anxiety variable, a greater significant difference was found in SA in the EG (being lower in the post-test) compared to the CG, with no significant differences found in TA. It is worth noting that these results were observed in both the independent samples t-test and the paired samples t-test. Although we are not aware of any studies that have analyzed the impact of PAS intervention programs in nature on state and trait anxiety, the scientific literature has shown that such programs improve positive affect (Olafsdottir et al., 2018), the tranquility (Byrka & Ryczko, 2018) and reducing stress (Alkahtani et al., 2019). Furthermore, various investigations have linked the practice of PAS with a decrease in SA (Frontini et al., 2021; Meira et al., 2020; Reigal et al., 2021) and TA (Frontini et al., 2021). A possible explanation for the results obtained is that the practice of PAS is associated with lower sympathetic nervous system and hypothalamic-pituitary-adrenal axis reactivity (Rimmele et al., 2007). Dysregulations in the hypothalamic-pituitary-adrenal axis have been implicated in the manifestation of depressive and anxiety symptoms. Therefore, and considering the results obtained in the present investigation, engaging in PAS in general and specifically in natural environments may help reduce anxiety.

Finally, this research has several strengths worth mentioning. These include conducting a five-day intensive PAS intervention program in a natural environment during a period of full perimeter lockdown, blinding the instructors of the intervention program, and having a considerable sample size for a quasi-experimental study. However, we must also point out several limitations. Firstly, the sample was not randomized. It was not possible to randomize the sample because the EG had to be students enrolled in the Mountaineering course of the Degree in Physical Activity and Sports Sciences. However, we do not believe that this affected the results of the research since the pre-test data were collected two weeks before the start of the intervention program, with blinding of the participants. In addition, the entire sample selected were students from the Faculty of Sports, and the participation of students from other faculties was not considered. We consider that another limitation of the study was the time of year in which the intervention program was carried out. The state government had recently relaxed restrictive measures on the population, which may have slightly altered the scores of the control group, although the perimeter lockdown was maintained. Another limitation could be the duration of the intervention program. Although a 24-hour intervention program was designed for five days to create a "bubble group," we believe that a longer program would have obtained greater positive effects on the variables analyzed. Due to these limitations, we believe that future research should consider students from different university degrees in which the sample is randomized to participate in the experimental group. We also consider it interesting to analyze academic variables after carrying out physical activity protocols in the natural environment.

CONCLUSION

Despite the limitations mentioned above, this article presents the first quasi-experimental study that compared the effects of a PAS intervention program in a natural environment during the period of perimeter lockdown caused by the COVID-19 pandemic. In summary, the preliminary analysis showed homogeneity of the sample with respect to all the variables studied. After conducting the post-test analysis, we can conclude that the EG showed a significant difference compared to the CG in SWL, EA, and SA. SWL and EA improved in the EG after the implementation of the PAS program in the natural environment, while SA decreased considerably. EC also increased, although not significantly compared to the CG. ER and TA remained practically at the same levels in both groups.

Despite the limitations mentioned above, this article presents the first quasi-experimental study that compared the effects of a physical activity intervention program in a natural environment during the period of perimeter lockdown caused by the COVID-19 pandemic. In summary, the preliminary analysis showed homogeneity of the sample with respect to all the variables studied. After conducting the post-test analysis, we can conclude that the EG showed a significant difference compared to the CG in SWL, EA, and SA. SWL and EA improved in the EG after the implementation of the PAS program in the natural environment, while SA decreased considerably. EC also increased, although not significantly compared to the CG. ER and TA remained practically at the same levels in both groups.

Practical Implications

The results of this research highlight the psychological benefits obtained by university students who have been subjected

to a stressful situation such as that experienced during the COVID-19 pandemic. Therefore, we believe it is advisable for educational institutions to design and offer PAS programs in various natural environments (e.g., hiking, meditation, yoga, climbing, via ferratas, outdoor dance classes, among others), as they positively affect different psychological variables (Alkahtani et al., 2019; Ballester-Martínez et al., 2022; Byrka & Ryczko, 2018; Calogiuri et al., 2016; Turner & Stevinson, 2017). These activities should not only be offered to increase psychological well-being in the aftermath of the pandemic but also during the academic year. This will allow students to acquire coping skills for stressful situations experienced both during the academic term and in the period leading up to exams (Olafsdottir et al., 2018).

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ENHANCING COGNITIVE FUNCTION THROUGH PHYSICAL EDUCATION: THE IMPACT OF PHYSICAL EDUCATION ACTIVITY ON ATTENTION AND FOCUS

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ABSTRACT

Aim: This study investigates the impact of an enhanced physical education (PE) program on attentional functions in middle school students. The aim is to evaluate whether increasing physical education hours, emphasizing cognitive tasks and team-based activities, could positively influence students' executive functions.

Methods: The study involved four middle school classes in Italy. Two classes participated in the standard PE curriculum lessons for two hours per week, while the other two classes engaged in an intensified program for four hours weekly, focusing more on team-play and activities that develop cognitive skills.

Results: Findings indicate that students in the intensified program demonstrated faster and more accurate attention responses than those in the control group. This suggests that a more holistic physical education approach incorporating cognitive challenges and strategic team exercises may enhance students' executive functioning.

Conclusion: These findings are relevant for designing educational programs that leverage physical activity to boost academic performance. They also underscore the value of integrating physical activity into the broader educational curriculum, positioning it as a core component that contributes to students' cognitive growth and overall learning experience rather than merely a means for physical education.

KEYWORDS

Attention, physical education, anticipation, preadolescents, executive function, cognitive performance

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Highlights

- *The intervention improved students' ability to focus and complete tasks efficiently, as shown by the increased number of bells in the experimental groups.*
- *Results suggest incorporating targeted activities can enhance executive function, aiding attention and problem-solving in class.*
- *Control groups showed no significant changes, highlighting the importance of structured interventions in physical education.*

INTRODUCTION

Cognitive function, particularly attention, is critical to academic success and overall youth development. Attention allows students to focus on relevant stimuli, ignore distractions, and efficiently process information (Miyake et al., 2000). Research indicates that attentional control is closely linked to executive functions, including inhibitory control and working memory, which play a pivotal role in academic performance across subjects such as mathematics and reading (Diamond, 2020). Deficits in attentional function have been associated with lower academic achievement, increased risk of disengagement from school, and difficulties in social interactions (Ahmed et al., 2019). Enhancing attention in school settings is a

priority for educators and policymakers due to its impact on educational outcomes. For example, the rising diagnoses of ADHD highlight the need for cognitive interventions, as recent studies estimate its prevalence at 5–7% among children and adolescents (Polanczyk et al., 2015). Physical activity (PA) has been identified as a potential factor for improving attention and executive functions (Hillman, Erickson, and Kramer, 2008). Both acute and chronic aerobic exercise have shown positive effects on cognitive performance, including attention span and working memory (Pesce et al., 2019).

Among the various ways to incorporate PA into daily routines, school-based physical education (PE) stands out as a structured and inclusive setting where movement can be intentionally linked to cognitive engagement. Unlike unstructured PA, PE ensures accessibility for all students while integrating pedagogical strategies to maximize cognitive benefits. PE offers a structured opportunity to integrate movement-based cognitive engagement, reducing the competitive pressures often found in sports while ensuring broad participation (Bailey, 2006). PA is recognized as a key enhancer of attention and executive functions, with evidence supporting its role in cognitive development (Friedman and Robbins, 2022; Lovecchio, 2022).

PE offers a structured, inclusive space for movement-based cognitive engagement in schools. Ensures participation beyond the subset of students involved in competitive sports (Bidzan-Bluma and Lipowska, 2018). Unlike traditional sports, PE should emphasize cognitively demanding motor activities—such as game-based learning, dual-task exercises, and problem-solving tasks—which have been shown to amplify cognitive gains compared to non-cognitively engaging physical activities (Diamond and Ling, 2020). Webster et al. (2015) suggested different PAs to maximize children's movement in academic classrooms as a key strategy for important educational and public health goals. Further, Robinson et al. (2023) provide a review with preliminary evidence that resistance training may improve cognitive function, academic performance, and on-task behaviors in school-aged youth. Further, due to rising sedentary behavior in youth (Bull et al., 2020), PE is a promising tool for enhancing academic readiness and long-term health.

These findings suggest that an enriched PE curriculum, which integrates cognitive challenges like team-based activities, problem-solving tasks, and coordination exercises, has the potential to offer significant cognitive benefits in addition to physical development. By incorporating these cognitive demands into the PE environment, students may improve their physical skills and enhance key cognitive functions such as attention, memory, and executive control.

This study explores whether increasing the number of PE hours, with a particular focus on activities designed to engage and challenge cognitive processes, can lead to measurable improvements in attentional function among middle school students. Through this approach, we seek to determine if a more cognitively demanding PE curriculum can contribute to developing physical and cognitive skills in young learners.

METHODS

Subjects

A total of 75 participants (36 Girls; 48%) from two secondary school classes (classes 6 and 7) were included in the study. Class 6 engaged in four hours of physical education per week; instead, class 7 practiced two hours of physical education. The sample comprised 75 participants and was distributed as follows: 41 in the experimental group and 34 in the control group. Randomization was employed to ensure a balanced distribution across groups. Schools were selected based on willingness to participate in the study; participants were chosen from classes already established in the school system to ensure minimal disruption. No exclusion criteria were applied except for medical conditions preventing physical activity. Descriptive statistics are in Table 1.

		Age (years)	Weight (Kg)	Height (cm)
CLASS 6	*M*	11.59 ± 0.40	44.69 ± 9.04	149.18 ± 7.02
	F	11.66± 0.52	46.93 ± 10.50	149.64 ± 8.27
CLASS 7	*M*	12.32 ± 0.36	49.1 ± 8.14	156.27 ± 7.05
	F	12.67± 0.40	48.7 ± 8.16	153.36 ± 9.22

Table 1: Descriptive statistics about Class 6th and 7th, including mean ± standard deviation

Procedure

The test was administered twice: initially in October and then in December. Between assessments, students followed their assigned PE programs. The curriculum included cognitive-based activities such as agility drills, coordination circuits, and strategic team games like volleyball and badminton, designed to stimulate cognitive engagement (Lovecchio, 2022). Indeed, it is hypothesized that activities with a cognitive load (i.e., those that engage the subject in decision-making with respect to a changing environment) and those that place greater stress on the central nervous system to manage coordination movements can produce a greater improvement in cognitive performance, particularly in individuals of developmental age (Barnett et al., 2022). In this regard, team sports in which one must anticipate the actions of opponents to prevent them from acting are particularly effective because they cognitively engage subjects in analyzing the context (environment) to identify the elements of the space (stimuli) that are (or are not) relevant to take effective actions (decisions to move) with respect to one's goal. Since individual student reassignment was not feasible within the school context, randomization

was applied at the class level, meaning that entire classes were assigned to either the experimental or control condition.

Attentional Test

The psychometric assessment used to evaluate cognitive attention was the Bells Test, a validated tool developed by Biancardi and Stoppa (Biancardi and Stoppa, 1997). This test consists of four standardized sheets containing 35 bells randomly interspersed with distractor stimuli, including various inanimate and animate objects (e.g., houses, trees, horses, fish). Participants were instructed to identify and mark as many bells as possible within a predefined time limit, assessing both selective and sustained attention. The test was administered in a controlled, distraction-free environment under standardized lighting conditions. Participants were seated at a fixed distance from the test sheets to ensure uniform visual exposure. Following the official protocol, participants were blinded to the total number of bells, the number of sheets, and the exact task duration to prevent cognitive bias or anticipatory strategies. Each sheet was presented for 120 seconds, with strictly timed intervals for page transitions. Only essential instructions were provided during transitions to maintain cognitive engagement while minimizing disruptions to attentional processing. The Processing Speed Score represents the number of bells correctly identified within the first 30 seconds, measuring initial visual search efficiency. The Total Detection Score refers to the cumulative number of bells identified over the full 120-second period, indicating sustained attention capacity. Lastly, the Error Rate is determined by the number of incorrect markings (i.e., non-bell figures), offering insight into attentional control and response accuracy. A dual-color annotation system was employed to ensure precise data recording: a blue pen for bells identified within the first 30 seconds and a red pen for those marked in the remaining 90 seconds. This method enabled clear differentiation between early-stage visual search efficiency and sustained detection ability. Researchers strictly monitored adherence to time constraints and protocol fidelity to eliminate potential confounds such as premature responses or inattentiveness. All test results were recorded in real-time and subsequently digitized for computational analysis.

Data Analysis

The number of bells identified (in the first 30 s and as a total over the 120 s) was stratified according to group (control and experimental) and according to the period (pre and post-experimental). Normality was checked with the Shapiro-Wilk test. A one-way ANOVA was conducted to evaluate the effect of treatments across groups.

The data from the 10–11-year-olds (Class 6) and the 11–12-year-olds (Class 7) were analyzed separately because the test of attention is dependent on cognitive maturation and development, which is also linked to school progression (Schul et al., 2003). No comparisons were made by gender, given that, in contrast to physiological performance, the cognitive outcome is not gender-specific (Biederman et al., 2005). In particular, the cut-offs for normality in bell recognition (speed and accuracy) and by age (11 and 12 years) are reported to be 63.20/130.3 and 63.30/1128.4, respectively.

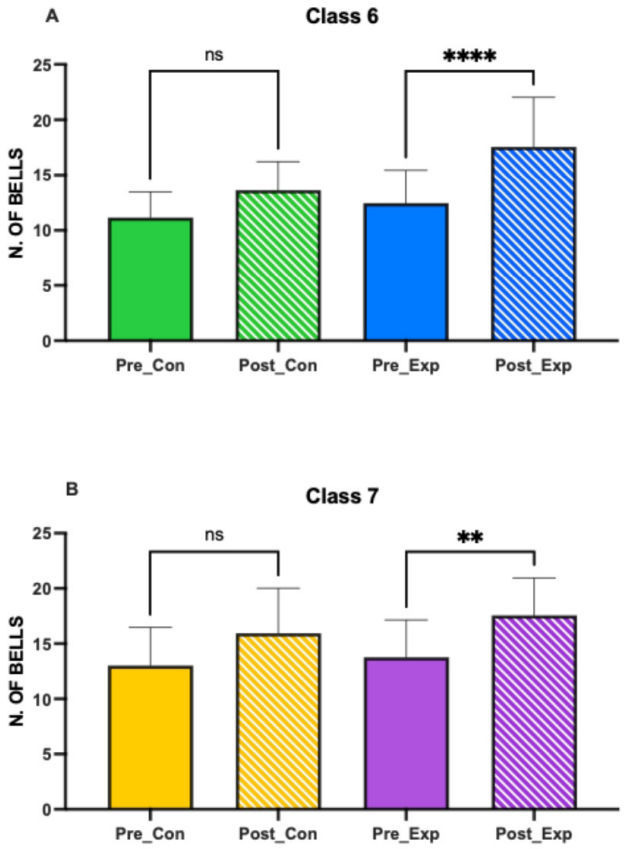
RESULTS

Number of Bells in 30 Seconds

ANOVA analysis showed a significant improvement in attention speed for the experimental group in Class 6 ($p < 0.001$) and Class 7 ($p < 0.001$). In contrast, no significant change was observed in the control groups (Figure 1A, B).

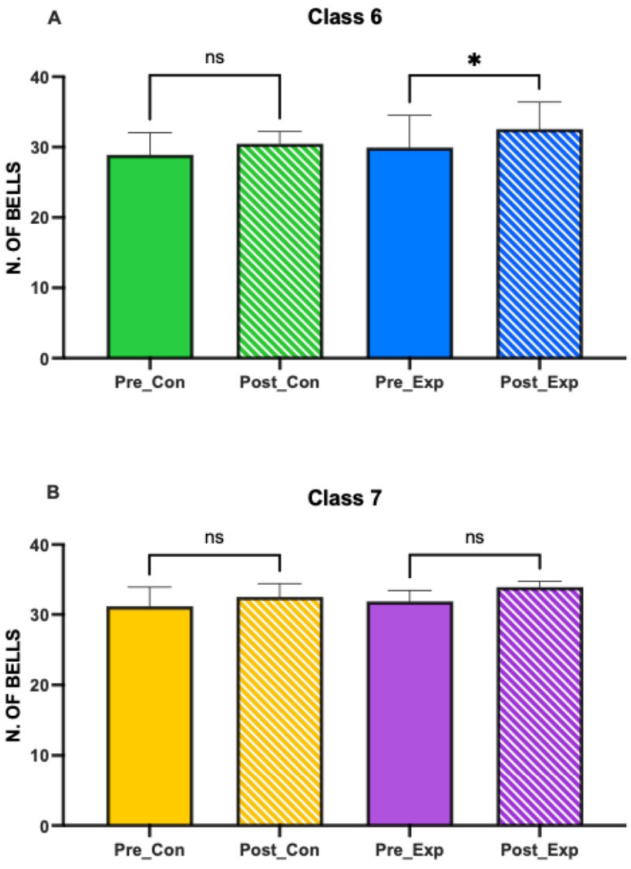
Number of Bells in 120 Seconds

A significant improvement in sustained attention was found in the experimental group of Class 6 ($p = 0.012$), but no notable changes were observed in Class 7. This suggests that increased PE hours have a greater impact on short-term attention than long-term attention (Figure 2A, B).



Note: A = Class 6, B = Class 7

Figure 1: Comparison between Pre–Post condition in control vs. experimental group in classes 6 and 7 after 30 seconds.



Note: A = Class 6, B = Class 7

Figure 2: Comparison between Pre–Post condition in control vs. experimental group in classes 6 and 7 after 120 seconds.

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DISCUSSION

The results of this research show that improvements are observed in the short-term tests (30 seconds), particularly in the experimental group of Class 6 (4 hours of activity per week) compared to Class 7 (2 hours of activity per week). The long-term tests (120 seconds) show limited benefits only for Class 6. No significant changes were found in the control groups.

Numerous studies have demonstrated the positive effect of physical activity on attention (Bidzan-Bluma and Lipowska, 2018; Janssen et al., 2014). In line with this research, the results of the present study suggest that increasing the number of hours of physical education had a greater impact on the speed of attention, particularly in the group that had 4 hours of activity per week. An interesting aspect that emerged was that the most pronounced improvements were in the short-duration test (30 seconds), where the experimental group was in Class 6. In contrast, for the 120-second test, improvements were limited to Class 6 itself, with no significant differences for Class 7, suggesting that the amount of physical activity is crucial in determining the extent of improvement. In line with this, a randomized controlled trial conducted by Hillman et al. (2014) revealed that children who participated in an afterschool exercise program of 150 minutes per week exhibited notable improvements in tasks measuring attention and cognitive flexibility. Considering this study, the amount of time spent in physical activity is more closely aligned with class 6 than class 7, which suggests that 120 minutes per week is insufficient to facilitate improvement.

The data show no significant changes in the control groups, indicating that the observed benefits are directly attributable to the implemented protocol. However, the discussion should be more cautious in generalizing that the intervention improves all dimensions of attention, as the benefits of accuracy and prolonged attention span were less consistent.

Another noteworthy element is the importance attached to the content of motor activities. Although the literature suggests that activities with high cognitive load may further stimulate attention and other cognitive functions (Giuriato et al., 2024; Giuriato et al., 2024; Lovecchio, 2022; Lovecchio et al., 2021), the results do not provide direct evidence on how the benefits are related to the specific type of activity performed. It is plausible that cognitive load contributed, but further research is needed to confirm this. The observation that improvements are more pronounced in tests of short duration indicates a functional adaptation to the stimuli that characterize the contemporary socio-cultural milieu, which is characterized by a prevailing tendency towards shorter attention spans. A decline in sustained attention has been observed across all age groups, with digital media use identified as a significant contributing factor (Nesi, Telzer, and Prinstein, 2022). Tasks requiring prolonged focus often compete with stimuli that encourage frequent, rapid shifts in attention. This socio-cultural shift may make individuals more responsive to cognitive tasks that mirror these patterns, such as brief tests requiring quick decision-making or short bursts of focus (Hillman et al., 2014; Nesi et al., 2022). Nevertheless, to promote more effective development of sustained attention abilities, it would be beneficial to extend the duration of motor activity and implement structured exercises to gradually train students in maintaining attention for extended periods.

This study has some limitations, including the influence of contextual factors such as class schedules, fatigue, and extracurricular activities, which may have affected attention levels. Additionally, the generalizability of the results is limited, as the study focused on a specific age group, and the findings may not apply to younger or older students. Lastly, the specific contribution of different activities (e.g., team sports vs. coordination exercises) requires further investigation.

CONCLUSION

The present study emphasizes how increasing physical education hours, especially when supplemented with strategically designed activities, can significantly improve short-term attention spans. To maximize their benefits, these activities should be preferably placed at the beginning of the school day (Trudeau and Shephard, 2008). However, further studies are needed to explore the long-term effects and content-specific impact of the activities.

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QUALITY OF LIFE AND ITS ASSOCIATION WITH PHYSICAL ACTIVITY, PHYSICAL FITNESS, AND ENJOYMENT OF PHYSICAL EDUCATION IN YOUTH: A STUDY ON GENDER DIFFERENCES

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ABSTRACT

The COVID-19 pandemic significantly impacted health-related quality of life (HRQoL) among adolescents, with declines in physical activity (PA) and fitness (PF), partly due to school closures. Physical education (PE) in schools plays a crucial role in promoting well-being and PA. Research suggests gender differences in PA and PF and also in responses to PE.

A total of 176 adolescents (48.3% girls; mean age 15.6 ± 0.6) reported gender, age, weekly PA, HRQoL (Kidscreen-10), and enjoyment in PE (FEFS-J: pleasure, flow, recovery). PF was assessed using the German motor performance test 6-18.

Results showed that girls had significantly lower HRQoL and enjoyment in PE scores than boys, but not in PA or PF. Significant positive correlations between HRQoL and all 3 dimensions of PE enjoyment were found in girls (r_s = 0.31 – 0.54), while in boys, only pleasure showed a significant correlation with HRQoL (r_s = 0.32). Multiple regression analyses showed that pleasure in PE was positively associated with HRQoL for both girls (β = 0.49; R^2 = 0.30) and boys (β = 0.52; R^2 = 0.09).

In conclusion, the results highlight the importance of enjoyment in PE for HRQoL in both genders. Teachers should adapt their planned activities to consider the different ways in which boys and girls enjoy PE.

KEYWORDS

Enjoyment in PE, gender differences, health-related quality of life, KIDSCREEN, physical activity, physical fitness

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Highlights

- *Girls showed significantly lower mean values in HRQoL and the dimensions of enjoyment in PE than boys.*
- *Significant moderate to strong positive correlations between HRQoL and the three dimensions of enjoyment in PE were found in girls, while boys-only pleasure showed a significant correlation with HRQoL.*
- *Teachers should adapt their activities to how boys and girls experience enjoyment in PE.*

INTRODUCTION

The enhancement of adolescents' quality of life is considered central to supporting their development and promoting the health of future generations (Inchley et al., 2020). Adolescence is characterized by a period of life full of changes, in which it is particularly important to understand the factors that can improve or reduce quality of life (Arnett, 2001). Health-related quality of life (HRQoL) encompasses multiple factors particularly relevant during adolescence, a critical developmental phase. The KIDSCREEN-10 model identifies physical well-being, psychological well-being, autonomy and leisure, family relationships, peer and social support, and the school environment as essential components of HRQoL (Ravens-Sieberer et al., 2010). The dimension of psychological well-being, in particular, showed a significant decline during the COVID-19 pandemic, manifesting in adolescents as an increase in sadness, stress, and anxiety (Haile et al., 2024). The decline in psychological well-being

during the pandemic-related restrictions had lasting effects on HRQoL even after the pandemic (Haile et al., 2024). For many adolescents, the pandemic catalyzed self-reflection about health and well-being. Approximately one-third of adolescents desired to increase physical activity to improve mental health, while 16.7% sought to reduce sedentary behavior (Peuters et al., 2024). Such findings highlight the link between physical activity and psychological well-being among young people.

Children and adolescents who meet the recommended 60 minutes of moderate-to-vigorous physical activity (MVPA) per day (World Health Organization, 2010) more frequently report better overall well-being (Poitras et al., 2016). According to Haile et al. (2024), the proportion of adolescents in secondary school meeting the World Health Organization (WHO) recommendations was 80% in 2020, dropping to 55% in 2021. Physical activity was identified as a relevant factor in approximately 50% of adolescent analyses, particularly concerning the physical and social dimensions of HRQoL (Haile et al., 2024). Despite the clear benefits of meeting daily MVPA recommendations for overall well-being, achieving these levels often requires structured interventions. For example, school-based programs moderately improve fitness levels but have limited success in increasing overall physical activity (Meyer et al., 2014). Their long-term impact depends on student engagement and enjoyment (Neil-Sztramko, Caldwell, and Dobbins, 2021).

While school sports programs have shown a measurable impact on physical fitness, their success in fostering long-term physical activity relies heavily on student engagement and enjoyment (Neil-Sztramko et al., 2021). Specifically, school sports programs positively impact physical fitness, as measured by VO2 max (maximum oxygen uptake), an indicator of cardiovascular fitness (Neil-Sztramko et al., 2021). Adolescents who engaged in regular physical activity demonstrated significantly higher physical fitness, including better cardiorespiratory endurance, flexibility in the thigh and lower back muscles, abdominal muscle strength, and endurance, as well as upper body strength, compared to inactive adolescents (Mateo-Orcajada et al., 2022).

Physical fitness is a complex concept encompassing a subset of health- and skill-related abilities such as endurance, strength, speed, and coordination (Caspersen, Powell, and Christenson, 1985). Research by Utesch et al. (2018) has demonstrated that physical fitness can be evaluated through multiple specific subtests, each assessing different aspects like endurance or coordination, which can then be combined to form an overall assessment. Higher physical fitness has been associated with reduced anxiety, increased self-esteem, improved cardiovascular efficiency, and greater bone strength (Fletcher et al., 1996; O'Connor, Herring, and Caravalho, 2010; Warburton and Bredin, 2019).

A study by Krug et al. (2012) suggests that adolescents with better physical fitness also experience greater enjoyment in participating in sports. Enjoyment of physical education plays a key role in promoting long-term physical activity and fitness by fostering motivation and positive attitudes (Cairney et al., 2012; Deci and Ryan, 2000). Studies have shown that enjoyment in physical education significantly correlates with the quality of instruction, teacher support, and activities conducted (Bossmann, Woll, and Wagner, 2023; Herrmann, Seiler, and Niederkofler, 2016). A varied and student-centered approach can increase motivation and engagement, whereas an overly performance-focused curriculum may diminish enjoyment, particularly among less athletically inclined children (Hascher, and Baillod, 2005). Notably, children's autonomy and participation play a crucial role in enjoying physical education (Leisterer and Paschold, 2022). According to the self-determination theory by Deci and Ryan (2000), children and adolescents with greater control over the design and selection of physical education activities report higher levels of enjoyment and intrinsic motivation (Hascher, and Baillod, 2005).

Autonomy in physical education fosters intrinsic motivation and may address disparities in experiences of enjoyment and quality of life, particularly among different genders. These differences are often linked to social role expectations, self-perception, and psychosocial pressures (Engels, and Freund, 2018; Moksnes et al., 2016; Michel et al., 2021; Inchley et al., 2020). For instance, girls more frequently report stress and academic pressure, which can adversely affect their perceived quality of life (Ravens-Sieberer et al., 2019). A Europe-wide study found that girls experienced fewer positive well-being effects from high physical activity than boys. This highlights gender-specific differences in promoting and perceiving sports activities (McMahon et al., 2017). These studies underscore the need for gender-specific approaches to promoting quality of life and physical activity. Incorporating enjoyment of physical education as a factor can help identify gender-based barriers and support targeted measures to enhance well-being for both genders. While numerous studies emphasize the importance of physical activity and physical fitness for physical and mental health (Bailey et al., 2018; Cadenas-Sanchez et al., 2021), there is a growing need to investigate gender-specific nuances in quality of life, motivation, and engagement in school sports to promote tailored strategies and dismantle barriers (Sánchez Hernández et al., 2018). Research also reveals gender differences in enjoyment of school sports: boys tend to enjoy competitive and performance-oriented aspects, while many girls prefer cooperative and health-oriented approaches (Frömel et al., 2022).

The relationship between physical activity, physical fitness, and perceived quality of life among children and adolescents has long been a focal point of health research (Biddle et al., 2019). A comprehensive understanding of these factors is critical, as both physical activity and physical fitness contribute significantly to youth development (Poitras et al., 2016). A crucial aspect of this research is the integration of these components within the school environment, particularly in physical education classes, which influence students' enjoyment and engagement (Kirk, 2020).

These findings highlight the need for further research into how gender differences in enjoyment of school sports impact broader outcomes like quality of life. However, studies exploring these aspects, particularly in the context of the COVID-19 pandemic, remain scarce. To our knowledge, no study has examined how enjoyment in physical education influences the quality of life in adolescents. Therefore, this

study aims to investigate associations of physical activity, physical fitness, and enjoyment of physical education with quality of life in adolescents, with a particular focus on gender-specific differences.

MATERIALS AND METHODS

Study Design and Participants

Using a cross-sectional design, secondary grammar schools in Western Austria, where direct contact with the directorate was available, were asked to participate (convenience sampling). To ensure that the curriculum timetable was similar among adolescents, only Grammar schools were contacted. Inclusion criteria for the participants were: a) being enrolled in the 10th grade of a grammar school and b) providing informed consent. A total of 176 adolescents (48.29% girls) with a mean age of 15.60 ± 0.63 years participated. Data collection took place between April 2023 and June 2023.

Before data collection, approval for the surveys and the fitness tests at schools was obtained from the Tyrolean Education Directorate, the Ethics Advisory Board of the University of Innsbruck (Certificate of Good Standing, 73/2021), and the schools' principals.

Test Procedures

Health-Related Quality of Life

Health-related quality of life (HRQoL) was assessed using the KIDSCREEN-10 questionnaire, a psychometrically robust and validated instrument designed to evaluate HRQoL in youth populations (Ravens-Sieberer et al., 2010). This tool serves as a screening, monitoring, and assessment instrument for children and adolescents aged 8–18, irrespective of the presence of chronic illness (Ravens-Sieberer et al., 2014a). The reliability and validity of the KIDSCREEN-10 have been rigorously evaluated and confirmed (Ravens-Sieberer, Wille, and Bettge, 2014b).

The KIDSCREEN-10 index provides a composite measure of quality of life, integrating aspects of physical and psychological well-being, interpersonal relationships with parents and peers, and school-related satisfaction (Ravens-Sieberer et al., 2014a). It consists of 10 items rated on a 5-point Likert scale ranging from 1 ("not at all") to 5 ("extremely"), with higher scores reflecting better HRQoL. Item scores are aggregated into a total score (T-score), which is subsequently transformed using RASCH-Person parameter estimates (Ravens-Sieberer et al., 2006). Higher transformed T-scores correspond to superior HRQoL.

Participants whose T-scores exceeded the sex-specific European normative mean values – 49.00 for females and 51.12 for males, as established by Ravens-Sieberer et al. (2006) – were categorized as having high HRQoL. T-scores above this threshold indicate high psychological well-being, characterized by descriptors such as happy, viewing life positively, satisfied with life, and emotionally balanced (Ravens-Sieberer et al., 2006). Conversely, lower scores signify diminished psychological well-being, described as no joy in life, feeling depressed, feeling unhappy, and having low self-esteem (Ravens-Sieberer et al., 2006).

The analysis required the use of programming commands (syntax files) or.sav files, and the protocol employed in this study was limited to cases with complete data. Incomplete datasets were excluded from the analysis to ensure data integrity (Ravens-Sieberer et al., 2006).

Physical Activity

To assess physical activity (PA), participants were asked whether they were members of a sports club or engaged in sports activities outside of school and sports clubs. The response options available to students were Yes/No. If the response was affirmative, the frequency of participation was documented in terms of hours per week. All responses marked as No were coded with a value of zero. For the analysis, the total number of hours per week from both questions was summed and used as an indicator of PA (hours per week) in accordance with the criteria established by Caspersen, Powell, and Christenson (1985) and Dasso (2019).

Physical Fitness

Physical Fitness (PF) was assessed using the German Motor Performance Test for the age group 6–18 years (Bös et al., 2009), a standardized test battery comprising eight components designed to evaluate distinct dimensions of PF. The test included the following test items: a 20-meter sprint to measure sprint velocity, backward balancing on three 3-meter-long beams of varying widths to assess coordination requiring precision, side-to-side jumps across a central line for 15 seconds to evaluate coordination under time constraints, the stand-and-reach test to measure flexibility, push-ups and sit-ups performed over a 40-second duration to gauge strength endurance, the standing long jump to determine explosive power, and a 6-minute run to assess aerobic endurance. According to Bös et al. (2009), the test battery demonstrated high inter-rater reliability (0.95) and satisfactory test-retest reliability (0.82), and it has been validated for the measurement of speed, coordination, flexibility, strength, and endurance. The assessments were conducted in the gymnasiums of the participating schools by physical education students who had received specialized training. All procedures were implemented strictly to the protocols outlined in the test manual by Bös et al. (2009).

Results of the test items were standardized using age- and sex-specific reference values, with a Z-score of 100 representing the average performance for each test (Bös et al., 2009). Z-scores exceeding 100 indicated performance above the average, whereas Z-scores below 100 reflected below-average performance, and the mean of all standardized Z-scores was calculated to serve as a comprehensive indicator of overall PF, i.e., the total Z-score (Bös et al., 2009).

Enjoyment in Physical Education

This variable was measured using the Questionnaire for the Measurement of Enjoyment in physical education (PE) in Adolescence (Fragebogen zur Erfassung der Freude am Schulsport im Jugendalter, FEFS-J) (Engels and Freund, 2018). It is based on a three-factor model encompassing the following dimensions: "pleasure" (e.g., "I enjoy PE"), "flow experience" (e.g., time flies during PE), and "recovery" (e.g., "during PE I can relax from other subjects"). Pleasure describes positive emotions and fun experienced during physical education classes. In contrast, flow experience measures the sense

of complete immersion in the activity, and recovery is rest and relaxation achieved through PE (Engels and Freund, 2018). The 3 dimensions consist of three items each, and responses were assessed on a 4-point-rating scale (0 = never, 1 = sometimes, 2 = often, 3 = always).

According to Engels and Freund (2018), the internal consistency results were good for pleasure (Cronbach's α = 0.86), acceptable for flow experience (Cronbach's α = 0.65), and good for recovery (Cronbach's α = 0.85). In the present study, the three dimensions showed at least good reliability for pleasure (Cronbach's α = 0.89), flow experience (Cronbach's α = 0.82), and recovery (Cronbach's α = 0.90).

To evaluate the FEFS-J, adolescents' responses to the individual items are assigned to the corresponding dimensions. Subsequently, mean values are calculated for each dimension to determine the individual levels of perceived enjoyment in these respective areas (Engels and Freund, 2019). The values range from 0 (minimum) to 3 (maximum), with the minimum meaning that the experience "never" occurs and the maximum meaning that the experience "always" occurs (Engels and Freund, 2018). This approach enables a nuanced analysis of enjoyment in PE and can provide valuable insights for designing and structuring PE classes (Engels and Freund, 2019).

STATISTICS

The statistical software SPSS 29.0.0.0 was used for the analysis. All data are presented as means ± standard deviations and absolute and relative frequencies. According to the tests on the normal distribution (Shapiro-Wilk), differences among metric data (HRQoL; PA; PF; pleasure; flow experience; recovery) between genders were evaluated either by independent t-tests or Mann–Whitney-U tests. In addition, associations were calculated for both genders between HRQoL and PA, PF, and the 3 dimensions of enjoyment in PE according to the tests on normal distribution either with Pearson product-moment correlation coefficient or Spearman's rank correlation coefficient. According to Cohen's (1988) categorization, correlations ranging from $r = 0.1$ to $r = 0.3$ are classified as small to moderate, correlations between $r = 0.3$ and $r = 0.5$ as moderate to large, and correlations exceeding $r = 0.5$ as large. Successively, Fishers Z transformations were performed to compare significant correlation values between girls and boys (Zar, 2005). Variables with correlation coefficients of $p < 0.1$ were additionally entered into multiple linear regression analyses with HRQoL as the dependent variable, separately for girls and boys (Ruedl et al., 2022).

All p-values were two-tailed, with values below 0.05 considered indicative of statistical significance.

RESULTS

The mean T-score of HRQoL was 52.11 ± 10.92 for the total cohort. Mean values for PA and PF were 9.48 ± 5.04 hours per week and a total Z-score of 107.15 ± 6.77, respectively. Regarding the 3 dimensions of enjoyment in PE, mean values were 1.77 ± 0.82 for pleasure, 1.61 ± 0.82 for flow experience, and 1.54 ± 0.97 for recovery. Table 1 shows a gender comparison of mean values of HRQoL, PA, PF, and enjoyment in PE. Boys showed significantly higher values in HRQoL and all three dimensions of enjoyment in PE. No significant difference was found in PA and PF.

	Girls (*N* = 85) mean ± *sd*	Boys (*N* = 91) mean ± *sd*	*P* value
Health-related quality of life	48.64 ± 8.55	55.35 ± 11.90	< .001*
Physical activity	8.81 ± 5.57	10.00 ± 4.59	.077
Physical fitness	106.48 ± 6.76	107.78 ± 6.76	.153
Pleasure	1.41 ± 0.70	2.10 ± 0.79	< .001*
Flow experience	1.35 ± 0.67	1.86 ± 0.87	< .001*
Recovery	1.14 ± 0.84	1.91 ± 0.93	< .001*

*Note: *p < .05*

Table 1: Comparison of quality of life, physical activity, physical fitness, and dimensions of enjoyment in physical education between girls and boys

In Table 2, Spearman correlation coefficients r_s between HRQoL and PA, PF, and enjoyment in PE for both girls and boys are presented. The results indicate significant moderate to large positive correlation coefficients between HRQoL and the three dimensions of enjoyment in PE for girls. In contrast, only the dimension "pleasure" shows a significantly positive association with HRQoL, exhibiting a moderate effect for boys. Regarding Fisher Z comparison, a statistical significance with $p = .038$ was found for "pleasure," indicating a significantly higher association with HRQoL in girls compared to boys.

	Girls (*N* = 85)		Boys (*N* = 91)	
	r_s	*P* value	r_s	*P* value
Physical activity	0.24	.146	0.02	.894
Physical fitness	0.16	.137	0.14	.189
Pleasure	0.54	< .001*	0.32	.002*
Flow experience	0.31	.005*	0.18	.093
Recovery	0.44	< .001*	0.18	.095

*Note: *p < .05*

Table 2: Spearman correlation (r_s) between health-related quality of life and physical activity, physical fitness, and dimensions of enjoyment in physical education for girls and boys

According to the multiple linear regression analysis for girls (table 3), only the dimension "pleasure" of enjoyment in PE (β = 0.49) shows a significant positive association with HRQoL.

Factor	*B*	*SE B*	*β*	*t*	*P* value
Constant	40.12	1.84		21.76	< .001
Pleasure	5.89	2.03	0.49	2.91	.005*
Flow experience	- 2.15	1.86	- 0.17	- 1.16	.252
Recovery	2.50	1.33	0.25	1.88	.064

*Note: R = 0.568, R^2 = 0.297, B: unstandardized regression coefficient, SE B: standard error of unstandardized regression coefficient, β: unstandardized regression coefficient; *p < .05*

Table 3: Results of the multiple linear regression analysis of factors associated with HRQoL among girls (*N* = 85)

The results of the multiple linear regression analysis for boys are presented in Table 4. Higher values in the dimension "pleasure" of enjoyment in PE (β = 0.52) are significantly associated with higher values of HRQoL. In contrast, dimensions "flow experience" and "recovery" showed no significant associations with HRQoL.

Factor	*B*	*SE B*	*β*	*t*	*P* value
Constant	45.33	3.42		13.25	< .001
Pleasure	7.74	2.86	0.52	2.71	.008*
Flow experience	- 2.26	2.50	- 0.16	- 0.90	.369
Recovery	- 1.04	2.12	- 0.08	- 0.49	.627

*Note: R = 0.345, R^2 = 0.088, B: unstandardized regression coefficient, SE B: standard error of unstandardized regression coefficient, β: unstandardized regression coefficient; *p < .05*

Table 4: Results of the multiple linear regression analysis of factors associated with HRQoL among boys (*N* = 91), 2023

DISCUSSION

This study aimed to analyze associations of PA, PF, and enjoyment of PE with health-related quality of life in both female and male adolescents. Results of the multiple linear regression analyses found a significant positive association between pleasure and HRQoL in girls as well as in boys, although girls showed significantly lower mean values of HRQoL and within the three dimensions of enjoyment in PE.

Mean HRQoL scores were significantly lower in girls compared to boys. In line with this, previous studies have reported gender differences in HRQoL, with lower mean values in females (The KIDSCREEN group et al., 2009; J. Wang et al., 2022). According to Meade and Dowswell (2015), these differences may be attributed to various factors, including divergent social expectations, the more significant impact of puberty on females (such as menstruation and hormonal fluctuations), and a higher prevalence of physical health problems among females.

On average, boys reported more PA hours per week than girls, although the result failed to reach statistical significance with p = .077. In the literature, however, there is a consensus that girls are less active than boys (Kretschmer et al., 2023; Telford et al., 2016). Telford et al. (2016) suggested that the family environment, which may support girls' engagement in sports less than boys, is a possible reason for reduced PA among girls or reduced participation in organized sports such as sports clubs. Kretschmer et al. (2023) also pointed to differences in perception, noting that girls often perceive PA as more strenuous than boys.

Regarding physical fitness (PF), the mean total Z-score of the DMT 6-18 was higher in boys; however, this study found no significant gender differences. Generally, studies examining PF have shown that boys outperform girls in areas such as muscle strength, muscular endurance, muscular power, and cardiovascular fitness (Brazo-Sayavera et al., 2021; Rosselli et al., 2020; Tomkinson et al., 2018). These differences become more pronounced with age, particularly from around 12 years onward (Tomkinson et al., 2018). However, it is important to note that the total Z-score was used to operationalize physical fitness. The calculation of the total Z-score takes into account the mean and standard deviation of the age- and sex-matched norming sample (Bös et al., 2009) and can, therefore, be viewed as a standardization of fitness relative to age and sex. As a result, a Z-score of 100 for both a 15-year-old girl and an 18-year-old boy represents different levels of physical fitness, even though both Z-scores correspond to the average fitness level for their respective age and sex.

It was also found that girls scored significantly lower than boys in all 3 dimensions (pleasure, flow experience, recovery) of enjoyment in PE, with pleasure being rated highest for both genders. This corresponds well with the results in the validation study of the FEFS-J by Engels and Freund (2019). A possible explanation for the lower values in girls could be a lower motivation for PA. Romero-Parra et al. (2023) found differences between girls and boys, especially in both intrinsic motivation (e.g., enjoyment of movement) and integrated motivation (movement as part of their personal values), with boys showing higher values in both cases. Compared to elementary school, adolescent girls experience a higher amount of amotivation, which manifests as a lack of interest in physical activity (Romero-Parra et al., 2023). Romero-Parra et al. (2023) identify several reasons, including body image and perception, social and cultural factors, academic pressure, lack of time, insufficient and engaging activities, and a lack of role models or support. Girls, particularly in secondary schools, may struggle with negative body image and greater concerns about their appearance, and the increased pursuit of a certain body ideal may cause them to be less enthusiastic about physical activities that are perceived

as less beneficial for their self-image (Walters et al., 2023). In many cultures, and especially in school settings, there are still stereotypical views that sports and physical activity are more suitable for boys or certain types of activities (e.g., competitive sports), which could discourage girls from taking an interest in sports that do not align with these stereotypical views (Cárcamo, Moreno and Del Barrio, 2021). The increasing focus on academic achievement in secondary schools, combined with less free time and higher stress levels, can also reduce motivation to engage in regular physical activity (Romero-Parra et al., 2023). In secondary schools, there is often less variety in physical activity offerings that align with the interests and preferences of girls (Romero-Parra et al., 2023). The lack of female role models in sports or fitness and a lack of support from family, friends, or teachers can further diminish intrinsic motivation and lead to girls feeling less encouraged to stay active (Midgley et al., 2021).

Regarding the results of the correlation analyses, gender-specific differences in how enjoyment in PE relates to HRQoL were found. While all three dimensions of PE enjoyment showed a significant positive correlation with HRQoL in girls, only the dimension "pleasure" revealed a significant positive correlation with HRQoL in boys. Furthermore, when comparing the significant correlation coefficients for "pleasure" between genders, a large correlation was found among girls ($r_s = 0.54$), whereas a moderate correlation was found for boys ($r_s = 0.32$). Fisher's Z-transformation indicated that these differences in the correlation coefficients between girls and boys were statistically significant.

These findings suggest that girls benefit from a comprehensive approach to fostering enjoyment in PE, where all dimensions (pleasure, flow experience, and recovery) play an important role. The relationship discovered by Fierro-Suero et al. (2023), which is more pronounced in girls than in boys, between positive emotions and future activity intentions could be taken into account. A positive and diverse PE environment could substantially enhance their quality of life (Rocliffe et al., 2024). In contrast, only the "pleasure" dimension significantly correlates with HRQoL, showing a moderate effect size for boys. This suggests that boys primarily react to the immediate enjoyment and positive experiences in PE. At the same time, according to a study by Berki, Csányi, and Tóth (2024), dimensions like challenge (perception and handling of difficult tasks and goals) or meaning (activity is perceived as important for one's life and well-being) seem less relevant to their HRQoL.

Results of the multiple regression analyses further emphasize the importance of the "pleasure" dimension for girls as well as for boys, with significant positive associations with HRQoL. This underscores that fun and immediate satisfaction are crucial for both genders' well-being. Interventions focused on enhancing enjoyment in PE through engaging and entertaining activities could, therefore, effectively improve the quality of life of female and male adolescents. However, it is important to note that the R^2 in the regression model for girls is substantially higher than for boys ($R^2 = 0.30$ vs. $R^2 = 0.09$), indicating a greater proportion of variance explained by the same independent variables in girls compared to boys. Therefore, enjoyment in physical education appears to be a particularly relevant factor influencing girls' health-related quality of life.

Physical education provides students with regular and structured physical activities (Latino and Tafuri, 2023). Furthermore, school sports can positively influence physical activity during leisure time (Sasayama et al., 2024). Some adolescents are physically active solely through school activities, suggesting that school sports can be an important source of physical activity (Sasayama et al., 2024).

These findings offer valuable insights for designing future PE curricula. For girls, programs should foster all three dimensions of enjoyment – pleasure, flow experience, and recovery – through diverse and engaging activities to comprehensively support their well-being. For boys, the emphasis should be on activities that maximize immediate enjoyment, such as games or team sports. Additionally, strategies could be introduced to gradually enhance their appreciation for challenge and meaning in PE, potentially broadening the positive impact on their HRQoL.

Several limitations should be considered when interpreting the findings of this study. Firstly, the cross-sectional design prevents any causal conclusions from being drawn. Future longitudinal research could provide better insights into the predictive capabilities of the independent variables, especially of enjoyment of school in PE on HRQoL, and additional factors, such as the social environment or individual attitudes towards sports, could be included to better explain the observed gender differences. Secondly, there is an inherent risk of bias (e.g., decline in attention or untruthful responses) in self-report questionnaires, even when they are validated, as is the case with the KIDSCREEN-10 and the FEFS-J. This risk is also present when non-validated questionnaires are used, as is the case with the PA questionnaire. However, the lack of validation further complicates the assessment of PA.

Future studies might incorporate objective tools for measuring PA, such as pedometers or accelerometers. However, it is noteworthy that in a recent study by Gall et al. (2020), self-reported PA emerged as the strongest predictor of children's HRQoL assessed with Kidscreen questionnaires. Thirdly, we tested linear relationships for factors associated with HRQoL. However, considering the distinct regression model results for boys and girls regarding HRQoL, a non-linear model might be more suitable.

CONCLUSION

In conclusion, the findings underline the importance of enjoyment of PE for the HRQoL of adolescents of both genders. For girls in particular, enjoyment of school PE appears to be an important factor in improving HRQoL, especially given that girls, on average, report lower HRQoL than boys. Tailored approaches that address the different needs of boys and girls are crucial to increasing motivation for physical activity in and out of the school environment and thus promoting the long-term physical and mental well-being of adolescents.

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BOREDOM OR FUN? IMPACT OF PERCEPTION OF PHYSICAL EDUCATION CLASS ON LEISURE-TIME PHYSICAL ACTIVITY IN MEXICAN CHILDREN

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ABSTRACT

The aim is to determine the predictive effect of Satisfaction/Fun, boredom, the importance of Physical Education (PE) classes, and intention to engage in leisure-time physical activity (LTPA) on the level of physical activity (PA) in primary school children. This is a cross-sectional causal study. A total of 519 children from the states of Jalisco and Nuevo León participated, with an average age of 10.50 ± 0.94 years. Inclusion criteria included signed informed consent; children with any pathology were excluded. The analysis included descriptive statistics and multiple linear relationships. The results showed high levels ($M > 4$) of Satisfaction/Fun, importance and usefulness of PE classes, and intention to practice LTPA; moderate to low levels of PA and boredom. Significant differences ($p = .001$) were found in PA levels by gender and state and in the importance of PE classes by gender. Fun/Satisfaction and intention to engage in LTPA were the best predictors of PA with values of $B = .25$; $B = .19$; F (2,516); ($p = .001$); $R^2 = .15$. PE classes should include strategies that promote student satisfaction and fun and reintegrate the learning unit into the current curriculum framework.

KEYWORDS

Boredom, enjoyment, physical education, relevance, school age

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Highlights

- *Participants exhibit high levels of Satisfaction/Enjoyment and importance regarding PE classes, a high intention to engage in PA, and low levels of boredom and AF.*
- *Boys presented higher levels of PA compared to girls.*
- *Boys perceive PE classes as more important and useful compared to girls.*
- *Satisfaction/Enjoyment of PE classes, as well as the intention to practice PA, has a predictive effect on PA.*

INTRODUCTION

Engaging in moderate to intense PA (60 minutes a day at least 5 days a week) has significant contributions to physical, psychological, and social health (Institute of Medicine, 2013; World Health Organization [WHO], 2021). Physical or physiological benefits of PA in children include reducing the risk of chronic non-communicable diseases (NCDs) such as diabetes, hypertension, and some cancers, among others. Regarding psychosocial benefits, it helps reduce stress, anxiety, and depression, improves concentration, attention, and promotes the acquisition of values such as respect, tolerance, justice, and peer support, among others (Álvarez-Pitti et al., 2020; Institute of Medicine, 2013; Martínez-Hernández et al., 2024; World Health Organization [WHO], 2021; Paramio-Pérez, 2017; Ramírez-Granizo et al., 2019; Reyes-Soto et al., 2019; Rojo-Ramos et al., 2022).

However, despite the well-known benefits of PA, the latest report from the 2022 National Health and Nutrition Survey (ENSANUT) reported that 68.3% of Mexican children aged ten to 14 do not engage in 60 minutes of moderate to vigorous physical activity at least four days a week (Medina et al., 2023). These figures highlight a public health problem related to physical inactivity, making the promotion of PA a topic that the scientific and health community should pay more attention to (Tremblay et al., 2014).

Some studies indicate that the school environment is where

children spend most of their day, making it an ideal place to promote compliance with recommended PA levels in school-aged children (Fin et al., 2017; Chu et al., 2020; Rojo-Ramos et al., 2022). Until 2022, Mexican school-aged children were required to take the PE learning unit, where they were required to practice an average of 40 minutes of PA twice a week (Secretaría de Educación Pública [SEP], 2011a, 2011b, 2015). However, in 2022, the SEP proposed a new primary education curriculum where PE ceased to be an independent learning unit and was placed in the field of formative knowledge and critical thinking, now having limited time and importance, with scientific knowledge taking the greatest emphasis (SEP, 2022, 2024). Given this situation, emphasizing the importance that children place on PE classes should gain greater relevance (González Rivas et al., 2023; Martínez-Hernández & Zamarripa, 2023; Rojo-Ramos et al., 2022), as it could be a good alternative for promoting PA and acquiring other healthy lifestyle habits, thereby helping to combat the high prevalence of physical inactivity, sedentary behavior, overweight, and obesity in the Mexican child population.

Current scientific literature indicates that PE plays an important and decisive role in acquiring and adhering to physical-sport behavior habits, which could persist into adulthood, but several factors interfere in the process (Muñoz, Gómez-López and Granero-Gallegos, 2019; World Health Organization, 2020; Moon and Park, 2022; Martínez-Hernández and Zamarripa, 2023), such as the satisfaction or motivation the child has towards PE, boredom during classes, perception of the importance of classes, intention to practice LTPA, previous negative experiences with teachers, inadequate facilities for physical-sport practice, among others (Fin et al., 2017; Chu et al., 2020; Rojo-Ramos et al., 2022; Martínez-Hernández and Zamarripa, 2023).

In this regard, some studies indicate that Satisfaction/Fun in PE classes plays a fundamental role in practicing LTPA and could determine commitment to class participation and, consequently, better adherence to PA outside the classroom (Muñoz-Miralles et al., 2016; Baños et al., 2019; Zueck et al., 2020; Aznar-Ballesta and Vernetta, 2022; Rojo-Ramos et al., 2022).

On the other hand, Muñoz-González et al. (2019) found that children who place greater importance and utility on PE have higher levels of extracurricular PA, so maintaining and increasing motivation, satisfaction, and perceived importance of classes should be fundamental (Baños et al., 2019; Muñoz, Gómez-López and Granero-Gallegos, 2019; Aznar-Ballesta and Vernetta, 2022).

In recent years, the desire to know the levels of Satisfaction/Fun, boredom, the importance of PE classes, and the intention to practice LTPA in adolescents has increased considerably. These studies also highlight the importance of thoroughly investigating these variables during primary education, as it is during this stage that PA levels tend to decline (Muñoz, Gómez-López and Granero-Gallegos, 2019; Rojo-Ramos et al., 2022). The results reveal that primary school children have a high level of satisfaction, adequate perception of the importance of PE classes, and a willingness to engage in LTPA, as well as low levels of boredom (Martínez-Hernández and Zamarripa, 2023), but the relationship or predictive effect these variables may have on PA levels has not been studied.

Therefore, the following three objectives are proposed: first, to evaluate the level of PA, Satisfaction/Fun, boredom, importance of PE classes, and intention to engage in LTPA; the second objective is to establish differences in these variables by states of the Mexican Republic and by gender; finally, the third objective is to determine the predictive effect of Satisfaction/Fun, boredom, importance of PE classes, and intention to engage in LTPA on PA levels in school-aged children.

MATERIALS AND METHODS

Design, Sample, and Sampling

This research study has a non-experimental, cross-sectional, and correlational-causal design (Hernández-Sampieri and Mendoza, 2018). A total of 541 children from seven primary schools in two different cities in Mexico participated; five from the West (Jalisco) and two from the Northeast (Nuevo León). Twenty-two surveys were eliminated due to incomplete information, leaving a sample of n = 519 children. Of the total sample, 61.5% were from Jalisco, 38.5% from Nuevo León, 50.1% were female, 39.7% and 33.7% were in the sixth and fifth grades of primary school, respectively, and 37.8% of the children were 11 years old. The average age was 10.50 ± 0.94 years, ranging from 9 to 12 years.

Inclusion criteria included only children who agreed to participate and had signed informed consent from their legal guardians. Children with any illness (asthma, diabetes, bronchitis, among others) that could limit outdoor activities and those with learning delays, as these children might not fully understand the questions, were excluded. This was assessed through direct questions to the group teacher and the parents or legal guardian.

The sample selection was non-probabilistic and convenient, as children were selected based on accessibility (Hernández-Sampieri and Mendoza, 2018), i.e., according to the access granted by the school authorities.

Study Variables

The Physical Activity Questionnaire for Children (PAQ-C) was used to evaluate the level of PA. This instrument is designed for children aged 8 to 14 years. It is self-administered and used to measure daily and free-time PA carried out in the last 7 days of the week. It is an instrument recommended for use during the school year, with questions involving school activities. It has a Cronbach's alpha of .83 in the Spanish child population (Manchola-González, Bagur-Calafat, and Girabent-Farrés, 2017; Martín-Bello, Vicente-Rodríguez, Casajús, and Gómez-Bruton, 2020) and a Cronbach's alpha of .83 in the Colombian child population (Herazo-Beltrán and Domínguez-Anaya, 2012). It consists of 10 questions, with five Likert-type response options that are scored from 1 to 5 (the less physical activity, the lower the score). The first question asks about activities carried out during free time; the next six questions evaluate the PA carried out in PE classes and during the academic break, at the end of class hours (daily PA) in the afternoons and on weekends; the last two questions

assess the PA carried out during the weekend and the frequency with which PA is carried out each day of the week; the tenth question is a filter question, used to find out if the child was sick that week. The final score of the AF level is obtained by the average of the first 9 questions; question 10 is not used as part of the overall score (Kowalski, Crocker and Faulkner, 1997; Kowalski, Crocker and Donen Rachel, 2004; Herazo-Beltrán and Domínguez-Anaya, 2012; Manchola-González, Bagur-Calafat and Girabent-Farrés, 2017; Arévalo, Feu and De la Cruz Sánchez, 2020), finally, a pilot test was carried out in Mexican primary school children with an $n = 48$ children and a Cronbach's alpha of .76 was obtained.

To measure Satisfaction/Fun and boredom in PE class, the Sport Satisfaction Instrument adapted to Physical Education (SSI-PE) was used (Baena-Extremera et al., 2012). It contains eight items: five for Satisfaction/Fun and three for boredom, with responses on a Likert-type scale from 1 to 5 (strongly disagree to strongly agree). Higher scores indicate greater Satisfaction/Fun or boredom. Reported alpha values in studies were.92 for the Satisfaction/Fun subscale and .79 for the boredom subscale (Muñoz, Gómez-López and Granero-Gallegos, 2019; Aznar-Ballesta and Vernetta, 2022; Baños et al., 2022).

The Importance and Utility of Physical Education (IEF) scale was used, developed, and validated in Spanish education to assess the importance and utility of PE according to students. This scale evaluates the importance and utility students attribute to PE classes. The instrument consists of three items answered on a Likert-type scale from 1 to 5 (strongly disagree to strongly agree) (Aznar Ballesta and Vernetta, 2022; Baños et al., 2019; Muñoz González et al., 2019).

To measure children's intention to engage in LTPA, the Intention to Participate in Leisure-Time Physical Activity scale adapted to PE (MIFA) was used (Granero-Gallegos et al., 2014). It consists of three items, with responses on a Likert-type scale from 1 to 5 (strongly disagree to strongly agree). Higher scores indicate a greater intention to participate in LTPA (Muñoz, Gómez-López, and Granero-Gallegos, 2019).

Procedure

Initially, permission was requested from the zone supervisor of the South Coast Region of Jalisco, Mexico. The project was then presented to the principals of five schools in the South Coast Region of Jalisco. The principals who agreed to the project granted permission, and a meeting with parents was organized to explain the project's objective and request the signing of informed consent. The informed consent outlined the main objectives of the research, the anonymity under which the instruments would be applied, the confidentiality of the information, the right to withdraw at any time, the data collection process, and all relevant information as established in the General Health Law on Health Research (Diario Oficial de la Federación, 2014) and the Declaration of Helsinki (World Medical Association, 2017).

Once informed consent was obtained from the children's guardians, the principal investigator presented the study's objective to the children, emphasizing voluntary participation, that it was not an exam, so there were no right or wrong answers, that participation would not affect their academic performance, that they could stop answering the instrument at any time, that only the researchers would know the results of their responses, and to give their assent and sign with their name if they wished to participate. Finally, they were asked to answer as honestly as possible. The children completed the entire questionnaire in the classroom, always accompanied by the principal investigator to resolve any doubts that arose during the application. The response time ranged from 15 to 20 minutes.

This research project adhered to the General Health Law on Health Research, published by the Diario Oficial de la Federación in 2014 (Diario Oficial de la Federación, 2014) and the Declaration of Helsinki of the World Medical Association (WMA) - ethical principles for medical research involving human subjects (World Medical Association, 2017). Therefore, this research project was submitted to the Ethics Committee in Research of the Faculty of Sports Organization (CEIFOD), which granted its approval with registration key CEIFOD 0124 015.

Statistical Analysis

To address the first objective, evaluating the level of PA, Satisfaction/Fun, boredom, importance of PE classes, and intention to engage in LTPA, descriptive statistics were conducted: measures of central tendency for continuous variables and frequencies and percentages for categorized variables. Reliability analysis was performed using Cronbach's alpha for all scales used.

To meet objective number two, to establish the difference in the level of PA, Satisfaction/Fun, boredom, the importance of PE classes, and the intention to do PATL by the state of the Mexican Republic and sex, two statistical analyses were performed. First, with the categorized variables, an X^2 test was performed. To determine the classifications of the different scales used, a non-hierarchical cluster analysis (K-means) was performed with three categories: low, moderate, and high.

Then, to establish differences by gender and state of the Mexican Republic with continuous variables, the normality of the data set was determined through skewness and kurtosis analysis. It was observed that three scales had non-normal distribution, so data transformation was performed using the logarithmic method. Once the data were transformed, an independent samples t-test was used.

Finally, to address the third objective, a multiple linear regression analysis was conducted using the stepwise method, considering PA level as the dependent variable and Satisfaction/Fun, boredom in PE classes, importance of PE classes, and intention to engage in LTPA as independent variables.

Statistical analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS) version 21 for Windows. The effect size and statistical power of the results were analyzed using the G*Power program version 3.1.9.7 to avoid type II errors.

RESULTS

Reliability, Normality, and Descriptive Analysis

Regarding internal consistency values, four scales obtained acceptable indices to engage in the LTPA scale having the highest acceptability index (Cronbach's alpha of .86). In

contrast, the boredom subscale had weak internal consistency with a value of .60 (see Table 1).

The skewness and kurtosis of the five scales used were analyzed using the Likert-type scales to determine data distribution. Skewness showed that the Satisfaction/Fun, importance of PE classes, and intention to engage in LTPA scales had negative skewness. In contrast, the PA level and boredom scales had right-skewed data, indicating positive skewness.

Regarding kurtosis values, most were positive, indicating that most scales had a leptokurtic distribution compared to a normal distribution, except for the PA level scale items, which were negative. These values indicated that the data did not have a normal distribution (see Table 1), so data transformation was performed using the logarithmic method to work with parametric statistics.

Table 1 shows the descriptive results of the Satisfaction/Fun, importance and utility of PE classes, and intention to engage in LTPA scales, which have high levels ($M \geq 4$). The PA level and boredom subscale have the lowest means, indicating moderate levels of PA and boredom.

Scale	*M*	*SD*	Min	Max	*α*	*S*	*K*
PAQ-C	2.95	.743	1	5	.75	.063	-.319
Satisfaction/Fun in PE classes	4.12	.932	1	5	.82	-1.307	1.317
Boredom	2.30	1.04	1	5	.60	.764	.023
Importance and utility of PE classes	4.07	1.01	1	5	.86	-1.27	1.020
Intention to engage in LTPA	4.11	1.04	1	5	.86	-1.27	1.020

*Note. *n = Total sample; M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum; α = Cronbach›s alpha, S = Skewness, K = Kurtosis*

Table 1: Reliability, Normality, and Descriptive Analysis of the Scales (*n* = 519*) (own elaboration)

The results of the Student's *t*-test revealed statistically significant differences ($p = .001$) in PA levels by state and gender. Significant differences ($p = .001$) were also found in the importance and utility of PE classes by gender (see Table 2).

Scale	State of the Republic				Gender			
	Jalisco	Nuevo León	*IC*95%	*p*	Boys	Girls	*IC*95%	*p*
	M(*SD*)	*M*(*SD*)			*M*(*SD*)	*M*(*SD*)		
PAQ-C	3.05 (.7)	2.80 (.6)	.12;.38	.001	3.17 (.75)	2.73 (.66)	.31;.56	.001
Satisfaction/Fun in PE classes	4.09 (.96)	4.16 (.91)	-.23;.09	.42	4.1 (.92)	4.0 (.96)	-.04;.28	.14
Boredom	2.76 (.82)	2.74 (.79)	-.12;.15	.84	2.79 (.84)	2.71 (.77)	-.05;.21	.26
Importance/utility of PE classes	4.08 (1.0)	4.06 (.96)	-.15;.19	.82	4.17 (.97)	3.9 (1.0)	.02;.37	.02
Intention to engage in LTPA	4.08 (1.0)	4.17 (.97)	-.27;.10	.36	4.19 (1.0)	4.04 (1.0)	-.02;.33	.10

*Note: *n = Total sample; M = mean; SD = Standard Deviation; 95% CI and p < .05 were considered statistically significant*

Table 2: Comparison of scales (continuous version) by state and gender (*n* = 519*) (own elaboration)

The chi-square test analysis showed that a higher proportion of children from Jalisco (31.7%) had a high level of PA compared to children from Nuevo León, with children showing higher prevalences of adequate PA levels. Significant differences ($p = .007$) were found in the importance of PE classes by gender (see Table 3).

Variables		State of the Republic		p	Gender		p
		Jalisco	Nuevo León		Boys	Girls	
PAQ-C	Low Level	24.5% (78)	40.5% (81)	.001	21.2% (55)	40.0% (104)	.001
	Moderate Level	43.9% (140)	38.5% (77)		38.6% (100)	45.0% (117)	
	High Level	31.7% (101)	21.0% (42)		40.2% (104)	15.0% (39)	
Satisfaction/Fun in PE classes	Low Level	7.2% (23)	6.5% (13)	.77	5.4% (14)	8.5% (22)	.18
	Moderate Level	23.2% (74)	21.0% (42)		20.5% (53)	24.2% (63)	
	High Level	69.6% (222)	72.5% (145)		74.1% (192)	67.3 (175)	
Boredom in PE classes	Low Level	33.5 (107)	39.5 (79)	.31	36.3 (94)	35.4(92)	.95
	Moderate Level	47.3 (151)	41.0 (82)		44.8 % (116)	45.0% (117)	
	High Level	19.1 (61)	19.5 (39)		18.9% (94)	35.4% (92)	
Importance/utility of PE classes	Low Level	9.1% (29)	8.5.% (17)	.88	8.5 % (22)	9.2 % (24)	.007
	Moderate Level	34.5% (110)	36.5% (73)		29.0% (75)	41.5 % (108)	
	High Level	56.4% (180)	55.0% (110)		62.5% (162)	49.2(128)	
Intention to engage in LTPA	Low Level	7.8% (25)	4.0% (8)	.10	6.2% (16)	6.5% (17)	.23
	Moderate Level	21.0% (67)	26.5% (53)		20.1% (52)	26.2% (68)	
	High Level	71.2% (227)	69.5% (139)		73.7% (191)	67.3% (175)	

*Note: *n = Total sample; M = mean; SD = Standard Deviation; 95% CI and p < .05 were considered statistically significant*

Table 3: Comparison of scales by state and gender (*n* = 519)* (own elaboration)

Multiple Linear Regression Analysis

Once it was verified that the scales' variance was different from 0 and that multicollinearity was not present, a multiple linear regression analysis was performed using the stepwise method to determine which of the independent variables was the best predictor of PA level.

The analysis showed two models and eliminated the variables of boredom and the importance of PE classes. The first model suggested that Satisfaction/Fun in PE classes was the best predictor of PA with values of B = .35; F (1,517) = 76.36, p = .001, β-1 = .99, and R^2 = .12, indicating that 12% of the PA level could be explained by the variable of Satisfaction/Fun during PE classes.

The second model showed that in addition to the Satisfaction/Fun of physical education classes, the Intention to practice PATL could also have a predictive effect on PA with values of B = .25 and B = .19, with an explained variance of 15% (p = .001) respectively (see Table 4).

Predictor Variables	*B*	*SE B*	Beta	R^2	$F_{(df)}$	*p*	1-β
Constant	1.563	.147					
Satisfaction/Fun in PE classes	.202	.039	.253	.15	47.11 (2,516)	.001	.87
Intention to engage in LTPA	.136	.034	.192				

Note. PA = physical activity; B = unstandardized coefficients; SE B = Standard Error; Beta = Standardized; R^2 = coefficient of determination; F(df) = F value with the regression degree of freedom; p < .05 were considered statistically significant; 1-β = statistical power

Table 4: Multiple linear regression analysis where the dependent variable is PA and the independent variables are Satisfaction/Fun in PE classes and Intention to engage in LTPA (*n* = 519)* (own elaboration)

DISCUSSION

This study had three objectives: the first objective was to evaluate the level of PA, Satisfaction/Fun, boredom, the importance of PE classes, and the intention to do PATL; the second objective was to establish the differences between these variables by states of the Mexican Republic and sex, and the third objective was to determine the predictive effect that Satisfaction/Fun, boredom, importance of PE classes, physical education and intention to do PATL have in school-aged children.

To answer objective number one, to evaluate the level of PA, Satisfaction/Fun, boredom, the importance of PE classes, and the intention to do PATL, the findings showed that like Aznar-Ballesta (2022), Martínez-Hernández and Zamarripa (2023), Muñoz et al. (2019) and Baños et al. (2019) most of the scales have an M ≥ 4, which indicates an adequate level of satisfaction, the importance of PE classes and intention to practice PATL, and present average levels in the boredom subscale during PE classes and PA level; These results could be explained by the fact that currently, in the primary school children's curriculum, the PE subject is not an independent and exclusive subject, in which a moderate level of PA has to be carried out (60 minutes 3 to 4 days a week), a situation that was occurring until before 2022, which causes PA levels to decrease. In turn, the findings show that children have a high level of Satisfaction/Fun, perceive PE class as important, and intend to practice PATL, which should be an incentive for the promotion of PA, and the low level of boredom shows that children really like doing PA in PE classes.

Regarding the second objective, the results showed that more children from Jalisco have adequate levels of PA compared to children from the state of Nuevo León. These results are inconsistent with those reported by (Arévalo, Feu, and De la Cruz Sánchez, 2020), where no differences were found in the level of PA by geographic area. These discrepancies could

be explained by the context in which the studies were carried out. Mexican children from the state of Jalisco were in suburban areas, while children from Nuevo León were in fully urbanized areas. Likewise, it is important to mention that the geographical context of Spain is totally different from the Mexican context, where in the areas of Jalisco, there are still marked gaps in the development of urbanization. Regarding the differences in the level of PA by sex, it was found, as in other studies (Martín-Bello et al., 2019; Aznar-Ballesta and Vernetta, 2022), that boys tend to be more physically active than girls and differ from what was reported by (Arévalo, Feu, and De la Cruz Sánchez, 2020), where no significant differences were found by sex; the concordant results are due to the fact that both studies were carried out on children in school education, it is also important to mention that children during this stage tend to be more extroverted and curious, likewise during this stage of development children receive compulsory physical education subjects, which forces students to be physically active while in secondary education the level of PA tends to decrease.

Another statistically significant difference was found in the importance and usefulness of PE classes; boys gave greater importance and usefulness to PE classes than girls; these results are similar to those reported by Muñoz et al. (2019) and Aznar-Ballesta and Vernetta (2022), where significant differences were also found in the perception of the importance and usefulness of PE classes, with boys being the ones who give the highest level of importance to PE classes, these results could be explained by several reasons, first because doing PA provides physical and psychological well-being and also provides fun and entertainment, (Vidarte et al., 2011; UNESCO, 2015; American Academy of Pediatrics, 2020) which contributes to giving a sense of importance to this type of activities.

Regarding the third objective of the study, the multiple linear regression analysis considering the PA level as the dependent variable and Satisfaction/Fun, boredom in PE classes, the importance of PE classes, and the intention to practice PATL as independent variables, the results showed that Satisfaction/Fun and intention to do PATL have a predictive effect of.25% and.19% respectively on the PA level, the results proposed here are based on a strong statistical power, these results, in turn, agree with what was reported by Zueck et al. (2020), where it was found that a group of children who received a PE program considering Satisfaction/Fun in PE classes increased their PA levels. Likewise, the results of the present study agree with those found by Muñoz et al. (2019) and Baños et al. (2019), where a strong association was found between the level of Satisfaction/Fun in PE classes and the level of PA.

CONCLUSIONS AND PRACTICAL IMPLICATIONS

The results of this study show high levels of Satisfaction/Fun and the importance of PE classes, a high intention to engage in LTPA, and low levels of boredom and PA. Statistically significant differences were found in PA levels by state and gender, with children from Jalisco having higher PA levels compared to children from Nuevo León. In the general population, a higher proportion of boys had high PA levels compared to girls. Statistically significant differences were also found in the importance and utility of PE classes by gender, with a higher proportion of boys attributing importance and utility to PE classes than girls.

Finally, the findings showed that Satisfaction/Fun in PE classes and the intention to engage in LTPA have a predictive effect on PA. Therefore, it is concluded that the study highlights two important aspects regarding physical education: firstly, during the planning and implementation of PE classes, teachers should include strategies that promote fun, enjoyment, and satisfaction among children to encourage regular PA. Secondly, it is suggested that the mandatory and exclusive PE learning unit be immediately reintegrated into the primary education curriculum to combat significant public health issues in the country, such as physical inactivity, sedentary behavior, overweight, and childhood obesity.

Within the limitations of the present study, it can be mentioned that satisfaction and enjoyment during PE classes can be influenced by more variables, such as the attitude of the teacher who provides the physical education classes, the experiences that the student has had during the classes and the type of activities that are carried out in the physical education classes, so it is suggested that more studies be carried out that incorporate a greater number of variables that can influence PA and its relationship with physical education classes.

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COMMUNICATIVE SELF-CONFIDENCE AND MOTIVATION: AN EDUCATIONAL EXPERIENCE OF LINGUISTIC IMMERSION AND LEISURE IN NATURE

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ABSTRACT

Communicative self-confidence and motivation play a crucial role in learning any language, including English. The absence of these elements significantly impacts students' ability to express themselves naturally and fluently. In Spain, language immersion programs seek to promote the simultaneous learning of language skills in a communicative context, facilitating learners' proficiency development. This study focuses on analyzing the influence of the natural environment and leisure activities on learning English as a second language (L2), investigating whether participation in a language immersion program in nature improves learners' communicative self-confidence and whether they perceive greater empowerment compared to conventional English classes. Participants were 305 secondary education students, of whom 172 were female. Results indicate that students who participated in the language immersion program experienced significant improvements in their communicative self-confidence and perceived greater relatedness support (Z =-3.55; p < .001; δ =-.21 and Z =-5.26; p < .001; δ =-.32, respectively). These findings highlight how the natural environment provides a conducive environment for the development of communicative and social skills, reducing language anxiety and improving students' self-confidence, and points to the importance of exploring basic psychological needs to understand the interaction between students, teachers and the environment in the process of learning English.

KEYWORDS

Communicative self-confidence, leisure, linguistic immersion, motivation, natural environment

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Highlights

- *The natural environment provides an environment conducive to developing communication skills, reducing linguistic anxiety, and improving students' self-confidence.*
- *Green spaces or nature spaces are suitable and beneficial settings for improving students' social relations.*
- *English language immersions are a key tool for improving student empowerment. In natural environments and with quality programs, students are immersed in a space where English is the main language and nature is the stimulus for learning.*

INTRODUCTION

In recent decades, there has been a significant increase in the commitment to integrating English within the educational context, driven by its global expansion and recognition (Axelsson, 2007; Cadiz-Gabejan, 2021), as well as the urgent need to enhance linguistic and multilingual competencies in younger generations. This aligns with the directives set by the Organic Law (LOMLOE, 2020), which is essential for navigating an increasingly globalized and interconnected society (Hashemi, 2011). Bilingual programs have proliferated across Europe since the 1990s to promote multilingual competencies. Consequently, educational policies promoted by organizations like the OECD, the Council of Europe, and the European Commission increasingly support the objective of enhancing language acquisition among their citizens (Palacios-Hidalgo et al., 2019). In Spain, language immersion programs based on Content and Language Integrated Learning (CLIL) aim to foster the simultaneous development of language skills and subject content by using a vehicular language different from students' mother tongue.

Effective communication in foreign language education necessitates that students possess foundational language

skills and confidence in speaking. However, Spanish students, similar to learners in various other contexts, often experience challenges with oral expression, notably in areas of pronunciation and vocabulary, which can significantly hinder interaction and dialogue (Alonso-Herrero & Lasagabaster, 2019; Cadiz-Gabejan, 2021; Gazali, 2022). These challenges can hinder intelligibility and comprehension between speakers (Thompson & Huensch, 2016). Self-confidence, therefore, is closely tied to students' success or difficulties in foreign language learning, as emphasized by Alonso-Herrero and Lasagabaster (2019). Supporting this, previous studies highlight self-confidence as a determinant of learners' willingness to communicate (Macintyre et al., 1998) and their inclination to initiate interactions with native speakers (Yashima et al., 2004). Although there is a shift toward more communicative and proficiency-based teaching approaches, many educational settings still rely heavily on traditional grammar-focused methods, often sidelining oral skills, such as listening and speaking. This is especially pronounced in formal teaching contexts, where limited opportunities for classroom communication restrict students' confidence in using English (Darasawang & Reinders, 2021). To reverse this trend, Hashemi (2011) advocates for creating supportive, informal spaces that encourage collaborative activities between teachers and students.

In this sense, fostering student confidence will be a key aspect that teachers can develop in teaching-learning contexts. In recent decades, the creation of empowering classroom climates has gained prominence due to the considerable influence that a teacher's words, actions, learning environment organization, and classroom dynamics management have on students' confidence and other adaptive variables (Appleton & Duda, 2016). Building on achievement goal theories (AGT; Ames, 1992; Nicholls, 1989) and self-determination theory (SDTDeci & Ryan, 1985; Ryan & Deci, 2020), Appleton and Duda (2016) propose that teachers can establish either empowering or disempowering climates that shape students' motivational processes.

To delve deeper into the social context in class, these authors characterize motivational climate from a broader, hierarchical, and multidimensional perspective, integrating constructs from SDT (Ryan & Deci, 2020) - autonomy support, control, and relatedness support - and from AGT (Ames, 1992; Nicholls, 1989)– task-oriented climate and ego- or performance-oriented climate. Appleton et al. (2016) point out that an empowering climate is fostered when teachers set achievement criteria based on effort, collaborative learning, and skill development (task-oriented climate); provide opportunities for choice and rationale for tasks; recognize students' preferences, interests, and perspectives (autonomy support); and ensure students feel valued and understood (relatedness support). However, a teacher can also create a disempowering climate when he or she establishes achievement criteria based on superiority, rivalry, and differentiated treatment according to performance, where mistakes are penalized. Achievements are rewarded (ego- or performance-oriented climate), and strategies that pressure students to think, behave, or feel a certain way (control). In the context of English as a foreign language, the literature suggests that when students perceive an empowering climate, they experience greater autonomy and choice, feel capable of overcoming the challenges presented, and sense support from both teachers and peers. This type of climate has been associated with enhanced perceived competence in English, thereby strengthening self-confidence (Darasawang & Reinders, 2021).

On the other hand, there is evidence that the context in which the teaching-learning process takes place can affect learning outcomes. Studies that have conducted adventure and leisure education programs (e.g., González-Melero, 2023) have shown improvements in school satisfaction, motivation, and self-efficacy. Along these lines, recent research related to teaching English as a foreign language (FLE) has concluded that connecting English language learners with nature reduces their stress and benefits both their academic and socioemotional well-being (Mueller & Pentón Herrera; Shoseyov-Kupferman, 2020). Additional studies by Gazali (2022), Sopanema (2016), and Asmara et al. (2016) report that secondary school students respond favorably, showing increased motivation and inspiration when learning English in natural settings. Pedagogical programs through leisure activities carried out in nature and outdoor spaces are marking a greater proliferation and an upward trend (González-Rivas et al., 2021; Marinho et al., 2017). Consequently, activities in natural spaces appear to create ideal environments for experiential learning, facilitating acquiring academic skills and competencies (Santos & Martínez, 2011). These transformative educational models provide students with social and academic benefits, as documented in recent years (Baena-Extremera et al., 2012; Hortigüela et al., 2017). Specifically, these approaches underscore the value of combining leisure and adventure activities with EFL instruction in nature, perceived as beneficial for enhancing self-esteem, social relationships, and self-confidence (García-Merino & Lizandra, 2022; Gehris & Swalm, 2011). Further research supports cognitive and mental health benefits from exposure to green spaces. Diamond et al. (2007) and Posner and Rothbart (2006) have shown improvements in attention spans and cognitive processing in such settings, as nature exposure helps students focus on relevant stimuli, facilitating a more directed cognitive experience (Peen et al., 2010).

The evidence discussed above suggests that engaging students in English language learning experiences within natural environments may enhance their self-confidence in communicating in English and foster an empowering climate that positively influences their motivational patterns. Nevertheless, previous literature has yet to explore whether learning English in nature directly affects students' communicative confidence. Additionally, no studies have compared students' perceptions of an empowering climate in formal classroom settings versus a natural environment for English language learning.

Students' gender could be a covariate to consider when understanding both the impact of immersion on self-confidence and the differences in the empowering climate between a classroom context and a nature immersion context. In this regard, Gardner's (1985) motivation theory suggests that students with greater integrative motivation (i.e., those interested in interacting with speakers of other cultures) are more successful in language learning and that girls tend to show higher integrative motivation than boys, which could

be related to a greater willingness to communicate in English. Also, previous evidence has suggested that Spanish girls might display higher English communicative competencies than boys when entering university (Suardí Peña & Eliche, 2023).

The aim of the present study was twofold. First, to investigate whether an immersion experience in learning English within a natural setting could enhance high school students' communicative self-confidence. In this respect, it was also explored whether the impact of the experience could vary between boys and girls. Second, this study examined potential differences in students' perception of an empowering climate between a formal English classroom setting and a natural language immersion experience. The role of gender in such differences was also analyzed. It was hypothesized that the natural immersion experience would increase students' communicative self-confidence and that students would perceive a stronger climate of empowerment in this setting compared to their regular English classes. Given the lack of conclusive previous evidence in this regard, no hypotheses were established regarding differences between boys and girls.

METHOD

Design

A quantitative pre-experimental design was employed, utilizing a within-subject comparison strategy to gather longitudinal data from the measurements taken in the pretest and post-test (Judd & Kenny, 1981).

Participants

The sample comprised 305 students (M = 12.86, SD = .95) in their second year of Compulsory Secondary Education. Specifically, 172 females and 133 males aged between 10 and 15 participated in the study (M = 12.91, SD = .92; M = 12.81, SD = .99 respectively). Participants belonged to a total of 19 public and private schools from different rural (47.8%) or urban (52.2%) areas in Spain. From those centers, 67.8% of students were engaged in bilingual schools.

Instruments

- ***Communicative self-confidence***: a Spanish version of the Willingness to Communicate scale (Darasawang & Reinders, 2021) was used. This scale consisted of 10 items translated to Spanish by two research members, ensuring the comprehension of each item. In the pretest version, the introductory phrase was… "In settings where English is used….", while in the post-test version, it was "After having lived the immersion experience, I think that when being involved in settings where English is used…" (e.g., "I worry about not understanding what my friends say in English"). Responses were rated on a 5-point Likert scale from strongly disagree to strongly agree. Cronbach's alpha for the single dimension of the scale was 0.73, indicating acceptable internal consistency.

- ***Empowering climate***: the Spanish version validated for the educational context of the empowerment climate dimension of the Educator-Created Empowering and Disempowering Climate Questionnaire (ECEDCQ; Granero-Gallegos et al., 2023) was used. This dimension comprises 21 items that measure the empowering climate (task-oriented motivational climate, autonomy support, and relatedness support). In the version applied in the first data collection, the introductory sentence was… "In English classes, my teacher…", while in the version administered after the immersion experience, the sentence was "During the activities we have done in the immersion week…". The items were grouped into five factors and measured students' perception of the teaching style: task-oriented motivational climate (4 items; e.g., "He expects us to learn new skills and gain new knowledge and skills"), autonomy support (5 items, e.g., "He has thought it is important that we participate in the activities because we really want to"), relatedness support (3 items; e.g., "He has listened openly and has not judged personal feelings"). A 5-point Likert scale was used for the responses. Cronbach's Alpha index was adequate: task-oriented climate (α = .85), autonomy support (α = .70), and relatedness support (α = .80).

Procedure

First, public and private secondary schools were contacted to inform them about the study. Following the guidelines of the American Psychological Association (2002), informed consent and approval were required for data collection involving minors. Consent was obtained from both the schools and the student's parents or legal guardians. An informational email was sent detailing the study's objectives, nature, research instruments, and data handling procedures, emphasizing that the data would be used exclusively for scientific purposes. Ultimately, 19 educational centers across Spain agreed to participate, and data collection took place between February and June of the 2022–2023 academic year. After collecting the necessary information, the data were processed. All incomplete questionnaires or those with responses that could lead to confusion or unreliability were excluded from the analysis.

At the beginning of the immersion program, students were provided with all the necessary and relevant information about the study to ensure that everyone involved clearly understood the process to be followed in administering the questionnaires. The language used by the native foreign language teachers was English as L2 throughout the process. Questionnaires were administered twice: on the first day of the program upon arrival at the facility and at the end of the program following seven days of training. Both questionnaires lasted approximately 20 minutes and were administered to the students in digital format via electronic devices to ensure individual and anonymous responses.

Each group participated in a seven-day immersion, with fifty students per week. The bilingual pedagogical program focused mainly on learning English through physical activities in the natural environment, artistic performances, games, and cooperative activities, fostering intercultural communicative competence and reflecting on diverse identities. English was the primary language of communication, facilitating real-life interactions with peers and native-speaking teachers in everyday scenarios (see Figure 1).

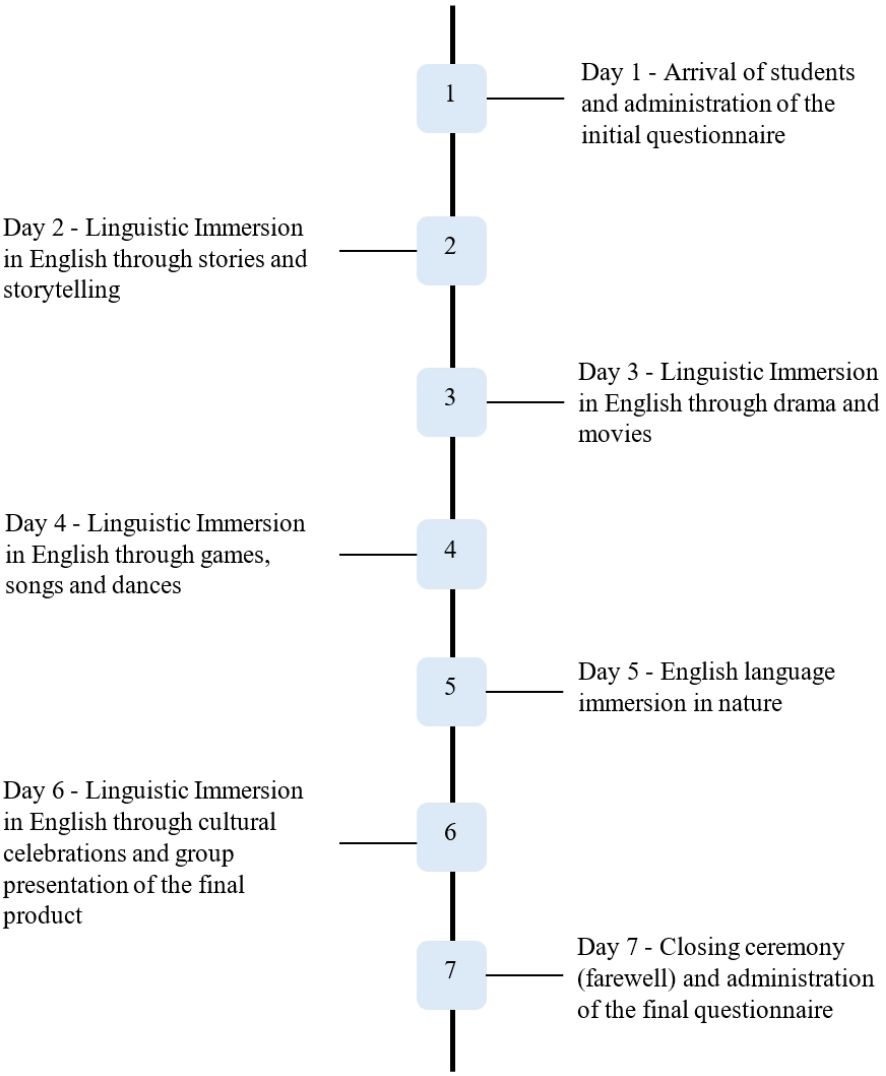

Figure 1: Description of the intervention schedule

Data Analysis

The variables analyzed were communicative self-confidence in English and the perception of an empowering climate, composed of the subdimensions of autonomy support, relatedness support, and task-oriented motivational climate. First, descriptive statistics (minimum, maximum, means, and standard deviations) and bivariate correlations between the study variables were calculated. Next, the Kolmogorov-Smirnov test was performed to check the distribution of the scores on the study variables, which did not conform to the normal, so nonparametric tests were applied to address the study's objective. First, the Wilcoxon test for related samples was performed to determine possible pre-post differences in participants' communicative self-confidence. Then, three 2x2 univariate analyses of variance (ANOVA) with context condition and gender as independent variables were used to investigate the effect of the interaction of these two variables on climate task, autonomy support, and relatedness support. Last, the Wilcoxon test was used to test whether there were significant differences between the English class and immersive experience by gender. As an index of effect size (ES), Cohen's delta was calculated, whose interpretation was based on the following values: < 0.06 small, η^2 0.06 to < 0.14 medium, and η^2 0.14 large (Cohen, 1988). All analyses were performed using the SPSS statistical software, version 26.0.

RESULTS

Descriptive Statistics

Table 1 presents the descriptive statistics and bivariate correlations of the study variables pre- and post-intervention. Overall, mean scores were relatively high, particularly within the empowerment dimensions. The initial mean score for communicative self-confidence was below 3 in the first measurement but showed a significant increase following the intervention. As for the correlations, a strong association between the dimensions that make up empowerment was observed both before and after the intervention. Although less strongly, a positive and significant correlation between communicative self-confidence and the three dimensions of empowerment stands out. It is worth noting that, generally, cross-time associations were not significant (i.e., pre-intervention scores on empowerment dimensions did not significantly correlate with post-intervention scores in the other dimensions).

	1	2	3	4	5	6	7	8
1. Communicative self-confidence PRE	---	.336**	.320**	.326**	.140*	.089	.124*	.091
2. Task-oriented climate_English class		---	.789**	.688**	.046	.068	.133*	.037
3. Autonomy support_English class			---	.670**	.063	.066	.129*	.051
4. Relatedness support_English class				---	.000	.044	.144*	.052
5. Communicative self-confidence POST					---	.221**	.215**	.273**
6. Task-oriented climate_Inmmersive experience						---	.694**	.708**
7. Autonomy support__Inmmersive experience							---	.748**
8. Relatedness support__Inmmersive experience								---
M (DT)	2.95 (.59)	3.97 (.93)	3.95 (.84)	3.72 (.96)	3.20 (.60)	3.99 (.88)	3.88 (.77)	3.98 (.86)

Table 1: Descriptive statistics and bivariate correlations

Impact of the Immersive Experience on Communicative Self-confidence

The results of the Wilcoxon test (Table 2) in this investigation indicated a significant increase in the values of communicative self-confidence following the program intervention (Z = -5.26; p < .001; δ = -.32) with a moderate effect. Analyzing results by sex, both girls and boys showed a significant improvement in communicative self-confidence after the intervention with moderate and small effects (Z = -4.90; p < .001; δ = -.29 and Z = -2.34; p = .019; δ = -.12, respectively).

	Before intervention *M* (*SD*)	After intervention *M* (*SD*)	*Z*	*p*	Cohen's *d*
Communicative self-confidence	2.95 (.59)	3.20 (.60)	-5.26	< .001	.32
Communicative self-confidence Girls (*n*=223)	2.91 (.57)	3.17 (.59)	-4.90	< .001	.29
Communicative self-confidence Boys (*n*=181)	3.08 (.59)	3.24 (.57)	-2.34	.019	.12

Table 2: Differences in communicative self-confidence between before and after the intervention.

Differences in Perceived Empowering Climate between English Class and Immersive Experience

First, three 2x2 ANOVA was carried out to explore the effect of the interaction between English class or immersive experience and gender. Results revealed that no significant interaction was found in the climate task (F = .43, p = .52, η^2_p = .01), autonomy support (F = 1.53, p = .22, η^2_p = .01), and relatedness support (F = .01, p = .94, η^2_p = .01).

Then, exploring significant differences between the English class and immersive experience by gender with the Wilcoxon test, results showed no significant differences in task-oriented climate for both the English class and immersive experience (Z = -.20, p = 0.84). Similarly, with the sample split by gender, neither girls (Z = -.64, p = .52) nor boys (Z = -.48, p = .63) significantly differed between contexts. Small effect sizes were found.

As for autonomy support, scores in the immersive experience did not differ from those in the English class (Z = −1.46, p = 0.15). The same pattern also emerged for girls, with no significant differences (Z = -0.66, p = 0.51). In contrast, boys showed significant differences between contexts with lower levels of perceived autonomy support in the immersive experience than in the classroom (Z = -2.53, p = .01), although the effect size was small.

Significant differences were also found in relatedness support between the English class and the immersive experience (Z = -3.55, p < .001). Specifically for gender, this effect was particularly noticeable for girls, who perceived higher relatedness support in the immersive experience compared to the classroom (Z = -1.96, p < .05). For boys, no significant difference was found (Z = -1.62, p = .11).

	English class *M* (*SD*)	Immersive experience *M* (*SD*)	*Z*	*p*	Cohen's *d*
Climate Task	3.97 (.93)	3.99 (.88)	-.20	.84	.02
Climate Task Girls	3.95 (.93)	4.00 (.90)	-.64	.52	.05
Climate Tasks Boys	4.06 (.86)	4.04 (.82)	-.48	.63	.04
Autonomy support	3.95 (.84)	3.88 (.77)	-1.46	.15	.07
Autonomy support Girls	3.93 (.86)	3.89 (.78)	-.66	.51	.05
Autonomy support Boys	4.04 (.76)	3.86 (.73)	-2.53	.01	.13
Relatedness support	3.72 (.96)	3.98 (.86)	-3.55	< .001	.21
Relatedness support Girls	3.78 (.98)	3.94 (.88)	-1.96	< .05	.10
Relatedness support Boys	3.82 (.92)	4.00 (.80)	-1.62	.11	.06

Table 3: Differences in empowering climate dimensions between English class and immersive experience

DISCUSSION

The present study had two primary objectives: first, to examine whether an English language immersion experience in a natural environment could impact high school students' communicative self-confidence, and second, to analyze differences in perceptions of an empowering climate between formal classroom English instruction and an immersion experience in nature. It was hypothesized that the immersion experience would enhance students' communicative self-confidence and that participants would perceive a more empowering climate during the immersion than in their regular English classes.

The results of this work partially confirmed the hypotheses of the study. The main finding of this research has been the confirmation that the students who participated in the language immersion program in nature improved their communicative self-confidence in the English language. What might be more important is that the impact of the immersive program was similar to that of boys and girls. These findings suggest that the experience in the language immersion program in a natural environment and away from the commonly known as traditional classrooms, where language anxiety seems to be very present in English language learning (Hashemi, 2011; Öztürk et al., 2022), could provide a more favorable environment for the development of communicative skills. Students' perception of the language learning process, their self-concept and identity in terms of their performance in communicative situations, and the linguistic obstacles they face when communicating in English seem to be closely intertwined with language anxiety and may have an impact on students' positive self-image or self-identity (Hashemi, 2011; Öztürk et al., 2022). In addition, different authors have evidenced that student achievement could be influenced by learning contexts (Pariyanto & Pradipta, 2020), so the environment and spaces in which teaching takes place will be directly related to the social, emotional, and physical well-being of students (Mueller & Pentón Herrera, 2023; Shoseyov-Kupferman, 2020). One factor that could be affecting the lower level of self-confidence reported by the participants about their experience in ordinary English classes in their schools is the possible abuse of grammar that is palpable in the classrooms. The method, commonly called Grammar Translation, impairs the planning of realistic and communicative situations that involve greater cooperation between interlocutors and satisfy the learner. From this perspective, Kocaman (2017) considers that overexposure to grammar in Spanish students can be a critical factor that causes serious difficulties, noting, in his studies, that students expressed greater concern for grammatical rules and remarked significant difficulties in listening comprehension and anxiety. Several studies have shown that closed spaces with an artificial environment, such as classrooms, can lead to and develop anxiety or mood disorders (Lederbogen et al., 2011; Peen et al., 2010; van Os et al., 2010). Similarly, research has shown that natural environments and their interaction through different leisure activities can help improve students' physical and psychological health (Retete-Ochoa & Heredia-León, 2024). In this line, previous studies indicate that natural environments could improve different motivational variables, such as the perception of self-efficacy and motivation, and academic variables, such as self-regulated learning and school satisfaction (González-Melero, 2023). Therefore, it seems that learning English in the natural environment could foster students' communicative self-confidence, which would reduce the levels of linguistic anxiety that they present in activities in which oral communication takes place. Thus, learning English in natural environments may bolster students' communicative self-confidence, potentially reducing the linguistic anxiety commonly associated with oral communication tasks. Further exploration of these factors could yield valuable insights into the interaction between students, teachers, and learning environments and the structuring of classes and specific activities that impact communicative self-confidence and language anxiety (Hashemi, 2011).

In addition, the results revealed that, during the program, students perceived greater relatedness support than during their English classes. While the analysis according to students' gender revealed that it was only among girls where this difference was significant, it must be noted that boys' values were also considerably higher in their perceptions of the immersive experience than in their English classes. From this perspective, and following studies by authors such as Cerrada et al. (2022) and Gutiérrez et al. (2017), this improvement could be related to the cooperative dynamics and the integral natural environment of the program, which foster social interaction, collaboration and bonding among participants. These values can be aligned with the studies of González-Melero (2023), whose adventure education (EA) program in secondary education with 416 subjects, significant improvements were observed in a multitude of variables such as school satisfaction, motivation, learning to self-efficacy or self-regulated learning to cognitive strategies, among others. Activities conducted in natural settings provide an optimal environment for experiential learning, enabling the acquisition of various academic skills and competencies (Santos & Martínez, 2011). The experiences generated in green spaces—marked by interaction with nature, risk, emotional engagement, social interaction, and uncertainty—create meaningful contexts for learning and self-expression (Caballero, 2012). In alignment with these findings, Cerrada et al. (2022) concluded that such activities offer substantial educational potential from multiple perspectives (Baena-Extremera et al., 2013; Caballero, 2012; Fuentesal-Garcia, 2014; González-Melero, 2023). Therefore, based on previous literature, we will say that the natural environment is considered an ideal setting for learning a foreign language, as well as for promoting certain behavioral and psychological variables among students that influence learning processes. This study highlights several factors affecting students' self-confidence and self-assurance. The fact that learners perceive greater ease in speaking and communicating in English will favor their self-confidence and empowerment towards the interaction and communicative situation. This is consistent with prior research, such as that of Pariyanto and Pradipta (2020), which found that positive attitudes, strong internal motivation, and supportive environments are essential for successful language learning.

The initial hypotheses were partially confirmed, as no significant differences were found in task-oriented climate and autonomy support between classroom and immersion experiences. Yet,

when splitting the sample by gender, boys exhibited significant differences between contexts in the opposite direction to that hypothesized with lower levels of autonomy support in the immersive experience. These findings could be explained by the need for teachers to control the classroom more, maybe due to safety concerns associated with the inherent risks of activities developed in the natural environment. The empowering climate is characterized by valuing student progress and establishing individualized criteria with the goal of personal improvement; specifically, the task-oriented climate seeks to offer opportunities for choice, reasoning, and justifying the activities that are proposed, as well as identifying and recognizing student interests and preferences (Appleton et al., 2016). This suggests the nature of the teacher-student relationship may influence the promotion of a task-oriented climate. In this study, the one-week program duration may have limited students' perception of certain task-oriented climate attributes, such as recognizing individual interests and preferences, given that instructors interacted with students for only a short time. Parallelly, it could be that students perceive more clearly the establishment of individualized criteria by their school English teacher since it is more feasible that, in this context, the objectives can be tailored to each student according to his or her previous performance and interests. Additionally, the inherent characteristics of each teacher—such as years of experience, gender, or motivational patterns—are strongly related to the type of climate generated in their teaching-learning contexts (Baena-Extremera et al., 2015; Baños et al., 2018; Franco et al., 2021). Consequently, students' perception of this variable may be more influenced by the individual qualities of the teacher or instructor than by the context or specific experience.

On the contrary, there was no distinct difference in perceptions in the autonomy support variable for the total sample, except for boys, who reported significantly lower levels of autonomy support in the immersion experience versus the classroom setting. A climate in which autonomy support is promoted is characterized by the fact that the people (teachers, technicians) who manage the context (class, training session, etc.) encourage participants to take the initiative, promote and value decision-making, propose interesting activities explaining the reasons for them, and put themselves in the place of the participants to understand them, showing understanding and flexibility (Mageau & Vallerand, 2003). Activities carried out in the natural environment are determined, in their management, by a fundamental aspect such as safety to preserve the physical integrity of the participants, and this could be conditioning the perception of support for autonomy on the part of the participants in these activities. For instance, and in line with what has been suggested in previous works, the fact that students are more controlled due to safety issues and being a space of continuous uncertainty (Peñarrubia et al., 2016) could have affected the perception of autonomy that students have during the immersion program. In contrast, in an ordinary classroom, students could be more encouraged to show initiative and make decisions, given the absence of physical risk. Additionally, as previously noted regarding task-oriented climate, evidence suggests that certain teacher-related characteristics, such as the satisfaction of teachers' psychological needs or burnout experienced at work, may condition the autonomy support they provide to their students (Burel et al., 2021; Franco et al., 2020). Pursuing further studies along these lines would be valuable, particularly those incorporating additional dispositional motivational variables, such as the satisfaction of basic psychological needs. Such research could provide deeper insights into how autonomy-supportive strategies—or more controlling behaviors (perhaps necessitated by the imperative to ensure participant safety during activities)—may shape students' motivational patterns. Understanding these dynamics would contribute to a more nuanced comprehension of the complex interplay between teacher practices, safety considerations, and student motivation in diverse learning environments.

Limitations and Practical Implications

The present study presents different limitations that need to be taken into consideration. First, the context in which the language immersion program was developed could be a limiting factor in terms of the influence on certain variables of the empowerment climate, specifically on support for autonomy, given the specific characteristics of the natural environment with respect to the aforementioned safety aspects, which are fundamental in carrying out activities in the natural environment. In addition, other aspects, such as the teacher's or instructor's interpersonal style, could also influence the differences presented in the findings. Future research could benefit from examining the role of teacher experience and consistency across environments to gain a more comprehensive understanding. This could be achieved through a design in which the same instructor leads the intervention both in a conventional classroom and in a natural setting, allowing for a clearer comparison of autonomy support and other variables across contexts.

Additionally, the self-confidence variable used in this study, which captures students' subjective perception of their linguistic competence, may be influenced by the novelty and emotional impact of an immersive experience in a natural setting. We suggest the need for future studies that address this type of variable through more objective measures with validated questionnaires or even the validation of the tool itself. Lastly, the multi-component nature of the study introduces complexity, as it does not allow for an isolated examination of each didactic strategy's impact on empowerment climate variables. For future research, we recommend designing a study that systematically identifies and evaluates the individual teaching strategies that contribute to a teacher's capacity to foster an empowering climate. This approach would allow for a more precise analysis of which strategies most effectively enhance autonomy support, relatedness support, and other aspects of the learning environment.

Despite these limitations, this work represents an advance in understanding the influence that leisure activities in the natural environment have in English language teaching on students' communicative self-confidence and the social relationships they establish among peers. Consequently, several practical implications emerge from these findings. The study underscores the importance of implementing language immersion experiences in environments distinct from the traditional school context, given the evidence that such settings enhance various motivational and learning outcomes related to English language acquisition. In line

with prior research, such as Hashemi (2011), this work suggests that creating informal, friendly, and collaborative spaces—particularly those facilitating teacher-student interactions—may support more effective English language teaching and learning. Moreover, gender differences were observed, with girls reporting a stronger sense of relatedness support during the immersive experience compared to the classroom, underscoring the need to consider gender dynamics in designing such programs. Therefore, developing similar immersion experiences within the school context could be highly beneficial. These experiences might involve exposing students to English learning through leisure activities in natural environments or replicating such contexts within the school through simulated settings. The fact of creating playful situations in spaces totally different from the classrooms where the classes are held could foster commitment, motivation, and, consequently, the student's English language skills. This type of action could be developed through interdisciplinary projects with subjects such as PE, where the focus of English language learning could be brought to the objective or achievement of different games and recreational activities that are related to the natural environment.

Likewise, educational administrations need to promote and support this type of initiative. Through the implementation of educational programs and projects such as these language immersion programs, the Spanish institutions responsible for education seek to promote learning and equity and provide our students with tools that will make them more competent for their professional future. Encouraging the participation of institutions and organizations related to education to develop a greater number of programs related to language immersion, both in and out of school, would ensure quality education and the promotion of the integral development of our students.

In short, language immersion is not only an investment in students' personal development but also an intelligent strategy to strengthen their professional prospects in an increasingly interconnected and demanding world of work.

CONCLUSIONS

With a specific focus on communicative self-confidence, it was found that participants in the nature-based language immersion program experienced substantial improvements. This finding aligns with previous research suggesting that a natural environment may be conducive to developing foreign language skills. Compared to regular English classes, the perception of increased relatedness support during the program supports the notion that activities in natural settings facilitate social interaction and bonding.

This underscores the importance of implementing such programs within educational centers. As our findings indicate, this program enhances communicative self-confidence and reveals how green or natural spaces serve as supportive environments for improving social relationships (Thompson et al., 2011). In addition, language immersions foster adaptability and openness to new experiences, qualities increasingly valued by employers. Students hone their language skills and develop intercultural skills and a global mindset that will translate into more successful job performance in the future.

We believe and recognize the importance of English language immersions as an effective way to improve our students' communication skills and empowerment. Immersions in natural settings, combined with high-quality educational programs, offer students the opportunity to engage fully in an authentic green environment where English is the primary language of communication and nature serves as a stimulus for learning. These experiences allow students to build fluency, confidence, autonomy, and cultural competence in English, effectively preparing them for an increasingly diverse, multicultural, and globalized world.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest in the writing of this article.

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Full research paper

VALIDATION OF THE TEACHERS' PERSONAL AND PROFESSIONAL SKILLS QUESTIONNAIRE IN THE CZECH PHYSICAL EDUCATION SETTING

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ABSTRACT

Personal (PSs) and professional (PRs) skills are necessary to any physical education (PE) teacher, potentially having an impact on the quality of teaching and students' engagement in PE. In recent years, the Teachers' Personal and Professional Skills Questionnaire (TPPS-Q), composed of two 5-item dimensions (PSs and PRs), has been developed and tested. This study aims to test the validity of the TPPS-Q in the Czech school context. The analysis of the questionnaire and its structure, which was based on responses from 135 pupils enrolled in the last grades of Czech primary schools, was performed using the software AMOS for structural equation modeling. Results suggest that the structural model is appropriate after removing two items (CFI = .981; RMSEA = .058; SRMR = .041). Internal validity was good for both PSs (Alpha = .811; Omega = .814) and PRs (Alpha = .795; Omega = .794). Reliability was also found to be good (PSs: ICC = .888; PRs: ICC = .760). Additional scores were assessed for convergent and discriminant validity. The final 8-item version is valid and can be used in the Czech school environment.

KEYWORDS

Personal skills, physical activity, physical education, professional skills questionnaire

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Highlights

- *The instrument was adapted following the scientific Translation, Review, Adjudication, Pre-testing, Documentation (TRAPD) method.*
- *The Czech version of the TPPS-Q is scientifically sound after the removal of two items.*
- *TPPS-Q is a unique instrument for assessing perceived teachers' skills in the classroom, filling an important gap in literature.*

INTRODUCTION

Teachers are the cornerstone of the teaching-learning process and, in a broader way, of the effectiveness of any educational system; for success, they must possess not only excellent pedagogical skills and practical experience but also an appropriate personal attitude (Dytrtová, 2018). Excellence in the teaching profession lies in the synergy between these two aspects, i.e., in combining and effectively using professional and personal skills (Farahmand, 2022). For physical education (PE) teachers, these two sets of skills become increasingly important compared to other subjects since they influence academic achievement and students' choice to be active or inactive in their lives (Martins et al., 2018).

According to Setiana et al. (2019), professional and personal skills include, among others, knowledge of the tasks and ability to manage them; planning skills; engagement in the activities; positive and fair attitude; as well as proper communication skills and high responsibility. Yanova et al. (2021) add that mutual understanding with the students, knowledge of creative and innovative methods and technologies, or the ability to propose new techniques may also be considered as important professional and personal skills for PE teachers. Baumgartner (2022) underlines that teachers can acquire and improve these skills using professional training and practice. Hence, developing high-quality skills may lead to more effective and successful job performance, which can create a positive environment for the recipients and increase personal and professional development (Doraisamy & Rahman, 2023). Additionally, these skills enable teachers to solve various problems during the development of their lessons (Yanova et al., 2021). Some

authors further emphasize the need for teachers to integrate professional and personal skills and use them simultaneously to be able to apply them properly (Ahmad, 2021).

Given the importance of these skills for PE teachers' professional success and for their students' engagement in PE and adherence to physical activity (PA) – hence, the promotion of active habits, a stream of studies has focused on developing instruments that may accurately measure them. Among them, a recently published work by Cocca et al. (2023) presents a novel questionnaire based on students' perception of their teachers' skills, the Teachers' Personal and Professional Skills Questionnaire (TPPS-Q), which has the advantage of gathering information on both professional and personal skills simply and quickly. The instrument is based on a work by Brettschneider et al. (2005), who had originally generated a pool of twelve questions focused on the above-mentioned skills within the framework of a project on school sports. For their creation, the authors carried out an in-depth analysis of PE, performing observations and interviews with all actors involved in the teaching-learning process, including parents and education specialists. The final version of the TPPS-Q is composed of five items for each type of skill. Students are asked to rate their teachers' characteristics (professionalism or empathy) using a scale from 1 to 5. The original questionnaire is presented in German, and Cocca et al. (2023) tested it in a sample of adolescents, finding excellent internal consistency and structural validity parameters.

The significance of properly assessing teachers' skills in the PE environment is clear, and this may be even more essential within the Czech educational environment, in which most PE teachers are usually asked to teach at least an additional school subject, thus needing to differentiate their skills and how they use them based on whether they are at the sports hall or in a regular classroom. Implementing the TPPS-Q, a tool that shows excellent validity at the same time as it is easy and quick to use in schools, could be of great use in this sense. Hence, the present work aims to verify its validity in the Czech educational setting.

METHODS

Sample

A total of 135 (girls = 55.6%) high school students, selected using a convenience sampling strategy, participated in the study. Students' ages ranged from 15 to 18 years old. Inclusion criteria for the selection of participants were as follows: (a) pupils enrolled in high schools whose principals had provided permission to carry out the research; (b) actively engaged in PE classes; (c) regularly participated in PE in the six months preceding the data collection, i.e., missed no more than 10% of the total PE sessions. Criteria for the exclusion of participants included (a) the impossibility of responding to the questionnaire due to medical or non-medical reasons, (b) holding a waiver for the PE subject, and (c) not in possession of informed consent signed by their parents/legal guardians. The data was collected from two secondary schools in the Moravian-Silesian region, the Czech Republic.

Instrument

A Czech-translated version of the TPPS-Q (Cocca et al., 2023) was used to record students' perception of their PE teachers' professional and personal skills. As described above, the tool is composed of 10 items equally distributed in two sub-scales (professional and personal skills) using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). For each sub-scale, average scores below 2.5 indicate perceived low teachers' skills, whilst scores higher than 2.5 are considered as indicating that students perceive their teachers' skills as high. Table 1 shows the items in the original language and their corresponding translation in the Czech language.

German version (English)	Czech translation
Selbstsicher (Self-confident)	Sebevědomý
Freundlich (Friendly)	Přátelský
Verständnisvoll (Understanding)	Chápající
Ungeduldig (Impatient)	Nedočkavý
Gerecht (Just)	Spravedlivý
Engagiert (Dedicated)	Zapálený
Humorvoll (Funny)	Vtipný
Sportlich (Athletic)	Atletický
Vorbereitet (Prepared)	Připravený
Fachlich gut (Professional)	Profesionální

Table 1: Original, English, and translated items of the Teachers' Personal and Professional Skills Questionnaire (TPPS-Q)

Procedure

The first step was to translate the original questionnaire into Czech using the Translation, Review, Adjudication, Pre-testing, Documentation (TRAPD) method.

Following this method, the original questionnaire was given to three linguists who specialized in German-Czech translations and provided independent forward translations. The results of the three independent translations were then compared, and any incongruence among them was settled during joint meetings with translators and the research team to create a single Czech version. A back translation was then requested from three linguists (different than those in charge of the forward translations). These back-translations were compared to each other and the original questionnaire, and incongruences were again settled by means of discussion tables with the translators and the research team. As a result of this process, an initial

Czech version of the TPPS-Q was generated. During the second step, this Czech TPPS-Q was pre-tested with a sample of 21 students with the same characteristics as the validation sample to verify whether all items were clear and understandable for the target population.

A final version of the Czech TPPS-Q resulted from this process and was used with the validation sample in the following step of the work. Before completing the questionnaire, all respondents were allowed to withdraw from the questionnaire and were informed that they could withdraw at any moment during the tool filling. Instructions and important information were verbally provided before the start of the data collection to avoid potential confusion or biases, such as the anonymous condition of the answers and the fact that results would not be directly shared with or overseen by the involved teachers. Researchers also responded to any additional questions from the participants.

Data Analysis

All analyses were carried out using the IBM SPSS and IBM Amos software. For the analysis of the structural validity (model fit), the following indexes of goodness of fit were examined: CFI (threshold above .95); RMSEA (threshold below .08); SRMR (threshold below .09); and TLI (threshold above .90). In case of poor model fit, two parameters were verified before any adjustment was made: item loadings, with values above .50 considered as good, values between .50 and .40 as acceptable, and values below.40 as inadequate (Hu & Bentler, 1999); and standardized residual covariances (SRC) between items, if higher than 2 (Collier, 2020; Fabrigar et al., 1999). Internal consistency was tested by calculating Cronbach's alpha and McDonald's omega for each sub-scale separately. For both parameters, values below .60 are insufficient, values between 0.60 and 0.80 are sufficient, and values above 0.80 are satisfactory (Cortina, 1993; Nunnally & Bernstein, 1994). Test-retest reliability was verified with a smaller sub-sample of the participants who responded to the TPPS-Q twice within fifteen days. The Intraclass Correlation Coefficient (ICC) was calculated for this purpose: values of ICC between 0.50 and 0.75 indicate moderate reliability; values between 0.75 and 0.90 indicate good reliability; any value below 0.50 indicates that the data are not reliable (Bobak et al., 2018). Regarding convergent validity, Average Variance Extracted (AVE, threshold above .50) (Fornell & Larcker, 1981) and Composite Reliability (CR, threshold above .70) (Hair et al., 2014) were calculated. Finally, discriminant validity was evaluated by comparing the AVE scores for each sub-scale with the quadratic correlation between that sub-scale and the other (Chai et al., 2022). To confirm discriminant validity, values from the former must be higher than the latter (Chai et al., 2022).

RESULTS

After the first evaluation, the model did not meet the established criteria (CFI = .906; RMSEA = 1.103; SRMR = .083; TLI = .875). Two items, "Impatient" and "Self-confident," showed loading values below.40. As a first step, the item "Impatient" was discarded, and the model was re-tested, with parameters showing insufficient model fit (CFI = .911; RMSEA = 1.106; SRMR = .076; TLI = .897). Following, the second conflicting item ("Self-confident") was discarded, and the model with 8 items (4 per each sub-scale) was tested. This model showed acceptable indexes of goodness of fit (CFI = .981; RMSEA = .058; SRMR = .041; TLI = .971). Figure 1 shows the final structure of the Czech TPPS-Q.

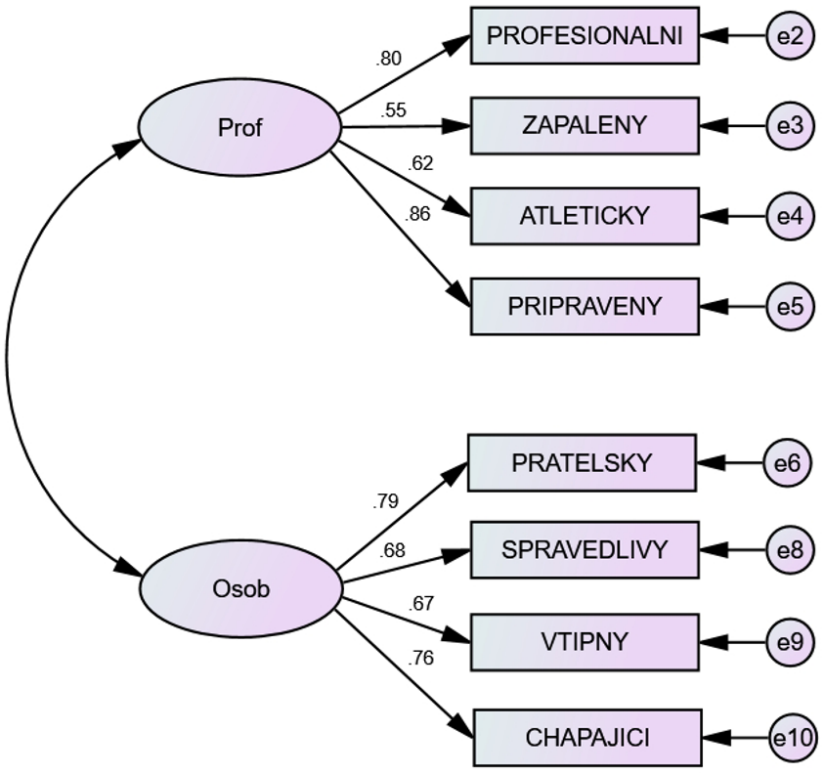

Figure 1: Final structure of the Czech version of the Teachers' Personal and Professional Skills Questionnaire

Cronbach's alpha and McDonald's omega for both 4-item sub-scales showed good scores (professional skills scale: Alpha = .795; Omega = .794; personal skills scale: Alpha = .811; Omega = .814).
Regarding reliability, ICC score for the professional skills sub-scale was good (ICC = .760); the result of the ICC testing was found to be good also for the personal skills sub-scale (ICC = .888).
For convergent validity, the professional skills and the personal skills sub-scales obtained AVE scores of .52 and .53, respectively; and CR scores of.81 and.82, respectively.
Finally, discriminant validity was confirmed for both sub-scales (professional skills sub-scale: AVE = .52; quadratic correlation = .47; personal skills sub-scale: AVE = .53; quadratic correlation = .47). Table 2 presents the model parameters for the tested structures for the Czech TPPS-Q.

	Original version	Version without "Impatient"	Final version
CFI	.906	.911	.981
RMSEA	1.103	1.106	.058
SRMR	.083	.076	.041
TLI	.875	.897	.971
Alpha	-	-	.795 - .811
Omega	-	-	.794 - .814
ICC	-	-	.760 - .888
AVE	-	-	.52 - .53
CR	-	-	.81 - .82

Table 2:Model parameters for the original questionnaire, after removal of the first item, and the final 8-item tool

DISCUSSION

This study aimed to test the validity of the TPPS-Q, a newly developed questionnaire that assesses students' perceptions of the professional and personal skills of physical education teachers in the Czech school environment.
Compared to the original questionnaire on which this work is based (Cocca et al., 2023), the initial Czech version was not satisfactory due to the presence of two conflicting items, i.e., "Impatient", and "Self-confident". Unlike all the other items in the questionnaire, "Impatient" has a negative meaning. Authors such as Shrestha (2020) mention that items with opposite direction than others within the same sub-scale may lead to confusion or, in some cases, to excessively high correlations, inducing a problem of collinearity when using validation-related statistical methods (Shrestha, 2020). When this happens, the assessed tool may suffer from the presence of redundant items, which are considered detrimental because they do not add further information at the same time as they increase the length of the affected instrument (Staffini et al., 2022). Considering that the TPPS-Q represents a relatively new questionnaire and that these statistical issues tend to arise more often in new tools (Staffini et al., 2022), it is possible that the initial Czech version was affected by this problem.
The above may also explain the conflicting results for the "Self-confident" item since authors have underlined that self-confidence is not always perceived as a virtue; in some settings, it may be considered a negative personal characteristic (Spittle, 2012). Hence, respondents in our sample may perceive their PE teachers' high self-confidence as a sign of arrogance or an ego-centric personality (Spittle, 2012).
A further reflection on our results may be provided: in the Czech educational system, the Czech School Inspectorate (*ČŠI*) is a body that focuses on analyzing the work of teachers, evaluating the effectiveness of schools, and assessing conditions, processes, and outcomes of education (*ČŠI*, 2023). Additionally, the *ČŠI* also aims to monitor compliance with educational legislation. Like any other teacher, PE teachers are constantly evaluated by *ČŠI* inspectors, this external scrutiny perhaps placing a higher emphasis on professional skills. Hence, teachers' behavior may be partly affected by the need to satisfy the *ČŠI* parameters, this possibly being reflected in higher than normal impatience towards students – due to the need to obtain positive outcomes –and a willingness to show high self-confidence in the classroom, which may be interpreted by the inspectors as a demonstration of high mastering of the teaching-learning process.
It must also be considered that it is common for context-related versions of the same instrument to present differences directly associated with the diversities that communities inherently have (Huang & Wong, 2014). The Czech educational system and the German one, within which the original questionnaire was validated, may present dissimilarities not only in the structure of the schooling scheme but also in the way education is perceived, as well as the approach and national/regional objectives set for PE (Huang & Wong, 2014). Nonetheless, our results show that, despite potential differences between the two environments, the overall structure of the questionnaire is consistent and valid; therefore, it can be implemented in both systems, and results can be compared for a deeper understanding of PE dynamics in diverse contexts. This is also confirmed by contrasting the indexes of goodness of fit for the German (CFI = .953; SRMR = .053) and the Czech version (CFI = .981; SRMR = .041).

Strengths and Limitations

Among the strengths of this work, it can be mentioned that a scientifically sound Czech version of the TPPS-Q will provide the possibility of obtaining deeper insights into how teachers' sets of skills may have an impact on the quality of PE in the Czech Republic, not only contributing to shaping PE

teacher training for both in-service and pre-service teachers, but also understanding what teachers can do to promote motivation to participate in PE or physical activity, and engagement in the PE classroom. Furthermore, validating an existing questionnaire in the Czech system may strengthen research in this field, particularly in comparing different educational systems and how each may be adapted based on social and cultural differences.

Some limitations can be pointed out for this study. Firstly, the results are based on students' perceptions, which may not fully accurately describe the reality, particularly in the evaluation of teachers' professional skills, which are partially "hidden" from them (for instance, the process of planning a lesson happens out of the lesson time and the students are unaware of how the teacher carries the planning out). Secondly, the answers were collected in just two schools. Although the sample size may be considered sufficient for the validation analysis, reaching a wider and more diverse portion of the population may increase the strength of the validation process. In addition, the schools were classified as "grammar schools", which commonly provide the best education, and many of the students continue their studies at the higher education level (State Administration, 2024). Hence, including students and schools with different conditions, advantages, and disadvantages may be of interest in confirming the validity of the tool and any potential variance in its structure. In line with the above, an additional limitation is that both schools were placed in the same region. Since different Czech regions may have slightly different approaches to education and PE, the instrument may benefit from selecting samples from each area. Indeed, literature confirms that each region within the same country may present specific characteristics and needs that are different from those of the others (Gay, 2015). A final limitation may lay in how the items were interpreted. Although the translation and adaptation process was rigorous and included a pre-test on a small sample with similar characteristics to the target sample, individual differences may still play a role in understanding and interpreting certain concepts (Mustofa & Hidayah, 2020).

CONCLUSIONS

After two conflicting items were removed, the Czech TPPS-Q structure showed suitable parameters for further use within Czech schools. The final version comprises four items for the professional skills subscale and four for the personal skills subscale.

Future data collected using this new instrument may be valuable not only for understanding the current status of teachers' preparation for high-quality PE delivery but can also contribute to shaping future operations within the school system and tertiary education programs focused on training future PE teachers.

Future steps in validating the instrument within the Czech educational system may consider analyzing invariance by gender, socioeconomic status of the school, region, and school type, particularly in terms of how teachers' skills are perceived in grammar, vocational, or traditional high schools and how they correlate with students' active habits inside and outside of the school setting.

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