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ASSESSING THE AVAILABILITY OF SPORTS FACILITIES AND EQUIPMENT IN TRANSYLVANIAN SCHOOLS: A CROSS-SECTIONAL ANALYSIS

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ABSTRACT. *Introduction:* Physical education facilities and equipment represent a fundamental resource for ensuring effective teaching and learning in schools. Their availability and quality directly influence the conditions in which students participate in physical education. *Objective*: This study aimed to assess the availability and quality of physical education facilities and equipment in schools across Transylvania, Romania, in accordance with the national standards set by the Romanian Ministry of Education (order no. 3399/2017). *Material and methods*: A questionnaire was distributed to physical education teachers working in the region, collecting data on the presence, number, condition, and use of gymnasiums, sports halls, and outdoor physical education areas, as well as the quantity and perceived quality of sports equipment. *Results*: The results showed that most schools had one gymnasium (78.2%), while 7.3% had none. A significant positive correlation was found between the number of enrolled students and the number of indoor sports facilities. On average, one gymnasium served 457 students (sd = 309.37). A total of 92.7% of schools reported having suitable outdoor areas for physical education classes. 4did not meet the recommended quantities outlined by national regulations. While the quantity of equipment was insufficient, the perceived quality of facilities and equipment was generally rated as good. *Discussion*: These findings were consistent with previous research highlighting inequalities in the distribution of school infrastructure and resources. The reported adequacy of quality, despite quantitative shortages, reflected broader issues described in similar educational contexts. *Conclusion*: The findings highlight the need for targeted improvements in school infrastructure and resource allocation to support quality physical education.

Keywords: school sports infrastructure; physical education equipment; Romanian schools; educational facility standards.

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INTRODUCTION

Physical education (PE) is a compulsory subject in the Romanian national curriculum, delivered either outdoors or in specially designated gymnasiums or sports facilities. As the only subject focused primarily on physical development, PE offers students structured opportunities to enhance their motor skills and physical fitness under the supervision of qualified instructors. It also contributes significantly to students' overall physical and mental well-being.

Beyond the school context, leisure-time physical activity has also been shown to play a crucial role in supporting a healthy lifestyle and overall well-being. Gherman, Monea, Gombos, and Patrascu (2021) emphasize that recreational exercise contributes not only to physical health, but also to stress reduction and mental balance, regardless of one's profession. Their findings indicate that the vast majority of participants (94.4%) perceive diet and nutrition as a key component of physical activity, and that sport is widely regarded as one of the most effective strategies for relaxation after stressful days. Such evidence underlines the importance of ensuring access to diverse opportunities for physical activity both within and beyond the school setting.

The physical and psychological benefits of regular physical activity are well established (Köse & Kirişci, 2020; Uzun Dönmez & İmamoğlu, 2020; Talbot, 2001; Parisi et al., 2015). Within the school setting, gymnasiums equipped with diverse tools and infrastructure allow students to engage in more complex and varied movement experiences. According to Brendon et al. (2016), the availability of a wide range of ground-based equipment is essential for facilitating complex physical tasks among children. Delidou et al. (2015) further emphasize that a supportive school environment plays a key role in promoting physical activity engagement and overall health in preadolescents.

This is supported by Verstraete et al. (2006), who found that simply providing game equipment during recess periods significantly increased moderate-to-vigorous physical activity among elementary school students. Similarly, Fein et al. (2005) concluded that the more opportunities the environment offers for physical activity, the more likely children are to engage in it. Willenberg et al. (2010) showed that even simple environmental modifications, such as playground markings, can meaningfully increase children's physical activity levels during school hours. Cradock et al. (2007) also reported a strong positive association between school physical environments and children's physical activity levels.

Bendíková (2016) demonstrated that incorporating equipment-supported training in PE classes has a positive effect on postural development, highlighting the functional importance of diverse physical tools. However, in Romania, such approaches are often hindered by structural limitations. Compared to the European average of 110.9 ± 33.1 minutes of PE per week, Romanian students receive

approximately 20 minutes less (Balla, Boros-Bálint, & Szatmári, 2022; European Commission, 2013). According to UNESCO (2014), primary and lower secondary students in Romania receive on average 95 minutes of physical activity per week, while high school students receive only half that amount.

The limited time devoted to PE is further compounded by poor infrastructure. Curticăpean (2011) and Iconomescu (2016) note that many schools and universities in Romania lack sufficient access to sports facilities, and the number of gymnasiums remains low relative to the school-age population. This issue is exacerbated by limited financial investment and institutional support for physical education, which often results in reduced access to quality PE and equipment.

Negru et al. (2020) results suggest that the pandemic, combined with poorly equipped school facilities, further limited opportunities for consistent physical activity. Despite the critical role of school infrastructure in supporting physical development, there is limited empirical data on the availability and distribution of sports halls and PE equipment in Romanian schools—particularly in the region of Transylvania. Therefore, the present study aims to provide a cross-sectional overview of the current state of school sports infrastructure in this region, contributing to a better understanding of infrastructural inequalities and opportunities for development in the Romanian educational system.

Aims of the study

The primary aim of this study was to evaluate the condition and availability of school sports facilities and physical education (PE) equipment in a sample of schools across Transylvania, Romania. The analysis was conducted in reference to the minimum standards outlined by the Romanian Ministry of Education (Order No. 3399/2017).

Specific objectives included:

- To assess the number, size, and condition of gymnasiums and outdoor PE areas in the participating schools.
- To evaluate the availability, usage frequency, and perceived quality of PE equipment.
- To identify gaps between existing resources and official standards.
- To explore the relationship between facility/equipment availability and the organization of extracurricular sports activities.
- To document teachers' needs and preferences regarding additional equipment.
- To examine whether infrastructure and equipment levels are associated with student participation in sports competitions organized by the Ministry of Education.

MATERIAL AND METHODS

Sample description

Data were collected from 55 schools located in Transylvania, Romania. None of the participating institutions are private or sports-specialized schools. The available facilities and their associated equipment are primarily used during physical education classes. In 36 schools (65.5%), extracurricular sports activities are also organized for students.

The sample includes both rural and urban institutions, with 45% of the schools located in rural areas and 55% in urban settings. Schools were selected from the following counties: Covasna (26 schools, 47.5%), Harghita (17 schools, 30.9%), Mureș (4 schools, 7.3%), Cluj (2 schools, 3.6%), Satu Mare (2 schools, 3.6%), Sălaj (2 schools, 3.6%), Maramureș (1 school, 1.8%), and Alba (1 school, 1.8%).

Data collection and instrumentation

This study was based on a descriptive cross-sectional research design. Data was collected using a self-administered questionnaire developed by the research team. The questionnaire was completed by physical education teachers employed at the participating schools. In designing the survey, we used as reference the official document issued by the Romanian Ministry of National Education (Ministerial Order No. 3399/2017), which outlines the infrastructure and equipment requirements for physical education.

The final version of the questionnaire included 20 items. Eight questions collected demographic information related to the school's location, type, and the characteristics of the teaching staff. The remaining 12 items focused on the availability and condition of indoor sports halls and outdoor spaces designated for physical education. One question block was dedicated to assessing both the quantity and subjective quality of sports equipment considered essential for conducting physical education lessons.

Procedure and data processing

Data collection took place between October 2024 and April 2025. During this period, physical education teachers received the questionnaire either as a printed version distributed in person or in digital format via email. The questionnaire was sent to 100 schools across the region. A total of 75 responses were returned, resulting in a response rate of 75%. However, due to incomplete or inconsistent answers, only 55 questionnaires were retained for analysis.

To ensure clarity and reliability, the questionnaire was pretested with a small group of physical education teachers prior to the full-scale data collection. The aim of the survey was to assess the availability and condition of sports facilities, the extent and quality of equipment use, and the challenges encountered by PE teachers in implementing effective physical education programs.

Statistical analysis

Descriptive and inferential statistical methods were used to analyze the data. Descriptive statistics, including means (*M*), standard deviations (*SD*), frequencies, and percentages, were calculated to summarize the characteristics of the schools, facilities, equipment, and teacher-reported evaluations.

To test for associations between variables, Pearson correlation coefficients were calculated (e.g., between the number of students and the number of sports facilities). Independent-samples t-tests were used to compare means across groups (e.g., comparing student-to-gymnasium ratios with national benchmarks). In addition, chi-square tests (χ^2) were applied to examine the relationship between categorical variables (e.g., presence of court markings and organization of extracurricular sports activities).

All statistical analyses were conducted using IBM SPSS Statistics software (Version 26.), with the level of statistical significance set at $p < .05$.

RESULTS

Descriptive results of school infrastructure and staffing

The data collected from 55 schools covered a total of 21,136 students, 61 gymnasiums, and 55 physical education (PE) teachers. On average, the number of students per school was 457 (*SD* = 309.37). The average number of PE teachers per school was 2.11 (*SD* = 1.08).

Most schools (78.2%) had only one gymnasium. Six schools (10.9%) were equipped with two gymnasiums, and two schools (3.6%) had three gymnasiums. However, four schools (7.3%) reported having no gymnasium at all. On average, schools had 1.11 (*SD* = 0.56) gymnasiums.

In terms of facility amenities, 74.5% of the gymnasiums were equipped with changing rooms, while only 58.2% had access to showers. These findings indicate significant variability in the basic infrastructure available for physical education in the assessed schools.

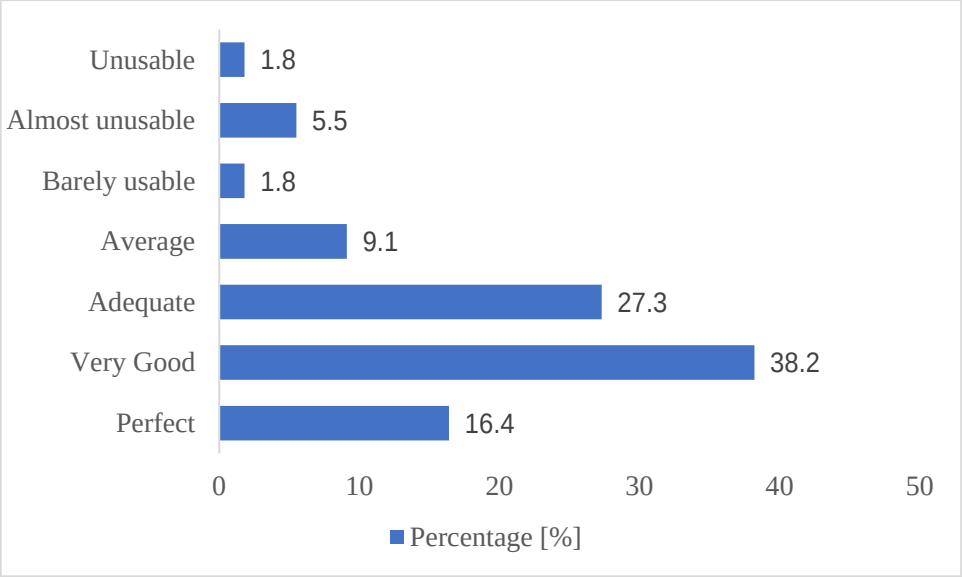

Figure 1. Distribution of sports equipment quality ratings in percentages.

Gymnasium size and perceived quality

The average surface area of the gymnasiums was 503.7 m² (*SD* = 580.25). Only nine schools (17.6%) had gymnasiums that met the standardized size requirements for school sports facilities (20 × 40 meters).

Teachers generally rated the condition of the gymnasiums positively. On a 7-point Likert scale (1 = unusable, 7 = excellent), 91.0% of the respondents rated the condition of their school's gymnasium as average or better. The overall average rating was 5.35 (*SD* = 1.37). However, in one case (1.8%), the gymnasium was reported to be in an unusable condition. Figure 1 also illustrates this.

Outdoor facilities for physical education

A total of 51 schools (92.7%) reported having at least one outdoor area suitable for conducting physical education classes. Among these, 30.9% of the surfaces were paved with concrete or asphalt, 25.5% were covered with artificial turf, and 18.2% consisted of paved stone surfaces. An additional 18.2% of the outdoor courts were concrete or asphalt surfaces equipped with appropriate

sport-specific line markings for various games. Furthermore, 13 schools (23.6%) had more than one outdoor facility usable for physical education classes. The utilization of these spaces was reported to be significant: according to the teachers, approximately 50.4% of their lessons were conducted outdoors, indicating the essential role of these areas in compensating for the limited indoor space available in some institutions.

Markings and flooring quality of gymnasiums

In 69.1% of the gymnasiums, court markings were available for at least one sport. Teachers were asked to rate the quality of these markings on a 7-point Likert scale (1 = unusable, 7 = excellent), resulting in an average score of 5.86 (*SD* = 0.24), which can be interpreted as "very good." Similarly, the quality of gymnasium flooring was rated at an average of 5.46 (*SD* = 0.55), indicating a generally positive assessment.

The most common types of sport-specific court markings were for basketball (60.0%), handball (49.1%), football (38.1%), volleyball (34.5%), and tennis (29.0%).

A chi-square test revealed a statistically significant association between the presence of markings for basketball ($p = .003$) and handball ($p = .005$) and the organization of extracurricular sports activities. This suggests that the availability of sport-specific markings in gymnasiums is positively related to the likelihood of offering after-school sports programs in those disciplines.

Availability of sport-Specific equipment and its relation to extracurricular activities

With respect to ball sports, the average number of footballs available across schools was 8.27 (*SD* = 5.28), handballs 10.18 (*SD* = 7.89), and basketballs 9.40 (*SD* = 7.83). The data indicate that schools with a greater supply of sport-specific equipment—particularly balls—were more likely to organize extracurricular activities in those respective sports.

Statistical analysis revealed significant associations between the quantity of available equipment and the frequency of sport-specific extracurricular programs. The number of basketballs was significantly associated with the likelihood of organizing basketball activities ($p = .017$), the number of handballs with handball activities ($p = .001$), and the number of footballs with football activities ($p = .033$). These findings highlight the practical importance of sufficient equipment availability in supporting diverse and frequent student engagement in sports.

Condition of sports equipment

The overall condition of sports equipment was assessed using a 7-point Likert scale (1 = unusable, 7 = excellent). Only four schools (7.3%) reported that their equipment was in flawless condition. When aggregating all responses, physical education teachers rated the overall quality of equipment at an average of 5.55 (*SD* = 1.29), corresponding to a "very good" classification.

Among the best-rated items were gymnastic bars and hoops, with an average score of 6.50 (*SD* = 0.70), followed by measuring tapes, which received an average of 6.16 (*SD* = 1.17). Wall bars, a frequently used fixture, were also considered to be in very good condition, scoring an average of 5.86 (*SD* = 1.20).

In contrast, the least well-maintained items were gym vaulting boxes (pommel horses), which received an average score of 4.94 (*SD* = 1.68), and table tennis tables, which were rated lowest at 4.23 (*SD* = 1.82). These results suggest considerable variation in the maintenance and renewal of equipment across schools.

Utilization and availability of equipment, and teachers' needs

According to the respondents, 78.8% of the existing sports equipment is regularly used during physical education classes. Handballs were the most available item, with an average of 10.18 units per school (*SD* = 7.89). In contrast, gymnastic equipment was scarcely present: parallel bars (0.07 units, *SD* = 0.325), beams (0.13, *SD* = 0.43), pommel horses (0.15, *SD* = 0.44), and rings (0.13, *SD* = 0.34). These apparatuses were not only underrepresented but also largely deemed unnecessary by teachers, who indicated low demand for them.

Interestingly, teachers expressed the greatest need for additional items that were already among the more frequently available and utilized. Besides handballs (10.18, *SD* = 7.89), teachers reported having on average 9.49 gym mats (*SD* = 5.67), 9.40 basketballs (*SD* = 7.83), and 8.27 footballs (*SD* = 5.38). However, they still identified these same items as needing further supplementation: 9.25 additional handballs (*SD* = 9.43), 7.07 basketballs (*SD* = 7.07), 7.05 gym mats (*SD* = 6.54), and 7.02 weighted balls over 5 kg (*SD* = 7.64) were requested to improve working conditions and facilitate lesson planning.

Over the past five years, teachers reported taking students to Ministry of Education-organized sports competitions an average of 12.95 times (*SD* = 11.78). However, no significant correlation was found between the quantity of available equipment and participation in these events. This suggests that the decision to engage in official school competitions is influenced by factors other than equipment availability.

DISCUSSION

This study aimed to assess the current state of sports facilities and equipment in schools across Transylvania, Romania, in relation to the minimum standards set by the Ministry of Education (Order No. 3399/2017). The findings reveal significant disparities between the prescribed standards and the actual conditions observed in the surveyed schools.

On average, each gymnasium served approximately 457 students (*SD* = 309.37), which is consistent with data from the National Institute of Statistics in 2016, reporting 462 students per gymnasium in Transylvania (Iconomescu, 2016). This suggests that little progress has been made in the development of school sports infrastructure over the past five years. Notably, the student-to-gymnasium ratio in Transylvania remains below the national average of 593 students per gymnasium, indicating a regional advantage in facility distribution. This difference was statistically significant, $t(50) = -3.301$, $p = .002$, 95% CI [–235.81, –57.41].

A significant positive correlation was found between the number of students and the number of gymnasiums in the participating Transylvanian schools ($p = .031$). However, Iconomescu (2016) reported no such correlation when examining national-level data. This suggests that, within Transylvania, higher student populations may be associated with increased investment in sports infrastructure.

Outdoor areas suitable for physical education were present in 92.7% of the schools, and teachers reported conducting 50.4% of their PE classes in these areas. This aligns with the findings of Delidou et al. (2015), who found that the size and availability of schoolyards were positively associated with students' physical activity levels during breaks.

The overall quality of sports equipment was rated positively by physical education teachers, with an average score of $M = 5.55$ ($SD = 1.29$) on a 7-point Likert scale. Teachers reported regular use of 78.8% of the existing equipment, particularly items that were already available in greater quantities, such as handballs, gym mats, basketballs, and footballs. This suggests that teachers prioritize maintaining and supplementing frequently used equipment to improve teaching quality.

Previous research also highlights the strong relationship between leisure-time physical activity and health-related quality of life (Negru and András, 2015). Gherman, Gomboș, Pop, and Pătrașcu (2022) reported that a vast majority of young adults in their sample (97.3%) considered sport an important or very important part of their daily lives. Furthermore, two-thirds of participants (67.6%) indicated that they spent more time engaging in sport

activities than using electronic devices. These findings emphasize the critical role of access to facilities and opportunities that support active lifestyles, particularly among youth populations. Ensuring adequate infrastructure in schools is therefore not only an educational necessity but also a determinant of students' long-term health and quality of life.

Şerban & Baciu (2017) show that structured programs combining physical activity, healthy nutrition, and social interaction improve group cohesion and children's quality of life.

Despite the generally good condition of the equipment, the quantity of sports equipment available in most schools falls below the recommended levels set by the Ministry of Education (Order No. 3399/2017). Additionally, teachers expressed a need for more of the same items they already use most frequently. On average, they indicated a need for 9.25 additional handballs (*SD* = 9.43), 7.07 basketballs (*SD* = 7.07), 7.05 gym mats (*SD* = 6.54), and 7.02 weighted balls over 5 kg (*SD* = 7.64).

Although teachers reported, on average, 12.95 (*SD* = 11.78) participations in Ministry-organized sports competitions over the past five years, no significant correlation was found between equipment availability and competitive participation. This indicates that the quantity of available equipment may not be the primary factor influencing a school's engagement in extracurricular competitions.

Taken together, these findings highlight a clear need for targeted investments in school sports infrastructure and equipment, especially in schools with large student populations. Improving the availability and quality of physical education facilities and tools is essential for promoting active lifestyles and the physical development of students. While infrastructure and equipment alone do not determine participation in formal sports competitions, they play a critical role in supporting daily physical activity and inclusive physical education programs.

CONCLUSIONS

This study provided a comprehensive overview of the current state of school sports infrastructure and equipment across a sample of schools in Transylvania, Romania. The results highlight persistent infrastructural gaps relative to national guidelines, including a shortage of gymnasiums and insufficient quantities of basic physical education equipment. Although many teachers rated the condition of existing facilities and equipment as generally good, the quantity and variety often fell short of the standards outlined by the Ministry of Education.

A notable finding was that the availability of certain types of equipment—particularly those already present in greater numbers—was associated with more frequent use during physical education lessons. This underscores the importance of not only expanding equipment inventories but also maintaining the quality of frequently used tools. However, the level of equipment did not predict participation in organized school competitions, suggesting that other factors, such as institutional support, school leadership, or logistical barriers, may also play a role.

To promote equitable access to physical education and to support students' physical development, targeted investments in infrastructure, equipment, and teacher support are necessary—particularly in schools with large student populations. Future research should explore the relationship between equipment availability, teaching practices, and long-term student outcomes, as well as strategies to ensure sustainable development of school sports infrastructure across both urban and rural regions.

Limitations of the study

While the present study provides valuable insights into the state of sports facilities and equipment in schools across Transylvania, several limitations should be acknowledged. First, the data were collected through a self-reported questionnaire completed by physical education teachers. Although this method allowed access to firsthand information from practitioners, it may have introduced subjective bias or inaccuracies in reporting due to personal perceptions or social desirability effects.

Second, the study was geographically limited to schools within Transylvania and may not fully reflect the national situation. Therefore, the generalizability of the findings to other Romanian regions, particularly those with different economic or infrastructural profiles, should be approached with caution.

Third, the cross-sectional design of the study limits the ability to establish causal relationships between variables such as equipment availability and the frequency of extracurricular activities. Longitudinal studies would be needed to assess how changes in infrastructure impact long-term physical education outcomes.

Finally, although the questionnaire was developed based on official ministry standards, its psychometric properties (e.g., validity and reliability) were not formally tested beyond initial pretesting, which may affect the robustness of the findings.

Despite these limitations, the study provides a timely and meaningful contribution to understanding the infrastructure-related challenges facing physical education in Romanian schools and offers a basis for future research and policy development.

AUTHOR CONTRIBUTIONS

This manuscript was prepared with the assistance of the language model ChatGPT (OpenAI, GPT-4), which was used to support the authors in drafting and editing parts of the text, improving clarity, and checking adherence to APA 7 style. The authors reviewed and approved all content generated with the tool, and are solely responsible for the final version of the manuscript. No part of the content was generated autonomously by AI without author oversight or validation.

AUTHOR CONTRIBUTIONS

BBJ designed and coordinated the research, performed the analysis, and wrote the manuscript. FG conducted the measurements and contributed to the writing of the manuscript. All authors have read and agreed to the published version of the manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest. The publication of this article was supported by the 2024 Development Fund of the UBB.

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