

PHYSICAL EDUCATION AS A CATALYST FOR ACADEMIC SUCCESS AND SUSTAINABLE DEVELOPMENT IN EDUCATION

Cătălin Octavian MĂNESCU

¹Department of Physical Education and Sport, Bucharest University of Economic Studies, Romania

* Corresponding author: catalin.manescu@defs.ase.ro

Abstract. *Background.* This study investigates the interconnection between physical education and educational performance in Romania, contextualized within Sustainable Development Goal 4 (SDG 4 – Quality Education). Recognizing that physical activity supports cognitive development, emotional regulation, and academic engagement, the research explores how structured physical education can contribute to improved learning outcomes and sustainable educational progress. The Romanian context presents a mixed landscape, where formal inclusion of physical education in school curricula is undermined by infrastructural disparities and socio-cultural undervaluation of sport as an academic enhancer.

Objectives. The objective of the study is to evaluate the extent to which participation in physical activity correlates with academic achievement, using indicators from the Romania Durabilă platform and Eurostat. Specific attention is given to early school leaving rates, tertiary education attainment, and adult participation in learning, alongside physical activity frequencies disaggregated by age, gender, and education level. The research also aims to assess whether greater investment in physical education infrastructure could serve as a catalyst for improved educational and health outcomes.

Methods. The methodology adopts a mixed-methods approach, primarily descriptive and comparative, analyzing national and European datasets spanning from 2014 to 2024. The study integrates statistical findings with contextual interpretation to identify patterns and potential causal relationships.

Results. The results show a positive correlation between educational attainment and levels of physical activity, with individuals holding tertiary degrees more likely to engage in regular exercise. Rising trends in higher education enrollment and adult learning are mirrored by increased health-oriented behaviors. However, early school leaving remains a concern, particularly among certain gender groups, and physical activity participation remains low across several demographics.

Conclusion. In conclusion, the study highlights a synergistic relationship between physical education and learning outcomes. It calls for integrated public policies that prioritize physical education as a core component of sustainable educational reform. Enhancing infrastructure, promoting lifelong learning, and embedding health awareness in education strategies are essential steps toward achieving SDG 4 in Romania.

Keywords: physical education, public health, sport, education, SDG 4.

Introduction

Education and physical activity represent two fundamental pillars of sustainable human development, deeply interconnected and mutually reinforcing. Within the framework of the United Nations' Sustainable Development Goal 4 (SDG 4) – Quality Education, the integration of sport and physical education into academic environments is increasingly acknowledged as essential. This



integration not only supports the adoption of healthy lifestyles but also contributes significantly to the enhancement of cognitive abilities, academic performance, and psychosocial well-being (United Nations, 2015). A growing body of international evidence underscores the cognitive benefits of regular physical activity, including improved attention span, memory retention, and emotional stability, all of which positively influence educational outcomes (Singh et al., 2019; Donnelly et al., 2016). Moreover, physical education plays a critical role in the development of soft skills such as collaboration, leadership, time management, and self-discipline—attributes that are essential for holistic personal development and lifelong learning.

In the Romanian context, the intersection between education and sport presents both promising opportunities and persistent systemic challenges. While the national curriculum formally mandates physical education across all grade levels (Ministry of National Education, 2023), the reality of its implementation varies significantly. This variation is largely shaped by disparities in infrastructure quality, financial investment, and localized education policies. In certain urban schools, students benefit from access to modern gymnasiums, sports equipment, and trained physical education teachers. However, many rural schools continue to operate under difficult conditions, lacking functional sports facilities, up-to-date equipment, and specialized personnel. These regional inequalities mirror broader socioeconomic disparities and pose serious obstacles to delivering equitable, high-quality education nationwide (World Bank, 2020).

Cultural perceptions of sport and physical education further complicate their integration into the education system. In many Romanian communities, physical education is often considered secondary or even non-essential compared to more academically emphasized subjects such as mathematics, sciences, or languages (Mănescu, D.C., 2013). This perception is reflected in limited institutional support and inadequate funding for extracurricular sports programs and facility improvements. The prevailing view tends to position sport as recreational rather than educational, thereby downplaying its vital role in students' physical, emotional, and academic development. This perspective diverges significantly from international best practices, which increasingly advocate for a whole-child approach to education—one that recognizes physical well-being as integral to learning, school engagement, and social inclusion (Bailey et al., 2009).

Quantitative data reinforce these concerns. According to recent statistics from Eurostat (2023), only 24% of Romanian adolescents engage in physical activity five or more times per week, compared to a European Union average of approximately 35%. Similarly, national performance reports from România Durabilă have flagged a steady decline in physical activity levels among school-aged children. These trends are alarming, as they are closely linked with a surge in childhood obesity, decreased academic motivation, and rising rates of mental health issues. The World Health Organization (2022) has reported that physical inactivity in children and adolescents is associated with higher levels of school absenteeism, diminished self-esteem, and a greater risk of anxiety and mood disorders. Thus, the lack of consistent physical activity poses not only a public health threat but also undermines Romania's educational and developmental goals.

To counteract these challenges, a comprehensive and systemic policy response is urgently required. First and foremost, the Romanian government should significantly increase public investment in sports infrastructure within educational institutions, especially in underserved and rural areas. Upgrading school facilities and ensuring access to modern equipment would enable all students to engage in regular physical activity in safe and inclusive settings. Second, teacher training programs should incorporate interdisciplinary pedagogical approaches that highlight the cognitive and psychosocial benefits of physical activity, thereby helping educators integrate movement into broader educational strategies. This could include movement-based learning activities or coordinated lessons that link physical activity to subjects like biology, health, or social sciences.

Third, national awareness campaigns are needed to reshape public and institutional attitudes toward sport and physical education. These campaigns should emphasize the long-term benefits of physical activity for mental health, academic success, and social development, using media, community outreach, and partnerships with youth organizations to promote more active lifestyles.

In addition, local governments and schools should be encouraged to develop structured extracurricular programs, sports competitions, and inclusive initiatives that target vulnerable and marginalized student populations.

Furthermore, a collaborative governance model—involving the Ministry of Education, health authorities, local administrations, and civil society—is crucial to ensure consistent implementation and evaluation of physical education reforms. Partnerships with NGOs and international organizations can also bring innovative models and funding support to pilot new programs and scale successful initiatives.

Ultimately, aligning physical education policy with the wider objectives of SDG 4 offers Romania a strategic opportunity to strengthen its education system, promote social equity, and foster national resilience. By embedding physical activity into the educational framework, the country can not only improve health and academic outcomes but also nurture future generations equipped with the physical, cognitive, and emotional competencies required to navigate a rapidly changing and increasingly demanding world.

Purpose of the study

The purpose of this study is to explore and critically analyze the interconnection between physical education and educational outcomes within the framework of Sustainable Development Goal 4 (Quality Education). Specifically, the research aims to investigate how participation in sports and regular physical activity can contribute not only to better physical health but also to enhanced cognitive function, academic performance, and social development among students in Romania.

Given the relatively underexplored relationship between sports and education in the Romanian context, this study seeks to fill an important gap in the literature by providing empirical evidence drawn from national data sets (Romania Durabilă – ODD 4 indicators) and European comparative statistics (Eurostat).

By correlating levels of physical activity with measures of educational attainment, the research will highlight the extent to which physical education initiatives can be leveraged as strategic tools for improving learning outcomes at a systemic level. Additionally, this study intends to shed light on the broader implications of investing in school-based sports infrastructure as a sustainable development strategy. By framing physical education not just as an extracurricular activity but as an essential component of a holistic educational system, the paper advocates for the integration of sports policies into national educational reforms. Ultimately, this research aspires to support policymakers, educators, and public health stakeholders in designing targeted interventions that promote both academic excellence and physical well-being, aligning Romania's development trajectory more closely with the objectives of SDG 4.

Research objectives

This study aims to analyze the relationship between physical education and educational outcomes in Romania within the framework of SDG 4. It seeks to correlate levels of sport participation with academic performance indicators using data from Romania Durabilă and Eurostat. Additionally, the research intends to evaluate the role of school infrastructure in supporting both physical activity and sustainable educational development.

Materials and methods

This study adopts a mixed-methods approach, combining quantitative data analysis with a contextual qualitative interpretation. The main data sources include official statistics from the Romania

Durabilă platform, specifically focusing on indicators related to SDG 4 (Quality Education), and Eurostat datasets that provide comprehensive information on sport participation rates and educational attainment levels across European Union countries, including Romania.

For the analysis, data from the "Romania's Sustainable Development Report" (Raportul privind Dezvoltarea Durabilă a României) are utilized, particularly indicators that measure early school leaving rate for young people, tertiary education graduates and adult participation in learning. From Eurostat, the study uses datasets on the frequency of participation in sports or fitness activities and data concerning educational performance indicators such as early school leaving rates and tertiary education attainment. The research particularly focuses on identifying correlations between the prevalence of physical education in schools and broader educational outcomes.

Data is analyzed descriptively to understand general trends and comparatively to position Romania within the broader European context. The timeframe for the data analyzed spans from 2014 to the most recent available figures (2023–2024), ensuring an up-to-date and relevant understanding of the situation. By integrating statistical analysis with contextual interpretation, the methodology aims to provide a comprehensive and nuanced understanding of how physical education supports sustainable learning outcomes, particularly in the Romanian setting, in line with the ambitions of SDG 4.

Results and interpretation

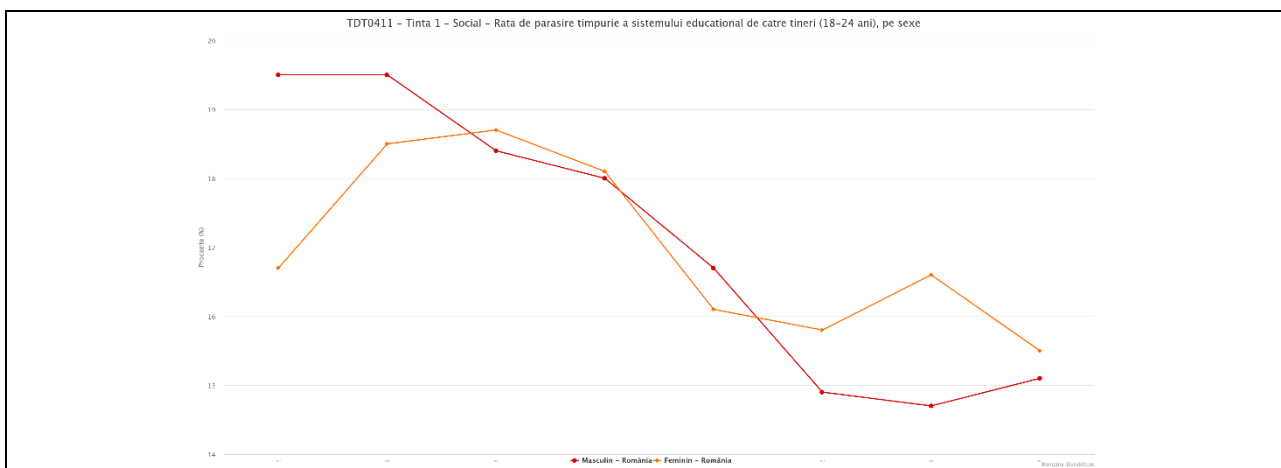


Figure 1. Early school leaving rate for young people (18–24 years old), by gender.

Source: <http://romania-durabila.gov.ro/>

Figure 1, titled "*Early school leaving rate for young people (18–24 years old), by gender*", focuses on an educational indicator that measures the proportion of young adults who leave formal education early. This metric is critical because early school leaving can signal deficiencies in the educational system, limited access to quality learning opportunities, and broader socio-economic challenges that may hinder personal and professional development. In Romania, as elsewhere, high rates of early school leaving are particularly concerning because they directly impact future employability, economic productivity, and social inclusion. Gender differences within this indicator may further underscore the existence of culturally or structurally embedded inequalities in educational opportunities, where one gender might be disproportionately disadvantaged in terms of retention and graduation.

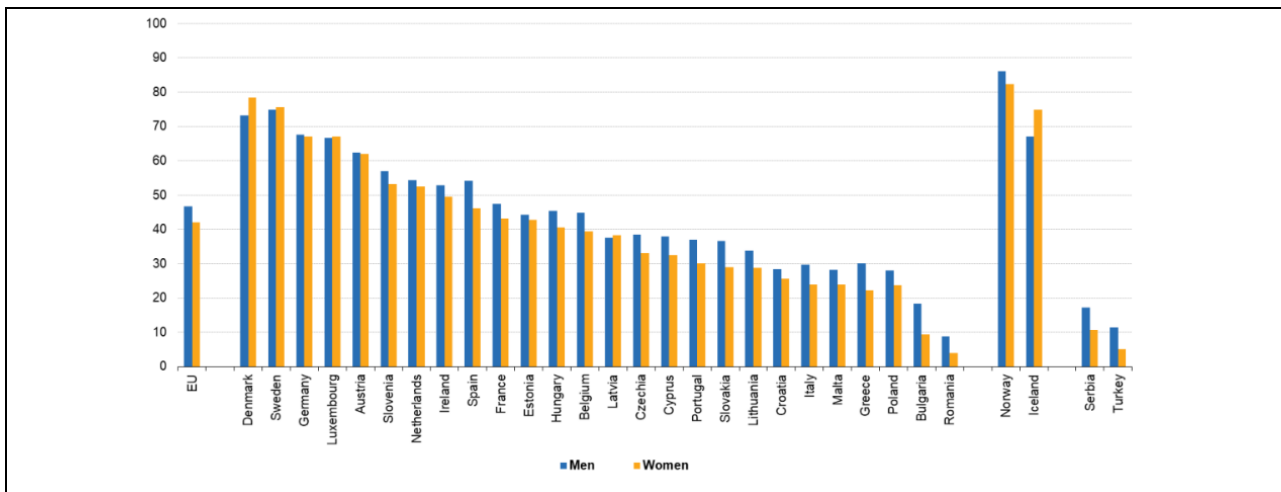


Figure 2. Practicing sport, keeping fit or participating in recreational (leisure) physical activities at least once a week, by sex, 2019 (%).

Source: <https://ec.europa.eu/eurostat/>

In parallel, Figure 2, *"Practicing sport, keeping fit or participating in recreational (leisure) physical activities at least once a week, by sex, 2019 (%)"*, provides a snapshot of how frequently different gender groups in various European countries engage in physical activities. This indicator is significant as it reflects not only the state of public health and overall societal wellbeing but also how cultural norms, economic factors, and policy initiatives shape lifestyle choices. For Romania, comparing the nation's data with that of other European countries can reveal whether there is a notable lag or alignment in promoting active lifestyles. Given the relationship between physical activity and improved health outcomes, lower participation rates might also suggest a risk of higher health care costs in the long run and potentially reduced quality of life, which can further exacerbate social and economic disparities.

Analyzing these two figures concurrently allows us to consider the broader implications for social policy in Romania. On one hand, early school leaving is a critical challenge that can have long-lasting effects on an individual's future opportunities and overall human capital. On the other hand, regular physical activity is essential for maintaining health, increasing productivity, and reducing the burden of non-communicable diseases. Both indicators, when disaggregated by gender, highlight persistent inequalities that require targeted interventions. For example, if young women in Romania are found to leave school at higher rates than their male counterparts, this not only limits their future economic prospects but may also correlate with lower levels of engagement in health-promoting behaviors, such as regular physical activity, although this relationship can be complex and context-dependent.

In conclusion, Figure 1 and Figure 2 together underscore the vital importance of integrated social policy that simultaneously addresses educational deficits and promotes healthful lifestyles. For Romania, these indicators highlight areas where progress has been uneven, particularly in terms of gender disparities. The comparative analysis suggests that while educational challenges such as early school leaving may compromise future economic opportunities and overall societal well-being, insufficient engagement in regular physical activities could further undermine health outcomes and quality of life. Addressing these issues through coordinated policy measures is essential for fostering a more resilient, inclusive, and prosperous society both within Romania and in the context of European standards.

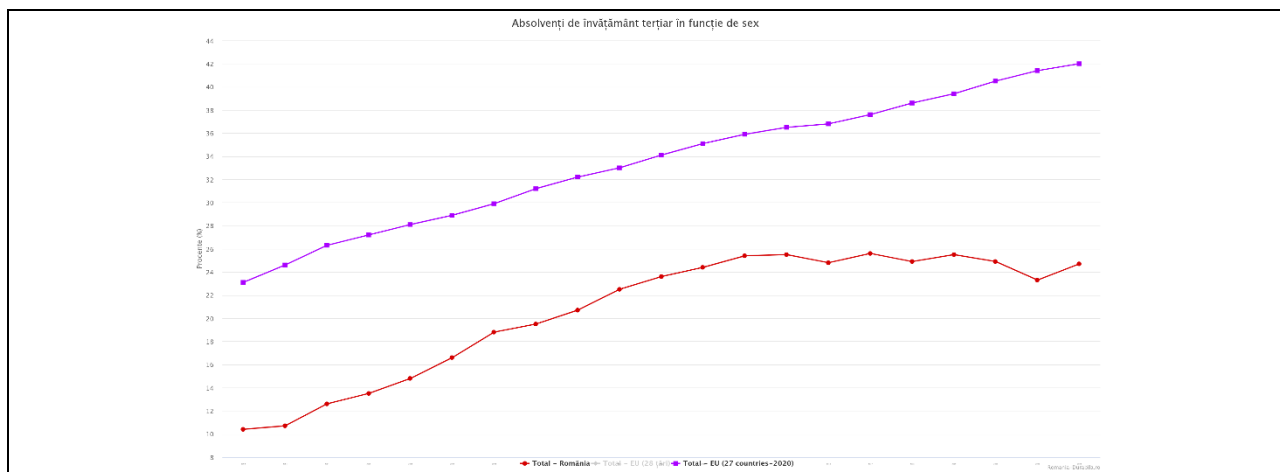


Figure 3. Tertiary education graduates.

Source: <http://romania-durabila.gov.ro/>

This indicator tracks the proportion of individuals who have completed higher education in Romania, serving as a proxy for human capital development and the country's overall capacity to drive a knowledge-based economy. Over recent years, Romania has seen an upward trend in tertiary education graduates—a positive signal that suggests increased access to higher education and enhanced educational outcomes. This growth, although moderate when compared to some EU member states, marks a significant improvement in Romania's educational landscape and is crucial for fostering innovation, competitiveness, and long-term economic sustainability.

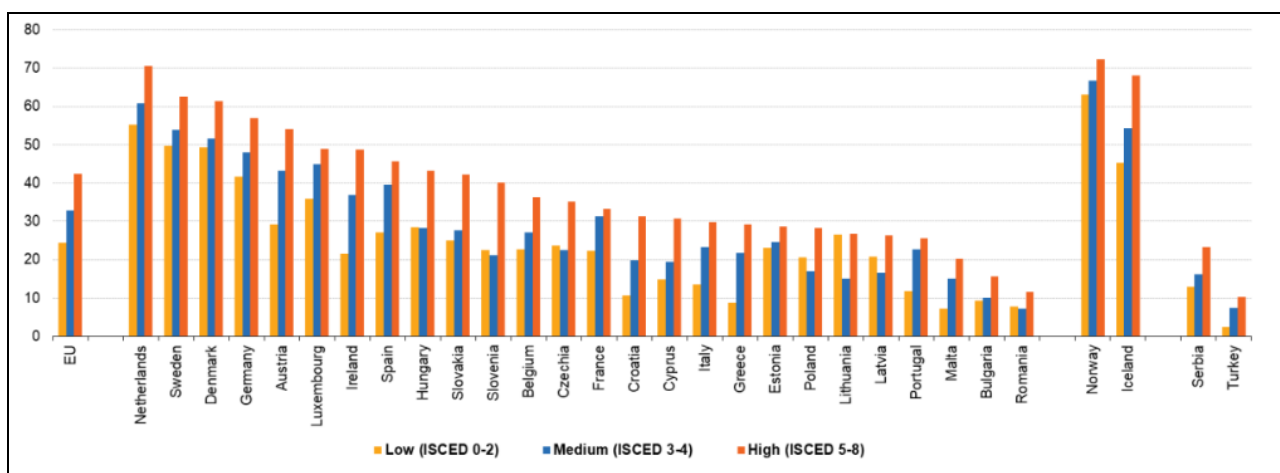


Figure 4. Distribution of people who spent at least 150 minutes on health-enhancing aerobic physical activity per week, by level of educational attainment, 2019 (%).

Source: <https://ec.europa.eu/eurostat/>

This indicator presents the percentage of individuals who engage in at least 150 minutes per week of aerobic physical activity, disaggregated by their level of educational attainment. In Romania, the data reveal a strong correlation between high educational achievement and a higher likelihood of participating in physical activities. In particular, individuals with tertiary education are found to engage in regular exercise at substantially higher rates than their peers with lower education levels. This pattern is consistent with broader European findings and underscores the role that higher education plays in promoting health awareness and healthier lifestyles. The convergence of these

indicators suggests a mutually reinforcing relationship between educational attainment and health behavior.

The increasing number of tertiary education graduates in Romania not only signals improved economic opportunities and social mobility but also appears to translate into healthier lifestyle choices, as seen in the higher participation rates in physical activity among the highly educated. This dual benefit is significant: on one hand, a more educated workforce is better equipped to drive economic growth and innovation; on the other hand, the associated increase in health-conscious behaviors may lead to reduced public health expenditures and improved overall quality of life. In the context of European benchmarks, Romania's rising tertiary education enrollment and graduation rates, coupled with the demonstrated link between higher education and active lifestyles, are promising trends. They suggest that continued investment in higher education—alongside policies that promote physical activity and public health—could enhance Romania's human capital and create a virtuous cycle of economic and social development.

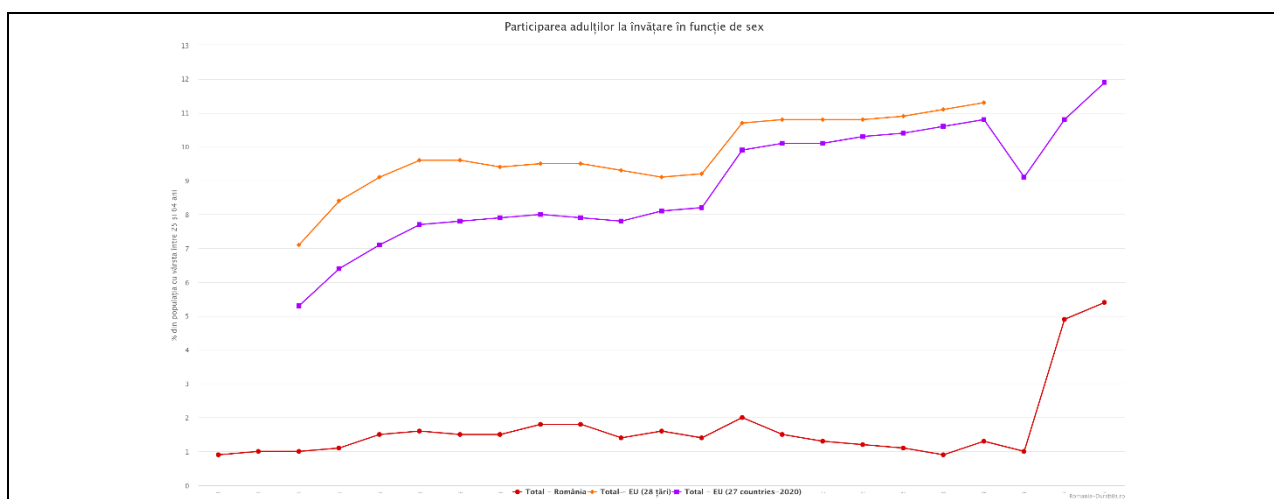


Figure 5. Adult participation in learning.

Source: <http://romania-durabila.gov.ro/>

Adult Participation in Learning measures the share of people aged 25 to 64 who declared that they received formal or non-formal education and training in the four weeks preceding the survey. This indicator serves as an important proxy for lifelong learning and capacity building among the adult population. Engaging in continuous education—not only formal academic courses but also various non-formal training opportunities—contributes to enhanced skillsets, improved employability, and a greater overall awareness of personal and professional development opportunities.

Figure 6: Practicing Sport, Keeping Fit or Participating in Recreational (Leisure) Physical Activities at Least Once a Week, by Age Group (2019) disaggregates the participation levels in physical activity across different adult age groups. This indicator reflects public health outcomes and captures behavioral patterns that are essential for reducing risks associated with sedentary lifestyles, such as chronic diseases. In addition to its implications for individual health, the data provide insights into the overall cultural and infrastructural support for recreational activities within different regions.

When examining these two indicators together, an interesting interrelationship emerges. In Romania, evidence suggests that adults who actively engage in learning—whether it be formal or non-formal education—also tend to be more inclined to participate in regular physical activity. This correlation can be attributed to several factors.

	Total	15-24	25-34	35-44	45-54	55-64	65+
EU	44	65	53	47	44	39	31
Belgium	42	64	51	47	41	37	26
Bulgaria	14	42	27	16	9	4	2
Czechia	36	63	48	48	37	23	13
Denmark	76	82	79	74	78	73	71
Germany	67	86	75	68	68	64	56
Estonia	44	63	55	53	44	35	25
Ireland	51	64	64	57	50	39	32
Greece	26	64	43	31	23	14	7
Spain	50	69	58	53	51	46	35
France	45	66	52	48	43	41	32
Croatia	27	53	44	41	30	22	13
Italy	27	50	40	31	28	21	12
Cyprus	35	36	36	38	36	35	30
Latvia	38	66	45	41	38	31	24
Lithuania	31	61	44	33	26	21	16
Luxembourg	67	78	71	66	64	65	58
Hungary	43	66	54	51	44	29	26
Malta	26	41	37	28	24	17	12
Netherlands	54	70	63	55	55	49	37
Austria	62	78	70	65	63	62	45
Poland	26	47	37	33	23	15	11
Portugal	33	59	42	39	34	24	19
Romania	6	20	11	7	3	2	1
Slovenia	55	83	67	67	62	45	27
Slovakia	33	57	41	39	32	22	13
Sweden	75	82	77	77	77	73	70
Iceland	71	82	70	77	76	66	62
Norway	84	89	87	87	85	84	76
Serbia	14	37	26	16	9	6	3
Turkey	8	14	12	8	5	4	2

Figure 6. Practicing sport, keeping fit or participating in recreational (leisure) physical activities at least once a week, by age group, 2019.

Source: <https://ec.europa.eu/eurostat/>

Firstly, higher engagement in learning activities may foster increased health literacy, leading to a better understanding of the benefits of a physically active lifestyle. More educated individuals are likely to be aware of how regular physical activity contributes not only to personal well-being but also to long-term health outcomes, thereby reducing the risk of chronic illnesses.

Secondly, participation in learning can be indicative of a proactive mindset and a commitment to self-improvement, traits that typically extend to maintaining physical fitness. Such individuals are more disposed to allocate time and resources to recreational activities, which reinforces a virtuous cycle between cognitive engagement and physical well-being.

In the Romanian context, the upward trend in adult participation in learning observed in Figure 5 is particularly promising. An increase in the proportion of adults engaged in education initiatives points to an evolving societal emphasis on continuous skill development and life-long learning. This development is noteworthy, especially when contrasted with many European peers, as it not only augments human capital but may also indirectly promote healthier lifestyles.

Given that the data from Figure 6 indicate higher levels of physical activity among groups with elevated educational attainment, it can be inferred that the recent rise in lifelong learning participation rates could lead to broader public health improvements over time.

Conclusions

The integrated analysis of education and physical activity indicators in Romania reveals a dynamic and mutually reinforcing relationship that supports the dual pillars of human capital development and public health. Extensive research confirms that education and health are inextricably linked, with each domain profoundly influencing the other. This interdependence is particularly crucial for advancing sustainable national progress, reducing inequalities, and fostering inclusive development (OECD, 2021).

Despite ongoing challenges—such as elevated early school leaving rates among youth aged 18 to 24, particularly with pronounced gender-based disparities—recent statistical trends offer reasons for cautious optimism. Improvements in higher education attainment are beginning to reverse prior patterns of educational disengagement, contributing to the cultivation of a more skilled, adaptable, and innovation-ready workforce, aligned with the competencies demanded by a

knowledge-driven global economy (Eurostat, 2023; European Commission, 2022). These positive shifts mark a critical turning point for Romania as it strives to close structural gaps in education and elevate its competitiveness within the European Union.

In parallel, there is a growing national emphasis on *lifelong learning*, with increasing adult participation in both formal and non-formal educational initiatives. This broader commitment to continuous education supports not only workforce adaptability but also enhances civic engagement and fosters a culture of social inclusion (UNESCO Institute for Lifelong Learning, 2020). Lifelong learning equips individuals with the skills and knowledge necessary to remain active contributors to society, while also reinforcing personal autonomy and socio-economic mobility. For Romania, the consolidation of such a culture is essential for bridging regional disparities and ensuring equitable development across urban and rural contexts.

Significantly, empirical evidence consistently demonstrates that higher levels of educational attainment are positively correlated with increased engagement in *health-enhancing physical activities*. Individuals with advanced education are more likely to embrace active lifestyles, maintain regular exercise routines, and engage in preventive health behaviors—patterns often driven by enhanced health literacy, greater access to health information, and a deeper understanding of the long-term benefits of physical well-being (WHO, 2022; Bauman et al., 2012; Marques et al., 2020). This connection illustrates how education functions as a key determinant of health, empowering individuals to make informed lifestyle decisions and reducing their susceptibility to chronic illnesses.

In addition to physical health, regular activity supports cognitive function, emotional stability, and mental health—factors that significantly influence productivity, academic persistence, and workplace performance (Lubans et al., 2016). By promoting physical activity through education, Romania can generate a positive feedback loop in which improved health outcomes further reinforce educational attainment and labor force participation.

Encouragingly, the recent upward trends in both higher education participation and physical activity rates across different age demographics indicate a growing recognition of these synergies. Continued engagement in education not only enhances professional qualifications and economic prospects but also cultivates healthier, more resilient populations. These trends are especially pertinent in the context of an aging society and a rapidly evolving labor market, where adaptability, digital competence, and physical well-being are increasingly essential (World Economic Forum, 2023).

For Romania, these evolving dynamics underscore the potential of *integrated policy frameworks*—those that bridge education, health, and labor development—as a strategic lever for fostering national resilience and inclusive economic growth. Such policies should aim to create coherent pathways between formal education systems, public health campaigns, and community-level physical activity programs, thereby amplifying their collective impact.

To fully capitalize on these opportunities, Romania must implement *multisectoral and holistic strategies* that align educational reforms with public health objectives. This includes expanding equitable access to higher education, embedding health literacy and physical well-being into curricula from early childhood onward, and promoting cross-sector collaboration among ministries of education, health, labor, and youth. Such an approach ensures that investments in higher education yield not only economic returns but also robust public health dividends.

Incorporating these principles into national planning and development aligns Romania more closely with the *2030 Agenda for Sustainable Development*, which emphasizes the interconnectedness of social, economic, and environmental goals (United Nations, 2015). Specifically, by integrating the targets of *SDG 4 (Quality Education)* and *SDG 3 (Good Health and Well-Being)*, Romania can move toward a development model that is inclusive, future-oriented, and firmly centered on human potential.

In conclusion, the synergy between education and physical activity is not merely a policy coincidence, but a foundational element for building a healthier, more educated, and economically dynamic society. Romania's ability to foster this synergy through targeted reforms and sustained investments will play a decisive role in shaping its trajectory toward equitable and sustainable national progress.

References

- Bailey, R., Armour, K., Kirk, D., Jess, M., Pickup, I., & Sandford, R. (2009). The educational benefits claimed for physical education and school sport: An academic review. *Research Papers in Education*, 24(1), 1–27. <https://doi.org/10.1080/02671520701809817>
- Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine & Science in Sports & Exercise*, 48(6), 1197–1222. <https://doi.org/10.1249/MSS.0000000000000901>
- Eurostat. (2023). *Physical activity statistics*. Retrieved from <https://ec.europa.eu/eurostat/>
- Lubans, D. R., Richards, J., Hillman, C. H., Faulkner, G., Beauchamp, M. R., Nilsson, M., ... & Biddle, S. J. H. (2016). Physical activity for cognitive and mental health in youth: A systematic review of mechanisms. *Pediatrics*, 138(3), e20161642. <https://doi.org/10.1542/peds.2016-1642>
- Mănescu, D.C. *Fundamente teoretice ale activităților fizice* (Theoretical fundamentals of physical activities). Editura ASE
- Ministry of National Education (Romania). (2023). *National curriculum for physical education*. Retrieved from <https://www.edu.ro>
- Singh, A. S., Saliasi, E., van den Berg, V., Uijtdewilligen, L., de Groot, R. H. M., Jolles, J., ... & Chinapaw, M. J. M. (2019). Effects of physical activity interventions on cognitive and academic performance in children and adolescents: A novel combination of a systematic review and recommendations from an expert panel. *British Journal of Sports Medicine*, 53(10), 640–647. <https://doi.org/10.1136/bjsports-2017-098136>
- United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Retrieved from <https://sdgs.un.org/2030agenda>
- World Bank. (2020). *Romania education sector analysis*. Retrieved from <https://www.worldbank.org/en/country/romania/publication/education-sector-analysis>
- World Health Organization (WHO). (2022). *Global status report on physical activity 2022*. <https://www.who.int/publications/i/item/9789240059153>