

The Role of Physical Education in Enhancing Learning Outcomes: A Sustainable Approach under SDG 4

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Abstract

This research explores the critical intersection between physical education and academic achievement within the broader framework of sustainable development, focusing on SDG 4 — Quality Education. By analyzing data from Romania Durabilă regarding educational performance and infrastructure, alongside Eurostat indicators related to sports participation and educational attainment, the study seeks to uncover the extent to which engagement in physical activities supports cognitive development and learning outcomes. The paper highlights how physical education not only promotes physical well-being but also enhances focus, discipline, and academic performance, positioning sport as a strategic driver for sustainable education systems. Ultimately, this research emphasizes the necessity of integrating structured physical education programs into national educational policies to foster holistic development and contribute meaningfully to the achievement of SDG 4.

Keywords: physical activity, public health, sport participation, SDG 4, tertiary education

JEL classification: I21; I23; I12; Z20

DOI: 10.24818/mrt.25.17.01.03

1. Introduction

Education and physical activity are two pillars of sustainable human development, each profoundly influencing the other. Within the context of SDG 4 - Quality Education - the integration of sport and physical education into the academic environment is increasingly recognized as essential not only for fostering healthy lifestyles but also for enhancing learning capacities, social skills, and cognitive development. A growing body of international research suggests that regular engagement in physical activity can significantly improve student's concentration, memory retention, emotional regulation, and overall academic performance.

In Romania, the relationship between education and sport presents both opportunities and challenges. Although the national curriculum formally includes physical education as a mandatory subject, disparities in infrastructure quality,

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societal attitudes towards sport, and resource allocation create gaps in how effectively physical activity supports educational outcomes. In many Romanian schools, physical education is still perceived as secondary compared to core academic subjects, and investment in sports facilities and structured programs remains limited, especially in rural areas. This dynamic reflects broader socioeconomic inequalities and underlines the need for a systemic approach to integrating sport as a key element in achieving quality education.

Moreover, data from Romania Durabilă and Eurostat reveal that participation rates in regular physical activity are relatively low across the country. These trends correlate with broader concerns regarding student's physical and mental health, academic engagement, and long-term personal development. As such, enhancing access to quality physical education programs, improving infrastructure, and promoting the educational value of sport are crucial steps toward building a resilient and equitable education system in Romania.

2. 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.



3. 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.

4. 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 compared 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.



5. Results and Interpretation

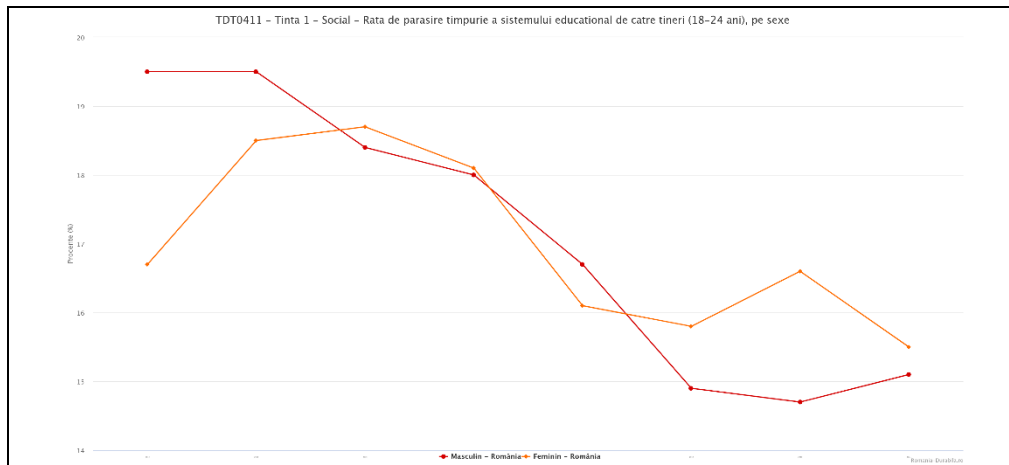


Chart 1. Early school leaving rate for young people (18-24 years old), by gender

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

Chart 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.

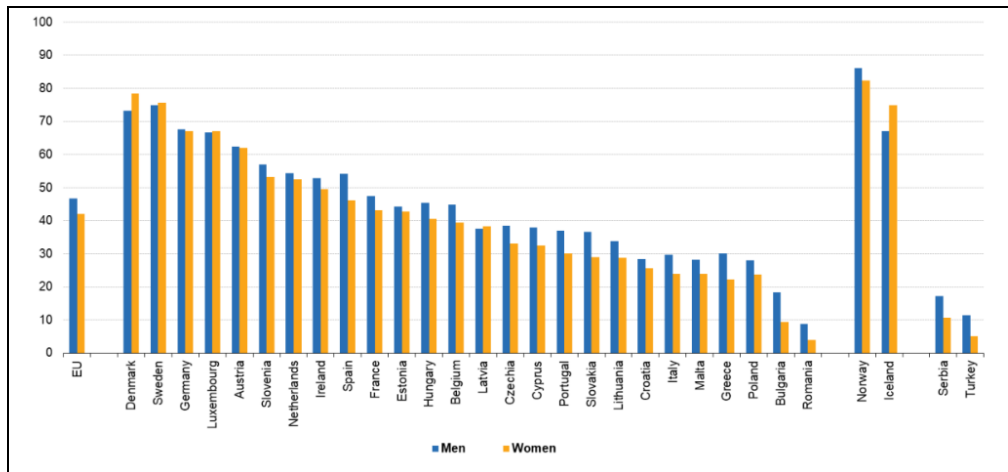


Chart 2. Practicing sport, keeping fit or participating in recreational (leisure) physical activities at least once a week, by sex, 2019 (%)

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

In parallel, Chart 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 charts 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, Chart 1 and Chart 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.

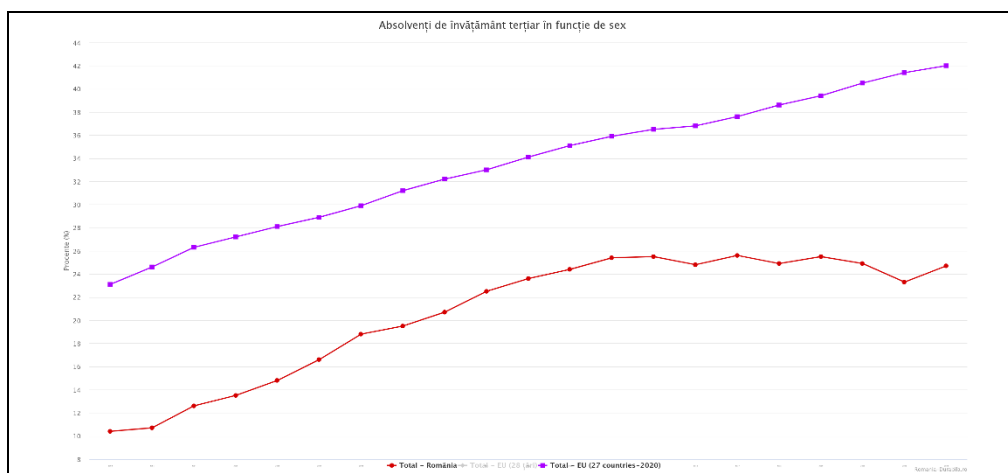


Chart 3. Tertiary education graduates

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.

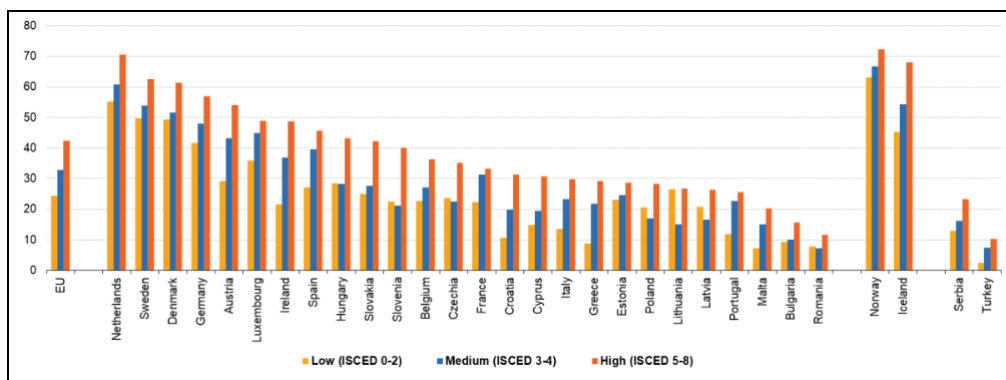


Chart 4. Distribution of people who spent at least 150 minutes on health-enhancing aerobic physical activity per week, by level of educational attainment, 2019 (%)

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.

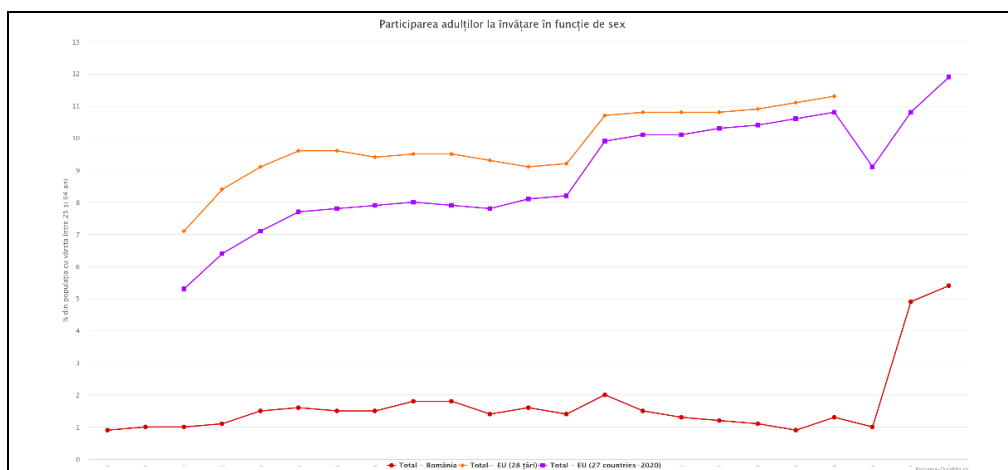


Chart 5. Adult participation in learning

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.

	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

Chart 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/>



Chart 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. 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 Chart 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 lifelong learning. This development is noteworthy, especially when compared with many European peers, as it not only augments human capital but may also indirectly promote healthier lifestyles. Given that the data from Chart 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.

6. Conclusions

The integrated analysis of the education and physical activity indicators reveals a synergistic relationship that underpins both human capital development and public health in Romania. Despite persistent challenges, such as high early school leaving rates among 18- to 24-year-olds, particularly when disaggregated by gender, there is clear evidence that advances in higher education attainment have begun to reverse earlier trends, fostering a more skilled and competitive workforce. This positive shift in tertiary education graduates, coupled with increased adult participation in both formal and non-formal learning, points to a broader societal commitment to lifelong learning.



Crucially, the data also demonstrates that higher educational attainment consistently correlates with greater engagement in health-enhancing physical activities. Adults with higher education are more likely to participate in regular, structured physical exercise, thereby promoting improved health outcomes. This interconnection suggests that education may play an essential role in enhancing health literacy, empowering individuals to make choices that support long-term well-being.

Furthermore, the upward trends in both higher education participation and physical activity among various age groups indicate that continuing education can have a dual benefit: it not only bolsters economic opportunities and social mobility but also fosters a healthier, more active population. For Romania, these trends offer encouragement, suggesting that integrated policy measures which simultaneously address educational advancement and health promotion are essential to overcoming current disparities.

Overall, the analysis underscores the need for multifaceted strategies that align educational reforms with public health initiatives. By investing in higher education and ensuring that learning opportunities are accessible throughout life, Romania can cultivate a workforce that is not only economically dynamic but also resilient in the face of growing public health challenges. This integrated approach is imperative for fostering sustainable development, reducing social inequalities, and positioning Romania competitively within the broader European context.

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