

THE IMPACT OF THE EDUCATIONAL ENVIRONMENT ON THE FUNCTIONAL DEVELOPMENT OF CHILDREN AND ADOLESCENTS

Muhammadaminova Rayana

Group 201, Foreign Language and Literature

Alieva Rano

Supervisor

Annotation. *This article offers a comprehensive analysis of how educational environments shape the functional development of children and adolescents across cognitive, socio-emotional, physical, and psychological domains. Drawing on scientific literature and empirical data, the study investigates the ways in which school climate, teachers' pedagogical approaches, physical infrastructure, and social context influence brain development, academic achievement, and children's day-to-day functioning. The findings indicate that building high-quality, supportive learning environments can meaningfully improve children's overall developmental outcomes. In the context of Uzbekistan, modernizing the educational environment holds particular strategic importance.*

Keywords: *educational environment, functional development, children and adolescents, brain development, cognitive abilities, socio-emotional development, school psychology.*

Annotatsiya. *Ushbu maqola ta'lim muhitining bolalar va o'smirlarning funksional rivojlanishiga - jumladan kognitiv, ijtimoiy-emotsional, jismoniy va psixologik sohalarga - ta'sirini keng ko'lamli tahlil qiladi. Tadqiqotda maktab muhiti, o'qituvchilar pedagogik yondashuvi, moddiy infratuzilma va ijtimoiy kontekst omillari bolalar miya rivojlanishi, akademik muvaffaqiyat va kundalik hayotdagi faoliyatiga qanday ta'sir ko'rsatishi ilmiy manbalar va empirik ma'lumotlar asosida o'rganilgan. Tadqiqot natijalari shuni ko'rsatadiki, sifatli va qo'llab-quvvatlovchi ta'lim muhitini shakllantirish bolalarning umumiy rivojlanish ko'rsatkichlarini sezilarli darajada yaxshilash imkonini beradi. O'zbekiston kontekstida ta'lim muhitini modernizatsiya qilish strategik ahamiyat kasb etadi.*

Kalit so'zlar: *ta'lim muhiti, funksional rivojlanish, bolalar va o'smirlar, miya rivojlanishi, kognitiv qobiliyatlar, ijtimoiy-emotsional rivojlanish, maktab psixologiyasi.*

Аннотация. *В данной статье представлен системный анализ влияния образовательной среды на функциональное развитие детей и подростков - включая когнитивную, социально-эмоциональную, физическую и психологическую сферы. В исследовании на основе научных источников и эмпирических данных изучается роль школьного климата, педагогических подходов учителей, материальной инфраструктуры и социального контекста в формировании развития мозга, академических результатов и повседневной деятельности детей. Результаты исследования показывают, что создание качественной и поддерживающей образовательной среды позволяет значительно улучшить общие показатели развития*

детей. В контексте Узбекистана модернизация образовательной среды имеет стратегическое значение.

Ключевые слова: *образовательная среда, функциональное развитие, дети и подростки, развитие мозга, когнитивные способности, социально-эмоциональное развитие, школьная психология.*

INTRODUCTION

Contemporary research in pedagogy and developmental psychology increasingly confirms that environmental factors play a decisive role in a child's growth - one that stands alongside, and at times rivals, purely biological influences. The educational environment, in particular, encompasses far more than classroom walls or curricula; it represents the full constellation of social, psychological, and physical conditions surrounding a learner. The quality of this environment can shape a child's intellectual and personal development across an entire lifetime. Findings from neuroscience are especially compelling in this regard. A large-scale study conducted by researchers at Stanford University found that children learning in high-performing school environments showed meaningfully faster development of white matter in the brain - and this pattern held even after controlling for external variables such as the family's socioeconomic status[1]. This suggests that the school environment exerts a direct influence on the brain's biological formation, pointing to an important conclusion: education is not merely a vehicle for transmitting knowledge, but a force that actively supports physical development as well. The concept of the educational environment is multi-layered, encompassing four key components:

1. The physical environment - classroom design, lighting, sanitation conditions, and learning resources;
2. The psychological environment - the sense of safety within the classroom, teacher-student relationships, and peer interaction;
3. The pedagogical environment - teaching methodology, differentiation, and additional support;
4. The social environment - school culture, inclusivity, and peer dynamics[2].

These components are deeply interconnected, and their harmonious functioning together determines the overall quality of education. The primary aim of this study is to systematically analyze the impact of the educational environment on the functional development of children and adolescents, to synthesize international and local scientific sources, and to develop practical recommendations suited to the conditions of Uzbekistan. The research is also intended to serve as a meaningful practical resource for parents, teachers, and education policymakers.

METHODS

The study was organized around two core methodological approaches: a systematic literature review and field research. This combined approach allowed the topic to be examined comprehensively from both theoretical and practical perspectives. In the course of the study,

more than 120 international scientific articles and reports published between 2019 and 2024 were systematically reviewed. The primary databases used were PubMed Central (PMC), Scopus, Web of Science, and Google Scholar. Field research was carried out between September 2023 and May 2024 across three schools of varying profiles in Tashkent: a centrally located school with modern facilities, a school in a peripheral district with average resources, and a private educational institution. This selection enabled a comparative analysis of different learning environments. The study was approved by the Ethics Committee of the National University of Uzbekistan.

Measurement instruments: To assess children's participation in their environment, the PEM-CY (Participation and Environment Measure for Children and Youth) was applied[5]. Cognitive abilities were evaluated using Raven's Progressive Matrices and the Stroop Color-Word Test. Socio-emotional development was measured using the SDQ (Strengths and Difficulties Questionnaire). The physical and psychological parameters of the educational environment were assessed through a tailored questionnaire based on the TIMSS and PISA methodologies[6]. **Statistical analysis:** Data were processed using SPSS Statistics 27. The primary analytical methods included Pearson correlation analysis, analysis of variance (ANOVA), and structural equation modeling (SEM). AMOS 27 was used for SEM analysis. All statistical conclusions were evaluated at a significance level of $p < 0.05$ [7].

RESULTS

Analysis of cognitive abilities revealed that students in educational environments classified as both modern and psychologically safe scored an average of 23.4% higher on standardized tests compared to other groups ($F(2,77)=18.92, p < 0.001$). This difference was particularly pronounced in measures of logical reasoning and working memory[8]. The literature review, aligned with neuroimaging research, confirmed Stanford University's findings that high-quality educational environments accelerate the development of white matter in the brain[1]. The correlation between connectivity levels in white matter (between the prefrontal cortex and hippocampus) and academic outcomes was $r=0.68$ ($p < 0.001$), reflecting a moderately strong relationship. Teachers' pedagogical approaches were identified as an independent predictor of cognitive development. Classrooms where teachers applied constructivist methods showed a 18.7% advantage in students' critical thinking skills[9]. SDQ assessment results indicated that the rate of emotional difficulties among students in supportive classroom environments was significantly below clinical population norms ($M=4.2$ vs. $M=7.8, t(78)=6.34, p < 0.001$). Students who reported a stronger sense of psychological safety in the classroom also demonstrated greater effectiveness in building social relationships[10]. PEM-CY data showed that a supportive school environment increases children's participation in daily activities by 30–32%. This finding also correlated positively with activity levels in the home environment ($r=0.54, p < 0.01$), suggesting that positive experiences at school carry over into the home[5].

The quality of peer relations was identified as an important mediator of socio-emotional development. SEM analysis confirmed both direct and indirect effects along the pathway:

educational environment quality → peer relations → emotional stability. In schools with well-equipped physical education and sports facilities, students' physical activity levels were 2.3 times more likely to meet standard norms (at least 60 minutes of moderate-intensity physical activity per day). Compared against the physical activity levels recommended by the WHO, only 31.2% of students in poorly equipped schools met these criteria, while in well-equipped schools the figure reached 71.8%[7].

Children in chronically stressful - unsafe, unpredictable - school environments showed cortisol levels that were 34% above normal. The link between elevated cortisol and reduced hippocampal volume is well documented in the literature [14], raising the risk of long-term cognitive harm. Our study partially confirmed these findings within the Uzbek context — a negative correlation was identified between stress indicators and academic performance ($r = -0.52$, $p < 0.001$).

DISCUSSION

The findings of this study affirm, from multiple angles, the central role of the educational environment in the development of children and adolescents. Cognitive, socio-emotional, physical, and psychological developmental indicators all demonstrated statistically significant associations with the quality of the educational environment - a result that serves to validate, within the Uzbek context, conclusions long established in international scientific literature[6]. A particularly noteworthy finding is that the influence of the educational environment extends beyond the school day, leaving its mark on activity levels in the home as well. This "transfer effect" is theoretically grounded in social learning theory (Bandura, 1977) and ecological systems theory (Bronfenbrenner, 1979), and our study observed it empirically within Uzbekistan. The predictive power of the teacher's role - reflected in standardized coefficients ranging from $\beta = 0.41$ to 0.61 - was especially striking, in fact exceeding even the effect of physical infrastructure. In other words, a skilled teacher, by cultivating a safe and supportive environment, can partially compensate for unfavorable material conditions[8]. This is a policy-relevant conclusion of considerable importance for all regions of Uzbekistan, and especially for areas where resources are limited. In terms of applying the study's findings to Uzbekistan's education system, the following directions stand out as particularly significant: first, training teachers not only in subject matter expertise but also in the creation of positive psychological environments; second, ensuring that the modernization of school infrastructure gives equal attention to psychological climate alongside physical conditions; and third, strengthening inclusive education approaches to provide equal developmental opportunities for all children[9].

CONCLUSION

This study has confirmed, through multifaceted empirical evidence, the central role of the educational environment in the functional development of children and adolescents. Cognitive abilities (23.4% higher outcomes), socio-emotional indicators (30–32% higher participation), physical activity (2.3 times greater adherence to recommended norms), and psychological stability - all demonstrated statistically significant and practically meaningful

associations with the quality of the educational environment. The study's core conclusions may be summarized as follows: the educational environment exerts influence at a biological level (brain development); the role of the teacher carries greater predictive power than physical infrastructure; an environment characterized by psychological safety and support produces positive effects across all domains of development; and positive experiences at school influence the quality of the home environment and life in general. Within the framework of education reforms currently underway in Uzbekistan, these conclusions offer important practical guidance. Every school - regardless of its location, financial capacity, or student body should become an environment that encourages functional development. This is not merely a question of improving educational quality; it is a matter of investing strategically in the society's next generation[2].

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