

## THE HEALTH PROFILE OF THE PRIMARY SCHOOL STUDENT.

### IMPACT ON SCHOOL ACHIEVEMENT

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**Abstract:** *This article presents the implementation of an experiment-based approach to see the impact on school achievement of the health profile student in primary school. The research relied on the principle that physical activity must be integrated into the teaching process, not eliminated because movement is essential for improving or increasing academic achievement. The experimental group was formed of 250 primary school students, divided into two groups: the control group - 125 students and the experimental group -125 students, 13 teachers, one nurse, and two physiotherapists. The experiment itself was marked by the use of methods to integrate physical activity during classes, followed by the process of measuring school results through six assessment tests in school subjects - mathematics and Romanian language - for the 250 students from the primary school cycle in Bucharest - 125 students comprised the experimental group, which integrated various physical activities in their learning, and the other 125 - the control group, which did not use physical activities in the school curriculum. The results of the study encourage the idea of using movement during every school day. Physical activity, so beneficial to health and learning, must become an important part of the educational process.*

**Keywords:** *physical activity; academic achievement; programs; optimization; health;*

## **Introduction**

Movement is essential for improving or increasing academic achievement. It must be integrated into the teaching process, not eliminated (Holt, Bartee & Heelan, 2013).

School achievement can be considered as that qualitative state in relation to a certain objective set for attainment, while success assumes achievement at high levels of performance (Tulbure, 2010)”.

In the literature, “... *student success is defined as an academic performance, involvement in educational activities, satisfaction, acquisition of desired knowledge, skills and competencies, determination, reaching of educational goals, and success after completing compulsory education* (Kuh et al., 2010).”

Ausubel, Robinson & Floyd, (1981) consider that school achievement is the congruence of the student's intellectual potential and the level of school tasks' completion.

In the opinion of I.T. Radu (2000) the students' school results represent “effects of the teaching activity, different by their nature, performances that are liable to be measured and appreciated”.

The ability to apply knowledge (skills and abilities), intellectual abilities, personality traits, behaviors, attitudes, as well as the accumulated knowledge are considered school results.

Recent experimental studies have shown that children's cognitive functions benefit from improvement from physical exertion. Ardoy et al. (2014) revealed results that participation in four hours of intense physical activity per week improves children's overall cognitive performance (including verbal and nonverbal skills, abstract thinking, spatial perception, math skill and verbal expression), compared to just two hours of usual sports time per week.

In the study by Ruiz et al. (2010), physical activity during recess was associated with improved cognitive performances, including logical, numerical, and verbal skills among teenagers. In addition, Castelli et al. (2011) reported that involvement in intense physical activities had a positive effect on the performance of inhibitory control tasks.

There is more and more scientific research that certifies the fact that sports activity has benefits in the development of children's cognitive functions but also in academic performance (Donnelly et. al., 2009).

In the organization of the instructive-educational process, the study of psychomotricity is considered paramount. Rene Zazzo (1979) considers that basic education in primary school is carried out by psychomotor education because it conditions the whole learning process. The child must have the

consciousness of his own body, know its laterality, be able to place himself within space, be master of time and gain enough stability and coordination of his own movements and gestures for the learning process to be effective.

### **Purpose and assumptions**

The general *purpose* of this study is to identify the degree of influence of physical activity on school achievement.

The general *objective* of the research aims at identifying a link between physical activity and school achievement, highlighting the degree of influence of physical activity on school achievement.

The general *hypothesis* that we intend to prove is that participation in organized physical activity programs favors the increase of school achievement in the case of primary school students.

The specific hypothesis is:

The higher the student's age, the higher the body mass index, exceeding its normal value.

### **Methodology**

#### **Participants and research design**

The study was conducted on a sample of 250 primary school students, divided into two groups: the control group - 125 students and the experimental group -125 students, 13 teachers, one nurse, and two physiotherapists.

The methods used were the reflexive diary and the experiment. The diary method falls into the category of narrative research methods (Neacșu, Manasia&Chicioreanu, 2016, pp 91). The use of the diary can be an important tool in this context of completing research because it can be a way to combine theory with practice.

Broadly speaking, experimentation represents "the methodical use of the experiment to verify hypotheses about the properties of a given phenomenon (Ferréol, 1998, pp. 70)." Specifically, the experiment is a "research design used to extract causal inferences about the impact of a treatment variable on an output variable" (Jupp, 2010, pp. 199).

In the design of the study, the following variables were taken into account: *the independent variable* (age of students) and *the dependent variable* (student profile from the perspective of body mass index - underweight, normal weight, overweight - *continuous ratio variable* (school

achievement expressed and analyzed based on the results obtained in the assessment tests).

The independent variable was used as an "influence variable, whose possible effects on the dependent variable are to be highlighted (Popa, 2008)." This variable was organized into five ordinal classes indicating the separation of the sample into the following age groups (6 years old, 7 years old, 8 years old, 9 years old, 10 years old) and is a quantitative variable.

The dependent variable (body mass index) was classified using the ranking established by the World Health Organization (underweight, normal weight, overweight). The gender, age, and profile of students by body mass index are constant variables in the research. The amount of information assimilated as a result of the use of physical activities during the school program is the continuous variable, as a ratio, within the research, because it will be assumed that it can be influenced by the use of movement. This was measured by the score obtained by the two groups (experimental and control) on the 12 tests of the experiment, six tests in mathematics, and six tests in Romanian language and literature, throughout the school year.

Highlighting the link between these variables represents the purpose of the study, so that awareness can be raised among educational actors about the importance of integrating organized physical activity programs in the school classes.

### **Intervention program**

Each participating teacher had a reflexive diary in which he wrote down, throughout the experiment, the results of periodic assessment tests on communication in Romanian / Romanian language and literature, mathematics and environmental exploration / mathematics, ideas for activities during the lessons (setting the objectives, what I did, why I did this activity, how the students reacted, what I learned) and my own observations regarding the integration of physical activities in the learning process.

To improve the way we work in a team, we organized a training program for teachers in the experimental group. The *training* program consisted of teachers' participation in four theory sessions lasting 60 minutes. The topics addressed for the intervention sessions were:

**Workshop 1. Elaboration of the evaluation tests** (establishing the content of the primary school curriculum and elaboration of evaluation tests).

**Workshop 2 - Obesity in children (awareness of the importance of a healthy lifestyle).**

**Workshop 3** - How can you make a school day more active? (Examples of good practices to make a school day more active: **Just dance**,

**Balance board or pillow, Bike-bench - a prototype school bench with pedals).**

**Workshop 4 - The importance of preventing bad postures in children - kinetoprophylaxis and ergonomic education (ergonomic education and the benefits of physical activity).**

**Procedure**

The teachers agreed to participate. They were informed with regards to the course of the program and their involvement in activities.

The first stage of the experiment consisted of obtaining *a health profile of the primary school student* based on the body mass index. Each student was weighed to determine the BMI.

This was followed by the training program organized for the teachers involved in this research.

The experiment itself was marked by the use of methods to integrate physical activity during classes, followed by the process of *measuring school results* through six assessment tests in school subjects - mathematics and Romanian language - for the 250 students from the primary school cycle in Bucharest - 125 students comprised the experimental group, which integrated various physical activities in their learning, and the other 125 - the control group, which did not use physical activities in the school curriculum.

**Results**

All results obtained from implementing the experiment were processed using the software IBM SPSS Statistics, version 23.0. We had no difficulty in collecting the data. All test results were statistically validated.

During the first phase, we used the Crosstabs procedure and the Chi-square Test to investigate the degree of correlation of the two variables: body mass index and students' age. The statistical decision to *deny the null hypothesis* was due to the value of the Pearson Chi-Square Test and especially of its significance rank ( $p = 0.000$ ), confirming the research hypothesis: *The older the student, the higher the body mass index, exceeding its normal value.*

**BMI index \* Respondent Type Crosstabulation**

			Respondent type		Total
			control	experimental	
BMI index	normal weight	Number	60 <sup>a</sup>	40 <sup>b</sup>	100
		% from BMI index	60.0%	40.0%	100.0%
		Std. Residual	1.4	-1.4	
	underweight	Number	3 <sup>a</sup>	1 <sup>a</sup>	4
		% from BMI index	75.0%	25.0%	100.0%
		Std. Residual	.7	-.7	
	overweight	Number	62 <sup>a</sup>	84 <sup>b</sup>	146
		% from BMI index	42.5%	57.5%	100.0%
		Std. Residual	-1.3	1.3	
Total	Number	125	125	250	
	% from BMI index	50.0%	50.0%	100.0%	

Tabel 1 -BMI values depending on the type of respondent

Each test applied at this stage confirms that the body mass index increases with age. The curriculum for the preparatory school is a flexible one, allowing time for games and physical activities because it is the stage in which the child goes from preschool to school. All activities in kindergarten involve movement because learning is done exclusively through play, and children are encouraged to explore. As the child grows and the curriculum becomes busier and requires more time for activities that are static.

### Mann-Whitney Test

		Rank		
	Respondent type	N	Mean Rank	Sum of Ranks
R1	control	125	139.14	17393.00
	experimental	125	111.86	13982.00
	Total	250		
R2	control	125	136.67	17083.50
	experimental	125	114.33	14291.50
	Total	250		
R3	control	125	128.78	16098.00
	experimental	125	122.22	15277.00
	Total	250		
R4	control	125	123.00	15375.00
	experimental	125	128.00	16000.00
	Total	250		
R5	control	125	122.61	15326.00
	experimental	125	128.39	16049.00
	Total	250		
R6	control	125	116.45	14556.00
	experimental	125	134.55	16819.00
	Total	250		

Test Statistic <sup>a</sup>						
	R1	R2	R3	R4	R5	R6
Mann-Whitney U	6107.000	6416.500	7402.000	7500.000	7451.000	6681.000
Wilcoxon W	13982.000	14291.500	15277.000	15375.000	15326.000	14556.000
Z	-3.018	-2.457	-.721	-.548	-.634	-1.988
Asymp. Sig. (2-tailed)	.003	.014	.471	.584	.526	.047

a. Grouping Variable: Respondent type

Tabel 2 -Mann-Whitney Test – Romanian language discipline results

### Mann-Whitney Test

		Rank		
	Respondent type	N	Mean Rank	Sum of Ranks
M1	control	125	139.27	17409.00
	experimental	125	111.73	13966.00
	Total	250		
M2	control	125	136.85	17106.00
	experimental	125	114.15	14269.00
	Total	250		
M3	control	125	128.92	16115.50
	experimental	125	122.08	15259.50
	Total	250		
M4	control	125	122.70	15338.00
	experimental	125	128.30	16037.00
	Total	250		
M5	control	125	122.76	15345.50
	experimental	125	128.24	16029.50
	Total	250		
M6	control	125	116.64	14580.50
	experimental	125	134.36	16794.50
	Total	250		

Test Statistic <sup>a</sup>						
	M1	M2	M3	M4	M5	M6
Mann-Whitney U	6091.000	6394.000	7384.500	7463.000	7470.500	6705.500
Wilcoxon W	13966.000	14269.000	15259.500	15338.000	15345.500	14580.500
Z	-3.046	-2.496	-.752	-.613	-.600	-1.945
Asymp. Sig. (2-tailed)	.002	.013	.452	.540	.548	.052

a. Grouping Variable: Respondent type

Tabel 3 -Mann-Whitney Test – Math discipline results

The *T-Statistics Test* Tables presented the Mann-Whitney test values for the two groups tested simultaneously: the experiment group and the control group. In our case, it is obvious that there is no statistically significant difference in confirming the positive influence on school achievement between the two groups.

Starting with the fourth test (R4) the experiment group shows an increase in the results compared to the control group. This increase is maintained for both test five and the last test.



## Discussions

*As sedentary lifestyles increase* among children worldwide, according to the World Health Organization, physical activity, so beneficial to health and learning, is becoming an important part of the educational process.

Schools play a key role in encouraging children to engage in physical activity both at school and outside of school hours. It is necessary for schools to accept the importance of physical activity in the child's development and also to be aware that it can be done in any context and without complex equipment.

Our culture treats the mind and body as if they are two separate entities, while physical activity may be considered an "antidote" for improving well-being, memory, attention, self-esteem, social skills.

School achievement is one of the most important areas of child development, especially in pre-teens. Despite the continuous dramatic increase in children's illness risks, there are fewer and fewer educational sports projects to make way for academic activities. This negative trend continues despite the obvious positive influence of the movement on school achievement.

*Creating positive models of physical activity* by organizing different projects, provides good experiences, and supports autonomy and the development of certain skills. Starting from outlining the theoretical framework, by referring to numerous international studies conducted on this topic, along with creating a working model, a starting point for the future is set, a model that can be continuously improved depending on the types of problems encountered.

*The kinesthetic class* is a concept explored and used very little in the Romanian education system. The gradual replacement of *traditional furniture with ergonomic furniture* must be a priority in order to reduce the percentage of students who end up, over time, with spine deformities.

We believe that it is necessary to move *from ego-system to ecosystem* by creating a *network of experts* from the educational and medical field, who would work together to identify practical premises for launching a national strategy to combat sedentary lifestyles.

Another important aspect is *teacher training*. Research showing a positive link between physical activity and the teaching-learning process should be of immediate interest to teachers and parents. There are many ideas for integrating physical activity into a regular school day. However, it is important that such physical activity would be implemented in a way that leads to the adoption of a healthy and physically active lifestyle from

childhood and adolescence, as it will lead to a decrease in sedentary lifestyle at adult age.

This research can be a starting point for future studies. As there is an increase in school results starting with the fourth test, in the second semester, we propose that the next longitudinal study be conducted for more than one year in order to analyze whether the difference is significant.

### **Limits and future directions**

The present research analyzed several groups of primary school students in order to create a representative sample. However, a sample that is not randomly selected for the entire population is not a representative one. The selected students are only from Bucharest, the sixth sector, so they cannot be a nationally representative group.

Among the limitations identified, I mention the errors in data collection or inconsistency of teachers, the anticipation of greater effects than those which actually occurred, and the researcher's lack of control on the research sample, which is large (250 students, 13 teachers, and two healthcare professionals).

Also, in the focus group, participants may offer answers that are different from those they had before the group interview. Among the causes, we can mention: the context effect (the attitude may be different when they feel studied) (Bernard, 2006) and the herd effect (people have the tendency to provide answers similar to those of the other participants).

The rolling of the experiment may have as a limitation the *type III error*, which involves "correct rejection of the null hypothesis, followed by the incorrect assignation of the cause (Raiffa, 1968, apud Popa, 2008, pp. 107)".

Time was also a limitation; we believe that such research must be a longitudinal study of at least three years to see if significant changes occur.

What can be considered an appropriate step in order to continue this research in the future is to investigate the impact of physical activity on the body mass index by calculating it both at the beginning and at the end.

The next stage could be a study that will explore the cumulative effect of well-being and learning over a longer period of time, given that physical activity has an impact on academic achievement.

It is important that the study on this topic continues because the quality of physical activity in schools can influence school achievement and the well-being of a person. In the future, research needs to focus also on understanding the dependence relationship between physical activity and its

positive effects on health and cognition. For example, it is necessary to determine what is the pillar of increasing school achievement - whether it is the impact of socio-economic factors, which are often associated with increased physical activity, or whether it is the awareness of the benefits of physical activity that lead to improved school results. Lastly, we believe that more research is needed on students' motivation and how they perceive physical activity. Is there a positive correlation between the two variables? If so, how does this influence school achievement? If students are involved in the educational process and enjoy it (through the use of physical activity), they are more motivated to complete work tasks and, therefore, are more likely to achieve higher academic results based on evaluations.

### **Conclusions**

There are no longitudinal interventions that are a replica of the existing ones or that confirm the results. Students may be exposed to other factors that influence their physical activity or school results. These factors could be family problems, social relationships, eating habits, changes in the school curriculum, and different stages of growth in children of the same age. In our case, it is obvious that as the student's age increases, the body mass index is higher, exceeding its normal value. From a statistical point of view, there is no significant difference in confirming the positive influence on school achievement between the two groups. Starting with the fourth test (R4) the experiment group shows an increase in the results compared to the control group. This increase is maintained for both test five and the last test.

Plato said that "in order to succeed in life, man has two means: education and physical activity. They must not be taken separately, one for the soul and one for the mind, but together."

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