TEACHING STAFF AND SCHOOL POPULATION: MAJOR TRENDS IN ROMANIA'S PRE-UNIVERSITY EDUCATION SYSTEM

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Abstract
The functioning of each educational system, at all levels, is based on a qualitative human resource for the coherent implementation of strategies. Teachers represent the essential resources for the effective implementation and realization of educational policies and classroom objectives. The shortage of the HR within the educational system reduces the performances of pupils. In this paper we aim to investigate the evolution of indicators that illustrate the human resources involved in the educational process in Romania, namely teaching staff and school population. Therefore, we conducted an empirical investigation, collecting data on human resources in education that were subject of statistical processing. The conclusions show that the trend of declining school population is more pronounced than the trend of reducing teaching staff, educational expenditures for the pre-university education system have decreased, and the average number of teaching staff per school has increased due to the merging of several schools, especially in rural areas, as a result of the increase in school population.

Keywords
Pre-university education system, teaching staff trend, school population trend, educational expenses.

JEL Classification
O15, I20

Introduction

The development and support of teachers are an important functions of the inspectorates and school organizations, according to the economic and educational reasons. As stated by the OECD "creating a stronger workforce in the education system is not an easy task" (OECD, 2009, p.48). In Romania, education sector challenges with many important problems (Bocean

and Sitnikov, 2015) as a result of underfunding the educational system. Although there has been an increase since 2016, spending on education remains low.
The teachers' payrolls in Romania are among the lowermost in Europe for all categories of teachers. Starting with January 2011, the basic salaries have recorded significant increases, however, still being among the lowest in Europe. A bonus system has been created to encourage teachers to work in rural areas (OECD, 2005, 2012), in order to prevent the depopulation of rural schools and to increase the quality of the educational act at the rural level.
A small number of measures related to teacher training are aimed at improving the recruitment and initial training process (Bocean, 2007; Varzaru and Varzaru, 2009; Stanciu et al., 2010; Barbu and Barbu, 2012; Varzaru and Varzaru, 2016). The recruitment system adopted in 1997 is still in place. The process of employment in primary and secondary education is based on an annual competitive examination - the tenure exam. Anyone who meets the compulsory requirements set out in the teacher status can participate. Those who passed this exam are then assigned according to options using a computer system (OECD, 2009). The difficulty of the tenure exam, as well as the lack of desire of teachers to work in rural areas, is a problem in the recruitment process and provision with capable teachers in rural schools.
The school population is in continuous decline due to low birth rates and the emigration of young people to Western European countries (Eurydice, 2015). There is also a trend of depopulation of the rural environment by concentrating the population in the urban environment (Eurydice, 2004).
In this paper, we intend to investigate the evolution of indicators that illustrate the HR in the Romanian educational system: the evolution of the teaching staff, the evolution of the school population, as well as the evolution of the level of expenses allocated for the pre-university education system. The paper work is systematized into four sections. The second section establishes the methodological framework. The third section presents an analysis of teaching staff' and school population trend. The fourth section draw the conclusions.

Research methodology

Starting from the conclusions of the previous research in this area, we elaborated two hypotheses concerning the trends of HR indicators in the Romanian educational system:
H1. The teaching staff has recorded a reduction in recent years, correlated with the school population trend and budgetary restrictions.
H2. The average number of teaching staff on school units increased as a result of the merging of some schools or the liquidation of other schools, being influenced by the school population and the degree of pupils' enrollment.
Based on the results of the hypothesis research we draw some recommendations concerning the HRM at pre-university level in Romania. As research tools we will use descriptive statistics and analyses of correlations among variables to identify their influences, as other authors have done in their research (Enescu et al., 2011; Pîrvu et al., 2018).

Results and discussions

In order to investigate the validity of the hypothesis H1 we collected for the period 2003-2017 at the level of Romania data that characterizes the following indicators: the teaching staff - TS, the school population - SP, the percentage of educational expenses in total budget revenues PEEBV, the percentage of educational expenses allocated reported to GDP – PEEGDP. The last two indicators are used to illustrate budget constraints.
The synthetic situation on teaching staff and school population for the period 2003-2017 in Romania is shown in table 1.

Table no. 1 Evolution of the teaching staff and the school population in Romania

	School population	Teaching staff
2003	3214999	216550
2004	3108634	219716
2005	2996029	213736
2006	2911213	210180
2007	2846904	207537
2008	2781039	205200
2009	2735424	199254
2010	2682489	185854
2011	2610022	181731
2012	2688590	182548
2013	2649040	184372
2014	2615722	181174
2015	2553861	175410
2016	2524399	174244
2017	2497768	174474

Source: Data collected and processed based on INS (2019)

To illustrate these evolutions, fig. no. 1 exposes the percentage changes of these indicators during the period 2004-2017, using as a basis the 2003 values.

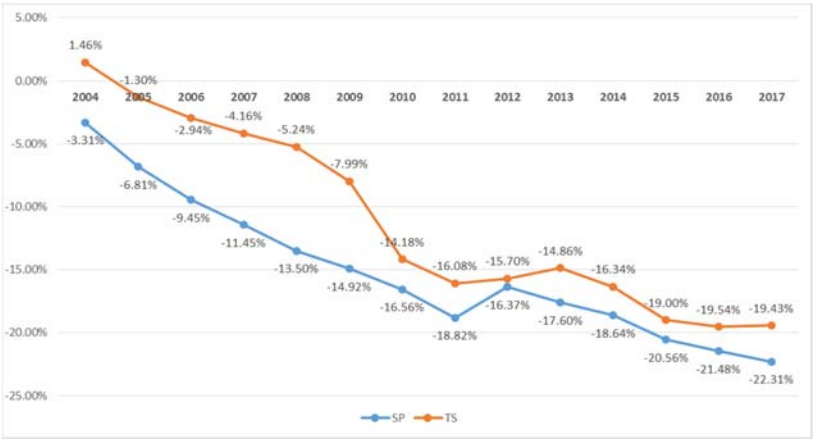

Fig. no. 1. Changes of the teaching staff and the school population (percentages, 2003 - base year)

Source: Data collected and processed based on INS (2019)

Analyzing the data in table 1 and fig. no. 1, a clear trend of both indicators can be observed within the selected period. Both indicators show a sharp decrease, interrupted in 2012, a more pronounced shrinkage of school population. The school population follows the decreasing demographic trend while also influencing the teaching staff trend. Other factors likely to influence the teaching staff number arise from the economic area of budgetary restrictions.
To detect the correlations among teaching staff and these factors, we have selected two indicators that exemplify the state of the budgetary allocations for education, indicators calculated as rates from the total budget revenues and from the GDP, to counteract the effects of nominal increases in educational expenses: the percentage of educational expenses in total budget revenues and the percentage of educational expenses allocated to pre-university

education reported to GDP. The percentage of educational expenses in total budget revenues (PEEBV) was calculated as a ratio between the total budget revenues for each year and the expenses allocated to education in that year, using data series from the TEMPO online database (National Institute of Statistics). The percentage of educational expenses allocated reported to GDP (PEEGDP) is calculated by reporting the expenses to the total GDP, the data being taken from the Education and training database (Eurostat, 2019).
The trends of these two indicators (PEEBV and PEEGDP) is shown in table 2.

Table no. 2 Evolution of indicators from the economic area of budgetary restrictions

	Percentage of educational expenses in total budget revenues	Percentage of educational expenses allocated reported to GDP
2003	15.0	2.02
2004	14.8	1.93
2005	15.6	1.93
2006	19.0	2.02
2007	19.4	1.97
2008	19.1	2.36
2009	17.8	2.30
2010	13.6	2.31
2011	11.4	1.86
2012	11.2	1.56
2013	11.4	1.55
2014	12.4	1.62
2015	12.0	1.71
2016	12.2	1.69
2017	13.0	1.53

Source: Data collected and processed based on INS (2019) and Eurostat (2019)

To detect the influence of school population, PEEBV and PEEGDP on teaching staff number we calculated correlations recorded among the values of these measures in the period 2003-2017 (Table 3).
The analysis of the correlations from table 3 show that TS is strongly correlated with the school population and PEEBV and average correlated with PEEGDP. We observed that pupils' number significantly influences the number of teaching staff, if the rate pupils-teachers remain unchanged.
PEEBV expresses the national policy at the level of education, illustrating the funds that are allocated for education, both for human resources and for what materials. PEEGDP has an average correlation due to the fact that, even during periods of economic crisis, the amount of expenditure allocated to education has an increasing evolution even if the denominator of this rate (GDP) has a decreasing evolution.
Using the data analysis we can conclude that the hypothesis H1 is validated for the period studied (2003-2017). The teaching staff' trend correlates with pupils' trend and the size of the budget allocations, which means that a return of the demographic trend or an increase of the budget allocations will lead to a teaching staff increase.

Table no. 3 Correlations among the evolution of teaching staff, school population, and percentages of educational expenses reported to budget revenues and GDP

		Teaching staff	Number of school units	Percentage of educational expenses in total budget revenues	Percentage of educational expenses allocated reported to GDP
TS	Pearson correlation	1	0.945**	0.726**	0.566*
	Significance		0.000	0.002	0.028
	Values	15	15	15	15
SP	Pearson correlation	0.945**	1	0.505	0.424
	Significance	0.000		0.055	0.115
	Values	15	15	15	15
PEEBV	Pearson correlation	0.726**	0.505	1	0.715**
	Significance	0.002	0.055		0.003
	Values	15	15	15	15
PEEGDP	Pearson correlation	0.566*	0.424	0.715**	1
	Significance	0.028	0.115	0.003	
	Values	15	15	15	15
**. Strong correlation; *. Average correlation					

Source: Developed by the author on the basis of data collected from INS (2019) and Eurostat (2019)

In order to investigate the validity of the H2 hypothesis, we collected for the period 2003-2017 following measures: teaching staff - TS, number of school units - NS, the average number of teachers per school unit - ANT, the school population - SP, the degree of enrollment in education - DEP. The values of these variables is shown in Table 4.

Table no. 4 Evolution of the measures concerning teaching staff, school units, school population and degree of education enrollment in education

	Teaching staff	Number of school units	Average number of teachers per school unit	School population	Degree of enrollment in education
2003	216550	10274	21,1	3214999	73,18
2004	219716	8592	25,6	3108634	72,7
2005	213736	7989	26,8	2996029	74,43
2006	210180	6660	31,6	2911213	76,66
2007	207537	6393	32,5	2846904	81,1
2008	205200	6397	32,1	2781039	85,9
2009	199254	6439	30,9	2735424	86,5
2010	185854	5982	31,1	2682489	88,3
2011	181731	5729	31,7	2610022	83,9
2012	182548	5740	31,8	2688590	82,9
2013	184372	5784	31,9	2649040	82,6
2014	181174	5790	31,3	2615722	73,6
2015	175410	5776	30,4	2553861	72,4
2016	174244	5736	30,4	2524399	72,1
2017	174474	5748	30,4	2497768	72,3

Source: Data collected and processed based on INS, 2019

To detect the influence of school population and the degree of enrollment in education on the average number of teachers per school unit, we calculated the correlations recorded among the values of these indicators during the period 2003-2017 (table 5).

Table no. 5 Correlations among the evolution of teaching staff, school population, and degree of enrollment in education

		Average number of teachers per school unit	School population	Degree of enrollment in education
Average number of teachers per school unit	Pearson correlation	1	-0,746**	0,509
	Significance		0,001	0,052
	Values	15	15	15
School population	Pearson correlation	-0,746**	1	-0,151
	Significance	0,001		0,592
	Values	15	15	15
Degree of enrollment in education	Pearson correlation	0,509	-0,151	1
	Significance	0,052	0,592	
	Values	15	15	15
**. Strong correlation				

Source: Developed by the author on the basis of data collected from INS, 2019 and Eurostat, 2019

The analysis of the correlations in table 5 leads to the conclusion that the average number of teachers per school unit strongly correlated with school population, the latter significantly influencing the number of schools that will serve the pupils. The other variable analyzed (degree of enrollment in education) does not register a significant correlation with the average number of teachers per school unit.

Following the results we conclude that the hypothesis H2 is partially validated. The average number of staff per school unit increased as a result of the merging of some schools or the liquidation of other schools, being influenced by school population trend, but not by the degree of enrollment in education.

Conclusions

Inadequate management of staff in the pre-university education system has been identified as the main cause of the unwanted behaviors of teachers and pupils within the public education system (OECD, 2012).

In this paper we set out to investigate a series of HR indicators in the educational system of Romania. In this regard, we formulated two hypotheses that were subject to a validation process, during the research. Following the research, we found that the number of teaching staff correlates with the number of pupils and the size of the budget allocations. On the other hand the average number of teachers per school unit is influenced by direct factors (number of schools or teachers) or indirect but important factors such as central and local decision-makers.

As a result of the decreasing evolution of the school population, the number of teachers decreased, but with a lower rate of decrease, which led to an increase in the average number of teachers per school unit. Such an evolution must be doubled by an increase in teachers'

skills through formalized training programs, which will lead to an improvement in the quality of the educational process. We also recommend the establishment of measures to attract capable teachers to schools in rural areas. Therefore, the Romanian government must increase the share of GDP or annual revenue budget allocated to the pre-university education system, in order to increase the motivation of teachers by ensuring financial rewards aligned at the level of developed European countries.

In Romania, all levels of the education system confront with the problems of teacher shortage especially in rural areas. Educational process in pre-university level is essential for combating the phenomenon of early school leaving, a phenomenon that remains a problem in Romania. A more numerous and qualified human resource in the educational system can lead to better results by the current school population.

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