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UKRAINIAN TEACHER: ANALYSIS OF UKRAINIAN EDUCATION PROBLEMS (BY TALIS METHODOLOGY)

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Abstract. The article deals with the study of the results of the All-Ukrainian Monitoring Survey of Secondary School Teachers and Principals (by the TALIS methodology) and their underlying causes. The research Is guided by the following questions: Does the size of locality influence the distribution of teachers? What prevents Ukrainian teachers from applying constructivist teaching methods? The author answers these questions after testing the following hypotheses: (1) There is a direct causal link between the indicators of the distribution of teachers by gender, age, level of education, experience and the size of a particular locality; (2) The development of a constructivist approach to learning and teaching, namely the use of ICT by students, depends on the school conditions and the level of teacher training (teacher education level, academic mobility, lack of computer facilities). The purpose of the study is to test the research hypotheses, through the results of the Ukrainian survey of teachers by the TALIS methodology, and to identify the main factors that influenced the obtained results. The research objectives are: to explore the dependence of the teacher distribution on the size of locality; to study the underlying causes of dependence; to analyze the obstacles of applying effective teaching methods in Ukraine; to formulate assumptions about the nature of these hindrances.

Through correlation analysis, the author explores links between the distribution of teachers by gender, age, level of education, experience and the size of a particular locality. The regression analysis enables to research the dependence of the application of ICT and constructivist approach on the academic mobility, teacher's level of education, lack of technical facilities and to design a formula to identify the level of use of e ffective teaching methods by an individual teacher.

Through the results of the Ukrainian survey of teachers by the TALIS methodology, the author managed to prove the hypothesis on a direct causal relationship between the distribution of teachers by sex, age, level of education, experience and the size of a particular locality. The most significant interdependence (coefficient – 0.99) was identified with an indicator that reflects the gender imbalances in the teaching profession primarily resulted from low prestige of this occupation and the population distribution by gender characterized by the predominance of women over men (53.7%).

The hypothesis on the dependence of the development of a constructivist approach to learning and teaching, namely the use of ICT by students, on the school conditions and the level of teacher training (teacher education level, academic mobility, lack of computer facilities) was only partially proved, since, due to the low level of academic mobility, this indicator turned out to be insignificant for the Ukrainian education system.

Key words: ICT, the distribution of teachers, size of locality, technical facilities, academic mobility, level of education, constructivist teaching methods, educational environment

Анотація. Статтю присвячено аналізу результатів Всеукраїнського опитування директорів та вчителів за методологією TALIS та обґрунтуванню основних причин отриманих результатів. Автор статті досліджує питання: Чи впливає розмір населеного пункту на розподіл вчителів? Чому в Україні стримується використання конструктивістського педагогічного підходу? Відповіді на ці питання надано після перевірки наступних гіпотез: 1. Між показниками розподілу вчителів за статтю, віком, рівнем освіти, досвідом та показником розміру певного населеного пункту існує прямий причинно-наслідковий зв'язок; 2. Показник рівня розвитку конструктивістського підходу до навчання, зокрема використання учнями ІКТ, залежить від шкільних умов та рівня підготовки вчителя (рівень освіти викладача, мобільність педагогічного складу, нестача комп'ютерних засобів у навчальному закладі). Використовуючи метод кореляційного аналізу, автор досліджує залежність показників розподілу вчителів (за статтю, віком, рівнем освіти, досвідом) від розміру населеного пункту. Регресійний аналіз уможливлює вивчення залежності показника використання ІКТ від рівня освіти та мобільності викладача, забезпеченості школи необхідними технічними засобами та виведення формули розрахунку рівня використання активних засобів навчання окремим вчителем. За допомогою результатів моніторингового опитування, проведеного за методологією TALIS, дослідникові вдалося довести гіпотезу про наявність прямого причинно-наслідкового зв'язку між показниками розподілу вчителів за статтю, віком, рівнем освіти та досвідом та показником розміру певного населеного пункту, при чому найбільша взаємозалежність (коефіцієнт – 0,99) виявлена з показником, що свідчить про наявність гендерного дисбалансу викладачів, сформованого через низький престиж роботи вчителя та загальний розподіл населення України за статтю, з перевагою кількості жінок (53,7%). Гіпотеза про залежність показника рівня розвитку конструктивістського педагогічного підходу від освітнього середовища та рівня підготовки вчителя була доведена лише частково, так як через недостатній розвиток системи мобільності в Україні цей показник виявився несуттєвим для української освітньої системи.

Ключові слова: ІКТ, розподіл вчителів, розмір населеного пункту, технічні засоби, академічна мобільність, рівень освіти, конструктивістський підхід до викладання та навчання, освітнє середовище.

Introduction.

Nowadays, one of the characteristic features of the development of most national

economies is the process of their gradual intellectualization. Hence, the further economic and social development is believed to have close links with the dominance of intellectual services, high-tech, computer and information industries in the GDP composition. The presence of innovation competition makes the factor of "knowledge" of exceptional importance for the country economic growth and competitiveness in the global marketplace. Intellectual activity and human capital formation are getting more and more critical, as well. This fact leads to the growing role of education and science and makes the research on the current state of the national educational system relevant for ensuring its efficient reforming. To ensure effective Ukrainian education reforms it is vital to deepen knowledge on the socio-professional status of the modern Ukrainian teachers, the educational environment they operate in and to study the problems of the educational system of Ukraine.

Research questions and hypotheses.

The reforming of Ukrainian education presents us with the questions:

1. Does the size of locality influence the distribution of teachers?

2. What prevents Ukrainian teachers from applying constructivist teaching methods?

We will try to answer these questions after testing the following hypotheses:

1. There is a direct causal link between the indicators of the distribution of teachers by gender, age, level of education, experience and the size of a particular locality;

2. The development of a constructivist approach to learning and teaching, namely the use of ICT by students, depends on the school conditions and the level of teacher training (teacher education level, academic mobility, lack of computer facilities).

The research purpose and objectives.

The purpose of the study is to test the research hypotheses, through the results of the Ukrainian survey of teachers by the TALIS methodology, and to identify the main factors that influenced the obtained results.

The research objectives are: 1) explore the dependence of the teacher distribution on the size of locality; 2) study the underlying causes of dependence; 3) analyze the obstacles of applying effective teaching methods in Ukraine; 4) to formulate assumptions about the nature of these hindrances.

Research methodology.

Quantitative and statistical methods serve as the methodological framework of the study. The results of the All-Ukrainian Monitoring Survey of Secondary School Teachers (by the TALIS methodology) served as the primary source of data. The other data sources were the UNESCO Institute of Statistics and the State Statistics Service of Ukraine. All the collected data were presented in the form of tables and graphs and used to identify specific trends in the development of education in Ukraine and to test research hypotheses.

Correlation and regression analyses build the analytical framework of the research. Through correlation analysis, we managed to reveal the interdependence between the distribution of teachers and the size of locality. Three groups of possible results were identified depending on the correlation coefficient: 0.1-0.3 – small correlation, 0.3-0.5 – moderate correlation, 0.5-1 – strong correlation. Regression analysis was applied to explore the dependence of the application of effective teaching methods on specific aspects of the learning environment and the teacher's personality, such as academic mobility, level of education, lack of technical facilities.

Findings.

The impact of the size of locality on the teachers' distribution. We hypothesised that there

was a direct causal link between the indicators of the distribution of teachers by gender, age, level of education, experience and the size of a particular locality [tab. 1]. (Shchudlo, Zabolotna & Lisova, 2017).

Table 1

Correlation matrix of teachers' distribution and size of locality

	Population	% of female teachers	Teachers under the age of 25	25-29 years	30-39 years	40-49 years	50-59 years	Over 60 years old	Less than 5 years of work experience	More than 5 years of work experience
Population	1									
% female teachers	0,99	1								
Teachers under the age of 25	0,36	0,34	1							
25-29 years	-0,68	-0,70	0,42	1						
30-39 years	-0,90	-0,89	-0,72	0,31	1					
40-49 years	-0,86	-0,87	0,15	0,96	0,56	1				
50-59 years	0,92	0,93	-0,01	-0,91	-0,67	-0,98	1			
over 60 years	0,96	0,97	0,10	-0,85	-0,75	-0,96	0,99	1		
Less than 5 years of work experience	-0,81	-0,82	0,24	0,98	0,48	0,99	-0,97	-0,93	1	
More than 5 years of work experience	0,81	0,82	-0,24	-0,98	-0,48	-0,99	0,97	0,93	-1	1
Associate Degree	-0,81	-0,82	0,24	0,98	0,48	0,99	-0,97	-0,93	1	-1
Bachelor`s or Master`s Degree	0,81	0,82	-0,24	-0,98	-0,48	-0,99	0,97	0,93	-1	1

The most important indicators of our research were highlighted to provide the visibility of the results of correlation analysis. We can conclude that there is a strong interdependence between the population and the distribution of teachers by gender (correlation coefficient - 0.99), and therefore the increase in the population leads to the increase in the number of female teachers. From our point of view, the reasons for this are as follows:

1. According to the data of the State Statistics Service of Ukraine, the number of women exceeds the number of men, and women account for 53.7% (22 million 658.6 thousand people) and men -only for 46.3% (19 million 558.2 thousand people) of the population of Ukraine. Moreover, the majority of the country population (69%) lives in cities, and only 31% of the population lives in rural areas. Thus, the increase in the size of the locality leads to an increase in the number of women, and as a result, to the increase in the number of female teachers.

2. In our opinion, the prestige of the teaching profession also plays an indirect role in this process. By gender stereotypes, a male being is the head of the household, the "breadwinner". These stereotypes give rise to the idea that men are to have a prestigious job and high wages. Based on the results of the monitoring survey, less than half of Ukrainian

principals (43.2%) believe that society values the teaching profession. We can also state that at the present stage the salary of a Ukrainian teacher is lower than the average salary in the country. Therefore, it seems reasonable to assume that men are searching for better paid and more prestigious jobs. It is much easier to cope with this task in the city; consequently, the number of male teachers decreases with the increase in the size of the locality (Moskvina, 2018).

In our study, we indicated a strong positive correlation between the population and the number of older teachers (correlation coefficient is 0.92). Consequently, the share of working pensioners increases with the size of the locality where schools are situated (from 9.9% for localities with a population under 15 000 – up to 14.7% for cities with a population of over 100 000). Factors that contribute to this situation overlap to a large extent with those that influence gender imbalances in the teaching profession, namely:

•As with the gender distribution of teachers, money plays an important role. According to our calculations, 79.1% of pensioners receive less than UAH 3,000, and only 6.6% of pensioners receive more than UAH 5,000 monthly. Concerning the situation and prices within the country, it is almost impossible to live on such an amount of money, so many retirees are forced to keep on working. Life in a large city is more expensive than life in small localities, and this is the reason for the increase in the number of working pensioners with the increase in the size of the locality [Fig. 1];

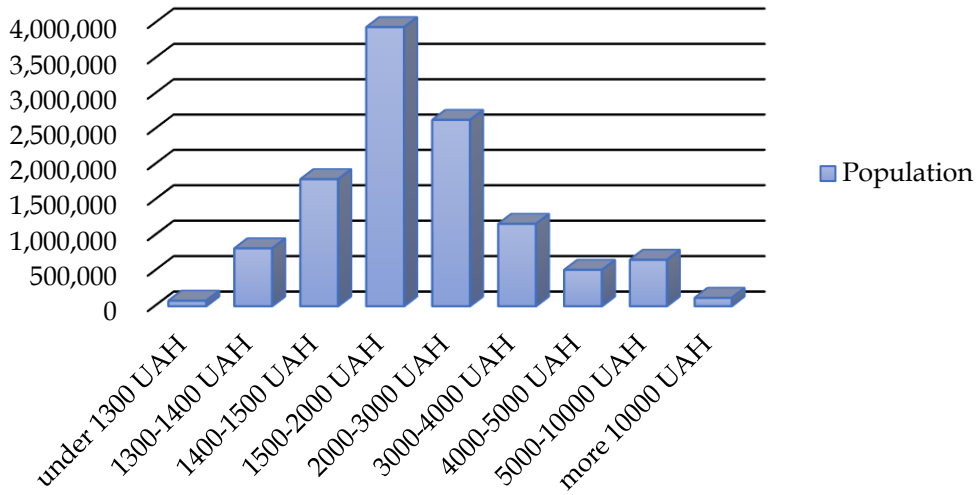

Figure 1. Pension payments in Ukraine, UAH (Ministerstvo finansiv Ukrainy)

It seems probable that, as with the first indicator, with the increase in the total population, the number of senior citizens, which currently accounts for 29% of the total population of Ukraine, increases, and as a result – the number of old teachers;

• As in the case of the number of male teachers, the lack of young specialists may be connected with the low prestige of the teaching profession. As already mentioned, there are more opportunities for finding more prestigious and fulfilling careers in a city. That is why fewer young people decide on working at school. Moreover, as a result – the number of employees of retirement age, due to the lack of opportunity to replace them with younger professionals, is growing.

• Wages of teachers are set by the national wage scale and the category of an employee. Thus, according to Annex 6 to the Order № 557 of the Ministry of Education and

Science of Ukraine, young professionals without previous work experience are considered as employees of the 10th or 11th category [tab. 2].

Table 2

Teacher's wage rates depending on the category

Category	*Wage coefficient*	*Wage rate since 01.01.2018, UAH*
1	1,00	1 762
2	1,09	1 921
3	1,18	2 079
4	1,27	2 238
5	1,36	2 396
6	1,45	2 555
7	1,54	2 713
8	1,64	2 890
9	1,73	3 048
10	1,82	3 207
11	1,97	3 471
12	2,12	3 735
13	2,27	4 000
14	2,42	4 264
15	2,58	4 546
16	2,79	4 916
17	3,00	5 286
18	3,21	5 656
19	3,42	6 026
20	3,64	6 414
21	3,85	6 784
22	4,06	7 154
23	4,27	7 524
24	4,36	7 682
25	4,51	7 947

The average base salary of a young teacher is UAH 3,350, the average salary in Ukraine is about UAH 9141. Thus, it is unreasonable for young professionals to get a job at school when they are to find another job and earn almost 3 times as much as they would as a teacher.

While exploring the interdependence between the indicators of quality of teachers, namely the level of their formal education, and the size of the locality, we have identified that correlation between such level of education as junior specialist and the size of locality is both strong and negative. The relationship between the size of locality and Bachelor's or Master's Degrees is, on the contrary, strong and positive. We can conclude that population growth and an increase in the size of the locality lead to a rise in the number of employees with a higher level of formal education and the improvement of educational services. Furthermore, vice versa, a decrease in the size of the locality increases the number of employees who have Junior Specialist Diploma and a slight deterioration in teaching quality. The same results were obtained after analyzing connections between work experience and population. The larger the locality, the higher the number of teachers with

more than 5 years of work experience, and vice versa.

In our opinion, it makes no sense to consider in detail the causes of such phenomena, because they are quite clear. We only see the need to name several of them. We believe that this trend is caused by lower living standards, the lack or poor functioning of most information technologies and the Internet, the lack of career opportunities in rural areas. Under these conditions, the desire of young people, who obtained high-quality education in cities, to stay and work there instead of returning or moving to small towns and villages is quite understandable. We can also understand the desire of more experienced teachers to live and work in significant localities.

Development of a constructivist approach to learning and teaching in Ukraine. It is crucial to ensure the development and use of active teaching techniques aimed at the acquisition of new knowledge and development of new skills through active and collaborative activities, such as teamwork and group projects to improve the Ukrainian education system.

It has already been mentioned that our second hypothesis was that the development of a constructivist approach to learning and teaching, namely the use of ICT by students, depended on the school conditions and the level of teacher training. We have also designed a formula to identify the level of use of effective teaching methods by an individual teacher depending on the level of education, academic mobility and school environment [tab. 3].

Table 3

Dependence of the use of ICT by students on selected indicators

Model		*Coefficients*				
		Unstandardized coefficients		Standardized coefficients	t	Value
		B	Standard error	Beta		
1	(Constant)	2,697	,076		35,343	,000
	Level of education	-5,384E-5	,024	,000	-,002	,998
2	(Constant)	2,800	,095		29,437	,000
	Level of education	,001	,024	,000	,021	,983
	Lack of technical facilities	-,035	,019	-,030	-1,815	,070
3	(Constant)	2,595	,114		22,730	,000
	Level of education	,001	,024	,001	,061	,951
	Lack of technical facilities	-,031	,019	-,027	-1,644	,100
	Academic mobility	,177	,055	,054	3,247	,001

a. Dependent variable: ICT

Note: Adapted from: Shchudlo, Zabolotna & Lisova, 2017.

Through regression analysis, we have determined that the lack of proper computer facilities in most secondary schools has the most significant impact on students' implementation of ICT. The regression coefficient is – 0,35, which means that the relationship between the dependent variable (ICT) and independent one (lack of technical facilities) is inverse. The more acute the need for computers is, the fewer students use these facilities in the classroom, and vice versa. The lack of technical means presents the main

obstacle to mastering and implementing modern teaching methods in Ukraine. This problem is especially pressing in rural areas. Secondary schools located in large cities have, on average, 28 computers per institution, schools situated in mid-sized cities – about 22 computers, and rural schools only have 9. It may seem that since the number of students is smaller in rural schools, such a difference is not significant, but it is not entirely true (Samokhin, 2016).

There are multiple causes of this problem, of which the most important are:

1. Insufficient educational funding. The public spending on education has decreased from 7% to 5.1% of GDP over the past few years [Fig. 2].

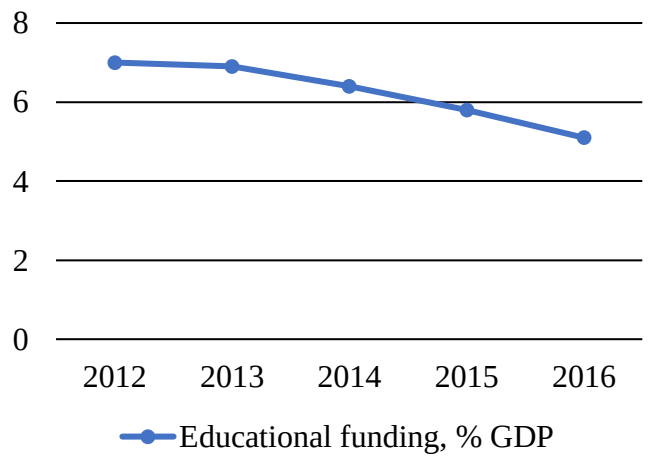

Figure 2. Educational funding, % GDP (Derzhavna sluzhba statystyky Ukrainy)

It is clear that city schools are more likely to be funded from the city or regional budget, the funding opportunities of villages are, in contrast, limited. Moreover, the problem of funding is not only connected with the amount of funding for education, but also with the inefficient use of funds by educational institutions, especially rural schools.

2.The poor conditions of school buildings. This problem is particularly acute in rural areas. The number of devices connected to the Internet may serve as an example. 19% of rural schools still do not have a single computer able to access the Internet. Such schools in urban areas comprise less than 2% (Samokhin, 2016).

In addition to that, the small computer rooms at some rural institutions prevent the accommodation of required equipment. As a result, computer systems are disassembled and used for various purposes, not related to the learning process. This situation led to the inefficient use of more than 232 000 UAH in 2007. Due to the lack of computer rooms or their non-compliance with sanitary standards, the total cost of computers not used to their full capacity is about 1.2 million. Moreover, the absence of the Internet prevents the use of technical facilities at the cost of 148 000 (Gribovsky, & Nikiforova, 2007).

In addition to the school environment, the quality of education obtained by a teacher also influences the implementation of ICT in the classroom. The relationship between these indicators is positive, which means that the higher the level of education is, the more the teacher uses effective teaching methods. It has to do with the fact that higher education is aimed at performing certain social functions, including the preparation of young people for active and meaningful participation in society, development of their professional skills and innovative thinking. According to a survey conducted by Ilko Kucheriv Democratic

Initiatives Foundation in 2016, 51% of respondents agreed that the main benefit of higher education was both professional and personal development. Thus, higher education institutions are to be responsible for the competences of teachers and their readiness to make innovative decisions. Individuals who lack the necessary qualifications fail to invent new activities and involve students in the learning process (Ilko Kucheriv Democratic Initiatives Foundation).

The Monitoring Survey by TALIS methodology has supported this conclusion by equipping us with the knowledge on the content of pedagogical education in Ukraine. The future teachers are able to take courses in teaching methodology, have a teaching internship. It means that professionals with higher education are more prepared to teach, develop professionally, implement a constructivist teaching approach in their classes [tab.4] (Shchudlo, Zabolotna, & Lisova, 2017).

Table 4

The distribution of Ukrainian teachers by the content of pedagogical education obtained

	Pedagogical education or specialised teaching training, %	*Subject content knowledge, %*	*Teaching methodology, %*	*Teaching internship, %*
East	98,5	85,6	86,0	81,0
West	98,1	83,5	83,7	80,6
Kyiv	98,7	86,5	87,3	82,1
North	98,1	86,1	85,6	81,0
Centre	98,8	78,0	80,0	78,9
South	98,2	73,0	72,6	72,6
National average	***98,3***	***82,5***	***82,9***	***79,7***

Note: Adapted from "Ukrainian Teachers and the Learning Environment. Results of All-Ukrainian Monitoring Survey of Secondary School Teachers and Principals (by the TALIS methodology)," by Shchudlo, S., Zabolotna, O. and Lisova, T., 2017. Copyright 2017 by the authors.

The shortage of qualified personnel presents one of the obstacles to the efficient use of modern technologies. According to UNESCO, there is a lack of professionals throughout the world. If current trends continue, about 33 countries will be suffering from a shortage of teachers of primary and secondary schools in 2030. Already, many schools are lowering their standards and hiring people with insufficient training, trying to fill this gap. As a result, in a third of countries, more than 25% of teachers fail to meet national standards (UNESCO Institute of Statistics).

Lack of qualified teaching staff forces teachers to teach subjects they are not qualified to teach. It, in turn, leads to an increase in the workload and poor- quality teaching of individual subjects. These factors prevent teachers from using a constructivist approach, and if measures are not taken to tackle these hindrances, the quality of education will remain unsatisfactory.

At the stage of hypothesizing, we considered academic mobility as a factor that might influence the use of ICT by students. Since active teaching techniques are widely applied in countries of North America and Europe, we expected that teachers who went abroad for professional purposes gained international experience in their using and involving students

in activities in the classroom. However, we failed to prove this part of our hypothesis. It may be caused by the low level of mobility in Ukraine, as according to Survey by TALIS methodology, 92.4% of respondents did not travel to other countries for professional purposes. Thus, this indicator is not significant for the Ukrainian educational system at the present stage.

Thereby, the formula to identify the level of use of effective teaching methods by an individual teacher in general is:

$$ICT = 2.8 + 0.01 * education\ level - 0.35 * lack\ of\ technical\ facilities$$

Conclusions and discussion.

The presence and constant intensification of competition in the global ICT market increase the role of education in economic growth and make it necessary to study and reform national education systems. Through the results of the Ukrainian survey of teachers by the TALIS methodology, we managed to prove the hypothesis on a direct causal relationship between the distribution of teachers by sex, age, level of education, experience and the size of a particular locality. The most significant interdependence (coefficient – 0.99) was identified with an indicator that reflects the gender imbalances in the teaching profession primarily resulted from low prestige of this occupation and the population distribution by gender characterized by the predominance of women over men (53.7%).

The hypothesis on the dependence of the development of a constructivist approach to learning and teaching, namely the use of ICT by students, on the school conditions and the level of teacher training (teacher education level, academic mobility, lack of computer facilities) was only partially proved, since, due to the low level of academic mobility, this indicator turned out to be insignificant for the Ukrainian education system. We do believe that this phenomenon still needs more detailed research and analysis.

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