

# Educational Value Added in lower secondary schools in Warsaw.

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## **Abstract**

Measuring Educational Value Added has had almost ten years of history in Poland. Examination results in lower secondary schools have been analyzed in a sample Polish city (Warsaw), but interpreted in the context of the city's districts, taking into account the above average results of lower secondary school graduates. At the same time, the attempt to measure economic effectiveness in the areas tested in final examinations in correlation with public expenditure proved once more that in a linear sense such correlation does not exist.

**Keywords:** educational value added, school results, school effectiveness

## **Introduction**

Extended research on Educational Value Added (EVA, Polish: EWD) has been carried out within the research project on Educational Value Added estimation methodology development. It is worth considering what kind of analyses, not only in local authority units, the results of external examinations in the context of EVA can be used for. Educational Leadership is a vision for education in the perspective of the future, which should build on the knowledge learned, resulting from past experiences. To be able to identify objectives and directions of development one must be able to draw conclusions from analysis and research. An example of this analysis is that development.

The International Standard Classification of Education (ISCED)<sup>1</sup>, introduced by UNESCO in 1997, places both Pol-

ish lower secondary schools and general secondary schools in the category of secondary schools, where lower secondary schools are marked ISCED-2, and general secondary schools – ISCED-3<sup>2</sup>. They are similarly categorized by the Polish Classification of Education Act<sup>3</sup>, and, in particular, annex 4 to the general education core curriculum ordinance<sup>1</sup> that treats lower secondary schools and general secondary schools that end in secondary school final examinations (Matura) as the 3rd and 4th level of general education (where primary school represents levels 1 and 2).

In the context of 2011 and 2012, final examinations in the abovementioned types of schools underwent minor modifications, which influenced the manner and range of their public presentation. In lower secondary schools, the final examination comprised two parts in 2011: (1) humanities and (2) mathematics and science. A foreign language part was also introduced as a pilot program. At the same time, examination results were published for the two obligatory parts. In 2012 the exam comprised five parts: Polish language, other humanities, mathematics, science and a foreign language. The presentation of results was analogous to the previous year, enabling their comparison with past results. At the same time, in general secondary schools the scope of examinations in the obligatory part did not change, but the way of presenting the

results was modified. In 2011, combined results for humanities and science were presented, and mathematics results were displayed separately. In most cases the results for science and mathematics were only slightly different. One of the possible conclusions was that knowing mathematics determines the results for other subjects in the group. In the following year, apart from the charts presented a year before, results for the Polish language examination were presented. Significant correlations between the results for this subject and other humanities were observed.

As the EVA value is connected with examination results of a given school in proportion to the country's average score, the school's achievements are presented on a correlation chart. Executive bodies of local authority units are obliged by the Polish Education System Act<sup>5</sup> to provide annual reports on the achievement of educational goals of a given unit in the previous school year, including test and examination results, to the decision-making body. Using data on the results of lower secondary school final examinations in Warsaw, which is available online, may exemplify the way of aggregating such results. Warsaw is a municipality on powiat (an administration unit of higher rank) rights, thus both types of schools are found there. What is more, the city had a two-degree organization, which makes data aggregation easier.

<sup>1</sup> [www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx](http://www.uis.unesco.org/Education/Pages/international-standard-classification-of-education.aspx)

<sup>2</sup> [www.uis.unesco.org/Education/ISCEDMappings/Pages/default.aspx](http://www.uis.unesco.org/Education/ISCEDMappings/Pages/default.aspx)

<sup>3</sup> Rozporządzenie Rady Ministrów z 6.05.2003 r. w sprawie Polskiej Klasyfikacji Edukacji – Dz. U. Nr 98 poz. 895

<sup>4</sup> Rozporządzeniu Ministra Edukacji Narodowej z 23.12.2008 r. w sprawie podstawy programowej wychowania przedszkolnego oraz kształcenia ogólnego w poszczególnych typach szkół – Dz. U. z 2009 r. Nr 4, poz. 17

<sup>5</sup> art. 5a ust. 4 ustawy z 7.09.1991 r. o systemie oświaty – Dz. U. z 2004 r. Nr 256, poz. 2571 ze zm.

The chart that we are going to use in the following analysis spreads along two axes: vertical (y), which illustrates EVA results, where the average result in Poland is 0, and this is where it intersects with the horizontal axis (x), on which results of students from a given population (community, school, class, etc.) are marked with points as a percentage of average scores for the country. Thus, the point of intersection with the y axis is 100%. It has been assumed by convention that the scores situating the population near the point of intersection represent neutral schools that have average results in the context of the country. The schools in the 1st quarter are success schools: their results are better than the country average and EVA is also above-average. It is influenced by many environmental factors, as well as those connected with students' personalities (potential), but also with the quality of a school's work (EVA). Schools whose results are found in the 2nd quarter are supporting schools: students' potential is lower than the country's average, but the school's work is superb. The 3rd quarter represents schools that require help: students' potential and EVA are below the country's average scores. Finally, the 4th quarter represents the results of students with above-average potential but attending schools that work poorly – these are schools of unused opportunities.

It is worth making two assumptions beforehand:

- EVA is not a legal measure and its results should not be treated as ultimate determinants;
- Lower secondary school final examination results are cumulated for three years and general secondary school final

examination results in 2011 only for two years because EVA had been monitored for only two years in those schools.

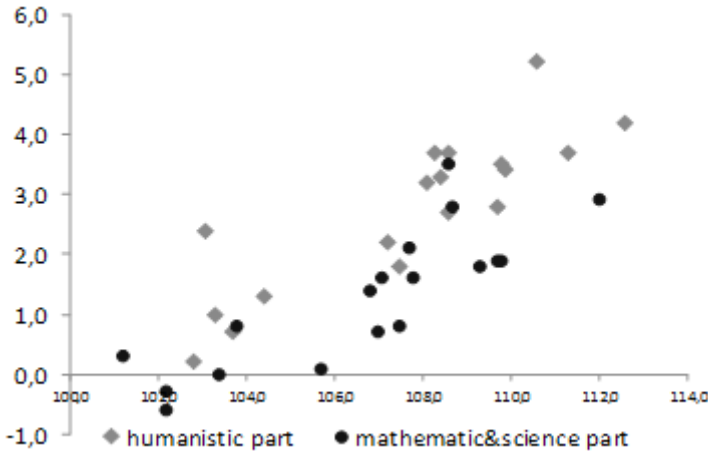
### *Lower secondary schools*

The EVA team at the Central Examination Board considered over 35 000 examination results from 194 schools in Warsaw. To start with, it is worth noting the results of humanistic as well as mathematics and science parts in different districts and how they compare to country-wide results (see Figure 1). The charts below do not include district names as their aim is to present the method and not to create local rankings.

The results are impressive, just like the year before. This time, apart from two results in the humanistic part and five in the mathematics and science part, all the results are noted in the right upper quarter of the standard chart. So in the context of Warsaw's districts, a vast majority of schools in the city are success schools: the students' results range from 100% to more than 112% of average results in Poland and the Educational Value Added reaches up to 5.2 points. Let us also note the fact that the results from Warsaw form an educational ellipse. Of course, the analysis for individual districts could provide information on specific schools, but there are too many of them to present the city council with such detailed data.

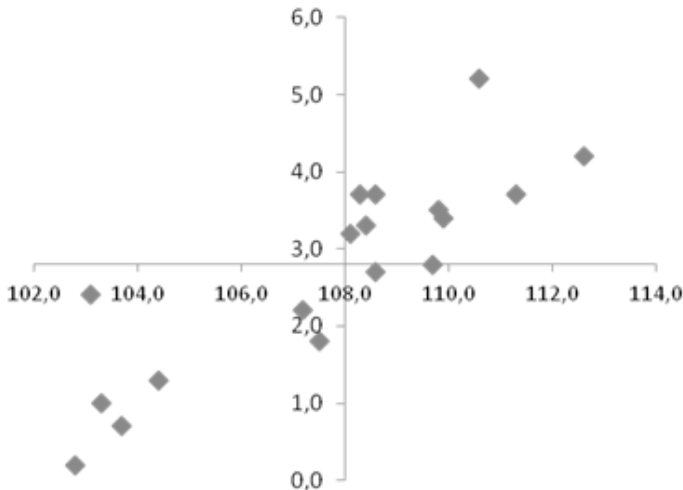
As average results for individual communities, poviats and provinces are available online, it is worth using this data – or at least its select part – to create reference points. Warsaw in this context represents a poviat level. Average examination results for the humanistic

**Figure 1.** Results of both lower secondary school final examinations in 2009-2011 for districts of Warsaw



**Source:** the author's own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

**Figure 2.** Results of the humanistic part of the lower secondary school final examination in 2009–2011 for districts of Warsaw



**Source:** the author's own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

part are 108.0%; 2.8 points, and for the mathematics and sciences part 107.0 %; 1.3 points. If we present the abovementioned results not on a reference frame for the whole country, but only for Warsaw, they will form a local picture of examination passing statistics and EVA in lower secondary schools in 2009–2011 (I would like to point here to the ellipse-shaped distribution of the results).

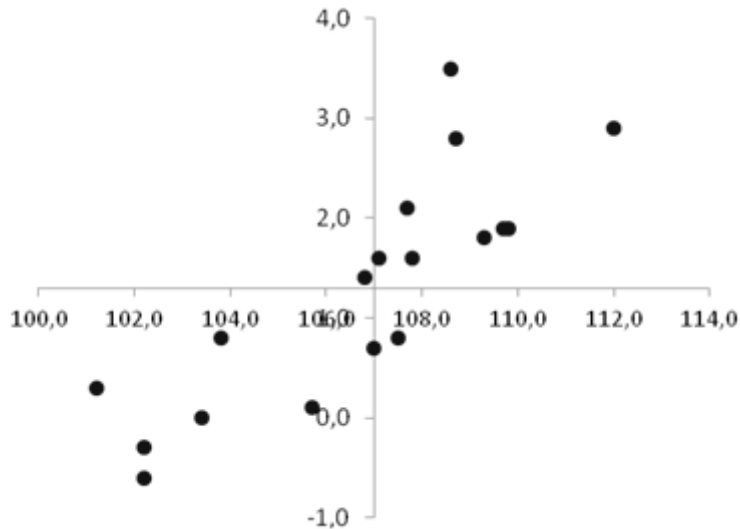
The point of intersection of the two axes (see Figure 2) shows the average scores for the city (108.0; 2.8). The chart resembles a standard chart for the whole country, where the axes intersect at the (100.0; 0.0) point. This time, in the scale of the city, we can see in which districts lower secondary schools get results higher than the average score for Warsaw and in which of them the scores

are below-average, within which measure and on what level. In the context of the whole country all lower secondary schools cumulated into districts have proved successful. However, on a local scale the conclusion is not that obvious.

The situation is similar in the case of the mathematics and science examination. The point in which the axes intersect (see Figure 3) shows the average scores for the whole city 107.0%; 1.3 points. What is more, it can be observed here in which districts lower secondary schools achieved scores above or below the local average for Warsaw.

The EVA team considered more than 35 000 examination results from 191 schools in Warsaw in 2010-2012. It is worth noticing how the scores for the humanistic as well as the mathematics and sciences

**Figure 3.** Results of the mathematics and science part of the lower secondary school final examination in 2009–2011 for districts of Warsaw



**Source:** the author’s own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

parts distributed in the context of individual districts in comparison with the results for the whole country (see Figure 4).

It is worth stating that the results are impressive. Apart from two scores from the mathematics and science part of the examination, all results are found in the upper right quarter of the standard chart. So in the context of Warsaw’s districts, all lower secondary schools in the city are success schools: students’ scores range from 100% to more than 113% of average country-wide scores and the Educational Value Added reaches up to 4.4 points. These results are comparable to the previous year’s scores.

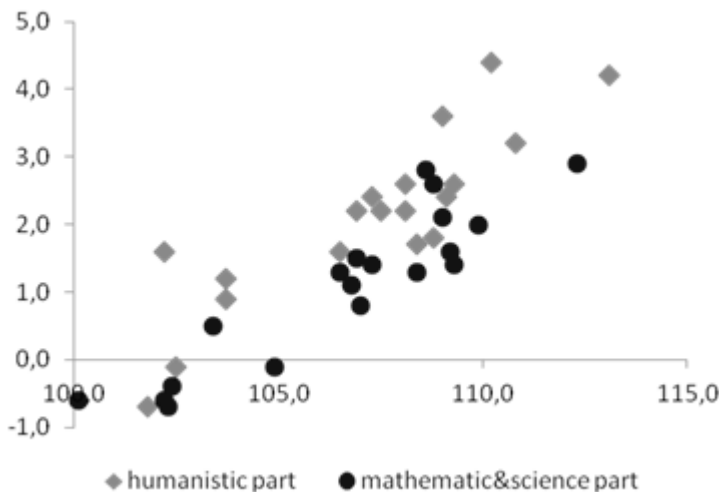
Local EVA reference points (for Warsaw) are 107.5%; 2.2 points for the humanistic part and 106.8 %; 1.1 points for the mathematics and science part. If

we present these results on a reference frame for Warsaw like we did last year, they will form a local, city picture of examination passing statistics and EVA in lower secondary schools in 2009–2011 (once more, I would like to point to the ellipse-shaped distribution of scores).

The point in which the axes intersect (see Figure 5) represents the average scores for the whole city (107.5; 2.2 points). The chart resembles a standard chart for the whole country. Also this time, at the scale of the city we can observe in which districts lower secondary schools achieved results higher than the average for Warsaw, and in which of them the scores are below-average, within which measure and on what level.

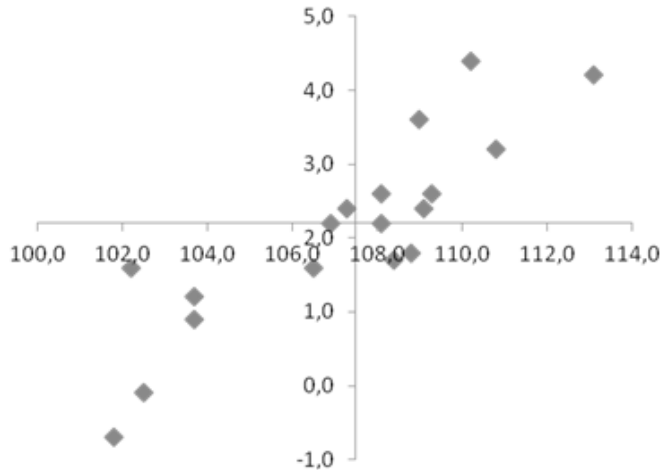
The situation is similar in the case of the mathematics and sciences part of

**Figure 4.** Results of both parts of the lower secondary school final examination in 2009–2011 for districts of Warsaw



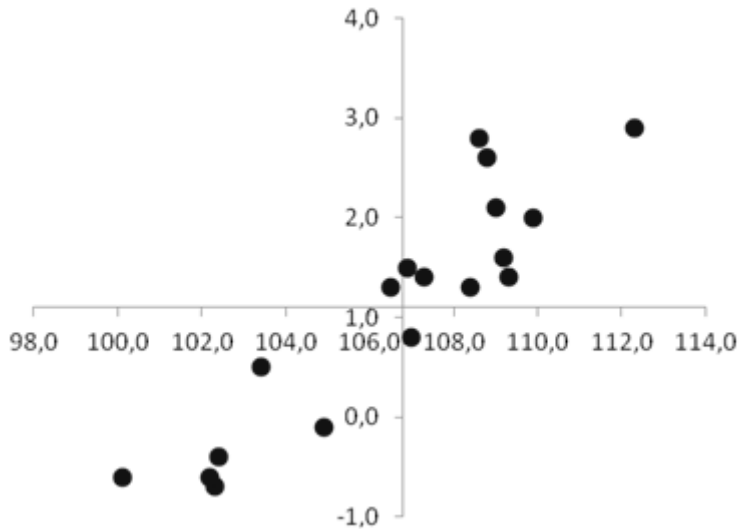
**Source:** the author’s own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

**Figure 5.** Results of the humanistic part of the lower secondary school final examination in 2010-2012 for districts of Warsaw



**Source:** the author’s own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

**Figure 6.** Results of the mathematics and science part of the lower secondary school final examination in 2010–2012 for districts of Warsaw



**Source:** the author’s own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>

**Table 1.** Comparison of lower secondary school final examination results in 2011-2012 in districts of Warsaw

District	Results of the lower secondary school final exam				Educational Value Added			
	Humanistic part		Mathematics and science part		Humanistic part		Mathematics and science part	
	2011	2012	2011	2012	2011	2012	2011	2012
Bemowo	108,6	108,1	107,0	107,0	2,7	2,2	0,7	0,8
Białołęka	108,6	108,1	107,1	107,3	3,7	2,6	1,6	1,4
Bielany	108,1	107,3	107,7	106,9	3,2	2,4	2,1	1,5
Mokotów	108,4	106,9	105,7	104,9	3,3	2,2	0,1	-0,1
Ochota	109,7	108,8	108,9	109,2	2,8	1,8	1,9	1,6
Praga Południe	107,2	106,5	106,8	106,5	2,2	1,6	1,4	1,3
Praga Północ	103,1	102,2	101,2	100,1	2,4	1,6	0,3	-0,6
Rembertów	103,7	102,5	103,8	103,4	0,7	-0,1	0,8	0,5
Śródmieście	112,6	113,1	112,0	112,3	4,2	4,2	2,9	2,9
Targówek	103,3	103,7	102,2	102,3	1,0	0,9	-0,3	-0,7
Ursus	102,8	101,8	102,2	102,2	0,2	-0,7	-0,6	-0,6
Ursynów	109,9	109,3	109,3	109,3	3,4	2,6	1,8	1,4
Wawer	18,3	109,0	108,6	108,6	3,7	3,6	3,5	2,8
Wesoła	110,6	110,2	108,7	108,8	5,2	4,4	2,8	2,6
Wilanów	109,8	109,1	107,5	108,4	3,5	2,4	0,8	1,3
Włochy	107,5	108,4	107,8	109,0	1,8	1,7	1,6	2,1
Wola	104,4	103,7	103,4	102,4	1,3	1,2	0,0	-0,4
Żoliborz	111,3	110,8	109,8	109,9	3,7	3,2	1,9	2,0
Warszawa	108,0	107,5	107,0	106,8	2,8	2,2	1,3	1,1

**Source:** the author's own calculations based on <http://gimnazjum.ewd.edu.pl/index.php>



the examination. The point of intersection of the axes (see Figure 6) shows the average results for the whole city, 106.8%; 1.1 points. It is also visible here in which districts lower secondary schools achieved results higher than the average for Warsaw, and in which of them the scores are below-average.

A compilation of examination results for two years indicates two tendencies:

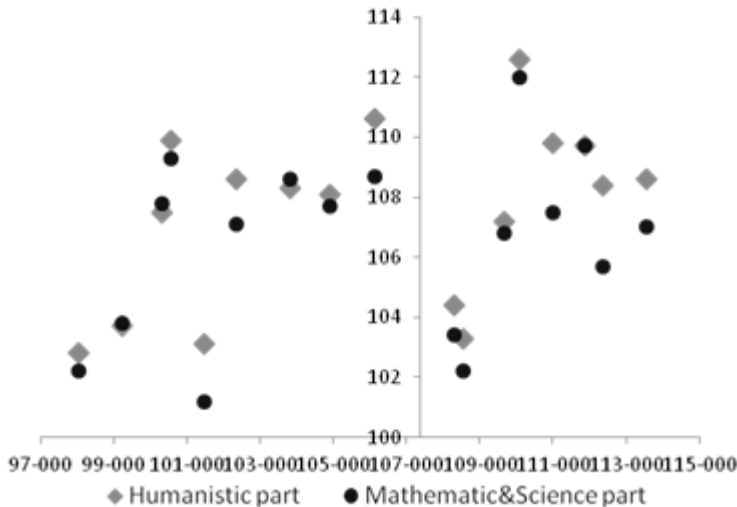
- 1) the scores for Warsaw in 2012 were lower than in the previous year, but it could result from the scale of difficulty of examination exercises, which are not yet standardized in Poland,
- 2) analyzing the results for individual districts, even when taking into account the remarks in point 1 above, leads to a conclusion that in many cases the scores were better than in the previous year, which does not prove that generalizing is accurate in this case.

A meeting with lower secondary school representatives provided new data on the results of external examinations in Warsaw in 2011-2012

**Conclusion**

Due to a relatively low estimated influence of a school’s work on students’ examination results (about 20%), which has been confirmed by many researchers from countries other than Poland, we will try to establish whether this determinant can be noted in the case of schools in Warsaw. In order to avoid referring to specific amounts, but also to the cost of educating a student, because in Polish conditions, where teachers’ remuneration is centrally established, these are the values that most influence the cost of educating students in a school unit, the values of this measure in relation to the local average are presented

**Figure 7.** EVA in the context of the cost of educating a student in a lower secondary school unit in relation to the average cost in the city in 2008-2011



**Source:** the author’s own calculations based on <http://gimnazjum.ewd.edu.pl/index.php> and data of the Department of Education, City Council of Warsaw

on the charts. The cost of the entire educational cycle, that is from 1 September 2008 to 31 August 2011, was taken into account. As the results for the next cycle are really similar, they were omitted.

As lower secondary schools in almost all districts of the city achieved average EVA higher than the country's average, it is worth noticing that the difference within the expenditure on educational students in lower secondary school units was 20% for extreme values (almost one standard deviation). The schools were able to achieve EVA close to 2 points by investing between 93% and 111% of the city's average expenditure on education, which may raise a question whether public investment must be so divergent in the face of such similar effects.

Such results do not justify too far-reaching conclusions about the influence of public expenditure on the effectiveness of education. The square of the Pearson correlation coefficient in the first case is  $R^2=1.14$ , and in the second example  $R^2=0.11$ , which clearly indicates that there is no linear correlation between the investigated qualities. Once again, it confirms the hypothesis that public expenditure does not translate directly into educational effectiveness. The example of Warsaw is clear evidence.

Thus, although comparative analysis of students' educational results in the context of their potential as well as in relation to the general potential of students in Poland, but also EVA in the context of country-wide EVA scores, may be an incentive to conclude about the quality of schools' work within the areas subject to examination as well as the students' educational activity, the attempt to draw

organizational and economic conclusions from this analysis, in the context of public expenditure must still remain unsolved.

## References

Brewer, D., J., McEwan P., J., (eds.), (2010), *Economics of education*, Elsevier

Ltd., Oxford-San Diego

Dolata, R., (2008), *Szkola – segregacje – nierówności*, (*School, Segregation, Inequality*), Wydawnictwo Uniwersytetu Warszawskiego, Warszawa

Dolata, R., (ed.), (2008), *Edukacyjna wartość dodana jako metoda oceny efektywności nauczania na podstawie wyników egzaminów zewnętrznych*, (*Educational Value Added as a Method of Assessment of Teaching Effectiveness on the Basis of External Examinations*), Centralna Komisja Egzaminacyjna, Warszawa

Dolata, R., Hawrot, A., Humenny, G., Jasińska, A., Koniewski, M., Majkut, P., Żóltak, T., (2013), *Trafność metody edukacyjnej wartości dodanej dla gimnazjów*, (*Educational Value Added Method Adequacy to Mmeasure Secondary Schools Effectiveness*), Instytut Badań Edukacyjnych, Warszawa

Dolata, R., Hawrot, A., Humenny, G., Jasińska-Maciążek, A., Koniewski, M., Majkut, P., (2014), *Kontekstowy model oceny efektywności nauczania po pierwszym etapie edukacyjnym*, (*Contextual model of assessment of effectiveness of teaching after the first educational level*), Instytut Badań Edukacyjnych, Warszawa

Hanushek, E., Machin, S., Woessmann, L., (eds.), (2011), *Handbook of the Economics of Education, vol. 3 and 4*, North-Holland, Oxford UK

Hanushek, E., A., Wossemann, L., (2007), *Education quality and economic growth*, The World Bank, Washington

Jakubowski, M., Pokropek, A., (2009), *Badając egzaminy. Podejście ilościowe w badaniach edukacyjnych*, (*Doing Research on Exams. Quantitative Approach in Educational Research*), Centralna Komisja Egzaminacyjna, Warszawa

Jeżowski A. (2012): *Ekonomika oświaty w zarządzaniu szkołą, wyd. II*. Warsaw. Dom Wydawniczy ABC a Wolters Kluwer Business

Johnes G., Johnes J. [edit.] (2004): *Inter-*

*national handbook on the economics of education*. Edward Elgar Publishing Ltd.

*Measuring improvements in learning outcome. Best practices to assess the value-added of schools*. OECD 2008

Piwowarski R. (2011): *Nauczyciele a osiągnięcia szkół (na podstawie danych TALIS i wyników egzaminu gimnazjalnego)*. Warsaw. IBE

Stożek E. (2013): *Wskaźniki edukacyjnej wartości dodanej dla gimnazjów*. Warsaw. IBE

