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IMPACT OF SOCIO-ECONOMIC HOME ENVIRONMENT ON STUDENT LEARNING ACHIEVEMENT

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ABSTRACT

Surveys on education intended to test student learning achievement often analyse which educational environment factors have the biggest impact on student achievement. Determination of such factors and assessment of their impact is important in order to control the change in student achievement. Most surveys showed that student achievement is influenced by economic home environment factors, and student's socio-economic status. The purpose of this article is to analyse impact of socio-economic home environment of Lithuania's students on learning achievement. Lithuania is a country of limited economic resources. Therefore, it is interesting to analyse whether student's home socio-economic environment has the same significant impact on learning achievements of Lithuania's students as the results of surveys in other – and often more rich – countries show. Moreover, it is important to analyse which specific aspects of home environment have stronger or weaker impact on student achievement. Quantitative approach was used for the research. Survey and test were used for data collection.

Keywords: socio-economic; home environment; student achievement.

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
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1. INTRODUCTION

Surveys on education intended to test student learning achievement often analyse which educational environment factors have the biggest impact on student achievement. Determination of such factors and assessment of their impact is important in order to control the change in student achievement.

Most surveys showed that student achievement is influenced by school, home environment factors and traits of a student. Impact of student's home environment factors, student's socio-economic status on study achievements has been holding scientific community's interest for a long time. The first and well-known publications about impact of socio-economic status of student's family on learning achievement were published 50 years ago: in the field of economics – "*Human Capital.*

A Theoretical and Empirical Analysis, with Special Reference to Education" *(*BECKER, 1964), sociology – "*Equality of Educational Opportunity*", better known as "*Coleman Report*" (COLEMAN, et al. 1966). The latter presents the results of the USA exhaustive survey (650 thousand students and their teachers participated in the survey) which state that student's home environment has a strong impact on learning achievement and which have been raising discussions among social scientists and encouraging further research in this field.

Impact of various educational environment factors, including socio-economic home environment of student, on learning achievement is analysed by all international surveys on education, such as OECD PISA (Programme for International Student Assessment), IEA TIMSS (Trends in International Mathematics and Science Study), IEA PIRLS (Progress in International Reading Literacy Study).

Impact of student's family status on achievement is usually analysed in the context of equal opportunities in order to provide better study conditions at school for those whose opportunities at home are not so good. Moreover, assessment of impact of student's home socio-economic factors on achievement is also important for more accurate assessment of school's value added for achievements.

- **Statement of the Problem**. Every country has its own socio-economic context. Therefore, it is significant to analyse the impact of socio-economic conditions of a specific country on student achievement and compare the results between various countries. Lithuanian education surveys do not

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ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

provide much analysis about socio-economic factors' impact on learning achievement. Lithuania is a country of limited economic resources. Therefore, it is interesting to analyse whether student's home socio-economic environment has the same significant impact on learning achievements of Lithuania's students as the results of surveys in other – and often more rich – countries show. Moreover, it is important to analyse which specific aspects of home environment have stronger or weaker impact on student achievement.

- **The purpose** of this article is to analyse impact of socio-economic home environment of Lithuania's students on learning achievement. The impact is analysed by different sections.

2. THEORETICAL BACKGROUND

The surveys analysing the impact of student's home environment and its strength on learning achievement are conducted in many countries and in all continents (MARTIN, et al. 2012; MULLIS, et al. 2012b; OECD, 2010a; OECD, 2010b).

Scientific literature shows that impact of home environment is measured in terms of achievements for various study subjects and in various age groups – mostly in school age groups, but sometimes even in the age group of 3–5 years (ANDERS, et al. 2012). Most surveys carried out are those analysing the impact of student's home environment in the field of mathematics (MULLIS, et al. 2012a; ELIJIO; DUDAITĖ, 2005; KIAMANESH, 2004), reading literacy (DUPERE, et al. 2010; STUBBE; BUDDEBERG, 2008; DIEPEN, et al. 2004) and science (MARTIN, et al. 2012; ALIVERNINI, et al. 2010b; BREČKO, 2004), but sometimes in other fields too (e.g. civic education (GESKE, 2004), economics (FALAYE, 2006), English (LOBBAN, 2012).

The results received in many countries reveal that student's home socio-economic environment has stronger or weaker relation with student achievement (FAN, 2012; THORON; MYERS, 2011; MCCULLOUGH, 2011; HOUSE; TELESE, 2007; PAPANASTASIOU, 2006; BROECK, 2004). Chiu and Xihua (2008) analysed the results of the survey in which students from 41 countries took part. The results of the analysis confirmed not only that on an average higher learning achievement is

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
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recorded in the student group of higher social class, but also that on an average students in rich countries have higher learning achievements.

Xia (2010) analysed the survey results of 58 countries. The analysis showed that student's home socio-economic environment impacts both academic and non-academic achievement. Some surveys showed that besides the direct impact student's home environment has also the indirect impact on learning achievement, e.g. parents belonging to higher social class have higher academic expectations as regards their children and this has a positive influence on the learning achievements of their children (STULL, 2013); or parents belonging to higher social class are more keen on reading books thus influencing the attitude of their children towards reading which have influence on their reading achievement (ALIVERNINI, et al. 2010a).

Although most surveys confirm statistically significant impact of student's home socio-economic environment on learning achievement, the results of some surveys show that impact of material resources on student achievement is statistically significant in a few countries only – such conclusion is based on the analysis of data of 43 countries (MARKS; CRESSWELL; AINLEY, 2007).

The survey of Heyneman and Loxley (1983) showed that in the countries with low per capita income the impact of home environment on student learning achievement is not significant compared with that of school environment. The survey analysed the results of Africa, Asia, Latin America and the Middle East while many other surveys covered only North America, Western Europe and Japan which basically are high-income countries.

This contradiction between different survey results may show that in different contexts of countries the impact of home environment on achievement can be different; moreover, different elements of student's home environment may have a different impact on learning achievement, and the strength of impact of general impact of home environment factor depends on the calculation of the factor.

How is home socio-economic environment factor (also known as family background, home background factor) made? Different surveys show that there is no standard for operationalizing these concepts that is agreed upon neither in social science in general, nor in educational research in particular. There are a number of components that are used in different combinations, yet again different from study to

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

study. However, there are certain components of home socio-economic environment that are used more often and are seen as more important than others.

One of the key components of home socio-economic environment is family socio-economic status (or human and financial capital). According to Buchmann (2002), the following components are mostly used for the calculation of student's family socio-economic status: parents' educational attainment, parents' professional status and family income. The now classic study "*The American Occupational Stucture"* (BLAU; DUNCAN, 1967) paved the way for this tradition of conceptualization of socio-economic family status.

According to the results of the study the achievements of a son are influenced by his father's educational attainment and professional status. This conceptualization was soon extended with family income, mother's educational attainment and socio-psychological factors (HALLER; PORTES, 1973).

However, it is obvious that collection of data on parents' educational attainment, professional status and family income is not always a simple task. If students take part in the survey they often cannot give definite answers to these questions or fail to answer at all (particularly as regards income). If students' parents take part in the survey many of them do not tend to answer such questions. Furthermore, in some countries questions about income are considered unethical.

According to Bourdieu (1986), differences between home backgrounds are described also by aspects in addition to socio-economic status. What he called cultural and social capital are resources that can also reside in the structure of the student's family background.

Coleman (1988), who was one of the early and most influential proponents of social capital, stated that social capital exists in the relations among persons. Within the family social capital is related to parent-child ties such as the attention devoted by parents to their children's education, involvement of parents in their children's schooling. Family size and family structure is usually included in the social capital concept (BRESE; MIRAZCHIYSKI, 2010).

The cultural capital is typically operationalized as participation in cultural activities, such as concerts, museums, art galleries, parent's reading habits, as well as having cultural possessions (especially books) and educational resources at

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
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home. The familiarity with the dominant culture and language is another indicator of the cultural capital. Such indicators as immigration status and language spoken at home are usually used. Cultural codes that are considered valuable should vary in different societies. Consideration of the way the cultural capital is determined by country differences in societal characteristics and in educational structures is important. (BUCHMANN, 2002).

The study of cultural and social capital and its impact on student achievement is still in its early stages, as compared to the research on socio-economic aspects of home environment. The concepts of cultural and social capital continue to be refined. However, it is obvious that the measures of student's home socio-economic environment factor should include measures of financial, human, cultural and social capital.

Analysis of the results of various surveys on how specific aspects of home socio-economic environment influence student achievement shows that impact of home environment factors on achievement differ among the surveys. E.g. according to the results of the survey of Shah et al (2012), parents' income has strong and statistically significant relation to learning achievement of their children. In their survey, Davis-Kean and Pamela (2005) concluded that parents' income relates to children's achievements only indirectly: through parents' beliefs and behaviours, also through possibility to have better educational resources at home. On the other hand, according to Siegel (2011), parents' income has no significant relation to their children's learning achievement at all.

Another home environment factor providing the most ambiguous results is information technologies. For example, according to the results received by Vigdor and Ladd (2010) the home computer technology is associated with modest but statistically significant and persistent negative impacts on student's scores in mathematics and reading.

Malamud and Pop-Eleches (2011) pointed out both positive and negative effects of home computers: children had significantly lower school grades but demonstrated better computer skills. Surveys of Kupari and Nissinen (2013), Brese and Mirazchiyski (2010) showed that having home computer and using it makes positive and significant impact on student achievement. According to the results

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DOI: 10.14807/ijmp.v7i3.439

received by Drechsel and Prenzel (2008) having computers has only negative impact on student achievement.

Analysis of the case of books at home usually revealed very strong positive relation with learning achievements. According to the results of many researches, the higher learning achievements is observed in cases when student has more books at home (KUPARI; NISSINEN, 2013; KIM, et al. 2013; BRESE; MIRAZCHIYSKI, 2010; STUBBE; BUDDEBERG, 2008).

The results of Brečko (2004) revealed that not only the quantity, but also the type of books is important. The results of the mentioned survey also showed such variables as the possession of a study desk, student's own room, calculator, computer also have a stronger or weaker link with student achievement. The survey results of Alivernini et al (2010b) showed strong impact of educational resources on achievement. Then again, Kim et al. (2013), who analysed the results of Singapore, South Korea and Finland, received statistically significant relation between student achievement and home educational resources only in case of Singapore.

Some studies revealed that socio-economic environment can influence student achievement not only directly but also indirectly. E.g. student socio-economic status has a strong influence on the attitudes in school. Comparison of students having lower socio-economic status with those having high socio-economic status shows that the latter seek higher learning achievements (OSA-EDOH; ALUTU, 2011).

This is in line with the results of Agulanna and Nwachukwu (2009) which reveal that parents who have high socio-economic status motivate and encourage their children to seek academic success and enjoy learning. The attitude towards learning is also strongly related with learning achievement (KIM, et al. 2013).

In conclusion, the analysis of scientific literature shows that although in many countries general student home socio-economic environment has a strong impact on learning achievement, yet different surveys have provided different or even contradictory results about the impact of certain aspects of home environment on achievement.

Moreover, according to some scientists, socio-economic home environment has bigger influence on student achievement in countries with higher income. As

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

already mentioned, Lithuania is a country of limited economic resources. Therefore, it is interesting to analyse the significance of the impact of home socio-economic environment on achievements of Lithuania's students.

3. RESEARCH METHODOLOGY

3.1. Methods and research instruments

Quantitative approach was used for the research. The following instruments were used for data collection: survey and test. Student questionnaire consisted of close-ended questions. The questions provided in the questionnaire were related with students' home social, economic and educational environment, as well as demographic data. Tests on mathematical, reading, and scientific literacy, consisted of close-ended and open-ended questions.

3.2. Sample

512 students of the 8th class from 162 schools participated in the research. **Type of sample of schools**: systematic sampling. Schools were selected according to school location, school type and school size. The sample encompasses schools of all 10 regions of Lithuania; schools of different type and size were selected. **Type of sample of students** within schools: simple random sample (2–4 students from each school according to the school size).

3.3. Data analysis methods

Factor analysis, Cronbach Alpha, regression analysis was used for data analysis. Factor analysis was used for socio-economic factor and factors of composite socio-economic environment factors. Regression analysis was used to measure how strong the impact of socio-economic factor on student learning achievement is. Data were analysed using SPSS 23 software package.

3.4. Ethics

The survey was based on free-will principle. The survey was conducted in the classrooms during instructional time.

4. RESULTS AND FINDINGS

Socio-economic home environment factor was calculated based on the student questionnaire data including financial, human, cultural and social aspects.

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

Financial capital in this research is represented by economic home resources. Parents' salary factor cannot be included because those interviewed were students of the 8th class and they could not provide answers about their family income.

Socio-economic home environment factor comprises the following components: digital camera, MP3 player, DVD, at least two TV sets, dishwasher, computer, the Internet, learning software, personal cell phone, personal room, study desk, place to study, number of books, classical literature, poetry, additional textbooks, dictionary and works of art. Factor's Kaiser-Meyer-Olkin Measure (KMO) = .80, Bartlett's test: $p < .01$, Cronbach Alpha = .75. Factor is standardized to have a mean of 0 and variance of 1. Some socio-economic home variables, such as automobile, additional learning tools, subscription of the press, immigration status, family size were not included into the factor because of the low Cronbach Alpha and factor loadings' parameters.

The following regression equation (1) was calculated to estimate influence of socio-economic home factor on learning achievements:

$$f(x) = 443 + 32x + e$$
$$p < .01 \qquad (1)$$
$$R^2 = .17$$

f(x) = literacy score;

x = socio-economic home environment

Literacy score was calculated by combining scientific, mathematical, and reading literacy scores. The visually presentation of the regression equation is shown in Figure 1.

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

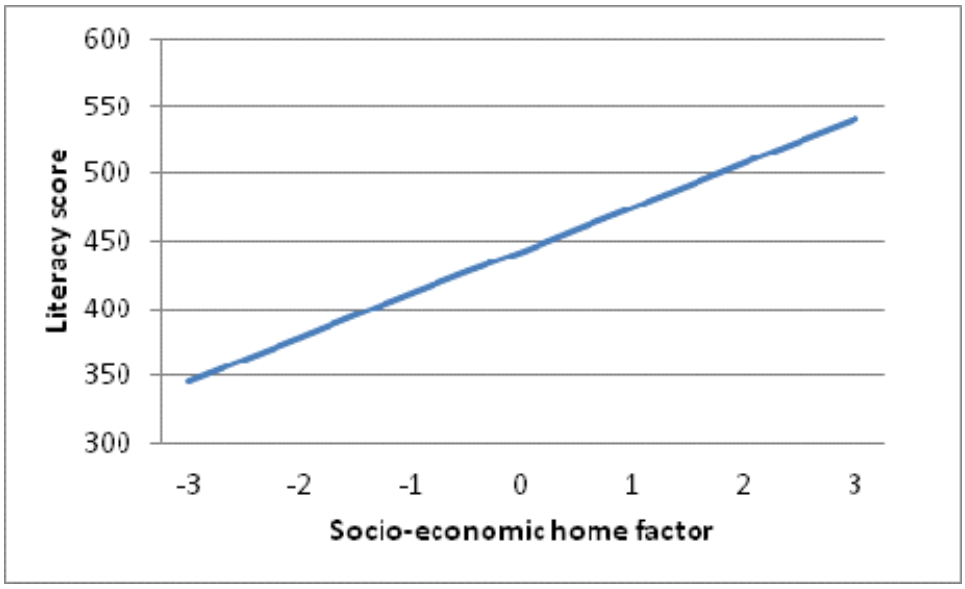

Figure 1: Influence of the socio-economic home factor on student achievement.

Equation (1) shows that student learning achievements are strongly influenced by home socio-economic environment. At the lowest values of socio-economic home factor, average student achievement score is about 345 points, while at the highest values of socio-economic home factor, it reaches about 545 points. The difference of achievements between the lowest and the highest values is about 200 points.

Comparison made to find out whether home socio-economic environment has the same impact on learning achievement of girls and that of boys showed that the impact differs.

(2)	(3)
Girls	**Boys**
f(x) = 448 + 29x + e	f(x) = 440 + 35x + e
p < .01	p < .01
R^2 = .16	R^2 = .18
f(x) = literacy score; x = socio-economic home environment	

Equations (2) and (3) show that home socio-economic environment has slightly stronger impact on learning achievement of boys than on that of girls. With

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

the improvement of home socio-economic environment of a girl her learning achievement increases by 29 points, while the learning achievement of a boy – by 35 points.

Similar comparison can be made to find out whether the same impact on student achievement is made in terms of students' living location. The following regression equations (4), (5) and (6) were calculated to find out whether socio-economic home factor has different influence on the learning achievements of students' from cities as compared to students' from towns and villages.

(4)	(5)	(6)
City	**Town**	**Village**
f(x) = 444 + 33x + e	f(x) = 446 + 34x + e	f(x) = 435 + 27x + e
p < .01	p < .01	p < .01
R^2 = .14	R^2 = .19	R^2 = .14
f(x) = literacy score; x = socio-economic home environment		

Comparison between the students' living location showed that influence of socio-economic factor on student achievement is higher for those living in cities and towns, and lower for those living in villages. Therefore, we may conclude that in Lithuania socio-economic home situation has lower influence on students living in villages. This can be explained by the lower social and economic diversification in rural areas compared to urban areas.

In order to analyse which particular aspects of socio-economic home environment have stronger influence on student achievement, factor analysis was carried out, thus revealing 4 more detailed socio-economic home factors which are as follows (Kaiser-Meyer-Olkin Measure (KMO) = .79, Bartlett's test: p < .01, all four factors are standardized to have a mean of 0 and variance of 1): wealth (W), personal space (PS), information technology (IT), books and works of art (BA).

INDEPENDENT JOURNAL OF MANAGEMENT & PRODUCTION (IJM&P)
http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
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Table 1: Detailed socio-economic home factors.

	Component			
	BA	**IT**	**W**	**PS**
Study desk	.040	.288	-.127	**.464**
Personal room	.014	.014	.225	**.659**
Study place	.143	-.010	.002	**.722**
Computer	.057	**.827**	.073	.073
Learning software	.224	**.595**	.006	.060
Internet	.097	**.751**	.183	-.061
Classical literature	**.793**	.072	.020	-.028
Poetry	**.813**	.055	-.023	-.016
Works of art	**.604**	-.006	.127	.105
Additional textbooks	**.486**	.053	-.007	.179
Dictionary	**.335**	.195	.115	.145
Dishwasher	.003	-.061	**.592**	-.023
DVD	.094	.214	**.630**	.059
MP3 player	.070	.087	**.644**	-.001
Personal cell phone	.060	**.364**	.172	.197
At least 2 TV sets	.036	.278	**.441**	.217
Over 100 books	**.551**	.259	.048	-.082

Relationship between these 4 factors and student achievement is presented in equation (7).

(7)
$f(x) = 449 - 8x_W + 10x_{PS} + 25x_{IT} + 31x_{BA} + e$
$p < .05$
$R^2 = .25$

f(x) = literacy score;
x = socio-economic home environment;
x_W = wealth;
x_{PS} = personal space;
x_{IT} = information technology;
x_{BA} = books and works of art

As the regression equation shows, BA factor (books and works of art) has the strongest positive influence on student achievement, while PS factor (personal space) makes the least positive influence on student achievement. The only W factor

http://www.ijmp.jor.br v. 7, n. 3, July - September 2016
ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

(wealth) has negative influence on student achievement. The result is very interesting – it shows that economic welfare, which is not related to educational environment or educational tools in any way, has a negative impact on student achievement.

Therefore, if general home socio-economic factor was calculated excluding material assets which are not related to educational environment and means, then the impact of this factor on student achievement (see equation (1)) would be even stronger.

It is worth checking how these detailed socio-economic home environment factors influence achievements of girls and those of boys. The results are provided in equations (8) and (9).

(8)	(9)
Girls	**Boys**
$f(x) = 448 + 11x_{PS} + 20x_{IT} + 28x_{BA} + e$	$f(x) = 448 + 9x_{PS} + 30x_{IT} + 32x_{BA} + e$
$p < .05$	$p < .05$
$R^2 = .22$	$R^2 = .27$

f(x) = literacy score;
x = socio-economic home environment;
x_{PS} = personal space;
x_{IT} = information technology;
x_{BA} = books and works of art.	

Equations (8) and (9) show that the most significant difference in the impact on achievements of girls and those of boys is caused by IT factor (the difference of 10 points). The result is possibly related to the fact that boys tend to use IT more often than girls. Regression equations do not provide the influence of material wealth on student achievement as the impact of this factor is not statistically significant.

The impact of these detailed socio-economic home environment factors on student achievements depending on the student's living location was assessed. The results are provided in equations (10), (11) and (12).

ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

(9)	(10)	(11)
City	**Town**	**Village**
$f(x) = 450 + 16x_{PS} + 23x_{IT} + 31x_{BA} + e$	$f(x) = 454 + 32x_{IT} + 33x_{BA} + e$	$f(x) = 437 + 20x_{IT} + 29x_{BA} + e$
$p < .01$	$p < .01$	$p < .01$
$R^2 = .20$	$R^2 = .29$	$R^2 = .25$

f(x) = literacy score;
x = socio-economic home environment;
x_{PS} = personal space;
x_{IT} = information technology;
x_{BA} = books and works of art.		

The regression equations show that information technologies at home have the strongest impact on learning achievements of students living in towns (33 points), the weakest – on those living in cities (23 points). The explanation for such difference can be such that students living in cities have more opportunities to compensate the lack of information technologies at home – in the internet cafés, at schools, which are in better economic situation in the cities; students living in cities can reach their friends who have information technologies at home more easily.

Thus having information technologies at home loses significance if they can be easily accessed elsewhere. Therefore, information technologies at home have less relation to learning achievements for children living in cities compared to towns and villages. The regression equations show that personal space factor has statistically significant impact only on learning achievements of students living in cities, although this impact is not strong (16 points only). The similar result was received in equation (7). In the case of the material wealth factor, statistically significant impact on student achievement was not received for any location.

5. CONCLUSIONS

1. Socio-economic home background has strong statistical significant influence on student outcomes.
2. Comparison between genders showed that socio-economic home factor has stronger relationship with boys' achievements than with girls' achievements.

ISSN: 2236-269X
DOI: 10.14807/ijmp.v7i3.439

3. Regarding students' living location, the stronger impact of socio-economic home factor on the learning achievement was observed for those living in cities and towns rather that those living in the rural area.
4. Books and works of art factor has the strongest positive influence on learning achievements of the students, while personal space factor has the weakest positive influence on student achievement. Wealth factor has negative influence on student achievement.
5. Information technologies factor has a stronger impact on learning achievement of boys and students living in towns.

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