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STUDENTS' FINANCIAL LITERACY AND POLICIES FOR ITS DEVELOPMENT

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ABSTRACT

The paper is dedicated to students' financial literacy development. The study is based on PISA data and analyses factors of two types: family and school ones. The Kruskal– Wallis H test, Jonckheere-Terpstra test is used to find significant differences between the groups. Regression research is based on the ordinary least squares method and t-statistics. Financial literacy is not knowledge, it is a skill or even an ability. Therefore, parental behavioral factors are very important for its improvement and development. Financial literacy is the only type of literacy that positively correlates with parental International Socio-Economic Index of Occupational Status (ISEI), including the highest ISEI of the father or mother. Thus, the first and most important issue in policy that will stimulate the development of each type of literacy is the creation of positive work environments for single parents. However, each model includes just one explanatory variable. The most significant for all students and female students is the father's ISEI. Whereas, for male students, it has the highest ISEI. Thus, this type of literacy does not directly depend on the mother's ISEI, unless it is the highest one. Financial literacy does not depend on school factors. The overall effect of the family factors that were analyzed is about 0.35 percent of literacy variations.

Disciplinary: Education Sciences, Family Studies, Financial Education.

1. INTRODUCTION

At the beginning of the XXI century, the ways of thinking about student literacy changed. Family values began to dominate human thought all over the world, which was reflected in scientific research at that time. New types of literacy, such as financial literacy, began to appear. According to Investopedia, "financial literacy is the education and understanding of various financial areas

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including topics related to managing personal finance, money and investing. This topic focuses on the ability to manage personal finance matters in an efficient manner, and it includes the knowledge of making appropriate decisions about personal finance such as investing, insurance, real estate, paying for college, budgeting, retirement and tax planning." Thus, financial literacy is not any less important than other types of literacy and, possibly, even more important in the modern world.

Currently, there are five key concepts of financial literacy:

- basics of budgeting, including resources such as special sites that help plan incomes and expenses;
- understanding interest rates, including mortgages, bank deposits, and credits, it is extremely important to understand different types of percentage calculations;
- prioritizing savings instead of living on credit;
- credit-debt cycle traps and knowledge of proper use of credit instruments, such knowledge will help pay for credit before it becomes a debt;
- identity theft issues and safety, that is especially important nowadays.

Thus, financial literacy includes many aspects and issues that are extremely important nowadays but are not a part of any school subject in many countries. This study covers PISA data and financial literacy in different countries and regions.

PISA has provided literacy tests since 2012. Therefore, Table 1 presents data for two years: 2012 and 2015. Table 1 shows all available data for financial literacy during these years. For countries that have participated in the research at both periods, the present research provides comparative statistics.

Table 1. PISA results. Financial literacy. Years 2012 and 2015.

2015		2012		Change to the previous period	
Country	PISA score	Country	PISA score	absolute	(%)
Belgium	541	Belgium	541	0	-0.06
Poland	485	Poland	510	-25	-4.85
Slovak Republic	445	Slovak Republic	470	-25	-5.37
Spain	469	Spain	484	-16	-3.23
United States	487	United States	492	-4	-0.84
Russia	512	Russia	486	26	5.31
Italy	483	Italy	466	17	3.68
Lithuania	449	Slovenia	484		
Peru	403	Australia	526		
Canada	533	Latvia	501		
Brazil	393	New Zealand	520		
B-S-J-G (China)	566	Colombia	379		
Chile	432	Czech Republic	513		
Croatia	480	Estonia	529		
Netherlands	509	France	486		
		Israel	476		
Average	479		492	-13	-2.64

Thus, average financial literacy scores have reduced during the observed period by 13 scores or 2.64 percent. In 7 countries that have taken part in both periods of research, one has shown zero changes, two have shown positive change, and four have shown negative. Overall, financial literacy has reduced during this period. This part of the research is comprised of 33 independent observations

for both years. That is significantly less than in data for other types of literacy.

2. LITERATURE REVIEW

Studies in this field began at the end of the XX century. At that time, the research focused on statistical and psychological factors (in the way of parents' involvement with their children), as well as the analysis of other factors. The statistical direction provides different research, both directly in regard to students' educational achievements (Willms 1999) and their future employment opportunities based on academic results (Nickell 1997). The psychological direction concentrated on psychological aspects of parents' involvement in children's education. There were many studies in this field that analyzed different school programs and inspired teachers to involve parents in their children's education (Walde and Baker 1990; Greenwood and Hickman 1991; McLaughlin and Shields 1987; Vincent 1997). However, it was later found that these programs had a limited effect. The main work of that time is the research by Hoover-Dempsey and Sandler (1997): 'Why do parents become involved in their children's education?' This study changed views in this sphere. It provided several important statements about the psychology of parents' involvement. The first is that each parent or family separately established the range of activities that they considered important, necessary, and permissible on behalf of children. The second is each parent's personal belief in her or his own influence on their children's education results and achievements. In other words, in case the parent does not believe in their own authority or ability to affect the child, the parent will not try to be involved in their children's education. The third statement claims that parents' involvement depends on their estimation of the child, and whether or not the school wants them to be included. Thus, parents' involvement significantly depends on their own beliefs and incentives, and no school program can affect them enough to change internal convictions. Later, Reed, Jones, Walker, and Hoover-Dempsey (1997) tested the theoretical model and found that the best way to affect parents' involvement is to construct the proper role in their own mind. Teachers and other school workers have to concentrate on this detail when presenting parents' involvement programs. In regard to the analysis of other factors, the study aimed to find a variety of issues that influenced scholars' academic achievements. Thus, Reynolds found that previous academic results were the main influence on seventh-grade students' achievements in math and science (1991). He explained that this result reflected the schooling process from the very beginning until the measured seventh grade. In other words, it is impossible to provide a high level of knowledge in seventh-grade students, in case they have missed previous years. The schooling process, according to Reynolds, also includes educational standards and quality principles. However, other factors, including parental expectations, motivation and classroom context, can improve academic results before middle school years (Reynolds 1991). After that period, their influence reduces. Moreover, the author estimated that sex variable influence is negative (in favor of girls). The analysis of "other factors" also included an analysis of parents' characteristics. Thus, Willms found that the higher the parents' education level, measured in years of education, the higher the child's literacy (1999b). The effect of each additional year of parents' education was more or less equal for Sweden, Netherlands, Switzerland, Germany, Canada, Poland, and the United States. However, the countries have some differences in the basic level of controlled variables. Willms also found that socioeconomic status does not influence similarly in each country

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(1999b). There were two types of countries with high and medium effect correspondingly. Moreover, the scientist showed that girls typically had higher scores, and mothers' education level influenced children's literacy more than fathers'. In the case of occupation, dependence is the opposite. Fathers' occupation substantially and positively influenced children's academic achievements, whereas mothers' had a slightly negative affect. Household income influence was about zero, although being raised by a single parent provoked lower academic achievements. This study was extremely important for that time, due to its inclusion of important family characteristics. It encountered many limits, the most significant of which was the small group of countries that were supposed to be further developed. Would these results be similar to developing countries? Moreover, all studies presented above were based on individual family data. Models helped to find out why separate children had better or worse results. Data included many family characteristics but was not standardized among different countries, including literacy measures. At that time, two types of literacy were supposed to be the most important: mathematical and science. Therefore, the presented studies concentrated on them, whereas reading and financial literacy were out of focus.

Upon analysis of financial literacy, several points must be mentioned. The first is that the key issue in this sphere is low literacy (Van Campenhout 2015; Lusardi, Mitchell, and Curto 2010). Many studies specified this issue and provided different educational policies. Van Campenhout proposed that youth financial literacy programs should be proactive and provide some collaborative education (2015). Financial literacy was integrally connected with risk-taking and the ability to deal with various uncertain financial decisions. Therefore, it was much more about making decisions than about knowledge or skills. Parental involvement could help to form proper behavior. Isolated school programs would not have any significant effect, due to the necessity of interactions with others for risk modeling and taking. Parents' role should be more than just creating adaptable financial consumers; they have to teach their children how to make financial decisions. The other research showed that a 'college-educated male whose parents had stocks and retirement savings is about 50 percent more likely to know about risk diversification than a female without high school education whose parents were not wealthy (Lusardi, Mitchell, and Curto 2010). In other words, sex, education level, family income, and financial behavior formed youth financial literacy. The other research in this field affirmed that young entrepreneurs in South Africa had financial literacy levels that were higher than average among youth populations of the country (Kojo Oseifuah 2010). Thus, financial literacy increased the probability to become an entrepreneur.

2.1 HYPOTHESIS

The issue of students' literacy improvement is very important, due to low levels of literacy in many countries — including developed ones. Previous studies provide some results for literacy improvement, but they do not cover all types of literacy simultaneously. The main question of how to develop students' literacy and provide a stable level is still open. Data show that sometimes the rise of literacy can be changed by a significant reduction of literacy. Therefore, it is important to develop a policy for sustainable growth of youth literacy. The study analyzes financial literacy. Regression models for financial literacy are presented. The models cover different social groups: female and male students. Overall, there are 3 resulting models in the research.

The results of the study can be used for educational policy development and extension. Due to

the analysis of family and school factors, the suggested policy includes both directions. Moreover, the results of the study provide new scientific issues. The most important details of current research include:

- lack of obvious explanatory variables, such as family income and parental educational level;
- direct variables for determination of family factors are substituted by indirect ones, which are more reasonable in explaining literacy;
- inter-correlating variables, such as educational level and income, are combined into one variable for each parent;
- family and school factors are compared with different regression models for each dependent variable;
- separate models for all students, female and male, are calculated.

According to these specifics, the hypotheses cover several directions. Thus, the hypotheses are:

1. Financial literacy does not depend on school factors at all.

2. Family explanatory factors are much more important than school factors.

3. METHOD

Research methods include several statistical instruments, based on research issues. At the first stage, the absence of statistical differences between parts of the samples has been proven. To prove this fact, several non-parametric tests for K independent samples are used to find significant differences between the groups. The Kruskal– Wallis H test, Jonckheere-Terpstra test, and the median test are applied to define differences between parts of the sample. These tests are applied to all independent variables; however, none of them indicated any significant differences.

The second stage includes regression. Regression research is based on the ordinary least squares method and t-statistics. The result is a set of regression models with significant variables. Models are different from each other in the variables used. Differences between similar models for one dependent variable provides distinctions in the R-square. Thus, it is possible to calculate an explained share of variance for each significant variable. Result models for each independent variable are defined.

There is one table with correlations and another with significant coefficients and R-squares for all models, estimated by the ordinary least squares method for each type of literacy.

3.1 DATA

The research is based on the Programme for International Student Assessment (PISA) data. PISA observes 15-year-old students at finance. PISA is a triennial international survey with standardized questions, including localization. Estimation of financial literacy is provided only for the years 2012 and 2015. The results of PISA do not provide any information about the particular knowledge of observed students. The data show common literacy in each field, understanding basic principles, and an ability to deal with information in four highlighted fields. 15-year-old students are close to the end of their compulsory education. Therefore, their literacy is significant for personal and social

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development, as well as future life prospects. For each country, PISA results can introduce information about the readiness of adolescents for adulthood.

There are several explanatory variables, used in the study. Students' reports are in the International Socio-Economic Index of Occupational Status (ISEI). This index converts information about parents' education and occupation into income. PISA specialists created this index to maximize the indirect effects on education by occupation and minimize direct effects in its calculation. Thus, ISEI definitely correlates with the socioeconomic status of parents, based on income and education level. Simultaneously, ISEI does not duplicate this variable and can be used as an instrumental variable. PISA's highest ISEI is based on either the father's or mother's occupations (whichever is higher). The index of parents' high occupational status has grown slightly during this period. Mothers' ISEI has grown more than 1 point from the highest of the fathers ' status.

The class size is defined as 'the average number of students per class, calculated by dividing the number of students enrolled by the number of classes. In order to ensure comparability between countries, special needs programs have been excluded. Data include only regular programs. Variables for government and student fees present average among observed schools for each country. The average mean for class size was 29 in the period from 2003-2015. Share of schools with government funding has decreased a bit, and with student fees, funding increased. However, average means for all independent variables have changed less than for the resulting ones. Class size, government funding, and student fee funding can be understood as " school factors."

4. RESULT AND DISCUSSION

Two models describe the dependence of a general level of financial literacy on independent variables. The first model is based on fathers' ISEI, and the second is based on the highest ISEI. Both models have quite similar explanatory power. R-square for the first model is 0.312 and is 0.310 for the second. Thus, according to econometric theory, the first model is a bit better. However, in a meaningful sense, the higher the family's ISEI, the better the students' financial literacy. Mothers' ISEI does not directly influence the general level of financial literacy. Thus, if mothers' ISEI is higher than that of fathers', it will have a positive effect on students' financial literacy. In other cases, mothers' ISEI does not influence financial literacy at the general level. Moreover, parental influence on children's financial literacy is very high. For general models, this value varies from 4.3 to 5.5 scores for each additional point to ISEI. These data help to understand that students' basic level of financial literacy is quite moderate, and financial literacy is formed with the help of parents' positive socio-economic behavior. Undoubtedly, parental ISEI variables are not the only explanatory variables, although they determine over 30 percent of students' financial literacy.

School factors do not influence financial literacy in any stable way. There is a lack of models that include any school factor. In other words, it does not matter if students attend a government-sponsored school or a private institution; what matters is how many students are in class. None of these factors have any significant effect on students' financial literacy (Table 2). Thus, financial literacy is a type of literacy that does not form at school. It forms at home and through interactions with other people, social contacts, or other specific activities. It is not similar to mathematical, science, or reading literacy. It is not a skill or simple knowledge. Financial literacy is

more of a behavior pattern than a particular set of knowledge.

Table 2. Regression models for students' financial literacy

Gender	Variables	Model 1		Model 2		Model 3	
		B	t-statistics	B	t-statistics	B	t-statistics
General	Constant	255.78	4.02	270.59	4.52	-	-
	Highest occupational status of parents	-	-	4.346	3.61	-	-
	Mother occupational status	-	-	-	-	-	-
	Father occupational status	5.452	3.63	-	-	-	-
	Size of class	-	-	-	-	-	-
	Funding government	-	-	-	-	-	-
	Funding student fees	-	-	-	-	-	-
	R-square	0.312	-	0.310	-	-	-
Female	Constant	240.27	4.02	269.24	4.6	326.85	5.73
	Highest occupational status of parents	-	-	4.407	3.75	-	-
	Mother occupational status	-	-	-	-	3.6	2.8
	Father occupational status	5.88	3.9	-	-	-	-
	Size of class	-	-	-	-	-	-
	Funding government	-	-	-	-	-	-
	Funding student fees	-	-	-	-	-	-
	R-square	0.346	-	0.326	-	0.216	-
Male	Constant	281.895	4.32	276.99	4.46	335.6	5.82
	Highest occupational status of parents	-	-	4.19	3.36		
	Mother occupational status	-	-	-	-	3.32	2.6
	Father occupational status	4.8	3.1	-	-		
	Size of class	-	-	-	-		
	Funding government	-	-	-	-		
	Funding student fees	-	-	-	-		
	R-square	0.251	-	0.280	-	0.189	

Models for female and male students are similar to a kind of general model. For both, there are three regression models, each of which includes just one explanatory variable among parental ISEI. Mothers' ISEI has the least explanatory power for female students. R-square for this model is just 0.216. Each additional percent of mothers' ISEI adds a 3.6 score to female students' financial literacy. Male students' results are quite similar. Thus, the explanatory power of the model with mothers' ISEI as an independent variable is just 0.189, and each additional percent of the variable adds a 3.32 score to male students' financial literacy. Other models for female and male students are not so similar. For female students, the variable with the highest explanatory power is fathers' ISEI. R-square for this model is 0.346. However, for the model with the highest ISEI, the R-square is 0.326. Each percent of the fathers' ISEI adds 5.88 scores to female students' financial literacy, and the highest ISEI (in the other model) adds 4.41. Therefore, for female students, fathers' ISEI is more significant for financial literacy than either the highest or that of the mother. Fathers' financial behavior affects female students' financial literacy more than mothers, even if mothers' ISEI is higher than the fathers'. This relationship should be analyzed more precisely in the future. For male students, models are different. The model with the highest explanatory power provides the relationship between male students' financial literacy and the highest parental ISEI. This model's R-square is 0.28. Each additional percent of the highest ISEI adds 4.19 scores to male students' financial literacy, whereas each additional percent of fathers' ISEI adds a score of 4.8 with R-square at level 0.251. Moreover, according to regression models, the basic level of male financial literacy is determined by fathers' ISEI and is higher than the second model. Thus, fathers' ISEI explains male students' financial

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literacy less than the highest one, but its influence is higher. Boys from families where the highest ISEI is equal to fathers' are financially literate. However, the highest ISEI is more important for male students as an explanatory variable of financial literacy. Dependencies of financial literacy for each group are similar in one sense: each of them has the highest influence by fathers' level of literacy. This specifies the most important part of financial literacy variance for everyone but male students. Thus, fathers' ISEI is the most influential and significant factor, excluding male students. For male students, the highest parental ISEI is more significant. In other words, male students more vulnerable to family ISEI, no matter whose ISEI it is, whereas the financial literacy of female students is generally more determined by fathers' ISEI.

Table 3 presents correlations between mothers', fathers' and the highest ISEI. All correlations are about 0.5. In other words, they are quite high. Relations between explained and explanatory variables are quite close. Therefore, none of the independent variables can be considered as instrumental.

Table 3. Correlations for students' financial literacy

Financial literacy	Highest occupational status of parents	Mother occupational status	Father occupational status
General	0.56	0.44	0.56
Female	0.57	0.47	0.59
Male	0.53	0.44	0.5

Financial literacy is the type of literacy that positively depends on parental ISEI, including the highest of their father and mother. However, each model includes just one explanatory variable. The most significant for all male and female students is a father's ISEI, and for male students, the highest ISEI. Thus, this type of literacy does not directly depend on a mother's ISEI, unless it is the highest one. Nevertheless, the ISEI of either parent does not negatively influence financial literacy. As mentioned above, positive parental socio-economic behavior forms financial literacy in children. Financial literacy does not depend on school factors. It is the only type of literacy that does not depend on it in any model. Thus, financial literacy forms in families. Moreover, financial literacy is the only type of literacy in which a female student 's basic level is significantly lower than the male 's. None of the models for financial literacy include an instrumental variable, while other types of literacy are specified with their help.

Financial literacy is quite diverse from other types of literacy. Undoubtedly, it is not a subject, because it is not determined by school factors, only family socioeconomic status, and parental behavior. Besides these issues, financial literacy has other specifics. It is the type of literacy discussed in the research for which a female student's model is similar to the model for all students. Whereas, the model for male students differs.

For financial literacy, each ISEI has a positive effect. Thus, the first and most important issue in policy that will stimulate the development of each type of literacy is the creation of positive work environments for single parents. Single parents in this context are parents who raise their children alone. This program should be especially directed toward women who have recently become single parents. The program should provide not just any employment, but current employment and opportunities for future development. The main goal of the program is to maintain the previous socio-economic status of a family, should the parent with the highest ISEI separate. According to

statistics, that is most likely to be the single mother.

Social policies regarding mothers are more or less popular and widespread, whereas programs directed at fathers are unusual. This study shows that a father's role in the family, especially in the context of socio-economic behavior, is important for a student's literacy development, especially females. The best opportunity to improve all types of knowledge literacy is to create the opportunity for children to live in families with a working father (of high socio-economic status) and a non-working mother (or a mother who works significantly less than the father). To provide such circumstances, social programs have to involve fathers as well. Undoubtedly, female students' fathers need such programs more than the fathers of male students. However, this kind of separation is discriminatory and unacceptable. Therefore, this social program should provide opportunities for personal socio-economic growth and development for all fathers.

Overall, there are four directions of proposed social policy:

- for married women – a stable job that retains enough time for family activities, such as raising and supporting children. It is an important combination of stability and retaining time for family. Undoubtedly, this kind of job should be suggested to women, but not first;
- for women who have recently become single mothers – any job opportunities that retain time for family. The best option for these jobs has a possible future promotion. Where no promotion is available, additional educational opportunities for future career development may be. The key issue is the literacy of female students who previously have grown up in families with two parents, one of which is a non-working mother. How can we improve the literacy of such female students if their mothers are single? This issue should be analyzed more thoroughly in the future;
- for single mothers – programs for welfare and socio-economic status improvement, especially with the help of additional educational opportunities;
- for fathers – similar to single mothers.

The program should be addressed to parents and include opportunities for education, as well as career promotion and development. Additional educational technologies should include such opportunities as massive, open, online courses and mobile applications. New formats of distance learning help to involve adults in extra activities. They provide many opportunities to study anywhere, including at home. Moreover, educational programs that are created with the help of such modern technologies are directed towards the development of particular skills. This can be useful for career promotion and development. One more benefit of distance learning opportunities is that they can be realized as profitable projects. For example, a large, open, online course can cover the costs during payable certificates. Parents who participate in the program can obtain these certificates for free. In any case, any digital educational project assumes high fixed, non-refundable costs, and rather moderate variable costs. Government support is necessary at the stage of primary financing. It can be realized directly and during bank systems, which has been discussed previously. Anyway, the costs for each additional student in these programs is quite low. In other words, this system will be effective anyway and can even earn some money after several years.

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A father's role for female students is providing a positive example of socioeconomic behavior. It is also important for all students' financial literacy. A mother's role in this context is the role of a parent who spends her time with children. A mother cannot be substituted by a father. However, fathers are important for financial literacy. It is a bit similar to Esping -Andersen's results, but an issue not of significance, but of gender differences between students. Moreover, Esping -Andersen showed that a mother's employment is generally positive for children's lives due to a reduction in the risk of poverty (2007).

The overall effect of the family factors that were analyzed is about 0.35 percent of literacy variations. The key difference with Martins' and Veiga's research is that scientists calculated the average explanatory power of schools in 15 countries of the EU as 42.38 percent of literacy variation (2010). Whereas, the current study shows that school factors do not explain financial literacy at all, according to R-square.

Much like previous studies, current studies show that students have low basic and average levels of financial literacy (Van Campenhout 2015; Lusardi, Mitchell, and Curto 2010). The basic level of financial literacy is significantly lower than of mathematics, reading, or the sciences. Van Campenhout proposed that financial literacy programs for youth should be proactive and provide some collaborative education (2015). Current research finds that school factors do not influence financial literacy. Therefore, an assumption about out-of-school activities seems rational. Research by Lusardi, Mitchell, and Curto showed that males with a college education whose parents had stocks and retirement savings are about 50 percent more likely to know about risk diversification than females with less than a high school education whose parents were not wealthy (2010). This research shows that there is indeed a difference in the basic level of financial literacy between female and male students. The basic level of financial literacy for male students is significantly higher. Due to quite similar regression models, and all other things being equal, it is reasonable to suppose that the expected level of financial literacy for male students is higher than for female students. The most important result of this research, relating to financial literacy, is that it is a quite diverse type of literacy. It is not like mathematics, reading, or the sciences. Financial literacy is not knowledge, but a skill or even an ability. Therefore, parental behavioral factors are very important for its improvement and development.

5. CONCLUSION

Financial literacy is the only type of literacy that positively correlates with parental ISEI, including the highest ISEI of the father or mother. However, each model includes just one explanatory variable. The most significant for all students and female students is the father 's ISEI. Whereas, for male students, it's the highest ISEI. Thus, this type of literacy does not directly depend on the mother's ISEI, unless it is the highest one**.** Financial literacy does not depend on school factors. It is the only type of literacy that does not depend on them in any model.

The results of this study are important for future education development due to the proposal for the models of both sexes. The fathers' role as an example of positive socio-economic behavior is more important for female students, Simultaneously, female students are less dependent on overall family socio-economic status and welfare in comparison to male students. These differences can be

the basis of future social policy in the educational sphere. There are other significant results, such as the absent role of school factors in financial literacy.

This study, such as any other, has some restrictions. The first of them is the data. Data are based on PISA results and limited due to the survey questions and provided statistical information. Secondly, indirect measures of family variables are limited by ISEIs. Future research can specify them more precisely. Thirdly, variables for school factors are specified with the help of currently available PISA data. They provide general information about the influence of class size and the number of public and private schools. Extension of these variables and their specification will lead to more accurate results. Fourthly, the research does not take into account cultural and country diversity. Further studies can specify these models for cultural and country diversity.

6. AVAILABILITY OF DATA AND MATERIAL

The research is based on open PISA data. No data is generated from this study.

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