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What Does PISA Tell Us About Performance of Education Systems?

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Abstract

The performance of education systems is an area where intense discussions take place around the world. Since international student achievement researches, such as the Program for International Student Assessment (PISA), provide information about readiness of students to modern society and participation to workforce differences in achievements between countries create great pressure for policy makers. Due to this pressure, many countries implement serious revisions in their education systems without adequately focusing on the national background of differences. Lack of national monitoring studies also increases the probability of inaccurate identifying the background of problems. In this study, the factors that function on the background of achievement differences between countries, especially in PISA studies, are tried to be determined and the most important factors that are effective in student achievement, which are independent of the cultural and social context differences of the countries, are tried to be specified. It is seen that the three major factors are teacher quality, delaying students' school tracking and allocating resources to schools, considering disadvantaged schools as priority. In addition, it is recommended to establish a national monitoring and evaluation system to evaluate international student achievement research results in healthier way and to develop more realistic policies.

PISA Eğitim Sistemlerinin Performansı Hakkında Bize Ne Söylüyor?

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Öz

Eğitim sistemlerinin performansı dünyada yoğun tartışmaların yapıldığı bir alanı oluşturmaktadır. Uluslararası Öğrenci Değerlendirme Programı (PISA) gibi uluslararası öğrenci başarı araştırmaları, öğrencilerin modern topluma ve işgücüne katılım için ne kadar hazır oldukları ile ilgili bilgi sağladığı için ülkeler arası başarı farkları politika yapıcılar için büyük baskı oluşturmaktadır. Bu baskı dolayısıyla, birçok ülke, başarı farklarının ulusal arka planına yeterince odaklanamadan eğitim sistemlerinde ciddi revizyona gitmektedir. Eğitim sistemlerinin bütününü izleyen ve değerlendiren ulusal izleme ve değerlendirme sistemlerinin olmaması da sorunların arka planını doğru tespit edememe riskini artırmaktadır. Bu çalışmada, özellikle PISA araştırmalarında ülkeler arası başarı farklarının arka planında işlev gören faktörler ele alınmakta ve ülkelerin kültürel ve sosyal bağlam farklarından bağımsız olarak öğrenci başarısında etkin olan en önemli faktörler belirlenmeye çalışılmaktadır. Bu bağlamda en önemli üç faktörün, öğretmen kalitesi, öğrencilerin okul ayrıştırmalarının geciktirilmesi ve özellikle dezavantajlı okulları daha fazla göz önüne alacak şekilde okullara kaynak dağıtılması olduğu görülmektedir. Ayrıca, uluslararası öğrenci başarı araştırma sonuçlarını sağlıklı değerlendirebilmek ve daha gerçekçi politikalar geliştirebilmek için eğitim sisteminin bütününe bakan bir ulusal izleme ve değerlendirme sisteminin kurulması önerilmektedir.

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Introduction

The achievement levels of the countries in international student achievement researches are interpreted as the achievement indicators of the education systems of the countries and bring intense discussions. In particular, the PISA study puts pressure on governments and policymakers to make changes to their country's education systems based on performance, as it is assumed that it measures the students' ability to solve problems associated with daily life rather than knowledge, in other words, it provides important information about how well students are ready for their community's expectations (Gür, Çelik and Özoğlu, 2012).

On the other hand, foreign investors also consider the results of international student achievement researches in the labour market evaluation of the country they will invest (NESC, 2012). It is now attempted to establish a relationship between educational outputs and economic outputs of countries based on PISA results, and even how much increase in certain PISA scores can lead to a certain amount of increase in national gross national product (GDP) is discussed (Hanushek and Woessmann, 2012; Woessmann, 2014). Therefore, when a country's position in the ranking is low in PISA research results, the pressure to revise or reform the education system of that country increases (Araujo, Saltelli and Schnepf, 2017).

Criticisms towards PISA have also increased over time. Since PISA deeply affected education systems, 100 academicians from different countries pointed out the negative effects of PISA rankings on education systems and stated that many companies, especially for profit, were involved in PISA test development processes (Meyer et al., 2014). This strengthens the views towards the commercialization of PISA research. Therefore, the linear relationships between PISA results and economic growth degrade PISA study to a commercial enterprise, which may lead to misinterpretation of the purpose of education (Araujo, Saltelli and Schnepf, 2017). On the other hand, the effects of social, economic and cultural contexts on student achievement can be neglected in this type of international achievement research and interpretation of the results, and therefore a uniform education approach is emphasized (Trohler, 2013).

After announcing the results of the PISA, which such great meanings are attributed, the countries are comparing their situation with other countries on one hand and, intense discussions and researches are made especially on the reasons of decrease in ranking or points on the other hand. However, uncertainty as to whether the relationship between achievement and factors associated with achievement is a correlation or a causal relationship also involves the risk of shifting debates from a healthy background. For example, although a correlation appears to be exist between PISA scores and GDP, the improvement in PISA scores will not necessarily lead to growth in GDP (Araujo, Saltelli and Schnepf, 2017).

Considering all these criticisms, when international student achievement researches are evaluated within its context, it also provides important information about the education systems of countries. It is assumed that the differences in countries' international student achievement research studies are systematically related to the organization and management of education systems (Woessmann, 2016). Educational production function approach is generally used to determine the weight of factors affecting education (Ammermüller, 2004). With this approach, the effects of various inputs affecting student achievement can be determined. On the other hand, as a common approach to understand what is behind the background of achievement, common patterns in education systems of high performing countries are tried to be identified and their relationship with achievement is investigated. However, other factors and cultural differences outside the education system can play an important role in achievement. Therefore, it is very difficult to determine the factors that affect achievement or the causes of low performance according to international achievement research results as a short cut, and requires a holistic approach that takes into account all parameters and dimensions.

In this study, the background of the differences between countries in international student achievement researches is reviewed and discussed on the basis of PISA studies and the main factors that countries should focus on in order to improve their education systems are tried to be determined.

What Do the International Student Achievement Researches Say?

Since international achievement researches give ranking information about the results, the discussions within the countries also revolve around the rankings, especially since the attention of the media focuses on rankings. However, focusing on scores rather than rankings in international studies provides healthier information about

countries' performance changes. Countries with statistically insignificant score differences in rankings, especially in PISA studies, can be placed above or below each other (Woessman, 2016) and it can lead to inaccurate comfort or anxiety only by focusing on rankings. Educational policy makers can turn to policies that they think will change in the PISA rankings in the short term and the long-term effects of these policy changes cannot be adequately evaluated (Gür, Çelik and Özoğlu, 2012; Takayama, 2015).

On the other hand, the mean scores alone are insufficient for a healthy evaluation. Beyond the scores, student ratios at the proficiency levels determined in each research area and the relationship between these ratio and the OECD average can provide much more meaningful information and contribute to developing the right policy. In all research areas, distribution of students in countries with approximately the same mean scores in these proficiency levels may differ. In other words, achievement differences of students with low and high performance provide more detailed information about those countries in the context of equality of education and equal opportunities in education. Grouping by OECD average, country mean scores and country rankings alone do not provide sufficient information. In order to evaluate this information in detail, the student ratios at proficiency levels must be taken into consideration. On the other hand, comparing these differences with other countries can provide an additional picture of the competitiveness of those countries. For example, although the country mean scores are above the OECD average in some areas, the student ratios at the baseline and upper qualification levels may be below the OECD average at those qualification levels (Hanushek, Peterson and Woessmann, 2013). On the other hand, in the USA, white and Asian students perform above OECD average in PISA researches while African-American and Latin students perform below average (Darling-Hammond, 2014).

Similar findings in different social and cultural contexts apply to different countries (NESC, 2012). For example, according to PISA 2018 results, the performance difference between the socioeconomic level and gender groups in B-S-J-Z (China), Singapore and Macao (China), which rank in the top three in the list of reading literacy are given in Figure 1 (OECD, 2019).

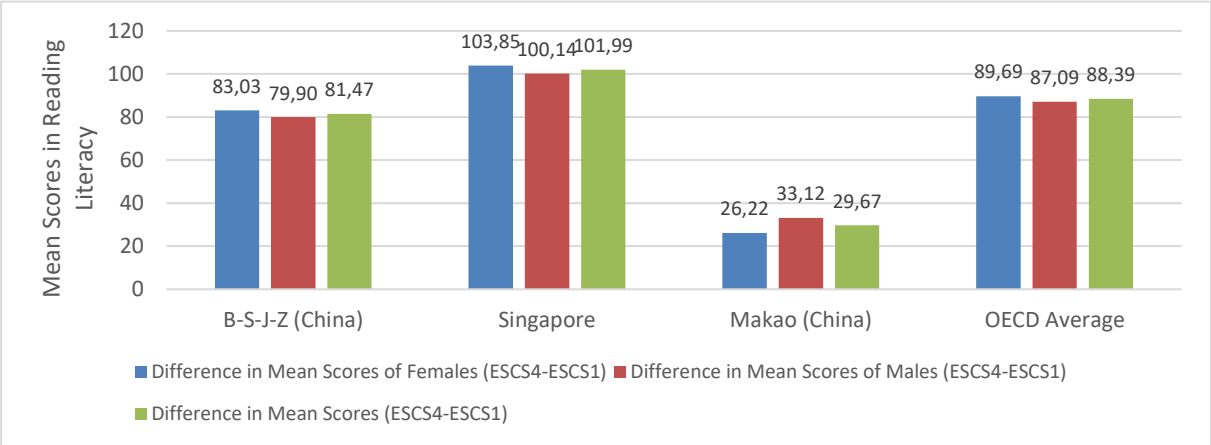

Figure 1. Change of PISA 2018 Reading Literacy Performance in Socioeconomic and Gender Groups of B-S-J-Z (China), Singapore and Macau (China)

As seen in Figure 1, the distribution of the performances of the top three countries in reading skills by gender and socioeconomic level is quite different. The difference between the mean scores of the students in terms of socioeconomic level at the highest level and the students at the lowest level is calculated as 81.47 in B-S-J-Z (China) and is close to the OECD average (88.39). In Singapore, where there is no significant difference between B-S-J-Z (China), this average is quite high (101.99). Macau (China), which ranks third in terms of performance, is one of the countries where socioeconomic level has the lowest impact on student performance with 2% comparing the OECD Average of 12%. The average score difference between the two groups in this region is quite low (29.67). The distribution of the proficiency levels in reading literacy is given in Figure 2 for these countries (OECD, 2019).

As seen in Figure 2, there are also significant differences in the distribution of students in the proficiency levels of the three countries that are in the top rank in the reading literacy. The ratio of students at the 6th level, which is the highest level of proficiency, is quite higher in Singapore than in other countries. Despite this, it is seen that student ratios at 1st, 3rd and 4th levels are low compared to B-S-J-Z (China). Among the countries with the same performance levels, B-S-J-Z (China) stands out with lesser ratio of students at lower levels while Singapore stands out with the higher ratio of students at the higher levels of qualification (level 5 and 6).

Therefore, in PISA studies, interpretations based on country rankings or mean scores should be made restrainedly and detailed analyses should be conducted from macro to micro levels.

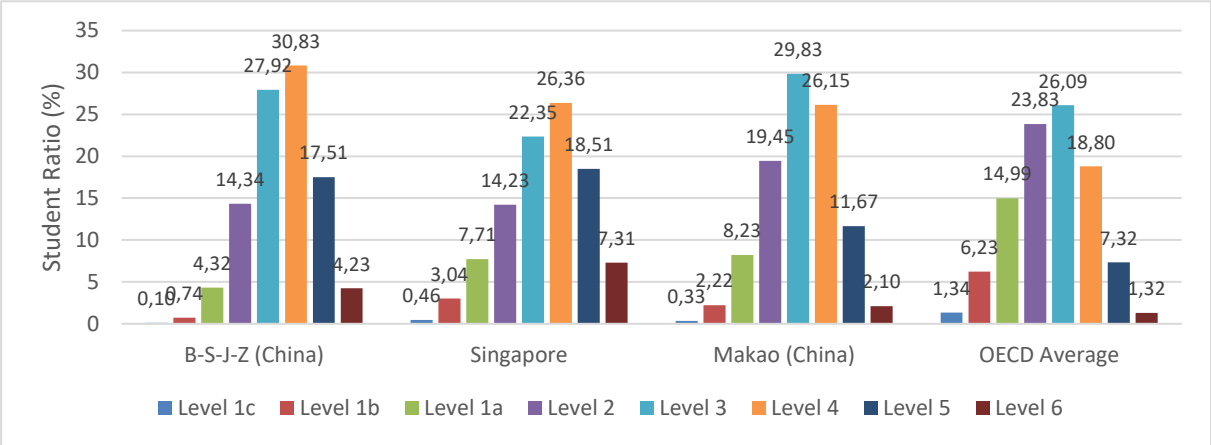

Figure 2. Distribution of PISA 2018 Reading Literacy Performances into Proficiency Levels in B-S-J-Z (China), Singapore and Macao (China)

The Relationship between International Student Achievement Research and Quality of Educational Systems

A good educational system must also meet important criteria outside the areas that international student achievement researches focus on (Sahlberg, 2011). If international student achievement research is the only indicator of whether education is successful or not, concerns are expressed that the focus will be only on these tests in education systems, education will weaken over time in other courses and ultimately the curriculum will narrow (Adams, 2003; Darling-Hammond, 2014; Goldstein, 2004; NESC, 2012; Prais, 2003). In particular, the linear relationships between PISA results and economic growth degrade PISA study to a commercial enterprise and thus may misinterpret the purpose of education (Araujo, Saltelli and Schnepf, 2017).

One of the most frequently expressed criticisms against PISA is to ignore the impact of historical, social, economic and cultural contexts on student achievement in the research and highlight a uniform educational approach (Trohler, 2013). It is stated that PISA does not provide sufficient evidence about causal relationships and that the policy recommendations presented in the result reports should be carefully evaluated before these relationships are established (Harris and Zhao; 2015). In this context, it is of great importance for the healthy development of education systems, to reduce the pressure to consider the results of international research as a sole indicator for the performance of educational systems and the risks of developing inaccurate policies, whose validity is discussed in terms of scale, sample, cultural differences and inclusiveness,. Consequently, the construction of national evaluation mechanisms that take into account the entire education system will provide an opportunity to use international achievement researches as secondary instruments, not the main ones, for the evaluation of education systems. National monitoring studies will also provide additional findings in terms of explaining and interpreting the results of international researches.

International studies carry out student achievement monitoring researches in different fields and at different periods and on different groups of students. For example, TIMSS focuses on curriculum-oriented student achievement research at 4th and 8th grade levels in four-year periods, while PISA focuses on the ability to solve

problems related to daily life based on the information learned by 15-year-old students in three-year periods. Correlation between different international studies can provide an opportunity to increase the number of options in instruments that countries can use to evaluate the outputs of education systems and to monitor educational outcomes and student achievement in different areas. In this manner, Hanushek and Woessmann (2015) found quite high correlations of 0.944 in mathematics and 0.930 in science, in the study in which they analysed the relationship between PISA 2012 and TIMSS 2011 results. This result shows that although the context and aim are different in international comparisons, test designs and item contents are of secondary importance (Woessmann, 2016). The fact that the high school types which have higher base scores in high school entrance exam including only multiple-choice items in Turkey, have also higher mean scores in PISA also confirms the aforementioned facts (MoNE, 2019). On the other hand, national monitoring studies provide richer feedback on curriculum-based deficiencies and improvements as countries use their curricula as resources. It is also possible to evaluate the criteria used by countries in educational quality assurance systems for national monitoring studies (DFID, 2011). These features show the importance of the national monitoring studies as the main instrument in the policies to be developed to improve educational processes.

The Relationship between International Student Achievement Research and Sociocultural Context

Researches on the background of achievement differences in international studies, cultural differences of countries require attention in evaluating the results. Research results do not mean that schools or education systems in countries with higher rankings are more effective than those in other countries (NESC, 2012). In researches, detailed outputs are presented according to the academic achievement or literacy levels of the target student group in the countries and the countries are ranked based on these outputs. However, the studies do not provide casual conclusions about why the countries are in their order because of the fact that the descriptive design of the researches prevent it (Takayama, 2015). However, correlational relations presented by the research might be interpreted as causal relations. While a parameter that positively affects the outcome in one country does not have an effect in another country, it may even have a negative effect on student achievement in another country.

Therefore, reforms that lead to success in one country may not lead to the same result in countries with different cultural or social contexts (Sahlberg, 2011). For example, although school autonomy has a significant effect on student achievement, this effect varies between countries; while this positive effect is quite high in developed and higher performing countries in PISA, it has a negative effect in developing and low performing countries in PISA (Woessmann, 2016). On the other hand, it is expressed that the cultural and social structure, in which students' hard work, determination and perseverance and family involvement to education coexist greatly explain the high performance of Asian countries such as South Korea (Araujo, Saltelli and Schnepf, 2017). On the other hand, it is not possible to state that these features explain achievement in Scandinavian countries such as Finland.

In a comparative study of the PISA results for Germany and Finland, it has been shown that the same characteristics may have different effects in the educational production function (Ammermüller, 2004). In other words, while mechanisms that activate cultural codes affect the results positively, conflicting mechanisms can also affect negatively. Therefore, it should not be ignored that multiple factors are effective in the results and that each of these factors can be affected by culture. Consequently, it is necessary to avoid inferences that the parameters that are effective in the results of high performing countries should lead to achievement in other countries. To avoid such risky implications, national monitoring research programs are very important, as we will see later.

Effects of Socioeconomic Background and School Tracking on the Achievement Differences

The impact of the socioeconomic background on the student achievement is generally addressed in the context of school tracking in the education system (Ozer and Perc, 2020). Since there are different types of schools in school systems in countries, students are tracked into different school types. The school tracking usually takes place at the beginning of upper secondary school level. The student age at which the tracking is made, the number of schools tracked and the scale of the curriculum differentiation in the tracked schools are examined in terms of their effects on student achievement (Reichelt, Collischon and Eberl, 2019). These studies focus on whether school tracking enhances the impact of out-of-school factors such as the socioeconomic status and educational levels of families on the student achievement (Bol and Van de Werfhorst, 2013; Brunello, 2004; Hanushek and Woessmann, 2006; Marks, 2006; Ozer and Perc, 2020; Pekkarinen, Uusitalo and Pekkala, 2006; Reichelt, Collischon and Eberl, 2019; Roemer, 1998; Woessmann, 2009; Zimmer, 2003).

The socioeconomic status of the family has a strong impact on the student's academic achievement especially at early ages (Horn, 2009; Marks, 2005; Ozer and Perc, 2020; Reichelt, Collischon and Eberl, 2019). With the school tracking at early ages, children from disadvantaged backgrounds are differentiated into different school types without having the chance to compensate for this situation, which further deepens the achievement difference in the country (Ammermüller, 2004). Therefore, disadvantaged students cannot adequately get involved in the high performing student community (Burroughs and Plucker, 2014; Jacobs and Wolbers, 2018).

Schütz, Ursprung and Woessmann (2008) showed that family background effects on student achievement are systematically larger in countries where the school tracking is made at an early age and pre-school education is less common. Access to preschool education is also related with the socioeconomic status of families. For example, in the United States, %30-%40 of children lack the skills required to be successful initially in primary school, as children of low-income families are much less likely to have access to pre-school education than their peers from wealthy families (Darling-Hammond, 2014). Similarly, early tracking and the increase in the number of tracked schools increase the impact of family education on the student achievement (Ammermueller, 2013). Although tracking of students according to their abilities in school types does not have the same level of positive contribution to the achievement of students in upper achievement groups, it has a rather negative effect on students in lower achievement groups (NESC, 2012). Therefore, early tracking significantly increases inequality in countries' achievement outcomes (Hanushek and Woessmann, 2006; Ozer and Perc, 2020).

Effects of Teacher Quality on the Achievement Differences

The main actors of education are teachers and their quality directly affects student achievement (Rivkin, Hanushek and Kain, 2005). In PISA studies, teacher quality is considered as the main explanatory factor of high performance (Takayama, Waldow and Sung, 2013). Employment of quality teachers is considered as a common point of the most successful education systems in the world (Barber and Mourshed, 2007). In countries with higher performance in the international student achievement researches, access to qualified teachers is higher (Akiba, LeTendre and Scribner, 2007).

The most important issue in reducing the achievement difference between schools is the quality of teachers. The importance of accessing a qualified teacher increases more, especially if children with a low socioeconomic background do not have a strong chance of early childhood education. For example, in the USA, students with high and low socioeconomic status have very high inequality of opportunity in accessing quality teachers (Darling-Hammond, 2014). In New Zealand, less than %40 of students have access to qualified teachers, while students with low socioeconomic status (SES) have higher access to qualified teachers than students with higher SES (Akiba, LeTendre and Scribner, 2007). In the disadvantaged areas where students with low SES are clustered, especially inadequate teachers are employed at a higher ratio due to the difficulty of working conditions (Darling-Hammond and Sykes, 2003), which leads to a further deepening of the initial disadvantage. Since more qualified and more experienced teachers are found less frequently in disadvantaged schools in most countries, the performance gap is growing even more according to socioeconomic status (OECD, 2018).

It is suggested that inequalities in accessing qualified teachers play an important role in long-standing achievement differences in the USA (Darling-Hammond, 2006). For this reason, in order to reduce the difference in student achievement in America, it is recommended to appoint qualified teachers especially in schools where minority students are present (Darling-Hammond, 2014). In Japan and South Korea, teachers change schools periodically, so that all schools' access to effective and experienced teachers is tried to be increased, while on the other hand, continuous professional development of teachers and flowing of experiences throughout the system are assured (OECD, 2018). In other words, the most common policy used to reduce the negative impact of SES on student achievement is practices that will increase the access of disadvantaged students to more qualified teachers.

Since the teacher was determined as the main actor in the transformation in education in Finland, both the selection of the candidates to be trained and their education have been strengthened, and as a result, the efficiency of the investments made in education with the strong teacher has been increased, thus high performance in international student achievement researches was achieved and the difference in achievement between schools has been minimized (Sahlberg, 2011). As a result, not only the difference between the ratio of the quality of teachers in a country compared to the international average, but also the ratio of access to qualified teachers of students with different socioeconomic backgrounds is an important parameter.

Effect of School-Related Other Factors on the Achievement Differences

Many studies have been carried out on the relationship of many factors such as the amount of expenditure per student in schools, accountability mechanisms in schools, number of students in classes, weekly course hours and teacher training with the student achievements.

In a study examining student achievement and expenditures per student over a 25-year period in OECD countries, it was shown that the large increases in student expenditures did not reflect the student achievement at the same ratio (Gundlach, Woessmann and Gmelin, 2001). Woessmann (2016) also showed that the effect of school expenditure on student achievement is relatively small. However, it is pointed out that when the resources are allocated correctly to prioritize the places where they are needed the most, they cause a significant difference in educational outcomes (Darling-Hammond, 2014). It has also been shown that there is a strong relationship between the national achievement level of a country and the level of allocating more resources to schools serving socioeconomically disadvantaged students (OECD, 2013). These results indicate the importance of how efficiently they are used rather than the amount of resources. Here, the interaction between the factors affecting the outcome comes to the fore. For example, resources are used more efficiently in Finland, where the selection and training of teachers is based on a very strong system (Ammermüller, 2004).

School autonomy is also one of the topics examined in terms of its effects on student achievement. In school systems, exit exams are associated with accountability, as well as school management capacities. In this context, significant positive interaction was found between changes in school autonomy and exit exams (Hanushek, Link and Woessmann, 2013). In addition, it has been shown that higher student achievement can be achieved as the quality of management in schools increases (Bloom et al., 2015).

Although countries prefer to reduce the number of students in the classroom in order to improve the quality of education in the classroom and to better meet the needs of the students, PISA findings indicate that the smaller class size is not associated with higher achievement (Ehrenberg et al., 2001). Conversely, as the number of students in the class increases, student achievement has been shown to increase (Woessmann, 2016). In a study conducted by Altinok and Kingdom (2012) over 47 countries, only 14 countries have shown that class size has an effect, but this effect is mostly small. It has been shown that low class size can only be beneficial in countries with relatively low teacher quality (Woessmann, 2005).

Weekly instruction hours and teacher education indicators have been shown to be positively associated with student achievement (Woessmann, 2016). Lavy (2015) showed that the instruction time has a significant positive effect on student achievement. In a study carried out by Andrietti (2015) for the 8th and 9th grades specific to Germany, an hourly increase in the weekly instruction hour led to a significant improvement in student achievement. Course duration has also been shown to be positively associated with the integration of immigrant students (Schneeweis, 2011). Although the number of books at home is positively associated with student achievement, the difference in achievement is shown to be lower among students who have different numbers of books in their homes when the class duration is increased (Ammermueller, 2013). Similarly, participation in early childhood education has been shown to be associated with lower socioeconomic gradients and better integration of immigrant students (Schneeweis, 2011; Schütz, Ursprung and Woessmann, 2008). Therefore, the weekly instruction hour has a positive effect on the achievement of students who come from disadvantaged backgrounds and on the integration of immigrant students, which stand out in international achievement differences.

Discussion and Policy Suggestions

Education is an area where there is intense debate all around the world and where satisfaction is relatively low. Countries are working hard to improve the quality of their education systems and meet their societies' expectations. While countries make their own monitoring and evaluation to measure the performance of their education systems, they also participate in international student achievement monitoring studies. In this context, PISA researches, conducted in three-year cycles and evaluating how ready students aged 15 are in the expectations of the modern society, have been one of the most important indicators of the educational performance of the countries. When PISA results are announced, intense discussions about education systems continue in countries, and pressure on policy makers is increasing. Despite discussions about the limitations of the context of PISA research, its validity and the impact of cultural differences on the results, revisions are made in education systems to succeed in PISA research in most countries.

It is seen that many factors are effective in student achievement of countries. While some of these factors are effective in one country, they may not have a significant impact on the outcome in another country. They may even have a negative effect. This indicates that both the interactions between the factors affecting the educational output and their impacts on the output have a nonlinear relationship. However, there are also main factors affecting the performance of the education systems regardless of the cultural differences of the countries. These factors stand out as teacher quality, delaying school tracking and providing a longer comprehensive schooling, and allocating resources according to the needs of schools to provide equal learning environments in schools. All of these three factors are the internal parameters of the education system and they are also the most effective factors in reducing the negative effects of external factors. While other factors may have positive effects in education systems where all three factors are strong, they cannot make a significant contribution to student achievement in systems where these three factors are weak.

Teacher quality is the most important factor that determines the performance of education systems. Carefully selected and well-trained teachers are critical to the success of schools. In education systems where teacher selection is weak and quality lacks a minimum level, it is quite difficult for investments made in education to give the expected output or for improvements made in different areas to become widespread in the system. Qualified teachers directly affect the efficiency of the investments in schools (Sahlberg, 2011; Darling-Hammond, 2014; Darling-Hammond et al., 2017). On the other hand, access of students with low socioeconomic background to quality teachers is of great importance in reducing student achievement differences in countries. Access to quality teachers has a much more critical function, especially in countries where pre-school education is not strong or access is limited, or in countries where other mechanisms to reduce social inequality are not implemented (Akiba, LeTendre and Scribner, 2007). Therefore, building some strong mechanisms that will ensure continuity in the professional development of teachers as lifelong learners, and on the other hand, increasing the mobility of teachers between schools in certain periods will provide a relatively fair distribution of experienced and qualified teachers among schools (OECD, 2018). This will also increase the professional development and experience of teachers in the country, as well as increase the flow of knowledge and experience sharing across the education system through teachers.

Considering the augmenting negative impact of socioeconomic status of families on student achievement by an early school tracking, both factors serve as the main factors in the growth of student achievement differences in countries (Ozer and Perc, 2020). This finding is also reflected in the PISA results. It is seen that countries adopt the comprehensive school approach, delay the tracking age and give all students the opportunity to receive education in the same curriculum until the tracking in order to reduce this out-of-school effects and increase the chance of compensating them. In PISA studies, it is seen that one of the main factors behind the success of Finland, which stands out in terms of both its place in the ranking and the difference in achievement and therefore equal opportunities in education, was the comprehensive school reform in 1970s (Pekkarinen, Uusitalo and Pekkala, 2006). With this reform, the school tracking age was increased from 11 to 16 and all students up to the age of 16 are provided with the same curriculum. In Finland, comprehensive schools supported by strong teachers have been able to minimize the impact of family socioeconomic status or background on student achievement (Sahlberg, 2011). In addition to Finland, most of high performing countries in PISA offer education opportunities to students with the same curriculum until upper secondary school level (Darling-Hammond, 2014).

The performance of education systems is evaluated in the context of equality in education and opportunity. Not only factors related to school and education system but also external factors affect student achievement. In all countries, the socioeconomic status and education levels of families differ. It is known that the socioeconomic status and education level of families are determining factors in the academic achievement of students, especially in the first stages of education. Therefore, it is seen that for the school tracking according to academic achievement, delaying tracking age and the implementation of a common curriculum in all schools until this age are a common approach adopted by countries to mitigate the effects of non-school factors (Ozer and Perc, 2020). This approach also reduces the differences in achievement between schools.

Similarly, although the resources allocated per student in education have been shown to have a small impact on international student achievement, it is known that especially investments in disadvantaged and needy schools have an important effect on student achievement and have an important function in reducing the achievement differences between schools. However, in this study, the transfer of resources to disadvantaged schools is not intended just the financial resources allocated per student to improve the learning environment. In addition to this,

positive discrimination in the appointment of more qualified and more experienced teachers and school administrators in disadvantaged schools are also meant.

The most important issue with the potential to reduce false inferences based on PISA is national monitoring researches. It enables countries to conduct their own national monitoring studies for student achievement, and to identify and compare their relationship with international research results. Thus, countries will be able to conduct their own student achievement research every year without waiting for three or four year cycles as in international research, take measures for improvement based on the findings obtained, and will soon be able to monitor their results.

Finally, while countries explore the background of their status in PISA research and their performance relative to different countries, the focus is often on how high performing countries achieve this. In this case, the effects of cultural differences on the outcome or the risk of a mechanism working in different cultures and social contexts does not perform the same in other countries may be neglected. On the other hand, situations where the characteristics of factors relate with student achievement are uncertain whether it is only correlation or causal lead to develop wrong policies. In this case, both the efficiency of the revisions and resources decrease and motivations of the main actors of the education systems, which are constantly revised, are negatively affected. Therefore, it is very important for countries to establish their own national evaluation systems in evaluating the performance of education systems and to look at education as a whole. Establishing national evaluation systems at international standards and evaluating international student achievement researches related to this system will contribute to more realistic policies and more efficient use of resources in the continuous improvement of countries' education systems.

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