

Full Length Research Paper

Equity index in the School systems of selected OECD Countries

Mustafa Ozmusul

Harran University, Turkey.

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The purpose of this study is to analysis the equity in the school systems of selected OECD countries. For this purpose, the international data for selected OECD countries was analyzed in terms of four dimensions of equity as learning equity, school resource equity, participating in education, and digital equity. When analyzing data, the equity index developed in this study was used. The results reveal that the selected OECD countries seem currently insufficient to achieve equity especially in terms of learning equity, school resource equity, and digital equity. In turn, these three dimensions appear to be issues that should be coped with immediately in education agendas of OECD countries. However, this study shows some limitations, because its methodology bases on the equity index developed by the author and its findings rely mainly on self reported data (e.g. student and principal questionnaires).

Key words: Equity, Index, Indicators, Education, School.

INTRODUCTION

Education is important because it; beats poverty, promotes gender equality, reduces child mortality, contributes to improved maternal health, helps combat preventable diseases such as HIV, malaria, encourages environment sustainability, and helps global development (UNESCO, 2011). Also education can play an important role in improving the conditions of next generations; in turn, children who have educated parents generally are healthier, perform better at school and have better labour market outcomes (OECD, 2011a,). However it is vital to take into consideration the equity dimension in education for achieving those benefits.

Equity means that every person should have equal opportunities to pursue a life of their choosing and be spared from extreme deprivation in outcomes (The World Bank, 2005). Equity is defined in Oxford (2013) Online Dictionary as “the quality of being fair and impartial”. In this regard, equity can be considered as equality turned into an action (Unterhalter, 2009). Equity entails focusing on the various issues such as social regression, racism, gender or status discrimination or other forms of discrimination (Castelli et al. 2012). Also the World Bank (2005) has brought two basic principles for defining equity:

E-mail: Mustafaozmusul@yahoo.com.

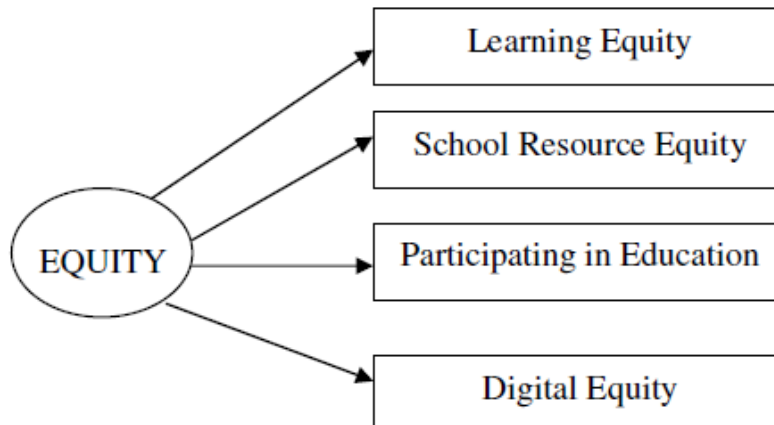


Figure 1. Dimensions of equity in the school system.

1. *Equal opportunity*: the circumstances such as gender, race, place of birth, family origins, and social groups should not indicate whether people are advantageous economically, socially, and politically.

2. *Avoidance of absolute deprivation*: Societies can play a considerable role in that its members will not be allowed to starve, in the face of low outcomes deriving from bad luck, or even a person's failings.

Equity in education is important because of a range of benefits: Education is a human right for all people for developing capacity and participating fully in society. When the opportunity of education is distributed unequally some people will not develop their skills and abilities not only for them but also for society. Hence, it seems that there is a relation between higher levels of education and positive life outcome, and also social cohesion is a considerable factor enhancing countries (Levin, 2003). When considering these benefits of education, the equitable education system means providing high quality education to all children, regardless of their background or where they live (Sherman and Poirier, 2007).

On the other hand, promoting equity is a complex issue and can not be achieved easily. It requires coping with some challenges. Some potential obstacles and barriers to promoting equity can be given as follows: the power structures and political incentives involved; the complexity of measuring and achieving equity; and the potential sticking point of cultural values (Jones, 2009).

Additionally, coping with the complex dimensions of equity in education entails to monitor the robust data and to evaluate them. Monitoring and evaluating the access, enrolment, retention and completion of schooling, and the quality and outcomes of teaching and learning requires tangible and wide-ranging information (UNESCO, 2008).

In this regard, analyzing the dimensions of equity can bring tangible and wide-ranging information.

After the general explanations given above, dimensions of equity will be given on the next parts for deeply understanding the equity in education and formulating the research questions.

Dimensions of Equity

Equity in education has two general dimensions: *fairness* and *inclusion*. While *fairness* means personal and social circumstances such as gender, socio-economic status or ethnic origin; *inclusion* means ensuring a basic minimum standard of education for all (OECD, 2008). Moreover, when looking at the studies upon the equity in school system, it appears that these can be contextualized as following dimensions (Figure 1): *Learning or educational equity* (Özerk, 2008; OECD, 2010a; Banks, 1981; Darling-Hammond, 1994; Freeman, 2004; Trueba and Bartolomé, 2000; Barona and Garcia, 1990; Yinger, 2004); *school resource equity* (Miles and Roza, 2006; Brown and Peterkin, 1999; Rubenstein, 1998; Iatarola and Stiefel, 2003); *participating in education* (United Nations, 2012; OECD, 2012a); *digital equity* (Solomon, 2002; Davis et al. 2007; Shafie, 2002; Rhodes and Robnolt, 2009; Judge et al., 2004; Becker, 2007; Gudmundsdottir, 2010; Wiburg, 2003).

Learning equity

There is a significant relation between students' socio-economic status and their achievement at school (Coleman, 1968; OECD, 2010a; Sirin, 2005; Marks et al.,

2006; Caro et al. 2009). In this sense, the differences in learning outcomes should not be based on the differences in wealth, income, power or possessions (Levin, 2003). And also schooling should be considered as “the great equalizer” and it may triumph over the circumstances (Schmidt et al., 2010). Inclusion in education means ensuring a basic minimum standard of education for all (OECD, 200). Consequently, one of the significant responsibilities of the nations is to set public policy that requires equal educational opportunities for all children (Schmidt et al., 2010).

Only school attainment can not indicate the quality of education of students in a given grade. The analyses provide strong evidence that cognitive skills of the individuals, rather than mere school attainment, are considerably related to individual earnings, to distributed of income, and to economic growth (Hanushek and Wößmann, 2007). Moreover, the analysis made by Wößmann (2008) reveals that focusing public investments early on, improving the fates of disadvantaged students in early childhood and in school provides efficiency and equity. In turn, opening the doors of the schools to students, ensuring participation of students in schools, is insufficient alone. After the students enter the schools, it requires doing what they should learn at the schools, or, another words, ensuring *learning equity* (Özerk, 2008).

Learning equity or educational equity is defined based on the output variables or the effect of schooling (Banks, 1981). In other words, it can be defined as equality in outcomes in abilities that students gain in the educational system (Formichella, 2011). Through these definitions, the major task of the schools has changed to create learning environments that uphold a standard of equity in educational outcomes for all students (Wang, 19980).

School resource equity

All levels of government should provide sufficient and equitable resources for supplying a high quality education to all children (Guisbond and Neill, 2004). Many countries design the policy on allocation of school resources so as to promote equality of opportunity by partly counteracting the effects of differences in family background (Hægeland et al., 2005).

School resources are related to the inputs and they consist of hours of instruction, class size, teachers, education and experience, materials, computers, and more (Lavy, 1999). School resources include quantity and quality of teaching, facilities and management (Bramley and Karley, 2007; Harrison et al., 2012); power, time, knowledge, technology, fiscal resources and the and human resources (Palardy, 2008; Caldwell and Spinks, 1992); classroom size (student-teacher ratio), teacher qualification, training, and experience, length of

instruction period, teachers' pay, and etc (Freinkman and Plekhanov, 2009).

Participating in education

It is important that participating in primary and secondary education levels becomes universal to help ensure good returns for individuals (OECD, 2012a). Since more educated people means more democratic societies, sustainable economies, equality among different groups in societies, better functioning of the governmental institutions; less dependent on public aid, and less vulnerable to economic downturns (OECD, 2012b; Baskan and Erduran, 2009); an also it means that families who have the power to cancel their children workforce and send them to school (Babapoor, 2012). Ensuring equity in terms of participating in education is related to formal equality which means equality that is premised on the notion of the sameness of men and women (Subrahmanian, 2005).

One of the Millennium Development Goals (MDG) declared by United Nations is to achieve universal primary education. In regard, a target, ensuring that, by 2015, children everywhere, boys and girls alike, will be able to complete a full of course of primary schooling. In addition, eliminating gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015, is a considerable target of MDG (United Nations, 2012).

Digital equity

Digital equity can be defined as “equal access and opportunity to digital tools, resources, and services to increase digital knowledge, awareness, and skills” (Davis et al., 2007). Such a kind of equity should procure quick, easy, and appropriately functional access to ICT equipment and tools, as well as access to training to ensure effective access and use (Shafie, 2002).

In the digital age, the efforts to avoid having a technological underclass that contributes to the economic and educational divides that already exist become important. However, the mean of educational access has changed and it entails to understand the changing nature of how one comes to know (Wiburg, 2003). However, it is not only access to technology but also quality and use of technology (Solomon, 2002). When considering digital equity, it should draw attention to the student access to technology and the student use of technology for educational purposes (Rhodes and Robnolt, 2009).

In sum up; the explanations and the literature regarding equity and its dimensions suggest that in general the issue of equity in education includes many complex dimensions; and ensuring it, entails to monitor the robust

data and to develop action plans through these data. Even as a considerable amount of data for equity in the education has been produced by international organizations continually, these are disseminated separately and need to be combined together for effective monitoring and evaluating the dimensions of equity. In other words, most studies in the equity in the school system have only been carried out in one dimension of equity. However, far too little attention has been paid to it in multi-dimensions.

To address these points, the purpose of this study is to analysis the equity in the school systems of selected OECD countries. For this purpose, the following questions have been answered:

What is the situation of the school systems of selected OECD countries in terms of:

1. Learning equity?
2. School resource equity?
3. Participating in education?
4. Digital equity?
5. Equity index?

METHOD

This study was designed as a descriptive study because the purpose of the study was to analysis the existing situation of the equity in the school systems of selected countries. In this sense, descriptive statistics were used. Among the OECD countries, 28 were selected into the study. France, Luxembourg, Mexico, Netherlands, United Kingdom and United States couldn't be taken into the study because the some values (e.g. digital equity) were not given on the database. When estimating the learning equity, school resource equity and digital equity for the selected countries, PISA 2009 samples were used (Table 1). In turn, this study has presented the PISA 2009 samples of the selected OECD countries.

Data Analysis

Data analyses used in this study were given according to dimensions of equity and were summarized on the Table 2.

When measuring learning equity; firstly, PISA 2009 scores in reading, math and science according to gender and ESCS (PISA index of economic, social and cultural status) of students were accessed the OECD database of PISA on <http://pisa.acer.edu.au/>. The ESCS was estimated by OECD (2010a) through highest occupational status of parents (HISEI), highest educational level of parents in years of education according to ISCED (PARED), and home possessions (HOMEPOS). In order to calculate the PISA 2009 score means according to gender (girls and boys) and ESCS values (bottom and top quarter), the SPSS macros prepared by the OECD (2009) was used.

These scores were evaluated in terms of two dimensions included gender and ESCS (PISA index of economic, social and cultural status) of students. In this sense, mean PISA score difference of girls and boys in reading, math and science domains were calculated and their average was taken. Then, mean PISA score differences of students in bottom quarter of ESCS and students in

top quarter of ESCS were calculated and their average was taken. Finally, learning equity value was calculated by the average of these two dimensions.

In the PISA study, the index on the school's educational resources (SCMATEDU) including seven items measuring school principals' perceptions of potential factors hindering instruction at their school was developed. Higher values on this index present better school resources (OECD, 2010b). In turn, SCMATEDU can be used for determining school resource equity among the schools.

When measuring school resource equity; firstly, each school's mean of ESCS of its students was calculated. Secondly, bottom quarter and top quarter of schools according to their ESCS means were determined. Thirdly, mean SCMATEDU differences of schools in bottom quarter of ESCS and schools in top quarter of ESCS were calculated. This difference was accepted school resource equity.

In this study, participating in education was taken base on the gender parity index estimated and monitored continually by the United Nations. Gender parity index indicates that to what extent the progress towards gender equity in literacy and learning opportunities for women in relation to those for men. This indicator is measured by the number ratio of the number of female students to the number of male students in education level (United Nations, 2003).

When measuring the equity in terms of participating in education, the gender parity index of primary and secondary level enrolment values in 2009 year (2008 for Canada, 2007 for Greece and 2008 for Luxembourg) were used. In parallel, the mean of primary and secondary level gender parity indices were estimated and accepted *participating in education* value.

When measuring digital equity, students' attitudes towards using computers and self confidence in ICT high-level tasks index values estimated by PISA 2009 study were taken base. The *index of attitudes towards using computers* was derived from four statements on which students agree with "It is very important to me to work with a computer"; "I think playing or working with a computer is really fun"; "I use a computer because I am very interested"; and "I lose track of time when I am working with the computer". In addition, the *index of self-confidence in ICT high-level tasks* was derived from five different levels of technical proficiency on which students felt they could perform "edit digital photographs or other graphic images"; "create a database (e.g. using Microsoft Access®)"; "use a spreadsheet to plot a graph"; "create a presentation (e.g. using Microsoft PowerPoint®)"; "create a multimedia presentation (with sound, pictures, video)". The higher scores of both two indices indicate higher attitudes or higher self-confidence (OECD, 2011b).

Table 6. .5.23 (OECD, 2011b), index of attitude towards computers; and Table 6.5.25 (OECD, 2011b), index of self-confidence in ICT high-level tasks were used to find the differences of gender and ESCS. The differences between girls and boys, and students in bottom quarter of ESCS and students in top quarter of ESCS for both indices were calculated. And after these calculations were performed; all the differences were averaged and then the digital equity index was generated.

After all the four indices were estimated, these indices were combined to create the equity index as a composite index. And it can be formulated as follows:

Equity index= participating in education + school resource equity + learning equity + digital equity

As indicated in the formula, equity index measures progress in four dimensions and it assigns equal weight to all four dimensions. Also measuring equity index and its dimensions were formulated on the Table 2.

Table 1. Sample Students and Schools (PISA 2009 samples).

Selected OECD Countries	Students						Schools	
	Gender		Total	ESCS		Total	Top quarter of ESCS	Bottom quarter of ESCS
	Girls	Boys		Bottom quarter of ESCS	Top quarter of ESCS			
Australia	7.231	7.020	14.251	3.650	3.333	353	88	88
Austria	3.338	3.252	6.590	1.509	1.642	282	70	70
Belgium	4.156	4.345	8.501	2.042	2.125	278	69	69
Canada	11.776	11.431	23.207	6.083	5.262	978	240	243
Chile	2.799	2.870	5.669	1.326	1.518	200	49	49
Czech Republic	2.949	3.115	6.064	1.314	1.856	261	65	65
Denmark	3.038	2.886	5.924	1.841	1.234	285	71	71
Estonia	2.297	2.430	4.727	1.098	1.213	175	43	43
Finland	2.954	2.856	5.810	1.361	1.561	203	50	50
Germany	2.434	2.545	4.979	1.170	1.138	226	56	56
Greece	2.557	2.412	4.969	1.159	1.316	184	46	46
Hungary	2.311	2.294	4.605	1.085	1.199	187	46	46
Iceland	1.854	1.792	3.646	895	888	131	32	32
Ireland	1.964	1.973	3.937	950	989	144	35	35
Israel	3.113	2.648	5.761	1.388	1.453	176	44	44
Italy	15.209	15.696	30.905	7.016	7.549	1.097	274	274
Japan	2.962	3.126	6.088	1.513	1.484	186	46	46
Korea	2.399	2.590	4.989	1.201	1.260	157	39	39
New Zealand	2.247	2.396	4.643	1.088	1.144	163	40	40
Norway	2.285	2.375	4.660	1.152	1.151	197	49	49
Poland	2.474	2.443	4.917	1.147	1.335	185	46	46
Portugal	3.278	3.020	6.298	1.498	1.589	214	53	53
Slovak Republic	2.317	2.238	4.555	1.116	1.142	189	47	47
Slovenia	2.822	3.333	6.155	1.829	1.221	341	85	85
Spain	12.746	13.141	25.887	5.480	6.625	889	222	222
Sweden	2.256	2.311	4.567	1.122	1.145	189	47	47
Switzerland	5.790	6.020	11.810	3.040	2.532	426	106	106
Turkey	2.445	2.551	4.996	1.230	1.234	170	42	42
TOTAL₂₈	114.001	115.109	229.110	55.303	56.138	8.466	2.100	2.103

FINDINGS

Learning Equity in the School Systems of Selected OECD Countries

Figure 2 shows the learning equity in reading, math and science score means of students in terms of gender. When evaluating the scores in terms of gender, Girls-Boys gap values seem positive and vary between 0.5 and 0.2 which mean that girls outperform boys in reading. However, Girls-Boys gap values vary between 0,02 and -0.22 in the math and seem negatively across the countries, except Sweden. In addition, Girls-Boys gap values in the science vary between 0.15 and -0.12 and seem positively in most countries but negatively in some countries (Iceland, Canada, Germany, Belgium, Spain,

Austria, Switzerland, Chile, and Denmark). As a result, when excluding the reading, and math for Sweden, the findings suggest that the selected countries encounter gender gap in the math and/or science PISA scores. Figure 3 shows the learning equity in reading, math and science score means of students in terms of ESCS. When evaluating the scores in terms of ESCS values, the reading, math and science mean scores between the students at the bottom quarter of ESCS and the students at the top quarter of ESCS seem negative (vary between -0.59 and -1.18 for reading; vary between -0.54 and -1.24 for math; vary between -0.57 and -1.20 for science). This situation indicates that selected countries encounter a considerable gap in terms of PISA scores of students between bottom and top quarter of ESCS.

Figure 4 shows the learning equity indices combined

Table 2. Measures for dimensions of equity.

Dimensions of equity	Measures	Data sources
Learning Equity =	Mean of (Girls reading scores - Boys reading scores), (Girls math scores - Boys math scores), (Girls science scores - Boys science scores), (Bottom ESCS of Students reading scores - Top ESCS of Students reading scores), (Bottom ESCS of Students math scores - Top ESCS of Students math scores), (Bottom ESCS of Students science scores - Top ESCS of Students science scores).	OECD PISA 2009 DATA (PISA scores and ESCS index) (OECD,2010a).
School resource equity =	Bottom ESCS of schools _{SCMATEDU} - Top ESCS of schools _{SCMATEDU}	OECD PISA 2009 DATA (OECD,2010b).
Participating in Education =	Mean of Gender Parity Index _{primary education} , Gender Parity Index _{secondary education} .	(United Nations, 2013)
Digital equity =	Mean of (Girls attitudes towards computers - Boys attitudes towards computers), (Bottom ESCS of Students attitudes towards computers - Top ESCS of Students attitudes towards computers), (Girls self confidence in ICT - Boys self confidence in ICT), (Bottom ESCS of Students self confidence in ICT - Top ESCS of Students self confidence in ICT)	OECD PISA 2009 DATA (OECD, 2011b)
Equity Index =	Learning Equity + School resource equity + Participating in Education + Digital Equity	

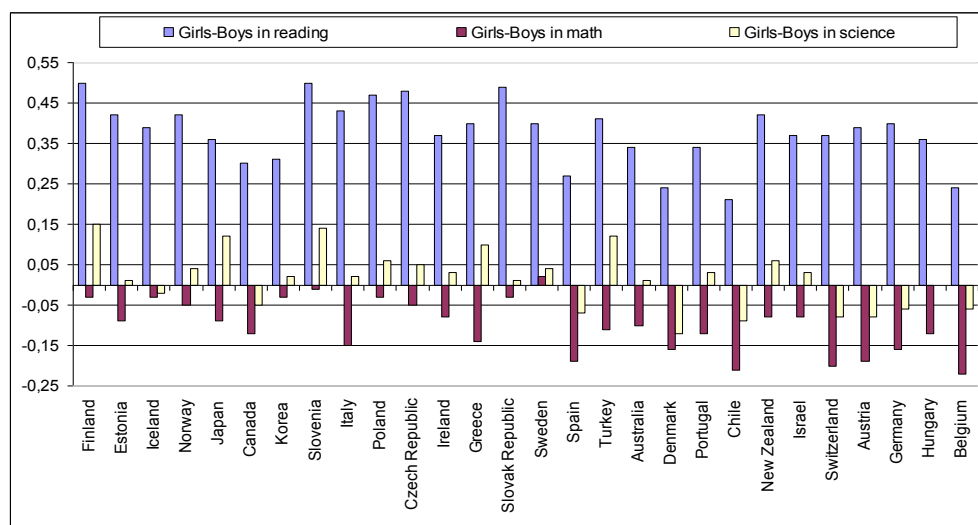


Figure 2. Learning Equity: Girls-Boys PISA 2009 scores.

with gender and ESCS. The learning equity indices combined with gender and ESCS gap values vary between -0.19 and -0.59 and seem negative across all selected OECD countries. Consequently, from the data in Figure

3, it is apparent that the values indicate that the selected OECD countries are insufficient in creating equitable learning outcomes for all. In this sense, particularly the countries should make their efforts to improve the

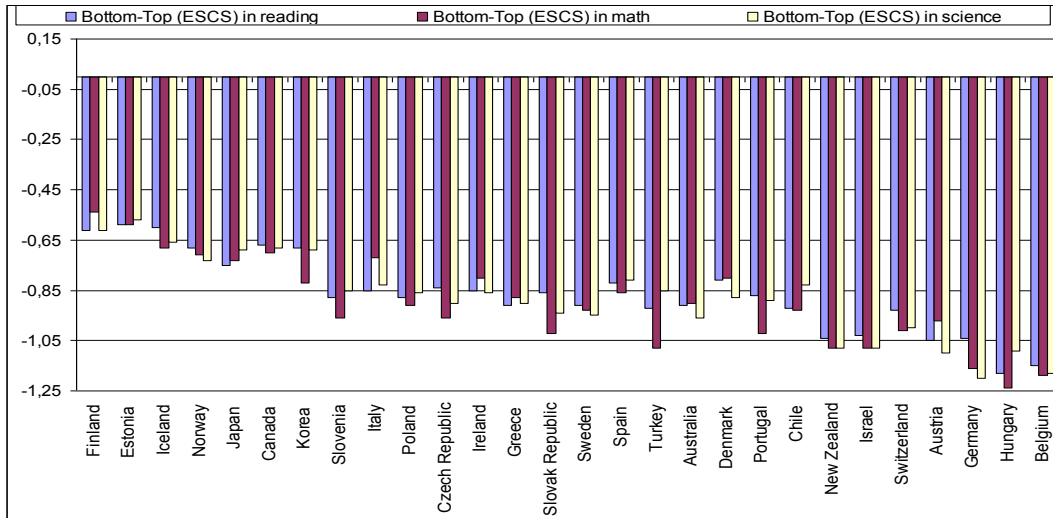


Figure 3. Learning Equity: Bottom-Top quarter of ESCS of students' PISA 2009 scores.

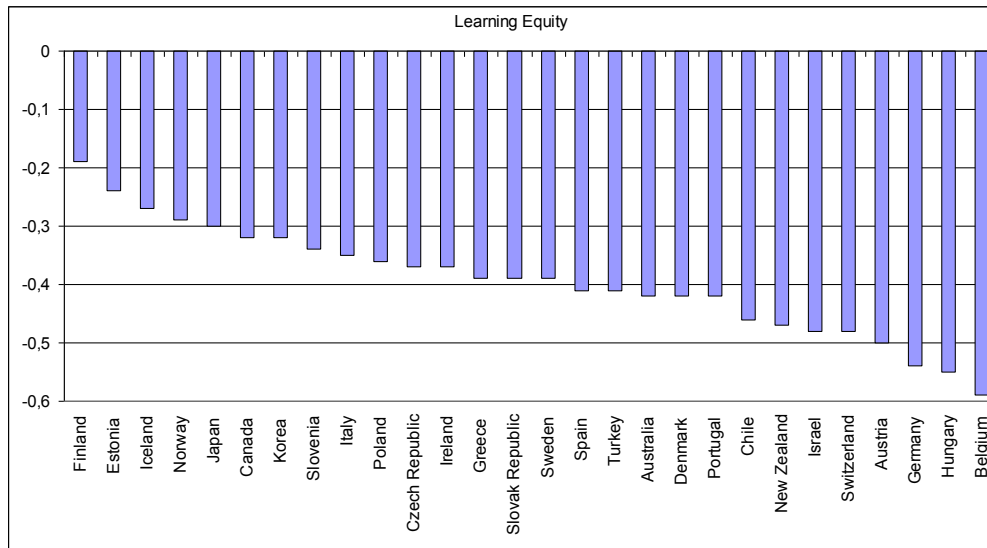


Figure 4. Learning Equity: mean differences of gender and ESCS.

learning outcomes of students at the bottom quarter of ESCS, as well as girls.

School resource equity in the School Systems of Selected OECD Countries

Figure 5 presents the school resource equity index generated by the differences of resource quality between bottom and top quarter of ESCS schools, as reported by the school principals. The school resource equity values across OECD countries vary from 0,18 to -1,30. The

positive differences are seen only in Iceland, Korea and Austria. This suggests that according to reports of school principals; the schools in the bottom quarter of ESCS have better school resources than the schools in the top quarter of ESCS in a few countries (Iceland, Korea and Austria). And some countries (Belgium, Czech Republic, Slovak Republic, and Denmark) are near to zero and indicate equitable school resources among the schools in terms of ESCS. Except these findings, the school resource equity values indicate that there is inequitable resources distribution among the schools across many OECD countries in terms of ESCS.

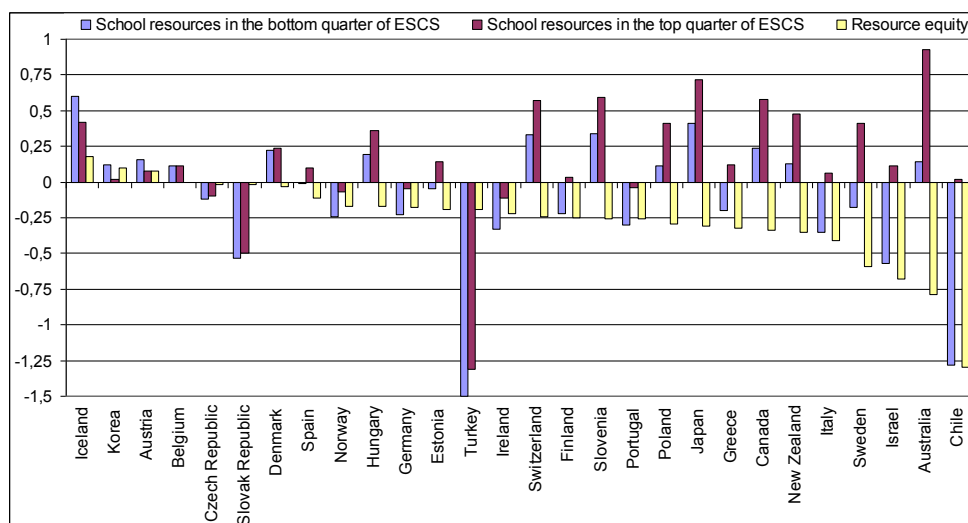


Figure 5. School resources equity: resources in the bottom and top quarter of ESCS of schools.

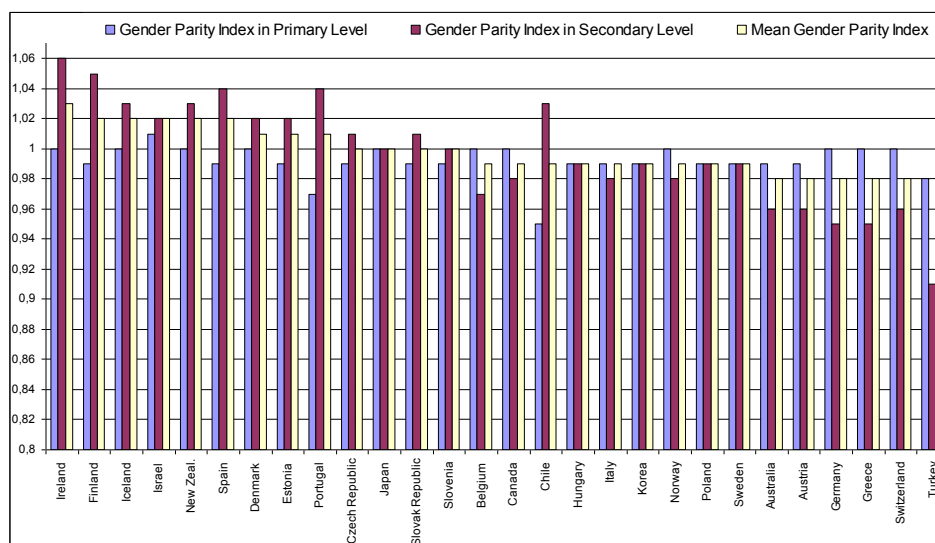


Figure 6. Participating in the school: gender parity in primary and secondary level.

On the other hand, the resource indices are negative in the both quarter of ESCS of schools in Czech Republic, Slovak Republic, Norway, Germany, Turkey, Ireland, and Portugal. In turn, even though the school resources indices among the schools in the bottom and the schools in the top quarter of ESCS are near, this situation does not mean that resources equity indicates sufficient resource allocation to all schools.

In sum up, the school resource equity is a challenging issue in many OECD countries because of the negative school resource equity values. And it should be approached with the issue of sufficient resource allocation.

Participating in the School Systems of Education in Selected OECD Countries

Figure 6 presents the equity in terms of participating in primary and secondary education by Gender Parity Index (GPI) developed by United Nations. Countries with the: GPI of less than 0.85 indicates far from the goal; GPI of 0.85 to 0.95 indicates additional effort needed; GPI of 0.96 to 1.04 indicates on course; GPI of 1.05 and above indicates that gap favours girls (UNICEF, 2005). According to these criteria, GPI indicates additional effort needed in Chile, while GPI indicates on course in the

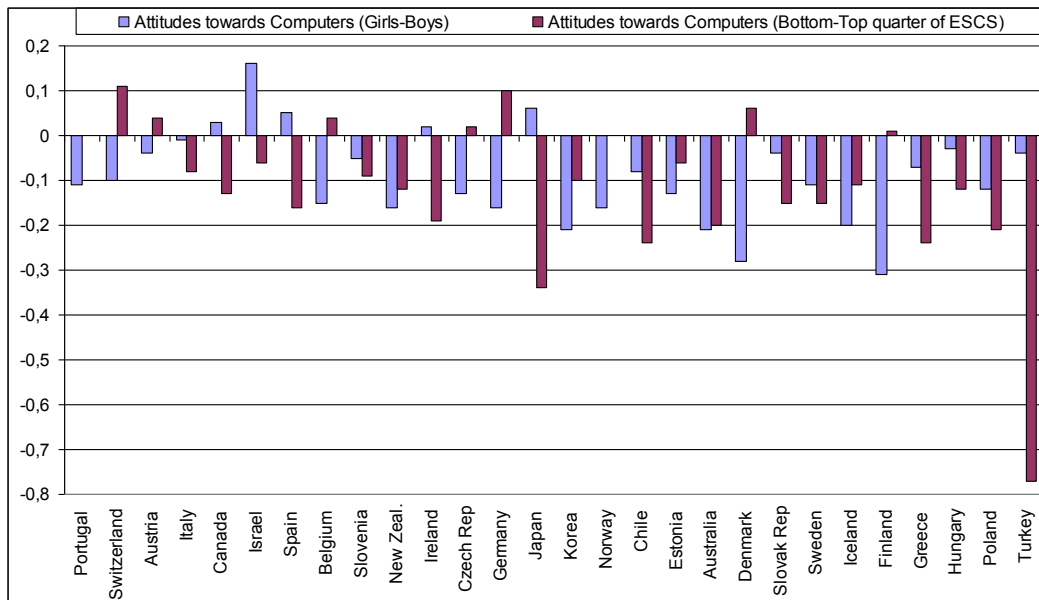


Figure 7. Attitudes towards computers: Girls-Boys, Bottom-Top quarter of ESCS.

other countries in primary education. In addition, GPI indicates: additional effort needed in Germany, Greece and Turkey; gap favours girls in Ireland and Finland; on course in the other countries in secondary education. On the other hand, according to the mean values Turkey should make additional effort for gender parity in basic education system, while other countries on course.

Digital Equity in the School Systems of Selected OECD Countries

Figure 7 shows the digital equity in terms of the attitudes towards computers. When evaluating the attitudes towards computers, Girls-Boys gap values seem vary between 0.16 and -0.31. The gap seems negatively across the many countries which mean that boys express more positive attitudes towards computers than girls. It only seems positively in Israel, Japan, Spain, Canada, and Ireland. On the other hand; the attitudes towards computers between the students at the bottom quarter of ESCS and the students at the top quarter of ESCS seem vary between 0.11 and -0.77. Except some countries (Switzerland, Germany, Denmark, Austria, Belgium, Czech Republic, Finland, Portugal, and Norway) the gap in the ESCS seems negatively across the many countries. Figure 8 shows the digital equity in terms of the self confidence in ICT. When evaluating the self confidence in ICT, Girls-Boys gap values seem vary between 0.08 and -0.55. And also except Korea, the gap seems negatively across the selected OECD countries. This finding

suggests that boys display higher self confidence in ICT than girls across the selected countries except Korea. However; the reported self confidence values between the students at the bottom quarter of ESCS and the students at the top quarter of ESCS seem vary between -0.17 and -0.82 across the selected OECD countries. Figure 9 shows the digital equity indices combined with attitudes towards computers and self confidence in ICT. The digital equity indices seem negatively and vary between -0.11 and -0.41 across the selected OECD countries. In this sense, it suggests that the values indicate that the selected OECD countries are insufficient in achieving the digital equity for all according to students' reports. Particularly the countries should make their efforts to achieve the digital equity through the students at the bottom quarter of ESCS, as well as girls.

Equity Index in the School Systems of Selected OECD Countries

Figure 10 shows the equity index combined four dimensions of learning equity, school resource equity, participating in education, and digital equity across the selected OECD countries. The equity index values vary between 0.69 and -0.98. In general, the values near to 1 present higher equity. In this sense, the selected OECD countries seem currently insufficient to achieve equity especially in terms of learning equity, school resource equity and digital equity. In turn, these three dimensions appear to be issues that should be coped with

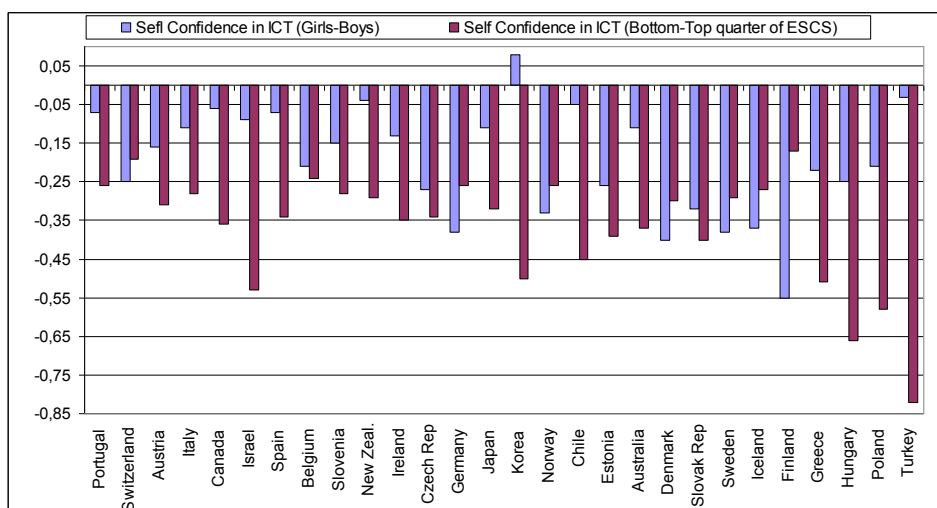


Figure 8. Self Confidence in ICT: Girls-Boys, Bottom-Top quarter of ESCS.

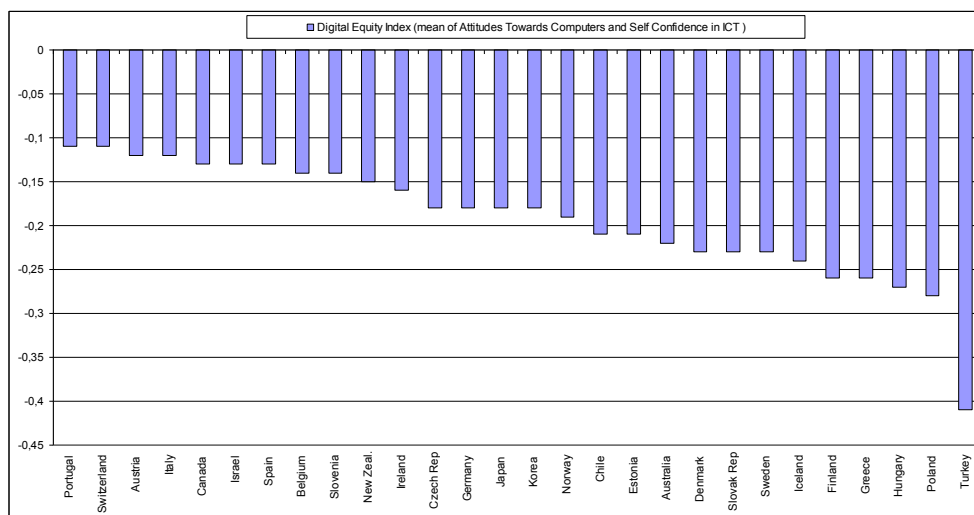


Figure 9. Digital Equity Index.

immediately in education agendas of OECD countries.

DISCUSSION

GPI indicates additional effort needed in Chile, while GPI indicates on course in the other countries in primary education. In addition, GPI indicates: additional effort needed in Germany, Greece and Turkey; the gap favours girls in Ireland and Finland; on course in the other countries in secondary education. On the other hand, according to the mean values, Turkey should make additional effort for enhancing gender parity in basic education system, while other countries on course. When excluding

the challenges mentioned above, it is noted that the UN data show that participating in primary and secondary level reach the universe level.

However, only expansion of school attainment does not ensure improving economic conditions, because individual earnings, distribution of income, and economic growth are more linked to cognitive skills than to attainment (Hanushek and Wößmann, 2007). In this sense, participating in the school systems should be evaluated with learning equity for more analyzing. When excluding the reading, and math for Sweden, the findings suggest that the selected countries encounter gender gap in the math and/or science PISA scores. In general, a number of studies show found that successful achievers report

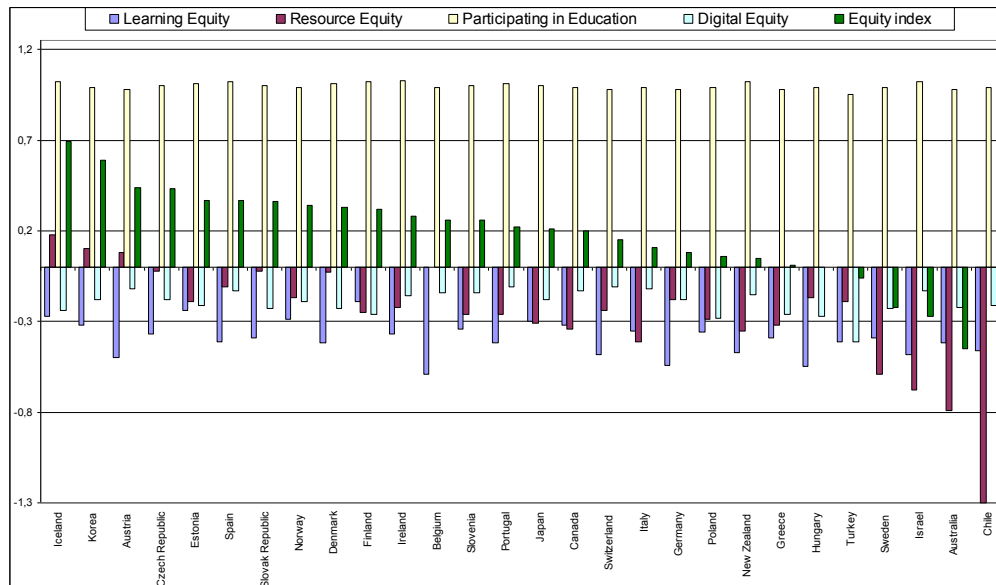


Figure 10. Equity Index and its dimensions.

more positive self-perceptions, more interpersonal support, and more active problem solving (Pollard, 1993). Halldórsson and Ólafsson (2009) report that anxiety, self-perception and motivation are more likely associated with performance for girls and less for boys. Additionally, gender differences in performance associates are associated with psychological and socio-cultural constructs such as self confidence (Väljjarvi et al., 2007).

Marks (2008) show that gender gaps in reading and mathematics across countries can be influenced by policy which enhances the educational outcomes of girls and young women. The study by Bedard and Cho (2007) show that the countries with education systems used very selective academic streams have larger gender gaps. Also they conclude that pro-female biased class/program assignment substantially reduce the observed gender gap in many countries. And, equal math training and experiences tend to contribute to reducing gender gap (Liu and Wilson, 2009).

Sukhnandan et al. (2000) identify three types of intervention for reducing gender gap as follows:

1. teaching single-sex classes or groups at secondary level,
2. mentoring and role modeling by adults, including teachers within the school, and other pupils, at secondary level,
3. additional literacy support from adult volunteers from outside school at primary level.

Lorenzo et al. (2006) explain that gender gap in introductory university physics course can be reduced through

interactive engagement methods promoted in-class interaction, decreasing competition, fostering collaboration, and conceptual understanding. Matteucci and Mignani (2011) suggest that females should be encouraged in embarking on a scientific career through awareness raising projects and teachers should conduct training activities to reduce the gender differences.

Additionally, the findings suggest that selected countries encounter a considerable gap in terms of PISA scores of students between bottom and top quarter of ESCS. And, it is apparent that the values indicate that the selected OECD countries are insufficient in creating equitable learning outcomes for all. In this sense, particularly the countries should make their efforts to improve the learning outcomes of students at the bottom quarter of ESCS, as well as girls.

It seems that socio-economic status and attainment are linked, in turn; using a stratifying variable such as ability, aptitude or attainment to select students can make students be grouped by their socio-economic background (Gorard and See, 2009). Also; Entorf and Minoiu (2005) provide that low-skilled migrants in combination with low intergenerational mobility determine the poor performance of migrants. Inequalities in the levels of parents' involvement at the school tend to increase the achievement gap (Lee and Bowen, 2006). These have not been today's problematic, but Machin and Vignoles (2004) showed that education systems in the 1980s and 1990s could not reduce the socio-economic gap.

Consequently, the school systems should create a mixed system and schools must not implement stratification. Because the international findings show that the

stratification increases the impact of socio-economic status on the achievement (Carey and Ernst, 2006). Additionally the competition-based reforms can reduce the public school efficiency (Misra, 2010). For that, educators can encourage grouping practices without compromising the advantages of students in higher ability groups for reducing the gap in socio economic status. And it is important that the stakeholders share the effect of groupings (Caro et al. 2009). Positive school influences tend to bring benefits for both advantaged and disadvantaged ones (Rutter, and Maughan, 2002). Increasing access the learning materials through books, TV, computers, and also the availability of compensatory education can reduce the impact of socio-economic status on achievement (Sirin, 2005).

The findings in this study suggest that that there has been inequitable resources distribution among the schools across many OECD countries in terms of ESCS. In sum up, the school resource equity is a challenging issue in many OECD countries because of the negative school resource equity values. And it should be approached with the issue of sufficient resource allocation.

While some authors report that school resources are considerably related student outcomes (Greenwald et al. 1996; Heyneman and Loxley, 1983; Murnane, 1975) some report weak relation (Hanushek, 1997; Coleman, 1968). Even though the impact of school resources is controversial, it suggests that school resources as an input which may affect the learning process and outcomes are important for education systems. In this sense, sufficient school resources must be distributed to the school, and also the gap in school resources between the advantaged and disadvantaged schools must be minimum level. Some policy implementations for reducing the mentioned gap can be given as follows: Ross and Levacic (1999) report that the needs-based resource allocation in education suggests benefits to school systems in terms of increased levels of equity, efficiency, effectiveness, transparency, and accountability. Court-ordered school-finance reform which raises spending for education in the poorest school districts (Murray et al. 1998). In parallel, the positive discrimination in Shanghai's education system, or another saying strengthening weak schools, through financial transfer payment system, transfer teachers from urban to rural areas, pair off urban districts with rural districts, commissioned administration, consortium of schools can be good policy implementations (OECD, 2011c). The "Programme to Improve the Quality of Basic Schools for the Poor", usually known as the "900 Schools Programme," is another good policy implementation reducing socio-economically disadvantage of basic schools in terms of distribution of school resources (Garcia-Huidobro, 1994).

The digital equity indices seem negatively across the selected OECD countries. In this sense, it suggests that the values indicate that the selected OECD countries

have been insufficient in achieving the digital equity for all according to students' reports. Particularly the countries should make their efforts to achieve the digital equity through the students at the bottom quarter of ESCS, as well as girls.

These findings indicate the digital divide across selected OECD countries. Digital divide seems to be very complex and dynamic phenomenon (Pick and Azari, 2008; Van Dijk, and Hacker, 2003). It does not mean only technological; but social, economic, cultural and political. For that, this needs a political recognition (Selwyn, 2004). Besides, little policy attention has been paid to the digital divide among children and young people (Livingstone and Helsper, 2007). The governments must cope with the observations of digital divide such as education, race, gender, geography, economic status, physical ability (Rao, 2005). Also in order to mitigate the digital divide, some local or national implementations such as equalizing of internet access rates between girls and boys (Gorski, 2005), empowering women to participate in the ICT workforce, encouraging societal openness and tolerance (Pick and Azari, 2008), e-government projects (Helbig et al. 2009), training programmes, competence development programmes (Warren, 2007), stimulating ICT culture, community resource centers providing opportunities for 'tasting' ICTs (Huggins and Izushi, 2002), constructing and developing village web sites for integration of rural people (Akca, et al. 2007) can be good steps.

Conclusion

The purpose of this study is to analysis the equity in the school systems of selected OECD countries. For this purpose, four dimensions of equity as follows learning equity, school resource equity, participating in education, and digital equity have been determined, and they have been converted into equity index. Through this index, the situations of the selected OECD countries have been analyzed.

In terms of learning equity; this study has shown that the values indicate that the selected OECD countries are insufficient in creating equitable learning outcomes for all. However, except some countries (Iceland, Korea and Austria; Belgium, Czech Republic, Slovak Republic, and Denmark) the school resource equity values indicate that there is inequitable resources distribution among the schools across many OECD countries in terms of ESCS. According to the equity in terms of participating in primary and secondary education by Gender Parity Index (GPI) developed by United Nations; GPI indicates additional effort needed in Chile, while GPI indicates on course in the other countries in primary education. In addition, GPI indicates: additional effort needed in Germany, Greece and Turkey; gap favours girls in Ireland and Finland; on

course in the other countries in secondary education. On the other hand, according to the mean values Turkey should make additional effort for gender parity in basic education system, while other countries on course.

When evaluating the attitudes towards computers, the gap seems negatively across the many countries which mean that boys express more positive attitudes towards computers than girls. On the other hand; except some countries (Switzerland, Germany, Denmark, Austria, Belgium, Czech Republic, Finland, Portugal, and Norway) the gap in the ESCS seems negatively across the many countries. When evaluating the self confidence in ICT, Girls-Boys gap values except Korea, seem negatively across the selected OECD countries. However; the reported self confidence values between the students at the bottom quarter of ESCS and the students at the top quarter of ESCS seem negatively across the selected OECD countries. In parallel, the digital equity indices seem negatively across the selected OECD countries.

In general, according to equity index developed in this study, the selected OECD countries seem currently insufficient to achieve equity especially in terms of learning equity, school resource equity and digital equity. In turn, these three dimensions appear to be issues that should be coped with immediately in education agendas of OECD countries.

However, this study shows some limitations, because its methodology bases on the equity index developed by the author and its findings rely mainly on self reported data (e.g. student and principal questionnaires).

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Appendices

Appendix A. Learning Equity by Gender, ESCS

Countries	Learning Equity by Gender									Learning Equity by ESCS percentiles									Learning Equity (mean of dif)
	Reading			Math			Science			Reading			Math			Science			
	Girls	Boys	Girls-Boys	Girls	Boys	Girls-Boys	Girls	Boys	Girls-Boys	1-Bottom	2- Top	1-2	1-Bottom	2- Top	1-2	1-Bottom	2- Top	1-2	
Finland	564	513	0,5	539	542	-0,03	562	546	0,15	504	565	-0,61	513	567	-0,54	523	583	-0,61	-0,19
Estonia	522	480	0,42	508	516	-0,09	528	527	0,01	476	534	-0,59	487	546	-0,59	503	560	-0,57	-0,24
Iceland	522	483	0,39	505	508	-0,03	495	496	-0,02	470	530	-0,6	472	540	-0,68	462	528	-0,66	-0,27
Norway	524	481	0,42	495	500	-0,05	502	498	0,04	468	536	-0,68	460	531	-0,71	460	534	-0,73	-0,29
Japan	538	502	0,36	524	534	-0,09	545	534	0,12	483	558	-0,75	492	565	-0,73	505	574	-0,69	-0,3
Canada	537	507	0,3	521	533	-0,12	526	531	-0,05	495	562	-0,67	495	565	-0,7	498	566	-0,68	-0,32
Korea	557	526	0,31	544	548	-0,03	539	537	0,02	503	572	-0,68	504	586	-0,82	501	570	-0,69	-0,32
Slovenia	514	464	0,5	501	502	-0,01	519	505	0,14	444	532	-0,88	459	555	-0,96	473	557	-0,85	-0,34
Italy	512	469	0,43	475	490	-0,15	490	488	0,02	442	526	-0,85	445	517	-0,72	443	527	-0,83	-0,35
Poland	526	479	0,47	493	497	-0,03	511	505	0,06	461	550	-0,88	454	545	-0,91	471	557	-0,86	-0,36
Czech Republic	513	465	0,48	490	495	-0,05	503	498	0,05	437	521	-0,84	446	542	-0,96	456	546	-0,9	-0,37
Ireland	512	476	0,37	483	491	-0,08	509	507	0,03	454	539	-0,85	447	527	-0,8	465	550	-0,86	-0,37
Greece	504	464	0,4	459	473	-0,14	475	465	0,1	437	528	-0,91	424	511	-0,88	425	515	-0,9	-0,39
Slovak Republic	505	456	0,49	495	498	-0,03	491	490	0,01	435	521	-0,86	447	548	-1,02	444	538	-0,94	-0,39
Sweden	514	475	0,4	495	493	0,02	497	493	0,04	452	543	-0,91	449	541	-0,93	448	543	-0,95	-0,39
Spain	494	468	0,27	474	493	-0,19	485	492	-0,07	443	525	-0,82	444	529	-0,86	450	531	-0,81	-0,41
Turkey	480	440	0,41	440	451	-0,11	460	448	0,12	422	514	-0,92	399	507	-1,08	416	502	-0,85	-0,41
Australia	529	495	0,34	509	519	-0,1	528	527	0,01	471	562	-0,91	471	561	-0,9	481	577	-0,96	-0,42
Denmark	504	480	0,24	495	511	-0,16	494	505	-0,12	455	536	-0,81	463	544	-0,8	455	544	-0,88	-0,42
Portugal	503	469	0,34	481	493	-0,12	495	491	0,03	451	537	-0,87	442	544	-1,02	454	543	-0,89	-0,42
Chile	463	442	0,21	410	431	-0,21	443	452	-0,09	409	501	-0,92	382	475	-0,93	414	496	-0,83	-0,46
New Zealand	539	497	0,42	515	523	-0,08	535	529	0,06	475	578	-1,04	469	577	-1,08	482	590	-1,08	-0,47
Israel	491	454	0,37	443	451	-0,08	456	453	0,03	423	526	-1,03	394	502	-1,08	402	510	-1,08	-0,48
Switzerland	521	484	0,37	524	544	-0,2	512	520	-0,08	457	550	-0,93	486	588	-1,01	469	569	-1	-0,48
Austria	490	451	0,39	486	506	-0,19	490	498	-0,08	421	525	-1,05	450	547	-0,97	441	551	-1,1	-0,5
Germany	521	481	0,4	505	520	-0,16	518	523	-0,06	445	550	-1,04	455	571	-1,16	460	580	-1,2	-0,54
Hungary	514	478	0,36	484	496	-0,12	503	503	0	435	553	-1,18	429	552	-1,24	448	558	-1,09	-0,55
Belgium	516	492	0,24	504	526	-0,22	503	510	-0,06	452	567	-1,15	460	579	-1,19	450	568	-1,18	-0,59

Appendix B. School resource equity in the school systems of selected OECD countries

Countries	School resources (SCMATEDU)		
	Bottom quarter of ESCS (1)	Top quarter of ESCS (2)	School resource equity (1-2)
Iceland	0,60	0,42	0,18
Korea	0,12	0,02	0,10
Austria	0,16	0,08	0,08
Belgium	0,11	0,11	0,00
Czech Republic	-0,12	-0,10	-0,02
Slovak Republic	-0,53	-0,50	-0,02
Denmark	0,22	0,24	-0,03
Spain	-0,01	0,10	-0,11
Norway	-0,24	-0,07	-0,17
Hungary	0,19	0,36	-0,17
Germany	-0,23	-0,05	-0,18
Estonia	-0,05	0,14	-0,19
Turkey	-1,50	-1,31	-0,19
Ireland	-0,33	-0,11	-0,22
Switzerland	0,33	0,57	-0,24
Finland	-0,22	0,03	-0,25
Slovenia	0,34	0,59	-0,26
Portugal	-0,30	-0,04	-0,26
Poland	0,11	0,41	-0,29
Japan	0,41	0,72	-0,31
Greece	-0,20	0,12	-0,32
Canada	0,24	0,58	-0,34
New Zealand	0,13	0,48	-0,35
Italy	-0,35	0,06	-0,41
Sweden	-0,18	0,41	-0,59
Israel	-0,57	0,11	-0,68
Australia	0,14	0,93	-0,79
Chile	-1,28	0,02	-1,30

Appendix C. Participating in the School Systems of Education in Selected OECD Countries

Countries	Participating in Education		
	Gender Parity Index		
	Primary	Secondary	mean
Ireland	1	1,06	1,03
Finland	0,99	1,05	1,02
Iceland	1	1,03	1,02
Israel	1,01	1,02	1,02
New Zeal.	1	1,03	1,02
Spain	0,99	1,04	1,02
Denmark	1	1,02	1,01
Estonia	0,99	1,02	1,01
Portugal	0,97	1,04	1,01
Czech Rep	0,99	1,01	1,00
Japan	1	1	1,00
Slovak Rep	0,99	1,01	1,00
Slovenia	0,99	1	1,00
Belgium	1	0,97	0,99
Canada	1	0,98	0,99
Chile	0,95	1,03	0,99
Hungary	0,99	0,99	0,99
Italy	0,99	0,98	0,99
Korea	0,99	0,99	0,99
Norway	1	0,98	0,99
Poland	0,99	0,99	0,99
Sweden	0,99	0,99	0,99
Australia	0,99	0,96	0,98
Austria	0,99	0,96	0,98
Germany	1	0,95	0,98
Greece	1	0,95	0,98
Switzerland	1	0,96	0,98
Turkey	0,98	0,91	0,95

Appendix D. Digital equity in the selected OECD countries.

Countries	DIGITAL EQUITY												mean
	Attitudes Towards Computers						Self Confidence In ICT						
	Gender			ESCS			Gender			ESCS			
	Girls	Boys	Girls-Boys	Bottom quarter (1)	Top quarter (2)	1-2	Girls	Boys	Girls-Boys	Bottom quarter (1)	Top quarter (2)	1-2	
Portugal	0,37	0,48	-0,11	0,41	0,41	0	0,53	0,6	-0,07	0,39	0,65	-0,26	-0,11
Switzerland	0	0,1	-0,1	0,1	-0,01	0,11	-0,06	0,19	-0,25	-0,05	0,14	-0,19	-0,11
Austria	0,13	0,16	-0,04	0,14	0,1	0,04	0,25	0,41	-0,16	0,15	0,46	-0,31	-0,12
Italy	0,18	0,19	-0,01	0,12	0,19	-0,08	-0,11	-0,01	-0,11	-0,22	0,05	-0,28	-0,12
Canada	0,06	0,03	0,03	-0,03	0,1	-0,13	0,02	0,08	-0,06	-0,14	0,22	-0,36	-0,13
Israel	0,24	0,08	0,16	0,1	0,15	-0,06	-0,23	-0,13	-0,09	-0,47	0,07	-0,53	-0,13
Spain	-0,01	-0,06	0,05	-0,13	0,03	-0,16	0,17	0,24	-0,07	-0,03	0,31	-0,34	-0,13
Belgium	0	0,15	-0,15	0,07	0,03	0,04	-0,09	0,12	-0,21	-0,1	0,13	-0,24	-0,14
Slovenia	0,06	0,11	-0,05	0,01	0,1	-0,09	0,14	0,29	-0,15	0,05	0,33	-0,28	-0,14
New Zeal.	-0,34	-0,18	-0,16	-0,31	-0,19	-0,12	-0,09	-0,05	-0,04	-0,22	0,07	-0,29	-0,15
Ireland	0,03	0,01	0,02	-0,12	0,07	-0,19	-0,18	-0,05	-0,13	-0,32	0,03	-0,35	-0,16
Czech Rep	-0,06	0,07	-0,13	-0,03	-0,06	0,02	0,08	0,35	-0,27	0,03	0,37	-0,34	-0,18
Germany	-0,02	0,15	-0,16	0,08	-0,02	0,1	-0,06	0,32	-0,38	0	0,26	-0,26	-0,18
Japan	-0,2	-0,26	0,06	-0,44	-0,1	-0,34	-0,72	-0,61	-0,11	-0,85	-0,53	-0,32	-0,18
Korea	-0,28	-0,08	-0,21	-0,21	-0,11	-0,1	-0,3	-0,38	0,08	-0,61	-0,1	-0,5	-0,18
Norway	-0,04	0,12	-0,16	0,02	0,01	0	-0,14	0,19	-0,33	-0,13	0,14	-0,26	-0,19
Chile	0,17	0,25	-0,08	0,06	0,31	-0,24	-0,1	-0,05	-0,05	-0,34	0,11	-0,45	-0,21
Estonia	-0,29	-0,15	-0,13	-0,24	-0,18	-0,06	-0,03	0,23	-0,26	-0,11	0,28	-0,39	-0,21
Australia	-0,42	-0,21	-0,21	-0,42	-0,22	-0,2	0,09	0,2	-0,11	-0,05	0,32	-0,37	-0,22
Denmark	-0,12	0,16	-0,28	0,02	-0,04	0,06	-0,25	0,15	-0,4	-0,19	0,12	-0,3	-0,23
Slovak Rep	0,1	0,13	-0,04	0,02	0,17	-0,15	-0,21	0,12	-0,32	-0,28	0,12	-0,4	-0,23
Sweden	-0,09	0,02	-0,11	-0,13	0,02	-0,15	-0,43	-0,05	-0,38	-0,4	-0,11	-0,29	-0,23
Iceland	-0,14	0,06	-0,2	-0,1	0,01	-0,11	-0,33	0,04	-0,37	-0,31	-0,04	-0,27	-0,24
Finland	-0,35	-0,04	-0,31	-0,19	-0,19	0,01	-0,58	-0,03	-0,55	-0,4	-0,23	-0,17	-0,26
Greece	0,24	0,32	-0,07	0,13	0,37	-0,24	-0,06	0,16	-0,22	-0,27	0,25	-0,51	-0,26
Hungary	-0,08	-0,04	-0,03	-0,2	-0,08	-0,12	0,01	0,25	-0,25	-0,29	0,38	-0,66	-0,27
Poland	-0,15	-0,04	-0,12	-0,28	-0,06	-0,21	0,13	0,33	-0,21	-0,11	0,47	-0,58	-0,28
Turkey	-0,27	-0,23	-0,04	-0,67	0,1	-0,77	-0,19	-0,15	-0,03	-0,58	0,24	-0,82	-0,41

Appendix E. Equity index and its dimensions in selected OECD countries.

Countries	1) learning Equity	2) School resource equity	3) Participating in Education	4) Digital Equity	Equity index (1+2+3+4)
Iceland	-0,27	0,18	1,02	-0,24	0,69
Korea	-0,32	0,1	0,99	-0,18	0,59
Austria	-0,5	0,08	0,98	-0,12	0,44
Czech Republic	-0,37	-0,02	1	-0,18	0,43
Estonia	-0,24	-0,19	1,01	-0,21	0,37
Spain	-0,41	-0,11	1,02	-0,13	0,37
Slovak Republic	-0,39	-0,02	1	-0,23	0,36
Norway	-0,29	-0,17	0,99	-0,19	0,34
Denmark	-0,42	-0,03	1,01	-0,23	0,33
Finland	-0,19	-0,25	1,02	-0,26	0,32
Ireland	-0,37	-0,22	1,03	-0,16	0,28
Belgium	-0,59	0	0,99	-0,14	0,26
Slovenia	-0,34	-0,26	1	-0,14	0,26
Portugal	-0,42	-0,26	1,01	-0,11	0,22
Japan	-0,3	-0,31	1	-0,18	0,21
Canada	-0,32	-0,34	0,99	-0,13	0,2
Switzerland	-0,48	-0,24	0,98	-0,11	0,15
Italy	-0,35	-0,41	0,99	-0,12	0,11
Germany	-0,54	-0,18	0,98	-0,18	0,08
Poland	-0,36	-0,29	0,99	-0,28	0,06
New Zealand	-0,47	-0,35	1,02	-0,15	0,05
Greece	-0,39	-0,32	0,98	-0,26	0,01
Hungary	-0,55	-0,17	0,99	-0,27	0
Turkey	-0,41	-0,19	0,95	-0,41	-0,06
Sweden	-0,39	-0,59	0,99	-0,23	-0,22
Israel	-0,48	-0,68	1,02	-0,13	-0,27
Australia	-0,42	-0,79	0,98	-0,22	-0,45
Chile	-0,46	-1,3	0,99	-0,21	-0,98