

## **Centralized and decentralized educational systems: A comparative quantitative approach**

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### **Abstract**

Nowadays, on the global map of education there are both decentralized and centralized educational systems that appear at about the same rate. Many countries, whenever planning a reform in education, make an effort to decide the ratio of centralization to decentralization of their educational system. Six European educational systems were selected, three of each form, and the values of critical educational indicators in them were compared. The comparison was made for each country individually and for each of the two groups of educational systems of the same category. In this study, the countries were selected on the basis of their representativeness criteria for educational structures, strictly among countries with high critical educational indicators, equal to or greater than the European averages. The study was mainly limited to primary and secondary education. Primary quantitative data, mostly regarding the year 2018, was drawn from supranational organizations.

**Keywords:** decentralized educational systems, centralized educational systems, comparison of educational indicators, educational reform

### **Introduction**

At the end of the 19th century and at the beginning of the 20th century, organized educational systems were developed internationally, gradually replacing other forms of education, such as apprenticeships. The initial organization and the need for standardization gave these systems a strongly centralized character, which corresponded with the nature of the governmental systems of the countries at the time. In addition, a number of reasons, such as urbanization, strong nationalism, economic competition between nations and the fight against corruption, have contributed to the formation of strong centralized educational systems (McGinn & Welsh, 1999). However, the truth is that during the last decades there has been a trend towards decentralization of educational systems in several countries at a local level and even at a corporate level (Wayne & Ferrare, 2015), especially in eastern Europe but also in Asia, Latin America and Africa.

For the purposes of this research, countries with centralized educational systems such as France, Germany and Austria were selected, as well as countries with decentralized systems of different forms such as that of the Czech Republic which decentralizes the institution of the school principal, the strongly self-administrative decentralized system of Finland and the more technocratically decentralized system of the Netherlands. This study compares educational indicators both by country and by form of educational system in order to determine their quantitative performance. Data was drawn from supranational organizations such as the Organization for Economic Co-operation and Development (OECD), the European Commission (EC), the Eurydice education network and Eurostat. In particular, it is examined in which form of educational systems students perform better in the Program for International Student Assessment (PISA) competition, as well as in which countries there are high student excellence rates or low percentages of students that lack exemplary school performance. The rates of successful participation in the labor market of graduates of these educational systems are also compared. It is determined in which form of educational systems schools have a greater number of Information and Communication Technology (ICT) infrastructures for teaching, which educational systems have less school leakage and a high participation of citizens in

lifelong learning programs, which countries offer adequate, efficient and effective financial support for their educational system. This project aims to establish the effects of the parameter that shows how decentralized or centralized an educational system is in its operation and to raise questions that will lead to an answer to the basic question: decentralized or centralized educational system.

### **Centralization versus decentralization**

The educational policy of each country is divided into two stages: the development stage and the implementation stage. With the above taken into consideration, in the centralized educational systems education policy is mostly centrally designed, i.e. at the level of ministry or central educational organizations directly supervised by the central level of power and implemented faithfully by the educational network, while in decentralized educational systems it is implemented under the responsibility of local communities but to a large extent it is also shaped by them. This is a fairly general definition of the two forms of educational systems. Decentralization can be divided into three categories: devolution, which is characterized by a transfer of power and real responsibility from central to local level, deconcentration, in which the central level of power is represented by local structures but maintains the exercise of power and delegation, in which duties and administrative responsibilities -not power- are transferred locally and decisions taken at central level are carried out (United Nations Educational Scientific and Cultural Organization, UNESCO, 2018). In centralized educational systems, the administrative authority of education belongs not to the local community but to a central body that has full power over educational resources, finance, information, human resources, technology, curricula, budget, building of educational facilities, discipline policies, etc. (Brennen, 2002). On the other hand, in decentralized educational systems there is a transfer of decision-making power, responsibility and tasks from higher to lower organizational levels (Bray, 1999). The passage into the 21st century finds many countries having decentralized their educational systems to varying degrees and several others planning educational reforms in this direction.

But what are the incentives that lead the various countries towards decentralizing their educational systems? There are cases where the change of the governmental system has caused the decentralization of the educational system, which is what has happened in the countries of the former Eastern Bloc. These countries (Czech Republic, Poland, Slovenia, Estonia, etc.) have shown high levels of decentralization of their educational systems during the last decades. The decentralization of educational systems is one of the effects of political democratization. In other cases, pressure by regional nationalistic elements has caused the decentralization of educational systems but on the level of a region or a small state (Spain, Austria, Germany, etc.). Another important incentive, which could be combined with the previous ones, is the countries' pursuit of improving the quality of educational work and the efficiency and effectiveness of the educational system as a whole. In several countries, they seek the maximum utilization of the expenditure on education and the increase in accountability of the educational system towards society through the decentralization of their educational systems. UNESCO (2018) highlights the following five incentives that drive countries to decentralize educational systems: a) more democracy in decision-making, b) greater efficiency and effectiveness regarding the use of resources for education, c) greater adaptation of the educational system to local needs, d) the shift of financial responsibility from central to local level and e) greater professional autonomy of teachers and schools. According to McGinn and Welsh (1999), there have been three reasons why there has been a global shift in the decentralization of educational systems since the 1980s. The first reason is globalization, which has led to the weakening of the strong centralized state, the strengthening of the markets' role and the skepticism about the Keynesian social model that had prevailed in many countries until then. Decision-making based on the markets' characteristics and interests has strengthened the tendency to transfer responsibilities from

the central to the local level. The second reason is the rapid increase in student potential during recent decades in every country, which has made it more difficult to maintain the quality of education through a central authority that functions slowly and bureaucratically. Finally, the third reason is the development of information and communication technology, which has made it possible for a decentralized administrative authority to set up systems for the inspection of the educational process.

Numerous questions arise about the advantages and disadvantages of centralized and decentralized educational systems and about how they affect and to what extent the quality of their outputs (which is the main issue), the management of teaching staff, the basic educational values that are promoted in each case, the division of costs for education, the form of its leadership, its evaluation mechanism, the management of educational inequalities, etc. But what are the key features of centralized and decentralized educational systems? Which are superior and which are inferior? Naturally, in most cases the disadvantage of one form is the advantage of the other. Centralized educational systems cannot manage complicated structures, they are bureaucratic and cannot adapt to the needs of local communities (Brennen, 2002). In decentralized educational systems, especially in primary and secondary education, there is a lot of freedom when considering the formation of the basic aspects of education. For example, when it comes to curriculum development, the usual tactic is to have a national curriculum, which is the basis for creating local curricula (School Based Curriculum Development- SBCD). This tactic is systematically followed in the decentralized European systems, such as the Czech Republic, Finland, the Netherlands, etc., while corresponding degrees of freedom are observed in the management of teaching staff in the decentralized educational systems (Eurydice, 2018). It gives the possibility and the opportunity to the local community to participate and make decisions, thus automatically creating a moral commitment on its part to achieve the educational goals. These decisions can bring about change and it seems that the reforms of decentralized educational systems show high success rates and a significant improvement in the learning outcomes of their students (Anderson, 2003). However, there have been concerns about harmonious co-operation between the central government and local school councils, and in many cases, there are diametrically opposed approaches to many educational issues (Galdway et al., 2013). In decentralized educational systems, those that are involved in local educational policy and in decision-making, are also closely linked to school. Thus, the evaluation of the educational work, the responsibility and the accountability in general, are created automatically. Decentralization requires the establishment of mechanisms of responsibility and evaluation. This in itself ensures that schools operate with a high level of efficiency and effectiveness in order to improve student performance (Brennen, 2002).

#### **The decentralization degree of an educational system**

Measuring the degree of decentralization of an educational system and describing it as centralized or decentralized is a complicated process and often incorporates elements of subjectivity. If we approach quantitatively the characterization of a system in terms of its degree of decentralization, then a good criterion is the index of school autonomy, which is formed by the percentage of important decisions taken at the local level, i.e. by the various forms of local school councils, by the principal or even the teachers. Decisions that are considered important are the distribution of financial resources and the formation of a school budget, the creation of study programs and the planning of the educational project, the formation of systems for the selection and evaluation of students, etc. In a relevant research of the OECD (last update 5 December 2016), the outcome is that for the countries that took part, the school autonomy index is 71.3% on average, 32 out of the 68 countries surveyed (47%), have a tendency to decentralize their educational systems, while the remaining 36 (53%) are characterized by centralism in their educational systems. Their characterization as

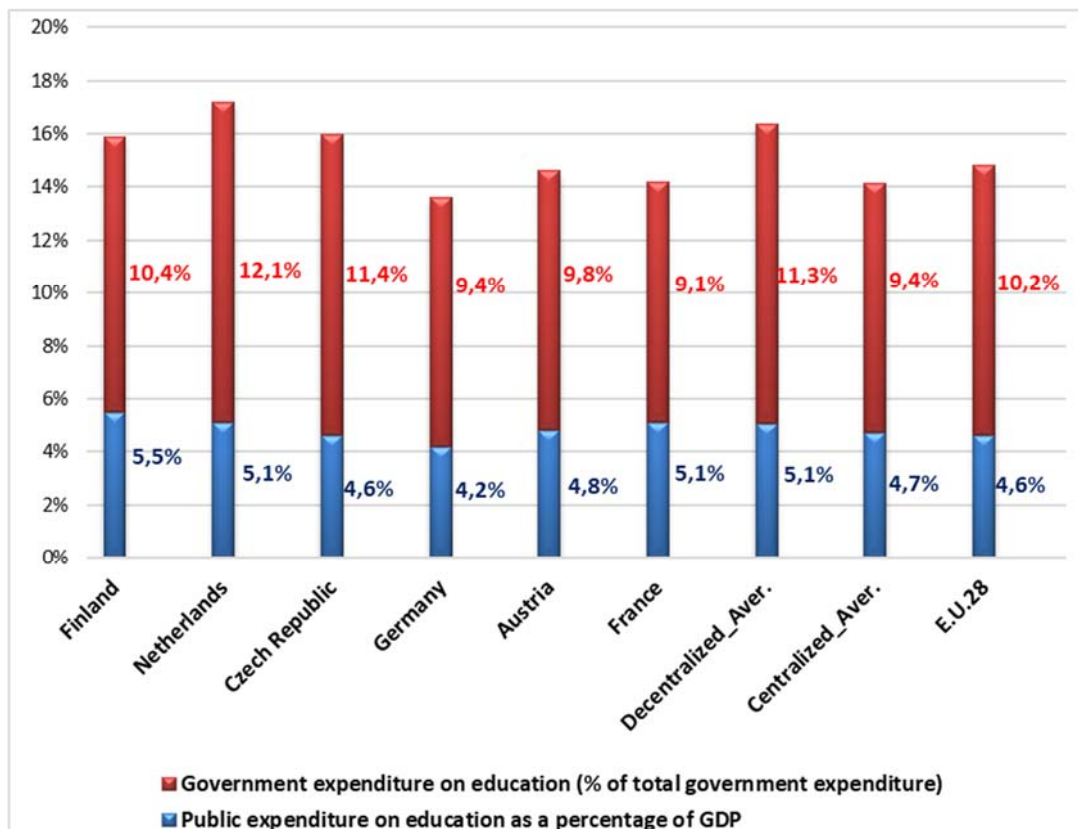
centralized or decentralized was made based on the values of the school autonomy index, as shown in Table 1.

**Table 1. Index of school autonomy and the category of research education systems**

Country	Index of school autonomy	Category
Finland	74,7%	Decentralized
Netherlands	90,8%	Decentralized
Czech Republic	95,6%	Decentralized
Germany	62,5%	Centralized
Austria	58,3%	Centralized
France	58,5%	Centralized
<b>OECD</b>	<b>71,3%</b>	

**Investment in education**

Funding for education or, more properly, investment in education, expressed as a percentage of the GDP of a country, indirectly indicates the importance that this country attaches to the education of its citizens. The funding percentages for education as a percentage of the GDP of each country for the year 2018 (Eurostat, 2018), are shown in Figure 1. However, since “...public spending on education as a percentage of total public spending shows the priority given to education compared to other areas of public spending...” (European Commission, 2019), government expenditure on education as a percentage of total government expenditure (Eurostat, 2018) is additionally recorded.



**Figure 1. Expenditure on education of research's countries.**

Source: Eurostat [gov\_10a\_exp]

In addition to the amount of funding, a particularly important parameter that completes the picture of financial support and indicates the priorities and the educational policy of each country, is the division of this expenditure into the various sub-categories.

Figure 2 shows the distribution of the expenditure on education for the year 2018, expressed as a percentage of the GDP in the following categories:

- ✓ Employee compensation (mainly teacher pay),
- ✓ Intermediate consumption, i.e. expenses for teaching materials, heating and electricity, etc.
- ✓ Gross fixed capital investments, i.e. investments in equipment such as computers, construction of new buildings, etc.

A careful study of Figure 2 leads to useful conclusions. In centralized educational systems, a relatively large part of the cost of education is related to the salaries of its employees (mainly teachers). Two typical examples are the cases of France, which allocates 72.5% of funding for education to employee payroll costs, and Finland, which allocates about 49% of education spending for the same purpose. In centralized educational systems, a relatively small part of the expenditure on education concerns intermediate consumption, i.e. expenditures on teaching materials, heating and electricity, etc. and gross fixed capital investments, i.e. investments in permanent equipment and buildings. The picture is symmetrically opposed to decentralized educational systems and suggests differences in priorities and educational policies in general.

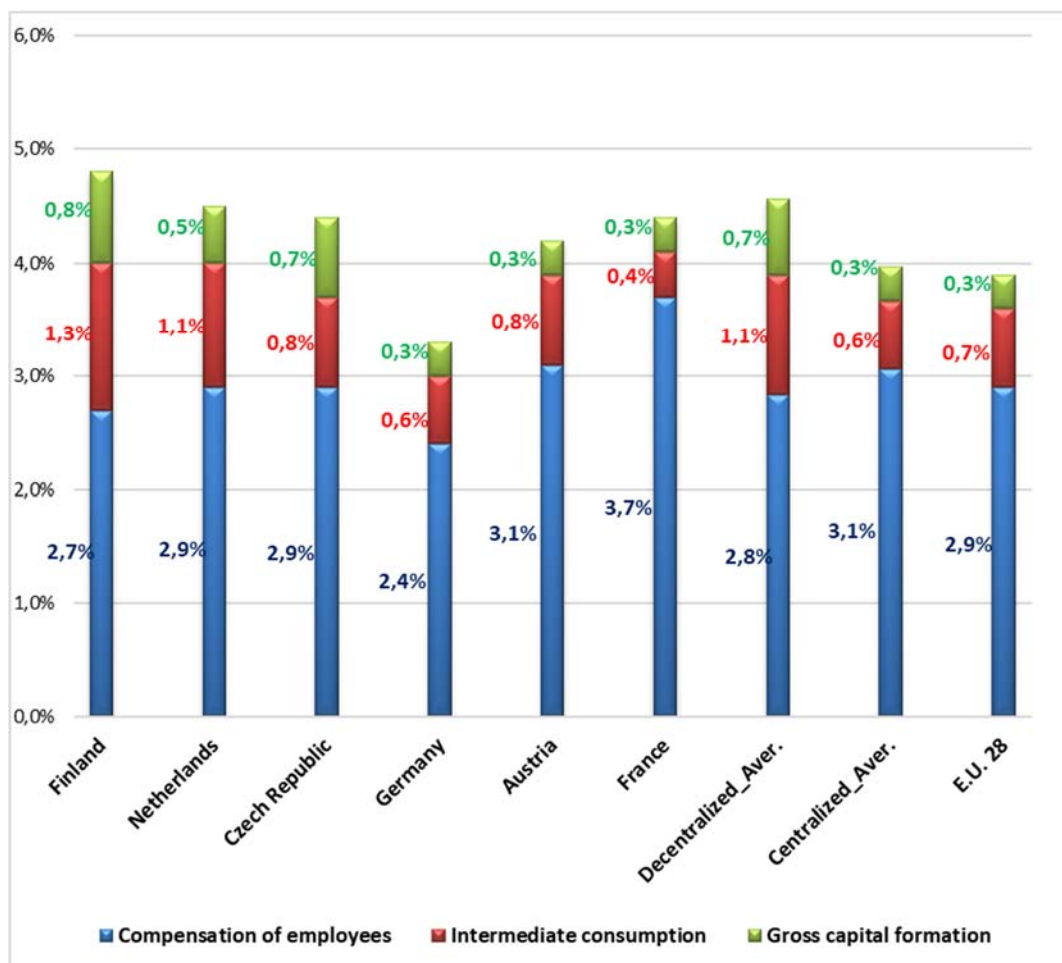
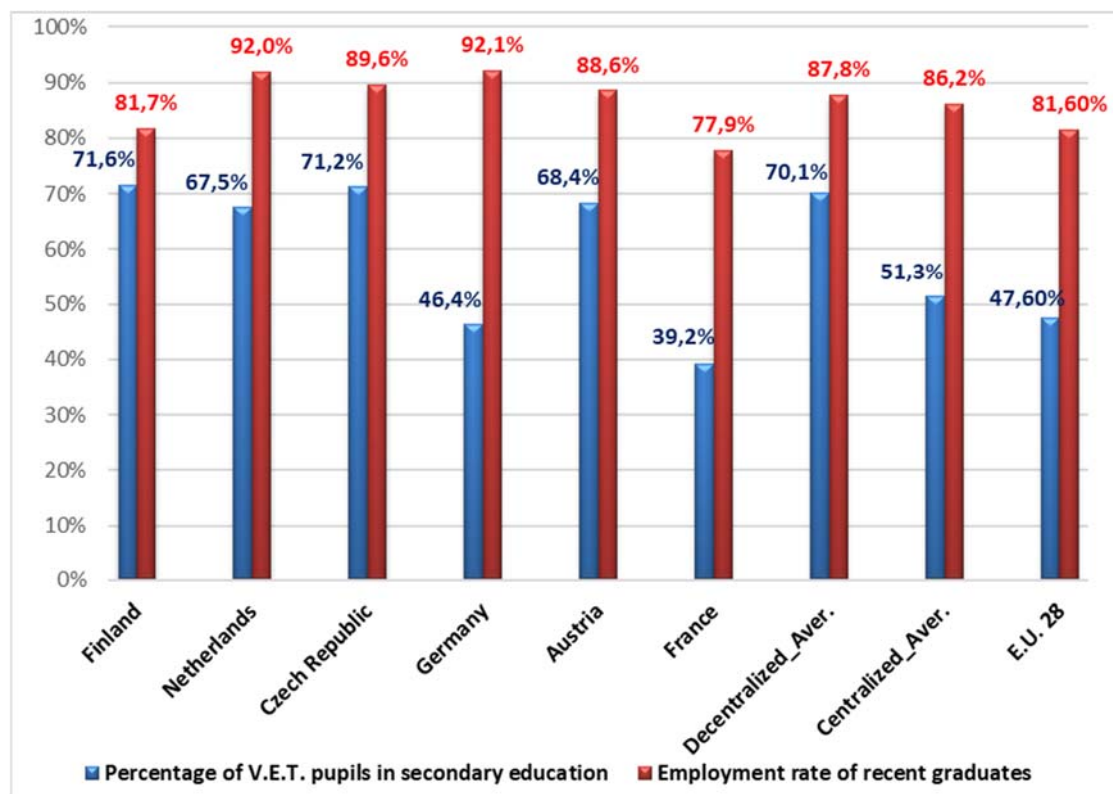


Figure 2. Expenditure on education by category in each country of the research.  
Source: Eurostat [gov\_10a\_exp]

**Employment rate of recent graduates and percentage of students attending Vocational Education and Training (VET)**

Figure 3 shows, for the countries of the research, the percentages of students who followed the VET in higher education, as well as the employment rate of ISCED 3-8 graduates, aged 20-34 years in 1 to 3 years from their graduation, during the year 2018. It has been questioned from time to time to what extent a country's educational system is responsible for the professional success of its graduates, or whether this is solely a matter determined by its economic and productive structures. The case of France, as shown in Figure 3, may give some answers to this. The forenamed countries, with the exception of France, have satisfactory to very good employment rates. It must be kept in mind that France is Europe's second largest economic power, with stable economic structures and a strong labor market. In 2018, only 1,072,405 (39.2%) out of the 2,730,647 French students follow VET, which is about 8.3% below the corresponding European average (Eurostat, 2018), a phenomenon that is observed in no other of the above-named countries. This relatively low absorptency of French graduates from the labor market, which is more than 4 percentage points lower than the corresponding European average, is likely due to the structure of its secondary education and mostly its higher secondary education, which offer very few educational options to secondary school students, compared to other educational systems (Eurydice, 2018/2019), and do not seem to harmonize with the market while showing a relatively small percentage of students attending VET.

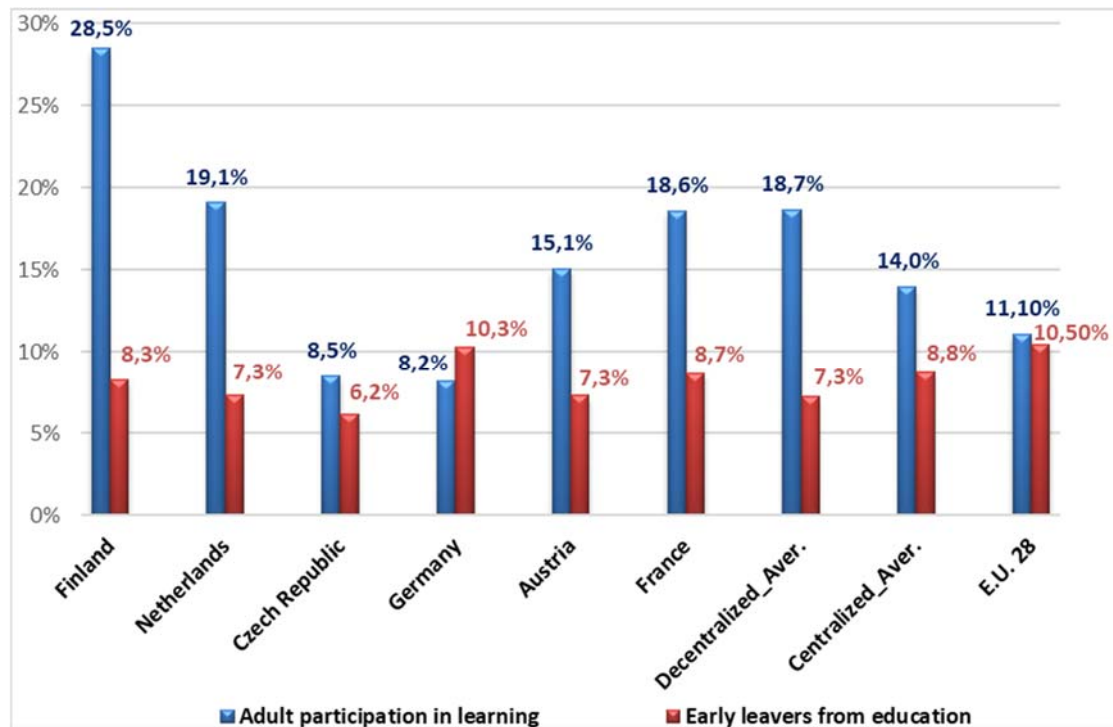


**Figure 3. The employment rate of recent graduates and the percentage of students attending VET in the countries of the research. Source: Eurostat [sdg\_04\_50] [educ\_uoe\_enrs05]**

**Early leavers from education and training and adult participation in learning.**

The percentages of students who abandon education or training early and the percentages of adult citizens involved in education or training processes, despite the fact that they are expressed quantitatively, highlight a key qualitative parameter of educational systems. Figure 4 shows for the year 2018, the percentages of adults aged 18 to 24 who discontinued their

studies prematurely, having graduated only from the lower secondary education at best, and did not continue their studies in any educational or training structure, (Eurostat, 2018). The values of this index for all six countries are better than the European average, but the better scores that the decentralized educational systems have as a whole is evident. EU policy's goal for 2020 is to make the value of this index equal to or less than 10%. Figure 4 also shows the percentages of adults between the ages of 25 and 64, graduates of all levels of education, who participated in 2018 in some form of education or training in structures of formal or informal education. EU policy's goal for 2020 is to make the value of this index at least 15%. In Finland, this educational index is the highest among EU countries, but in this case, too, the better scores that the decentralized educational systems have as a whole is evident.



**Figure 4. The percentage of early leavers from education and training and adult participation in learning. Source: Eurostat [edat\_ifse\_16], [trng\_ifse\_04]**

**Student performance**

In the PISA competition in 2018, 79 countries participated. The PISA competition does not assess the amount of knowledge that students can memorize, but their ability to apply knowledge and skills in the Natural Sciences, Mathematics and Reading, which will make them capable and active citizens in modern society. Various objections have been voiced against the participation in the PISA, the results and the conclusions drawn from the students' performance, but "just as most people would agree that there is more to education than reading, maths and science, most people would agree that this broader education ought to include reading, maths and science". (Crehan, 2016).

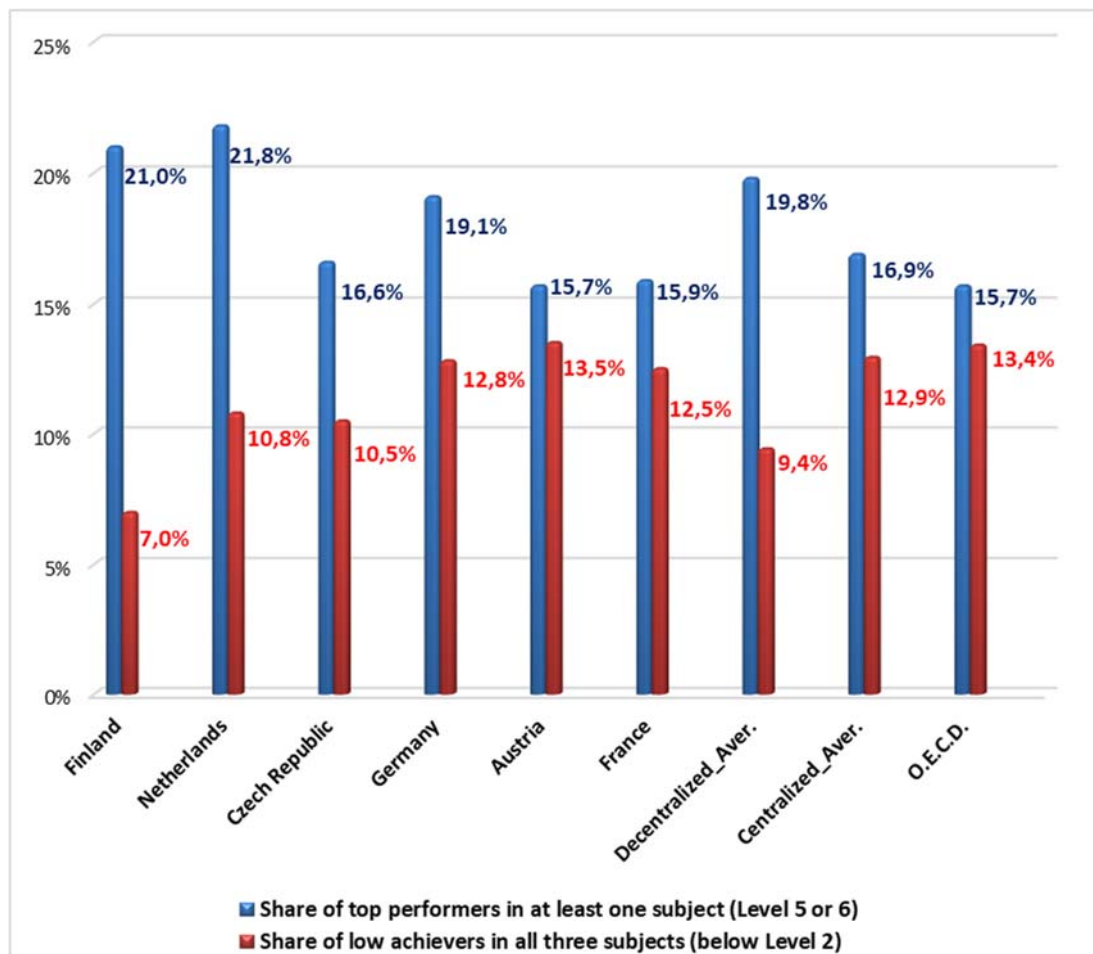
In 2018, about 600,000 15-year-old students took part in the PISA competition. They were a representative sample of their 32 million peers attending the respective schools in the 79 countries participating in the competition. Table 2 shows the average performance of students in the three main subjects of the competition (Reading, Mathematics, Science). The result is that students in decentralized educational systems perform slightly better in the competition.

**Table 2. Performance in PISA 2018 of educational research systems.**

Country	Performance in PISA 2018
Finland	516
Netherlands	502
Czech Republic	495
Decentralized Aver.	504
Germany	500
Austria	491
France	494
Centralized Aver.	495
<b>OECD (Average)</b>	<b>488</b>

**Top-performing and low-performing students in PISA2018**

In addition to the average performance of the students in the competition, some data worth observing are those on the percentages of the excellent students of each country, i.e. the students who showed high performance, levels 5 and 6 on the PISA scale, in at least one of the three subjects of the competition. Another important fact are the percentages of students who scored low in the subjects of the competition, i.e. students who showed low performance, below the 2nd level on the PISA scale, in all three subjects of the competition. It is very likely that these low-performing students will become functionally illiterate citizens in the future.



**Figure 5. Share of high and low achievers in each country of the research in PISA 2018.**

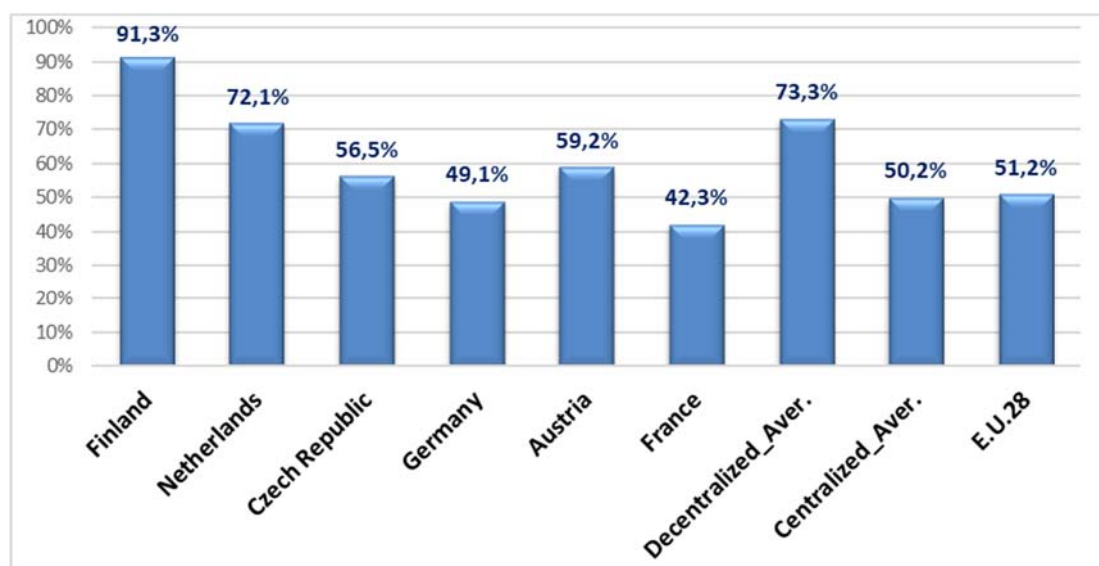
Source: OECD



Figure 5 shows the better performance of decentralized educational systems, both in the percentages of high-performing students and the percentages of low-performing students. Conclusions are drawn about the priorities of educational systems from these percentages, especially regarding Finland, which aims to alleviate educational inequalities, and the Netherlands, which promotes and seeks excellence in its educational system.

**ICT uses in teaching**

During the 2017-2018 school year, a large survey was conducted in European schools (2<sup>nd</sup> Survey of Schools: ICT in Education) on behalf of the EU with the main purpose of comparative evaluation of ICT infrastructure in schools as well as the development of a school model with a high level of digital equipment and interconnection (Highly Equipped and Connected Classroom -HECC). The digital readiness of schools determines the use of ICT tools in daily teaching. Especially during the interruption of in person teaching, due to the covid-19 virus pandemic, distance learning methods had and -quite possibly- will have again a catalytic role in the operation of schools. The percentages of schools that have high ICT infrastructure (PCs and laptops, cameras, interactive whiteboards, etc) per number of students and high broadband internet connection speeds are shown in Figure 6. The percentages of ISCED 1 level schools are also documented separately depending on their internet connection speeds. The predominance of countries with decentralized educational systems is probably due to the difference in priorities that these countries have when it comes to spending on education as a percentage of public spending as well as when it comes to the distribution of education funding in individual categories, as shown in Figures 1 and 2. It is a fact that the educational policy of each country has an impact on its social and economic future. For example, countries' investment in the implementation of ICT in their educational systems creates, among others, their future digital level. The digital level of a country is captured by the Digital Economy and Society Index (DESI). Europe monitors the evolution of its Member States in digital competitiveness and their digital performance for 2020 is reflected in the corresponding values of the DESI, where the 1st and 4th place among the 28 countries of the EU belong to Finland and the Netherlands respectively (EC, 2020). This fact is not random: it stems from the values shown in Figure 6. It is noteworthy that the 2nd and 3rd places belong to two other Scandinavian countries that also invested in their educational systems and gave high priority in the application of ICT.



**Figure 6. ICT uses in teaching in the educational systems of the research's countries.**

Source: European Commission

## Conclusions

The study of the above tables and figures leads to the conclusion that the decentralized educational systems present better scores than their centralized counterparts in almost all the criteria that were investigated. In decentralized educational systems, funding is higher and -most importantly- it is oriented. Their students attend schools that have a significantly higher level of digital ICT infrastructure, they generally perform better, they present higher levels of excellence, and those who fall behind and possibly become functionally illiterate are fewer than the corresponding students in the centralized educational systems. Concerning countries with decentralized educational systems, a higher percentage of students continue their studies after lower secondary education, while more adults participate in educational and training programs. The professional success of students in all of the above-mentioned countries except France is at least satisfactory.

Is the answer simple? Are decentralized educational systems better? What form of educational system, decentralized or centralized, ultimately produces higher quality outputs, whatever the term quality means in this case? In conclusion, there is no definite, one-word answer. There is clearly a superiority of decentralized educational systems in certain points, which to some extent justifies the international trend towards decentralization. The countries that have transferred a portion of the difficult decision-making process regarding their educational systems from central government to local communities have been proven right for their decision. However, they transferred just a part of the difficult decision-making, not the whole of it, and they obviously had reasons for that. It is like taking medications: in the right dosage they work beneficially, in a smaller dosage they might not work at all and in a larger dosage they could cause serious health problems.

Through the process of the decentralization of education, several issues that must be studied in detail in each case and country of application arise. Issues such as teacher management, educational inequalities, evaluation of educational work, composition of decentralized school boards, selection and evaluation of education executives, formulation of detailed curricula, evaluation of students, continuous professional development of teachers and many more need special study on a case-by-case basis before taking the decision to decentralize. Studies such as this one, but with a greater extent and depth, are needed in order to create the information base that is necessary for making decisions regarding the issues listed above. There is room for expansion: more criteria can be analyzed and the criteria under examination can be further investigated. For example, the schools' infrastructures for the use of ICT in teaching that determined their digital readiness were recorded, but it would be interesting to explore the digital readiness of teachers to use this infrastructure. Adopting one of the two forms of educational systems is quite a complicated subject for a country and can be influenced by a number of special features. The economic situation of each country, the structures of its economy, the priorities of each society and the characteristics and the composition of the labor market affect the educational system which likewise affects them in a two-way manner. Other characteristics such as the size of the population, the state, the demographic identity, the percentage of a country's population with an immigrant background, the extent and even the morphology of a country also play an important role in the form and structure of the educational system.

An important question arises as to whether the decentralization of the educational system should concern all levels of education, or whether a distinction should be made between primary education, lower and upper secondary education, general and vocational education, postgraduate and higher education. For example, the German educational system decentralizes primary and secondary education at a state level but centralizes vocational education and training with the apprenticeship system at a federational level (Eurydice, 2019). Decentralization is more appropriate in the levels of primary and secondary education, but not in higher education, according to the World Bank. Nevertheless, even for these levels, the

World Bank suggests that several responsibilities such as training curricula should fall under the responsibility of the central administration. Therefore, the fundamental question to be answered is not the choice of centralized or decentralized but what aspects of educational systems, what levels of education and to what extent will be centralized or decentralized. The answer will be the result of a study which will use the scientific methodology of educational reforms and will include scientific analysis, pilot implementation, evaluation of the process and feedback about it. This question is already under global negotiation and experimentation. "The center and local units need each other. Schools will get nowhere by swinging from one dominance to another. What is required is a different two-way relationship of pressure, support, and continuous negotiation" (Brennen, 2002).

In the relevant OECD survey concerning the index of school autonomy, the Greek educational system presents the lowest value in it, only 26.4%, and is ranked as the most centralized, occupying the 68th place among the 68 countries that participated in the survey. Consequently, a similar future research that would include Greece, which presents significantly lower values in all of its educational indicators and would highlight the need for controlled decentralization of its educational system, is an interesting and valuable idea.

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