

## *PISA 2015 in Spain : opportunities and limits of a territorialized evaluation for the education system*

### 1. INTRODUCTION

The latest results published in the Programme for International Student Assessment or PISA Report, by the Organisation for Economic Cooperation and Development (OECD) in December 2016, help evaluate the academic performance of 15-year-old students, worldwide, in Mathematics, Science and Reading. The study provides data for country comparisons and, in the case of Spain, regional-level data, to get a better understanding of the state of school education in the various settings and thus promote improvements.

As an international assessment programme, the PISA Report is considered an objective comparison system: a sample study of education assessment focusing on the three competencies considered core (Mathematics, Science and Reading) which systematically contribute to measuring what students know and are capable of doing at the end of their compulsory secondary education. However, the formulation and results derived therefrom are not free from criticism and recommendations for improvement. In this regard, the academic literature that has covered these issues has usually focused on two key aspects: assessment methodology and interpretation of results. Although pedagogical and education sciences concepts in general (research, measurements and education diagnosis) have prevailed in this type of analyses and reflections.

As a supplement to this, our study provides a critical review of the assessment method and interpretation of results of the PISA Report (2015) in relation to the Spanish Autonomous Communities. The aim was to evidence the

opportunity that the International Programme provides for a territorial assessment of the education system in our country, but also to show the limitations caused by not considering the spatial component, which could provide a more optimal measurement of school performance and the factors associated to the “regional gap”.

The spatial approach can be very useful to supplement an integrated evaluation of the measurement of school performance, as the contributions by British and American geographers have been proving in recent years. Furthermore, education and territory are concepts that are increasingly interwoven when “determining factors” of school performance are highlighted. Nonetheless, it is just as true that these are still explained based solely on factors linked to the socioeconomic and cultural context, aside from the strictly educational variable.

### II. SCHOOL PERFORMANCE AND “DETERMINING FACTORS” OF CONTEXT BY AUTONOMOUS COMMUNITY

The overall results of the PISA Report help assess the relative success of the education systems in the Spanish Autonomous Communities compared to the national average, the European Union average and the OECD average, as a whole, based on the measurement of the knowledge and skills of the students who took the test. At the same time, it has become essential for student academic performance in the various regions analysed to be related to specific contexts, connected to the incidence of

social, economic and cultural factors in the school environments, as well as to the students' own characteristics.

The PISA Assessment (2015) indicates that Spain achieved a Science score of 493, the same as the average for the group of countries in the Organisation for Economic Cooperation and Development and only two points below that of the European Union. The highest scores were for Singapore (556), Japan (538), Estonia (534) and Finland (531). By Autonomous Communities, Castilla y León (519), the Community of Madrid (516), Navarre (512) and Galicia (512) achieved scores close to the OECD and the European Union, although considerably lower than those of the countries on the top of the list. The bottom places were for Extremadura (474), Andalusia (473) and Canary Islands (475). In turn, for Reading, the national average was 496, higher, therefore, than the OECD average (493) and that of the EU (494), but lower than the best countries in the ranking: Singapore (535), Finland (526) and Ireland (521). In this sense, Castilla y León (522) reached a score very close to the second highest, followed by the Community of Madrid (520), Navarre (514) and Galicia (509). In contrast, the worst results occurred in Extremadura (475), Andalusia (478) and the Canary Islands (483). Finally, the average scores in Mathematics (486) place Spain slightly below the whole of the OECD (490) and the European Union (493), with Singapore (564), Japan (532), South Korea (524) and Switzerland (521) being the best positioned countries. Regionally, the top places were for Castilla y León (506), Navarre (518), La Rioja (505) and the Community of Madrid (503), which were all above the general OECD and EU Member State average.

Many variables have been identified as having an impact on student performance: economic, social and cultural factors of the education system setting and those related to school characteristics and pertaining to students themselves and their social, economic and cultural environment. These "determining factors" have helped establish a link between school characteristics, individual student characteristics, student socioeconomic background, cultural factors and school performance.

### III. THE SPATIAL COMPONENT: RECONFIGURING AND EMPHASISING TERRITORIAL SCALES IN REGIONAL EVALUATIONS OF THE EDUCATION SYSTEM

As indicated by the title of this paper, this study focused on the territorial evaluation of the Spanish educa-

tion system, which uses the data from the PISA (2015) report. The results of the report provide insight, through regional comparison, on student academic performance in our country upon completion of compulsory secondary education, as well as a framework for their interpretation. What is under consideration are the limits of education assessments, at a regional level, that do not take into account the variables inherent to the territorial structure: the breadth and diversity of geographical space, understood here as the "setting" for education.

The so-called "geographical factor" is unavoidable in any attempt to complete a full assessment of school performance results. Firstly, it must be considered so that the choice of schools and students assessed is aligned with the heterogeneity of spaces. And also, secondly, because a territorial analysis is an essential part of the social, economic and cultural context which "determines" school performance. In short, this geographical perspective aims to offer a new opportunity to assess the PISA results by Autonomous Communities, which is enormously useful, and also to formulate policies to improve education linked to the territory specificities and the needs and problems derived therefrom for the student population and environment.

#### 1. ATTRIBUTES OF UNVERIFIED TERRITORIAL STRUCTURES

For geographers, the wide assortment of different types of spaces that exist in Spain and, thereby, in each and every one of its Autonomous Communities, is unquestionable. Without getting into too much detail, those listed below emerge from an evident duality: the dichotomy between the urban and rural worlds. Yet there are several issues that complicate delimiting rural and urban areas in a territory. The first is the impossibility of establishing a classification based on simple indicators, even though some official statistics and standards attempt to do so. In any case, regardless of the theoretical and operating complexity of delimiting the space of what is understood as urban and rural, the fact is that activities and populations are progressively concentrating in cities, while the territory continues being primarily rural, with the problems of development, service provision and inequalities this entails.

A superficial characterisation of the diversity of spaces and territorial contrasts in each Autonomous Community in Spain, with the added disadvantage that the data are not filtered geographically using more representative

population thresholds, shows that the mark of the rural areas, if one can define them as a spatial category loosely related to the two bottom “intervals” in PISA, is the defining trait of a good part of the territory. Thus, 86.8 % of the municipalities in Spain are “rural”, with Castilla y León (99.2 %), La Rioja (98.9 %), Aragón (98.8 %), Navarre (98.2 %), Castilla-La Mancha (97.7 %), Extremadura (97.4 %), Cantabria (94.1 %), Catalonia (91 %), Galicia (89.2 %), Asturias (88.5 %) and the Basque Country (88.4 %) above that average. Linked to this is the depopulation of this predominantly rural world: only 32.7 % of the Spanish population lives in municipalities with less than 15,000 inhabitants; with Extremadura (55 %), Navarre (54.8 %), Castilla-La Mancha (53.8 %), Castilla y León (46.8 %), La Rioja (44.7 %), Cantabria (43.1 %), Galicia (40.3 %) and Aragón (34.9 %), in that order, being the regions that are well above the national average.

In contrast, urban concentration in a much smaller number of municipalities is the other side of the territorial structure, although here the variety of spatial types defined by ESPON is even greater than in the rural areas. These range from small and medium towns, which are not very well defined given the lack of clear data, to cities with over 500,000 inhabitants (Malaga, Seville, Zaragoza, Barcelona, Madrid and Valencia) that are barely distinguished from the former save for the two largest cities in the urban system. Thus, 67.3 % of the Spanish population is urban and lives in 13.3 % of the municipalities. At the top of the list of the most urbanised Autonomous Communities is the Community of Madrid, 92.6 % of the population and 77.1 % of the municipalities. This is followed by the Region of Murcia, 90.6 % and 46.1 %, Canary Islands, 85.7 % and 60.2 %, the Region of Valencia, 77.3 % and 85.6 %, and Balearic Islands 75.8 % and 77.6 %. The picture is completed with Catalonia (75.4 % of its population lives in municipalities of over 15,000 inhabitants), Andalusia (73.9 %), Asturias (73 %) and the Basque Country (72.9 %), all surrounded by a municipal sea of rurality.

Given this general landscape, it is reasonable to believe that the organised provision of education services, that is, the spatial location of secondary education schools (the targets of the PISA Report), would respond, to a certain degree, to this territorial layout: 2,153, according to the State Registry of Non-University Education Centres of the Ministry of Education, Culture and Sports, are located in rural municipalities (29.1 % of all schools), with a ratio of one student for every 7,085 inhabitants as a national average. Certainly, among these municipalities

are those that ESPON calls dynamic enclaves of agricultural renewal or enhancement of the endogenous potential and, in particular, rural hubs or service hubs for the whole district, without forgetting the peri-urban areas that are statistically confused with rural ones. In contrast, 5,249 schools (70.91 %) are established in cities, with a ratio for the whole of Spain of 6,529 urban residents for every school.

By Autonomous Communities, the greatest distortions to this logic of spatial distribution of education facilities, considering the population model, are seen in Andalusia, with a higher proportion of secondary schools in rural areas than the population living therein; in particular in “deeply rural” municipalities, given the number of smallholdings across the territory (52.3 % of all municipalities in Andalusia have less than 3,000 inhabitants). The same is true of Aragón, Asturias, the Basque Country, La Rioja and Navarre, where the dynamic nature of certain booming districts, would explain the oversizing of schools in the rural areas. This is the case of La Rioja and the mid-valley of the Ebro in Navarre and Aragón, the municipal dispersal of Aragón (94.1 % of municipalities have less than 3,000 residents) or the population system legacy of small valley municipal seats, as is the case in Asturias and the Basque Country. The situation is different regarding school facilities in the smaller towns of the Balearic Islands, Cantabria, Castilla-La Mancha or Castilla y León. In the two Castillas and in Cantabria, spatial atony and ageing appear to be the reason for a lower ratio of schools to rural population. This is not so much the case in towns with between 3,000 to 15,000 inhabitants, which are essentially districtwide schools (without forgetting other municipalities in the area of urban influence of cities), but it is a factor in those that are smaller in size and undergoing depopulation. In the Balearic Islands, in turn, the dynamic nature of its economy and intense urbanisation explains the higher urban concentration of facilities. These provide education services to rural areas, which are practically non-existent if we look at those that are “deeply rural”.

All the same, and in spite of the above nuances, spatial distribution of secondary schools in accordance with the PISA population “intervals” for the Autonomous Communities, appears to follow their territorial structure: with Canary Islands, Catalonia, Extremadura, Galicia, the Community of Madrid, the Regions of Murcia and Valencia, in this respect, the ones in which the spatial logic for distribution of school facilities perfectly matches their population model.

## 2. SPATIAL DIFFERENCES BETWEEN SCHOOL PERFORMANCE AND TERRITORIAL INTERPRETATION OF REGIONAL RESULTS

PISA (2015) is undoubtedly helpful for the assessment of education systems in the Spanish Autonomous Communities. However, the spatial heterogeneity derived from the different types of geographies existing in the territory of each region, has been entirely neglected as an additional variable to be considered for the collection and measurement of results. The sample design for each Autonomous Community was stratified into two-stage clusters, with samples proportional to the size of the Report's target population: 15-year-old students completing secondary education. The primary units of the sample were schools and the secondary ones, the students in each school, who were selected randomly from lists of eligible subjects. In total, for the whole of Spain, 980 schools were selected, and a total of 37,205 students were assessed.

In addition to challenging the lack of a method to evaluate and, ultimately, adapt the representation of the PISA schools to the territorial structure in each Autonomous Community, our interest lies in the distribution of students who were assessed: taking into account that the non-existent geographical balance in the choice of schools should be the basis for establishing the number of students, which should be proportional to the universe of those that exist in each spatial category.

A brief review of the distribution of PISA students by population "intervals" in the various Autonomous Communities shows, once again, to what extent the spatial component has been neglected in the regional assessment of the education results: adapting the percentage of students tested to the number of participating secondary schools. These same mismatches, or their heightened version, are thereby transferred to the representation of the education situation associated to the various territorial settings.

By Autonomous Communities, and for the calculation of the three core competencies (Reading Skills, Mathematics and Science) assessed, this pattern seems to hold true, although in different degrees, in all of them except Asturias, the Basque Country and Catalonia. However, the results obtained in the "deeply rural" municipalities of Andalusia, Aragón, Canary Islands and Castilla y León, in small cities in Aragón, Canary Islands and Valencia and mid-size ones in the Community of Madrid, break the general rule, similar to the three above-mentioned regional exceptions. Before addressing below the territorial interpretation of results based on the index

of economic, social and cultural status (ESCS) by population "intervals" within each community, the explanation for this more than evident difference must be sought in the limited representativeness of some of these samples (students) collected by territorial category. Thus, the percentage of Basque, Asturian and, above all, Catalan students assessed in smaller rural municipalities, to give the three examples mentioned as an exception to the urban/rural dichotomy, is too limited to make the results shown entirely reliable.

Yet even with these limitations, it is absolutely relevant to explore to what extent the relationship established between the social, economic and cultural level of families and the learning outcomes of students in the Assessment differs according to the various territorial types the schools are in. In general, the larger the population of the kind of space being considered, the higher the index of economic, social and cultural status (ESCS); and linked to this, the better the education outcomes. Differences in the level of parent education and resources available in the household (books at home, connection to the Internet, use of computers, etc.) are the aspects to be quantified. This is evident and should be initially underscored: again, there is a manifest duality between the urban and the rural worlds. Now then, in some regions the differences found are more marked than in others. Was this circumstance taken into account when selecting the schools and students for the Assessment or a sample of education systems with a greater or lesser degree of equity? On the other hand, in certain communities the lowest indices do not appear to be linked to rurality. This is the case, for example, of the Community of Madrid, where the lowest index is recorded in the "satellite" cities of the cluster (those with over 100,000 inhabitants), with the segregation and heterogeneity of these schools being perhaps the causes of this supposed "disparity". For we must not forget that, aside from sample limitations, the data obtained by PISA (2015) conceal a wide variety of spatial types -of "settings" for education-, contemplated geographically (ESPON) for each population threshold.

## IV. CONCLUSIONS

The aim of this paper has been to call attention to the limits in the regional assessment of the Spanish education system because the International Programme for International Student Assessment (PISA) did not consider the territorial component in its most recent 2015 edition. The criticism extends to:

(1) The scarce and poorly set out spatial information included in the Report. The municipal population “intervals” used to break down (microdata) the education performance results (in Reading Skills, Mathematics and Science) and the context “determining factors” (economic, social and cultural status) by Autonomous Communities (with less than 3,000 inhabitants, with 3,001 to 15,000, with 15,001 to 100,000, with 100,001 to 1,000,000 and with over 1,000,000) do not relate well to the various criteria and indicators commonly used to define the structures and wide variety of territorial types.

(2) The non-existent adaptation of the selected schools and students to the territorial structure, the population model and the location of secondary education schools in the various Spanish Autonomous Communities. The municipal distribution of the population and the secondary education schools by PISA “intervals” -the limited spatial categories abovementioned- seem to match, to a greater or lesser extent, the structure of each regional territory, adapting the location of the schools -all those potentially eligible for the Assessment Programme- to the popula-

tion model. However, in light of the microdata in PISA (2015) supplied by the OECD, this is not the case with the municipal distribution of the schools and the students assessed, which does not reliably match the frequency for each “interval” (even with the above cautions) as a representative threshold of territorial layouts.

(3) The fact that the “geographical factor” is not a substantial part for understanding the economic, social and cultural context associated to interpretation of school performance. We propose a better regional understanding and evaluation of certain types of spaces, such as the rural areas, without forgetting that more detailed urban scales should likewise consider internal differences of morphology, social and economic status and function (neighbourhoods, suburbs, downtown...). In short, we call for a greater use of this innovative view to study and reflect upon the education system. One that takes into account territorial specificities -of the multiple territories- and the needs and issues derived therefrom, which would help optimise a tool of public education policy as important as the PISA Report.