Family and school success according to the State quality tests in a región of the Colombian Caribbean[1]

Familia y éxito escolar según las pruebas de calidad del Estado en una región del Caribe colombiano

哥伦比亚加勒比地区的国家教育质量测试所反映的家庭支持和学校成绩间关系

Семья и школьная успеваемость по результатам государственных тестов качества в Карибском регионе Колумбии

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Abstract

Different types of family support in the educational process of children are studied based on the averages variability of the Saber 11 test got by public schools in 27 non-certified municipalities of Córdoba, Colombia. For the size of the sample was used a multi-stage sampling which displayed a sample of 109 educational institutions in the first stage, distributed in three strata of the municipalities. In the second stage were estimated 629 families selected by the simple random method. The data were analyzed with the principal components analysis method, which allowed the construction of a support index to establish the correlations between the variables. Relevant results show there does not exist a significant relationship between family support and the classification results of public schools in the State test in 2016. But, it is found that when the family support in the educational process is greater, the probability of get a score with an average of 50% is 4.650 higher. Among the explanatory variables with the greatest influence on family support were: living in an urban area, municipalities with 6 to 10 schools, the female sex, the highest level of parents education, housewives and families with access to the computer. It is inferred the lack of relevance of the Saber 11 test related to the acquired learning and the types of evaluation applied in the schools.

Keywords: family, school success, parent participation, learning test, learning conditions.

Resumen

Se examina las diferentes formas de acompañamiento de la familia en el proceso educativo de sus hijos a partir de la variabilidad de los promedios de las pruebas de Estado 2016 obtenidos por las instituciones educativas oficiales en 27 municipios no certificados del Departamento de Córdoba, Colombia. Para el tamaño de la muestra se utilizó un muestreo polietápico, que arrojó en la primera etapa una muestra de 109 instituciones educativas distribuidas en tres estratos de municipios. En la segunda etapa se estimó un total de 629 familias seleccionadas con el método aleatorio simple. Los datos se analizaron con el método de análisis de componentes principales que permitió construir un índice de acompañamiento para establecer las correlaciones entre las variables. Como resultados relevantes se encontró ausencia de relación significativa entre el acompañamiento familiar y la variabilidad de los promedios de dichos resultados por municipios. Pero se constata que, a mayor acompañamiento de las familias en el proceso educativo, la probabilidad de obtener un puntaje promedio dentro del 50% más alto es 4.650 veces mayor. Entre las variables explicativas de mayor influencia en el acompañamiento familiar se obtuvo: vivir en zona urbana, los municipios entre 6 y 10 instituciones educativas, el sexo femenino, el mayor nivel de educación de los padres, las amas de casa y familias con acceso a computador. Se infiere la poca pertinencia de las Pruebas Saber 11 respecto a los aprendizajes adquiridos y los tipos de evaluación aplicados en las escuelas a sus estudiantes.

Palabras clave: familia, éxito escolar, participación de los padres, test de aprendizaje, condiciones de aprendizaje.

摘要

从哥伦比亚科尔多瓦省 27 个非认证城市的官方教育机构获得的 2016 年国家测试平均值的可变性中, 我们研究了家庭在子女教育过程中的不同形式的陪伴。研究采用了多阶段抽样的样本规模, 在第一阶段采纳了分布在三个市镇的 109 所教育机构的样本。在第二阶段, 用简单随机方法对 629 个家庭进行了分析。我们采用了主成分分析方法对数据进行分析, 该方法允许构建后续指标以建立变量之间的相关性。作为相关结果, 家庭支持与市政

当局的上述结果平均值的可变性之间没有显着关系。但研究发现，家庭在教育过程中得到的支持越多，获得最高50%以内平均分的概率要大4650倍。对家庭支持影响最大的解释变量包括：居住在城市地区、拥有 6 至 10 所教育机构的市镇、女性、父母的教育水平较高、家庭主妇和拥有计算机的家庭。Sabre 11 测试的相关性很小，这是从所获得的学习和学校对学生应用的评估类型推断出来的。

关键词: 家庭、学校成绩、父母参与、学习测试、学习条件。

Аннотация

Исследуются различные формы сопровождения семей в образовательном процессе их детей на основе вариативности средних показателей государственных тестов 2016 года, полученных официальными образовательными учреждениями в 27 несертифицированных муниципалитетах департамента Кордова, Колумбия. Для определения размера выборки использовалась многоступенчатая выборка, которая на первом этапе дала выборку из 109 образовательных учреждений, распределенных по трем стратам муниципалитетов. На втором этапе была проведена оценка 629 семей, отобранных методом случайных чисел. Данные были проанализированы с помощью метода анализа главных компонент, что позволило построить индекс сопровождения для установления корреляций между переменными. В качестве соответствующих результатов, не было обнаружено существенной связи между сопровождением семьи и вариативностью средних значений этих результатов по муниципалитетам. Однако было установлено, что чем больше сопровождение семьи в образовательном процессе, тем в 4,650 раз выше вероятность получения среднего балла в 50% лучших. Среди объясняющих переменных, оказывающих наибольшее влияние на поддержку семьи, были следующие: проживание в городской местности, муниципалитеты с количеством учебных заведений от 6 до 10, женский пол, более высокий уровень образования родителей, домохозяйки и семьи, имеющие доступ к компьютеру. Можно сделать вывод, что значимость тестов Saber 11 по отношению к полученным знаниям и видам оценивания, применяемым в школах к своим ученикам, невысока.

Ключевые слова: семья, школьная успешность, участие родителей, учебный тест, условия обучения.

Introduction

Among the series of economic, political and social transformations implemented in the field of education in response to the challenges of globalisation, the issue of educational quality takes on different connotations, with two major theoretical currents that continue to be the object of debate. The first of these currents, which originates from and is justified precisely by the challenges posed by globalisation, analyses this educational problem in the context of public policies that define the needs and purposes of education in terms of business and production requirements. The school is likened to a 'factory' that builds the parts required for competitiveness and innovation, and students and teachers are seen as part of a commercial exchange system which is organised, oriented and evaluated in accordance with a business model, i.e. with market criteria and economic principles of effectiveness and efficiency of resources (Álvarez & Matarranz, 2020; Mejía, 2016).

According to these principles and criteria, the concept and scope of educational quality encompasses five dimensions which together make up the education system: learner characteristics, context, enabling inputs, teaching-learning and outcomes, each of which is subject to evaluation to determine their level of quality and development. Students are conceived as elements to be transformed through learning management and acquisition processes (Martín, 2018). According to this approach, schools and families in their role as part of the economic and social context become the main actors for economic development, the assumption being that an educated person will be able to generate monetary income and mechanisms to achieve basic needs, social mobility and reconciliation. Hence, these arguments serve as the basis for the assumption of education as a tradeable service and an investment that generates individual benefits in the medium and long term (Becker, 1964; Schultz, 1981).

The alternative current is proposed by the United Nations Educational, Scientific and Cultural Organization (UNESCO), which although differing in terms of the emphasis placed on some of these aspects, essentially has more common and complementary features than differences. Its main criticism of the former approach is that public education policies are developed with a view towards integration of international guidelines governing economic and human development whereby the former take precedence. Indeed, the assessment of learning achievement does not focus on how much the students enjoyed their educational process and how this learning provided tools for their personal growth, but rather the State, and consequently schools and families, are more interested in what level the student achieves in their academic exams and what ranking the school achieves in the local and national context.

In contrast to the above, UNESCO (2016) conceives education as a means of transforming people and communities based on the understanding that students are transformed into ambassadors of peace, harmony and reconciliation with others. In pursuit of this purpose, UNESCO proposes mechanisms to eradicate poverty and work towards sustainable development through the adoption of educational policies oriented towards the resignification of human dignity which, parallel to its human rights vision, mark paths of analytical interest for the Americas.

Similarly, schools and families are seen as key actors for social transformation which are influenced by recognition of human rights, gender diversity, inclusion of women in the labour market, demographic changes and educational attention for ethnic minorities. Consequently, these socio-political and cultural considerations grant a new emphasis and a new meaning to quality, seen as a permanent process of continuous improvement which is inherent to human development leading to empowerment and expansion of human capabilities based on what people aspire to be, have and do in educational terms (Croso, 2016; Lacayo, 2016).

Based on these considerations, UNESCO (2016) poses a rethinking of education, educational quality and school success as an interconnected sequence of factors that contribute towards an understanding of the diversity of the human species and its different contexts, arguing that quality cannot be measured solely based on the results of students' learning achievements. Instead, it proposes three interrelated factors or dimensions to assess quality: i) the characteristics of students and their families; b) the characteristics of the teachers, teaching practices and classroom resources; and iii) the characteristics of the schools.

This implies refocusing studies in this area and involving as many variables as possible in order to obtain a general overview of the data obtained. This approach is based

on the assumption that the characteristics of students and their families are of major relevance when considering the education system, because living conditions are present at every stage of individual, family and collective human history. In this regard, Rivas and Scasso (2017) point out that evaluating student results makes it possible to measure the effectiveness of education systems, assess the degree of fulfilment of the right to education and provide elements for a comprehensive understanding of their different realities. They also emphasise that one of the research tasks for governments to make the right decisions regarding educational processes is to understand the historical and cultural context and particular characteristics of students, because data alone do not provide sufficient inputs for action.

Interest in the relationship between families, schools and living conditions was sparked by the pioneering study by James Coleman, who presented weighty arguments that were independent to the academic progressivism of his time (Fernández, 2016) and promoted an interest in addressing social determinants and involving family members in studies as key elements for analysis of students' learning results. According to Carabaña (2016) and Marqués (2016), it was Coleman who opened up the debate on social inequalities, the need to link schools as part of an integrated analytical system, and of course, the imperative need to propose an educational reform that guarantees universal access to education, parallel to the analysis of how to design schools in light of the segregation present in society.

As can be seen, the relationship between family and schools is a broad and diverse topic. These two analytical categories have been closely linked over the history of humanity, although the fragmentation of the approaches taken limits the understanding we have of the significant interactions and level of influence between one and the other. These categories have in common the fact that they are conceived as social institutions shaped by history with the capacity to contribute to the socialisation process, with family assuming a role as the first school par excellence, and schools being seen as a second home and a space for the provision of cognitive and behavioural tools that favour the comprehensive training of individuals (Campoalegre, 2016).

This context of prior history and debate forms the backdrop for the educational policies adopted in Latin America to assess educational quality in its respective countries, which include adherence to international assessment and information systems such as the PISA test implemented by the Organisation for Economic Co-operation and Development (OECD) since 1997 (OECD, 2017).

In the case of Colombia and the Department of Córdoba in particular, the strategies designed for this purpose are framed within the 2030 Agenda for Sustainable Development in Education proposed by the United Nations (UN) and adopted by 193 Member States since the end of 2015. Since that same year, Colombia has been implementing the Synthetic Index of Educational Quality (ISCE), which assesses students' performance in the national tests, the progress made by students measured in terms of the percentage reduction with respect to the total number of students who reported an inadequate level of performance, grade repetition and all other factors affecting the school environment (Organisation for Economic Co-operation and Development [OECD] and Ministry of National Education [MEN], 2016).

The practical results of these assessments have revealed a series of contrasts, with countries such as Colombia not faring particularly well. The 2018 PISA Report, for example, concluded that Colombian students lag behind in all knowledge tests even when the average performance represents a medium-low threshold. The OECD aver-

ages for performance in reading, mathematics and science respectively are 491, 489 and 489; Colombia, meanwhile, scored 412, 391 and 413 in these same areas, barely outperforming countries such as Albania, North Macedonia and Qatar. Furthermore, the report adds that around 50% of students were placed at the second of five proficiency levels and around 30% were below that level (OECD, 2019).

From a regional viewpoint, the results of the Saber 11 tests by the Colombian Institute for Educational Evaluation (ICFES)[2] indicate that the departments of Santander (263), Boyacá (261) and Cundinamarca (254) occupy the top positions in the national territory. In contrast, Córdoba (235) is very close to the departments with the worst results, equivalent to less than 50% performance in the test (Government of Colombia, 2019).

Similarly, according to the Secretariat of Municipal Education of Montería, the capital of Córdoba, in 2016 this city ranked 138th nationally, with an average of 53.32, followed by Sahagún (ranked 231st - average 52.41), Montelíbano (ranked 314th - average 51.55), Ciénaga de Oro (ranked 403rd - average 50.77) and Chinú (ranked 425th - average 50.57). In 2019 the top-ranked municipality continued to be Montería, but its ranking dropped to 154th in the national total with an average of 51.37, followed by Sahagún (ranked 260th - average 49.95), Montelíbano (ranked 322nd - average 49.95), Chinú (ranked 417th - average 48.55) and Ciénaga de Oro (ranked 457th - average 48.55), (Pineda García & Madera Simanca, 2019).

These results justify an examination of the relationship between family and school contexts in view of the relative socio-economic homogeneity of school contexts, based on the assumption that these characteristics should lead to more balanced results, i.e. with less differences in the same performance standard. Consequently, this study aims to analyse the relationship between the degree of participation or support by families in the education processes of their children. Based on the results, it will then determine the impact of this support on the variability of the average scores obtained by schools in the 2016 Saber 11 state tests.

Methodology

The methodology consisted of a descriptive cross-sectional correlational study with a quantitative approach. According to Hernández et al. (2014), this type of design comprises the series of processes which aim to cross-match variables and draw up methodological plans that allow establishment of parameters with a view to their measurement in specific contexts and association to draw conclusions regarding the problem being explored.

Sample

The sample was selected from the total number of official schools offering educational services in the Department of Córdoba (Colombia), equivalent to a total of 249 schools distributed across the 27 uncertified municipalities of this territorial entity. These were secondary vocational education schools which applied the Saber 11 tests during 2016, with classification by the ICFES into the categories A+, A, B, C and D.

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2 The Saber 11 test is an assessment instrument for secondary education and is part of the education quality system in Colombia.

The simple random sampling method was applied to select a representative proportional sample from the total school population in accordance with the variability of the averages obtained by the students in the state tests. To do this, three different strata were formed by municipalities selected on the basis of the number of schools: stratum 1 (made up of municipalities with between one and five schools); stratum 2 (municipalities with six to ten schools) and stratum 3 (municipalities with more than ten schools).

This was then used to calculate the sample size, taking the average variable in the Saber 11 tests for each school and municipality by applying the statistical formula for finite populations, where: N=249 (Total number of schools), Z=1.96 (quantile value of the standard normal distribution), confidence (95%), s2=314.966 (variability of averages by schools) and E=2.5 (maximum permissible error in the estimation of the average score), resulting in n=109 schools.

Subsequently, the sample size was determined for each of the strata (1, 2 and 3) by applying Neyman's Affixation, where N_h (number of schools per stratum) and (variance of the averages per stratum), in order to obtain a larger sample size for the strata with greater variance (Table 1).

Table 1

Sample size according to strata

Stratum	Municipalities	Schools	Sample size
1	Buenavista, Chimá, Cotorra, La Apartada, Momil, Purísima, San Antero, San José de Uré	29	6
2	Canalete, Los Córdobas, Puerto Escondido, Puerto Libertador, San Andrés de Sotavento, San Carlos, Tuchín	55	27
3	Ayapel, Cereté, Chinú, Ciénaga de Oro, Montelíbano, Moñitos, Planeta Rica, Pueblo Nuevo, San Bernardo del Viento, San Pelayo, Tierralta, Valencia	165	76
Total		249	109

After selecting the schools in each municipality, the sample of families was calculated taking into account 10% of the number of 11th and 10th grade students enrolled in these schools, resulting in a total of 629 families.

Based on this information, a list was drawn up with the names, addresses and telephone numbers of school principals and parents or responsible adults of the adolescents and youths enrolled in grades 10 and 11, which served as the basis for selection of the families to be surveyed. The project was presented to the Secretariat of the Education Department and the academic authorities of the respective local educational institutions, and the objectives and data collection strategies were disclosed. The corresponding endorsements were obtained, along with precise information on how to access families, particularly those in rural areas with difficult access.

Instruments

The data collection instrument consisted of a questionnaire designed by the researchers and validated by a team of experts (graduates, teaching professionals, teaching authorities and statisticians). It was structured into six blocks composed of questions relating to the objectives of the research. The first five blocks examine the independent or explanatory variables and the sixth block comprises questions that represent the dependent or explained variables which are the objective of the research:

Block I (with five informative questions regarding the school and its location); Block II (made up of six items addressing the socio-demographic aspects of the sample); Block III (with two questions about the occupational status of the head or representative of the household); Block IV (one question about the economic level of the father of the family); Block V (eight items relating to the physical characteristics and services of the dwelling) and Block VI referring to school participation and support, with 10 questions on a Likert scale of 1 to 5 with the options of Always, Very Frequently, Indifferent, Very Rarely and Never.

The data concerning the results of the Saber 11 tests were obtained from the statistics of the Ministry of National Education published on the official website of ICFES and were complemented with the data of the official databases of the Secretariat of Education of the Department of Córdoba.

The legal representative (or their delegate) of each school was contacted and informed of the scope of the project to gain access to the database of students enrolled in grades 10 and 11. Using this information, the parents or adults responsible for the students' educational process were selected taking into account the following inclusion criteria: (i) location and geographical distribution of the dwelling with respect to the school context, seeking a balanced representation in this sense, (ii) availability of the respondents, (iii) kinship and/or responsibility of the adult in the student's educational process, selecting only the person who had this responsibility, (iv) where there was more than one household per dwelling and different people studying in the same school, each of the members responsible for the student had to be interviewed separately, (v) where there was more than one member in a dwelling studying in the same school, only one family or person responsible for the student was chosen. Upon arrival at the households, the household representatives were informed about the research and the informed consent form was read to the participants, who were guaranteed the right to anonymity and the right to withdraw from the study if they considered it necessary.

Procedure

The methodological process involved two stages: in the first stage, the sample elements of interest (schools and students) were selected, implementing a sampling design in which the municipalities were stratified according to the number of schools. The number of families was then estimated based on the number of students enrolled in grades 11 and 10 in the respective schools, applying 10% to each of the total numbers of students in question.

The second stage consisted of calculating descriptive measurements for all the variables, which are then used as the basis for a subsequent comparative analysis to determine the degrees of association between categorical variables and the groups of

schools established. The Chi-Square Test, Cramér's V, and the Spearman Correlation were used. Hypothesis tests were then conducted to compare groups of interest using parametric or non-parametric strategies according to the distributional settings.

For the analysis of the data on family participation and support, principal component analysis (PCA) was applied to the data corresponding to the 10 statements that make up Block VI of the survey questions on the Likert scale. A participation and support index was constructed that served as the basis for the correlations between the averages of the Saber 11 tests by municipality and question 9 of Block VI. These procedures were carried out using R statistical software.

Analysis and Results

The central purpose of the study was to examine the relationship between family support and the educational processes of secondary vocational school students in schools of the Department of Córdoba, based on the variability of the average scores obtained in the 2016 Saber 11 tests by municipality.

The socio-demographic characterisation of the sample (parents or responsible adults of students enrolled in grades 10 and 11 of the schools selected) consisted of an average age of between 46 and 47 years, with a minimum age of 20 years and a maximum of 82 years. The results show an average number of households per dwelling of 1.2, comprising between 1 and 17 persons, equivalent to an average of 5.2 members.

With regard to the independent variables of a socio-economic nature and the most relevant indicators examined in relation to participation and support by parents or responsible adults in the educational process, there was a majority of males (54.8%) compared to females (42.2%), with a higher proportion in rural zones (70.4%); the educational level of the parents or responsible adults surveyed was incomplete primary school (30.1%), complete primary school (19.2%), complete secondary school (11.4%), university (6%), incomplete secondary school (3.5%) and technological (3%); and in terms of household income, the majority stated that they earned less than the minimum wage (73.4%) and 66.8% said they were employed, while 28.5% were homemakers. A large proportion of the working population was self-employed (40.5%), with the remainder being those with a permanent contract (11.9%) or a fixed-term contract (10%) and those working on a casual basis (9.5%).

The responses regarding access to technological goods and services in the home mainly consisted of having a mobile phone (96%) and cable TV (59%). Meanwhile, 83% did not have access to the internet and 80% did not have a computer.

Set out below are the main findings concerning the different forms and factors related with family support in the educational process, the relationship between the different forms of participation or support and occupation, gender, income level and access to a computer, and the degree of the link between the family support indicator and the average score obtained by the students in the 2016 Saber 11 tests by municipality.

Different forms of participation and factors related with family support in the educational process

The highest scores or percentages by participation categories for the responses by parents or responsible adults included never attending school meetings when called upon to do so (82.4%), never being happy or saddened by their children's academic results (65.3%) and never supporting school activities for quality improvement (51.8%).

The study also established the averages of the variables of gender, schooling and occupation of the family member and their relationship with the different forms of support. The results of the Chi-square statistics and the p-value of the test of independence were also established for each of the statements (Table 2), where a value of less than .05 indicates rejection of the hypothesis of independence.

The results showed rejection of the hypothesis of independence in favour of gender being related with the level of family support in each of the statements; with respect to schooling, it was found that this is related with the statement "I keep informed about my children's learning process", and the match between occupation and the statements "I keep informed about my children's academic results", "My children's academic results make me happy and/or sad", "I have time to support my children's school learning", "I foster reading habits in my children" and "I keep informed about my children's learning process" rejects the hypothesis of independence in favour of there being a relationship.

Table 2

Relationship between gender, schooling and occupations of families and the different forms of support in the educational process of their children

Statement and/or question	Gender		Schooling		Occupation	
	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value
Q1. I attend school meetings when called upon to do so	27.836	3.9e-06	19.592	.143	3.145	.925
Q2. I check school homework	16.798	.0021	21.665	.419	25.835	.011
Q3. I keep informed about my children's academic results 13.300		.0040	26.685	.181	26.621	.009
Q4. My children's academic results make me happy and/or sad	11.334	.0231	18.406	.623	9.671	.646
Q5. I help my children with their homework	22.512	.0002	25.690	.218	20.638	.061
Q6. I support all school activities for quality improvement	11.132	.0251	26.534	.187	9.472	.662

Statement and/or question	Gender		Schooling		Occupation	
	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value
Q7. I have time to support my children's school learning	18.976	.0008	23.208	.333	37.621	.000
Q8. I foster reading habits in my children	27.750	1.4e-05	20.777	.473	35.612	.000
Q9. I think that teaching and learning is the sole responsibility of the school	13.825	.0079	18.061	.645	18.726	.095
Q10. I keep informed about my children's learning process	28.247	1.1e-05	32.972	.047	25.470	.013

As in Table 2 above, the results of Table 3 show the relationship between the variables of income of the family member, access by families to a computer and participation or support in the educational process of the students, confirming a rejection of the hypothesis of independence at a 5% level of significance, in favour of the relationship between income and the statement "I attend school meetings when I am called upon to do so." Likewise, the match between the statement "I have time to support my children's school learning" and having access to a computer showed rejection of the hypothesis of independence at a 5% level of significance.

Table 3

Relationship between income, access by families to a computer and participation or support in the educational process of their children

Statement	Income		Computer	
	Chi-square	p-value	Chi-square	p-value
Q1. I attend school meetings when called upon to do so	616.900	.000	6.134	.104
Q2. I check school homework	13.011	.368	3.448	.488
Q3. I keep informed of my children's academic results	4.543	.9.71	6.742	.148
Q4. My children's academic results make me happy and/or sad	6.780	.872	7.758	.099
Q5. I help my children with their homework	14.875	.248	4.505	.339
Q6. I support all school activities for quality improvement	15.771	.202	7.430	.114

Statement	Income		Computer	
	Chi-square	p-value	Chi-square	p-value
Q7. I have time to support my children's school learning	9.929	.622	9.327	.051
Q8. I foster reading habits in my children	11.499	.487	5.014	.273
Q9. I think that teaching and learning is the sole responsibility of the school	12.060	.659	2.533	.649
Q10. I keep informed of my children's learning process	11.271	.551	8.041	.079

For the estimation of the average participation score by forms and categories, a participation and support indicator was constructed with information from statements Q1 to Q8 and Q10 and the Principal Component Analysis (PCA). The remaining survey questions were used as supplementary qualitative variables. The PCA is a multivariate statistical method that allows reduction of dimensions based on a set of variables of interest and an understanding of the relationships between them, both graphically and quantitatively. Figure 1 shows the percentages of variability for each of the principal components *(Scree plot)*. It can be seen that the first principal component captures the greatest amount of variability, i.e. it summarises the most information about the participation and support statements.
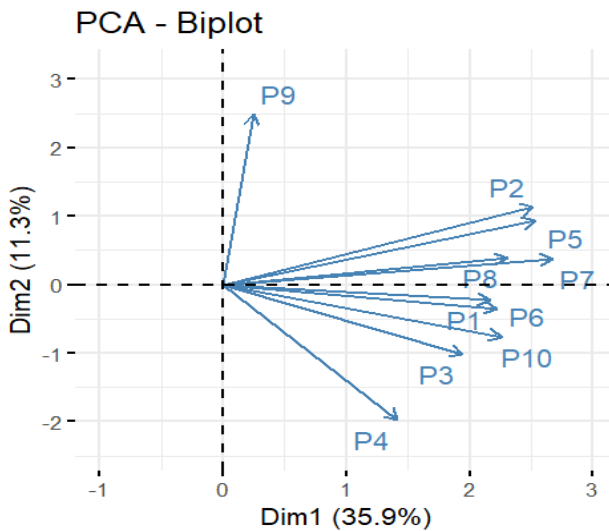
Figure 1

Percentages of variability of each of the components
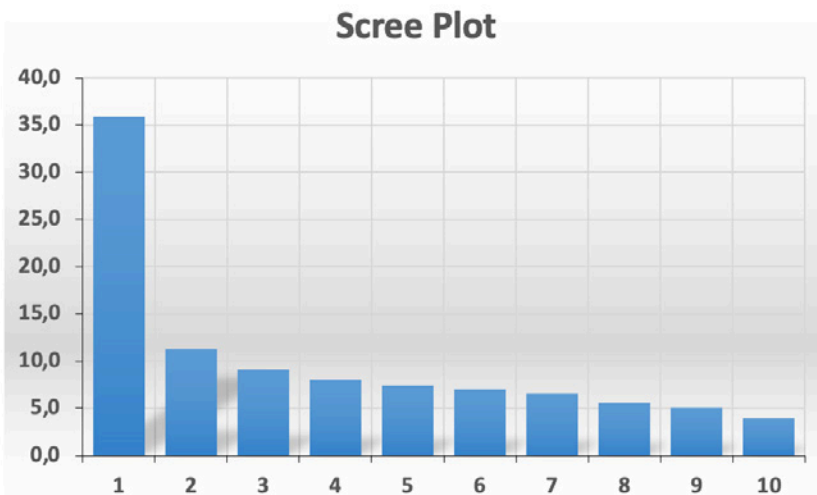
More specifically, the first principal component accounts for 35.9% of the total variability, while the second component accounts for 11.3%. The first main plane then captures 47.2% of the total variability and can be used to describe the general behaviour of the statements and their relationships.

Figure 2

Correlation circle of the variables in the first main plane

The results in Figure 2 show how the information contained in the scores for statements Q1 to Q8 and Q10 may be summarised in a single indicator of participation and support that will only have insufficient information for statement Q9. On the other hand, the findings are related to the statistical independence between statement Q9 and the other statements, i.e. the respondents' rating of statement P9 is independent to the other ratings for the other statements.

Based on the above, a participation indicator was estimated using the following equation:

$$I= -1.47 + 7.73Q1 + 6.34Q2 + 10.47Q3 + 6.30Q4 + 6.46Q5 + 6.62Q6 + 7.99Q7 + 6.22Q8 + .60Q9 + 9.32Q10$$

where higher indicator values represent higher scores for statements Q1 - Q8 and Q10, while lower indicator values represent lower scores for those statements. Thus, from the weights corresponding to each of the statements, it may be seen that statement Q3 has the highest weight or influence on the indicator (with 10.47 units), followed by statement Q10 with a weight of 9.32 units. Statements Q1 and Q7 have the third highest weight with 7.73 and 7.99 units, respectively. It should also be noted that statements Q2, Q4, Q5, Q6 and Q8 have similar weights or influence on the indicator. Statement Q9 in this indicator does not have any significant weight.

In order to compare each of the qualitative variables in terms of averages and standard deviations of the support percentages for this indicator, their values were transferred to a scale of 0-100%, where 100% is the highest score obtained (highest participation and support). In addition, the results were compared with the average participation and support scores of statement 9, also transferred to a 0-100% scale instead of the 0-5 scale to allow their comparison. The results obtained are shown in Tables 5 and 6, where the averages of the indicator and the Q9 statement score which are statistically higher than the rest of the levels of each variable are highlighted in bold.

Table 4

Averages and standard deviations (SD) of the indicator on a 0-100% scale for the socio-economic variables and the family context

Variable	Category	Indicator (Q1-Q8, Q10)		Q9	
		Average	SD	Average	SD
Sub region	Alto Sinú	59.3	20.6	25.0	25.4
	Bajo Sinú o Ciénaga	78.8	12.8	30.5	40.5
	Costanera	66.6	22.9	21.2	34.9
	Medio Sinú	77.9	17.7	34.7	38.3
	Sabanas	75.1	23.0	36.6	41.2
	San Jorge	76.3	21.1	43.0	41.1
Zone	Rural	70.7	22.2	31.6	37.3
	Urban	77.2	19.3	36.3	40.0
Stratum	1	72.4	21.6	31.9	37.8
	2	77.7	18.4	43.2	39.0
	3	65.9	17.6	67.9	42.6
Sex	F	77.9	20.3	30.3	38.6
	M	68.3	21.6	35.2	37.7
Schooling	Elementary complete	67.8	23.8	37.6	37.9
	Elementary incomplete	68.5	22.6	33.3	39.2
	Secondary incomplete	73.0	21.5	37.6	37.9
	Secondary complete	77.6	19.2	33.3	39.2
	Technical	78.4	16.4	32.0	38.6
	University complete	80.9	16.6	38.8	38.4
Occupation	Student	76.7	13.5	63.9	37.7
	Do not work	72.2	18.0	25.0	NA
	Home chores	77.6	21.2	28.6	38.4
	Work not income	65.5	33.7	25.0	30.6
	Work	70.4	21.4	34.2	38.2
	Other	75.7	21.0	37.5	32.2

Variable	Category	Indicator (Q1-Q8, Q10)		Q9	
		Average	SD	Average	SD
Income	<1 SM	72.3	22.5	31.7	38.2
	1-2 SM	73.6	18.6	37.1	37.5
	2-3 SM	73.6	19.6	33.6	40.2
	4-5 SM	55.8	14.6	58.3	52.0
	> 5 SM	89.4	NA	NA	NA

The data in Table 4 indicate that, from a regional viewpoint, the Alto Sinú and the Costanera sub-regions in Córdoba (Colombia) have the lowest scores for all of statements Q1-Q8 and Q10, as well as rural zones, while there were no significant differences with the average scores of statement Q9. Meanwhile, the Bajo Sinú (78.8) and Medio Sinú (77.9) sub-regions have the highest averages for the same statements.

By strata of municipalities, stratum 2 (municipalities with 6 to 10 schools) has the highest average participation (77.7), with a statistically higher difference only in the case of stratum 3 (municipalities with more than 10 schools) for statement Q9. In terms of gender, females have the highest average score only for this indicator, with a statistical difference. The schooling data show how the level of schooling (secondary school and above) reveals a statistical difference or impact on the average participation, while for the Q9 statement no significant differences were observed.

Table 5

Averages and standard deviations (SD) of the indicator on a scale of 0-100% for the technology variables

Variable	Category	Indicator (P1-P8, P10)		P9	
		Average	SD	Average	SD
Internet	Yes	75.1	18.9	32.0	36.6
	No	72.1	22.0	33.2	38.5
Computer	Yes	77.0	17.9	32.0	36.4
	No	71.5	22.2	33.2	38.6
Mobile phone	Yes	72.7	21.3	32.5	38.0
	No	69.2	27.6	47.5	42.8
Cable TV	Yes	72.2	21.2	33.3	37.1
	No	73.2	22.1	32.5	39.7

With regard to the scores for family access to technology, Table V shows that families with access to a computer have a higher average participation and support score (77.0) than those without (71.5).

Relationship between different forms of participation or support and occupation, gender and income level and access to a computer

According to the data in Table 2, women devoted mainly to household activities represented a higher percentage of cases in favour of keeping themselves informed of their children's academic results; of being happy and/or sad about their children's academic results; with greater availability of time for school support and fostering reading habits and keeping themselves informed of the learning process. Meanwhile, parents with another occupation are more likely to say that they always foster their children's reading habits, as well as being those who always have time to support their children's school learning.

Regarding the relationship between income and the statement "I attend school meetings when I am called upon to do so", the findings in Table 3 show that people with an income of less than three times the current legal minimum monthly wage (approximately $753 USD) more frequently always attend school meetings compared to those with an income of between four and five times the current legal minimum monthly wage (approximately $1.004/$1.255 USD).

Between the statement "I have time to support my children's school learning" and having a computer, it was observed that among respondents who do not have a computer, the proportion of those who hardly ever have time for school support is higher compared to those who do have a computer.

In general, it may be affirmed that in the sub-regions of Bajo Sinú, Medio Sinú, Sabanas and San Jorge, factors such as living in an urban zone, higher municipality strata, female gender, higher education level, being a homemaker and having access to a computer are related to higher average participation and support for statements Q1-Q8 and Q10. On the other hand, and independently, in the Sabanas and San Jorge sub-regions, stratum 3, and families with incomes between 4 and 5 legal minimum monthly wages have a higher average participation for statement Q9 ("I think that teaching and learning is the sole responsibility of the school").

Degree of the relationship between the family support indicator and the average score obtained by students in the 2016 Saber 11 tests by municipality

To establish a relationship between the average score of the 2016 Saber 11 tests and the participation indicator, the average scores by municipality were transferred to the 0-100% scale of the indicator, followed by a comparison of the empirical density functions between the re-scaled average score and the indicator, as shown in Figure 3. The blue line corresponds to the indicator and the black line corresponds to the average test score of the municipality on the new scale.

Figure 3

Empirical densities of the average score per municipality and indicator
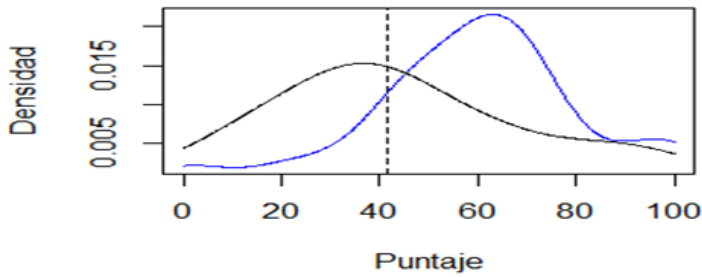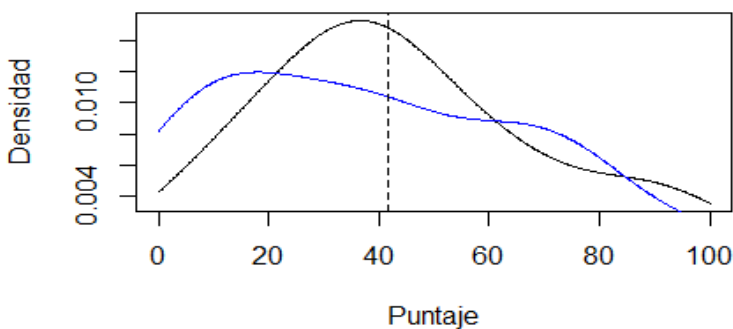

[Density Score]

The dotted line in Figure 3 shows the average score of the municipalities, Ave = 41.552, which indicates that on the 0-100% scale 50% of the municipalities obtained an average score of 41.552% or less. However, if we calculate the empirical probability that the indicator is lower than this value, the probability is equivalent to .177 (P(I<=41.552) = 17.7%), and when it is higher than this value of .823. Thus, the probability of obtaining a score corresponding to the top 50% is related to 82.3% of the highest values of the indicator. This result indicates a positive relationship between a high indicator value and a high average test score in each municipality. In fact, the chance of obtaining a score higher than the average is 4.650 times higher. It is worth noting that the indicator contains information on participation and support in questions 1-8 and 10, which shows that the greater the participation or support by families in the education process, the higher the probability of obtaining an average score in the Saber 11 tests in the top 50%.

Similarly, Figure 4 shows the empirical density functions between the rescaled average score and question 9 rescaled as 0-100%. The blue line corresponds to question 9 and the black line corresponds to the average score of the municipality on the new scale. Thus, if we calculate the empirical probability that question 9 is lower than the average score we find that this probability is .524 (P(I<=41.552) = 52.4%), indicating that question 9 is not a discriminant of the probability of obtaining a higher score.

Figure 4

Empirical densities of the average score by municipality and question 9

[Density Score]

Regarding the correlation between the scores and question 9, a correlation coefficient of .3776 (37.76%) was obtained. Thus, it may be concluded that at municipality level the linear correlation between the average test score and the support indicator is only - .0185 (1.85%), indicating no linear relationship between the variables. Finally, regarding the correlation between the scores and question 9, a correlation coefficient of .2766 (27.66%) was obtained.

Discussion and Conclusions

The relevant findings of this study allow us to conclude that there is no significant linear relationship between the degree of family support and the variability of the scores obtained by schools according to the results of the 2016 Saber 11 tests, given that this relationship yields a correlation coefficient of only - .0185 (1.85%). However, in terms of probabilities, a positive relationship may be established between the high value of the indicator and the variation of the school averages according to the average Saber 11 test score of each municipality. Thus, the probability of obtaining a score higher than the average on these tests is 4.650 times higher, i.e., the greater the family participation or support, the higher the chance of obtaining a ranking in the Saber 11 tests within the top 50%.

These indicators in Córdoba partially coincide with the results of the Third Regional Comparative and Explanatory Study - TERCE (UNESCO, 2016), which analyses and demonstrates a favourable relationship between socio-economic level and student learning. The study further adds that, when considering this index at school level, a one-unit increase in this measurement leads to an increase of up to 60 points (more than half the standard deviation) in the learning outcomes of the school. Based on these findings, UNESCO reaches certain conclusions about the importance of considering the key role of families in educational processes, particularly because student performance tends to increase when parents have high expectations about their children's achievement, use school information to support their learning and supervise the development of their children's learning.

The studies by Madueño et al. (2020) and Pinos et al. (2020) show results similar to those of UNESCO (2016) and differ from our findings in that they consider family support as a decisive factor for the development and achievement of student goals, as well as finding a relationship with strengthening of self-esteem, promotion of reading habits and improvement of relational ties, all of which influences academic performance. These circumstances were not found in our study, probably due to the fact that the reference taken for the learning was evaluated by an external system that does not include all the dimensions of the teaching-learning process, thus undermining the importance of family support in this process, as recognised by numerous authors. Chaparro et al. (2016), for example, highlights the decisive role of families in students' academic performance, noting that the educational level of both parents and the cultural resources available for school support are one of the most influential factors in academic success.

Similarly, research by Lastre et al. (2017), reaffirms the importance of family support in the educational process; as does UNESCO (2016) when it urges a rethinking of the scope of education quality by incorporating the socio-economic factors of students and their families. Razeto (2016) also suggests that a collaborative relationship or alliance should be established between families and schools that allows the actors

involved to share responsibilities and means for the development of learning. Thus, educational success will then be the result of both school work and support at home.

As can be seen, the discrepancies found in our study are contrary not only to the empirical trends noted but also to the expectations and purposes of the public policies that encourage them. This leads us to question the effectiveness of the state assessment system used, in terms of what kind of knowledge is being assessed, how this knowledge is assessed, the purpose of the assessment, who is involved in the assessment and whether this type of assessment is consistent with the systems in place in the schools being assessed.

The answers to these questions may be found in an analysis of the socio-economic and territorial inequalities which characterise society and to a certain extent prevent schools from achieving optimal and balanced results. Therefore, it would be illogical to expect the learning results in themselves to define the quality or academic performance of students, because a higher result in the Saber 11 tests does not necessarily indicate the existence of higher quality schools, and such differences could be due to the socio-economic, family and cultural differences of the students. This represents a disadvantage for low-income groups when it comes to taking such tests.

School success in Colombian state tests in regions with similar characteristics to Córdoba is subject to a number of factors. On the one hand, when students live in urban areas, have parents with high education levels and a mother in charge of the household, with access to ICT and higher income, they are more likely to have greater family support and participation, and thus increase their chances of obtaining better scores. On the other hand, mere recognition of the student's living conditions and the presumption of connection with the results of the State tests constitute an analytical barrier when other factors associated with the divergence between the content and forms of application of the exam and curricular development at school are excluded, or as Alvarado and Núñez (2017) conclude, where there are contradictions between the level assessed by the ICFES and the learning acquired in the internal school experience.

Based on the above, approaching these types of issues in a region with the particular characteristics of the Córdoba department provides the opportunity to rethink research regarding educational quality, in particular through studies that emphasise students from the viewpoint of their history and culture, as well as the particular characteristics of teachers and teaching practices in the classroom, teaching resources and the material conditions of the schools.

References

Pineda García, M. D., & Madera Simanca, R. (2019). *Caracterización del subproceso "D01.04. Elaborar la caracterización y perfil de Sector Educativo" 2018*.

https://www.monteria.gov.co/loader.php?lServicio=Tools2&lTipo=descargas&lFuncion=descargar&idFile=1892

Alvarado, P., Y Núñez, C. (2018). La evaluación como referente de calidad educativa. El caso del Municipio de Sopetran, Antioquia (Colombia). *Revista Espacios, 39*(15). https://repository.udem.edu.co/handle/11407/4903.

Álvarez, G., & Matarranz, M. (2020). Calidad y evaluación como tendencias globales en política educativa: estudio comparado de agencias nacionales de evaluación en

educación obligatoria en Europa. *Revista Complutense de Educación*, *31*(1), 85-93. https://doi.org/10.5209/rced.61865

Becker, G. (1964). *Human Capital. A Theoretical and Empirical Analysis with Special Reference to Education*. National Bureau of Economic Research.

Campoalegre Septien, R. (2016). Familia y Escuela. Desafíos sociales y políticos. In J. L. Meza Rueda & R. M. Páez Martínez (Coords.), *Familia, Escuela y Desarrollo Humano* (pp. 31-56). Universidad de la Salle & CLACSO. http://biblioteca.clacso.edu.ar/clacso/gt/20161116033448/FamiliaEscuelaYDesarrolloHumano.pdf

Carabaña, J. (2016). El Informe Coleman, 50 años después. *Revista de Sociología de la Educación*, *9*(1), 9-21. https://ojs.uv.es/index.php/RASE/article/view/8400/7993

Croso, C. (2016). La plena realización de los derechos humanos: nuestra lucha colectiva. In Consejo de Educación Popular de América Latina y el Caribe (Ed.), *Debates sobre calidad educativa* (pp. 31-39). CLACSO. http://biblioteca.clacso.edu.ar/Costa_Rica/ceaal/20160506035311/Debate_sobre_calidad_educativa.pdf

Chaparro, A., González, C., & Caso, J. (2016). Familia y rendimiento académico: configuración de perfiles estudiantiles en secundaria. *Revista Electrónica de Investigación Educativa, 18*(1), 53-68. http://redie.uabc.mx/redie/article/view/774

Fernández Enguita, M. (2016). El Informe Coleman: Una lección de sociología y de política. *Revista de Sociología de la Educación*, *9*(1), 37-45. https://ojs.uv.es/index.php/RASE/article/view/8402/7995

Hernández Sampieri, R, Fernández Collado, C., & Baptista, Lucio P (2014). *Metodología de la investigación* (6 ed.). MacGraw-Hill.

Lastre, K., López, L., & Alcázar, C. (2018). Relación entre apoyo familiar y el rendimiento académico en estudiantes colombianos de educación primaria. *Psicogente, 21*(39), 102-115. http://doi.org/10.17081/psico.21.39.2825

Lacayo Parajón, F. J. (2016). ¿Calidad de educación o nuevo paradigma de la educación? In Consejo de Educación Popular de América Latina y el Caribe (Ed.), *Debates sobre calidad educativa* (pp. 39-56). CLACSO. http://biblioteca.clacso.edu.ar/Costa_Rica/ceaal/20160506035311/Debate_sobre_calidad_educativa.pdf

Madueño P., Lévano, J., & Salazar, A. (2020). Conductas parentales y habilidades sociales en estudiantes de educación secundaria del Callao. *Propósitos y Representaciones*, *8*(1), http://dx.doi.org/10.20511/pyr2020.v8n1.234

Marqués Perales, I. (2016). Apuntes sobre el Informe Coleman. Sobre la difícil convivencia de los principios igualitarios en un mundo desigual. *Revista internacional de sociología de la educación*, *5*(2), 104-125. http://dx.doi.org/10.17583/rise.2016.2092

Martin, J. F. (2018). Calidad educativa en la educación superior colombiana: una aproximación teórica. *Sophia, 14*(2), 4-14. http://dx.doi.org/10.18634/sophiaj.14v.2i.799

Mejia, M. R. (2016). La calidad de la educación, una disputa polisémica por sus sentidos. In Consejo de Educación Popular de América Latina y el Caribe (Ed.), *Debates sobre calidad educativa* (pp. 7-24). CLACSO. http://biblioteca.clacso.edu.ar/Costa_Rica/ceaal/20160506035311/Debate_sobre_calidad_educativa.pdf

Government of Colombia. (2019). *Resultado ICFES (2019-2) por departamento*. [Online Report]. https://www.datos.gov.co/Educaci-n/RESULTADO-ICFES-POR-DEPARTAMENTO/vxwe-bk96

Organisation for Economic Co-operation and Development. (2016). *Reviews of National Policies for Education. Education in Colombia* [Trad. Colombian Ministry of National

Education]. OECD. https://www.mineducacion.gov.co/1759/articles-356787_re-curso_1.pdf

Organisation for Economic Co-operation and Development. (2017). *PISA for Development Assessment and Analytical Framework: Reading, Mathematics and Science, Preliminary Version*. OECD. https://www.oecd.org/pisa/aboutpisa/ebook - PISA-D Framework_PRELIMINARY version_SPANISH.pdf

Organisation for Economic Co-operation and Development. (2019). *Colombia Country Note - PISA 2018* [Report in Spanish]. OECD. https://www.oecd.org/pisa/publications/PISA2018_CN_COL_ESP.pdf

Pinos, G., Moya, M., Bastidas, M., & Pazmiño, G. (2020). Relación entre las habilidades parentales y el bajo rendimiento académico en una muestra de adolescentes. *Revista Scientific*, *5*(Esp), 110-126. https://doi.org/10.29394/Scientific.issn.2542-2987.2020.5.E.5.110-126

Razeto, A. (2016). El involucramiento de las familias en la educación de los niños. cuatro reflexiones para fortalecer la relación entre familias y escuelas. *Revista Páginas de Educación, 9*(2). http://www.scielo.edu.uy/pdf/pe/v9n2/v9n2a07.pdf

Gaviria, A., & Dahan, M. (2017). ¿Qué países mejoraron la calidad educativa? *América Latina en las evaluaciones de aprendizaje*. CIPPEC. https://www.cippec.org/wp-content/uploads/2017/12/DT-Que-paises-mejoraron-en-PISA-vf.pdf

Schultz, T. W. (1981). *Investing in people: The economics of population quality*. Univ of California Press.

UNESCO & OREALC/UNESCO. (2016). *Results of the Third Regional Comparative and Explanatory Study -TERCE-. Learning achievements*. http://unesdoc.unesco.org/images/0024/002435/243532S.pdf