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How schools perceive the rural environment in the iberoamerican context: an approach to sustainability

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Abstract: Rural environment has experienced changes as a result of Covid-19, which encourage the introduction of sustainability in education. However, the representation of rurality in school geography and in the 2030 Agenda are factors that continue to present rurality as a concept opposed to urban spaces. The objective was to investigate the perception that the student has about the rural environment from an instrument and his drawings to understand if the explanation of it allows to introduce elements related to sustainability in educational projects. The quantitative research approach allows analyzing the psychometric properties of an instrument to measure the perception of the rural environment of a sample of 300 fifteen-year-old students from Brazil, Colombia and Spain. Those school knowledges that idealize rurality warn of the pedagogical difficulties to promote the teaching of rurality from sustainability criteria and condition the formation of students from a citizenship committed to social problems. This study is important because it diagnoses the elements that intervene in the teaching of rurality from school geography and provides some suggestions to include sustainability in educational projects.

Keywords: rural environment; sustainability; educational projects; representation; school geography.

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1. Introduction

Rural territories are currently experiencing some problems that threaten their sustainability and, consequently, that of the planet. With the Covid-19 pandemic, part of the population has moved from cities to rural areas, while the rest of the population is still visiting these territories and is attracted by natural and ecological values that they cannot find in urban areas. This distinction between rural and urban has a scientific explanation that is based on a paradigm of comparison between the countryside and the city [1,2] which has become part of the discourse in literary, artistic and social sciences[3–5]. This has repercussions for school geography, as the rural environment is a highly relevant content that contributes to the civic education of secondary school students [6,7].

Rural life is a complex factor that has been identified with the concept "field" in social science didactics [8,9] and especially in school geography, where contents related to the rural environment have been separated from those dedicated to urban areas [10–

12].Educational strategies have had difficulties integrating rural schools into local communities [13,14] and achieving didactic treatment of the problems experienced in these areas [15,9].

Within the 2030 Agenda and the Sustainable Development Goals, rural life does not have a specific goal, but is connected to some main targets related to three goals. SDG 1 mentions improving the education and well-being of almost 50% of the population living in rural areas, eradicating extreme poverty and reducing the number of immigrants on the outskirts and in marginalised neighbourhoods in large urban areas. SDG 2 calls for sustainable agricultural production to ensure that everybody has access to the food they need. SDG 8 calls for the protection and conservation of the natural resource-based capacity to ensure that natural resources are able to continue providing productive, environmental and cultural services. Despite the fact that these references refer to aspects related to the multifunctions of rural areas, the didactic inclusion of sustainability requires consideration of the three functions (ecological, production and residential) set out in the European Charter for Rural Areas established in 1996 [16].

In the specific case of two of the countries participating in this study (Brazil and Colombia), the structural problems of rural areas are embodied in the modern development speeches that have permeated these countries' governmental institutions. These representations have simplified the rural environment to a synonym for retarded or undeveloped [17], and oppose it to the urban values that are reflected in public policies and state efforts in Latin American cities to integrate their citizens into the habitable settings of modern cities. Thus, the rural environment is reduced to a peripheral role and its characteristics are minimised to the strengthening of central urban economies. In Spain, the territorial division between rural and urban areas has also been reinforced due to a management model that differentiates between urban centres and rural or suburban outskirts, despite the fact that it is no longer possible to establish differences between the lifestyles of inhabitants of one or the other [18].

These representations have been made available to the public through the media (television, internet and social networks), which are the main sources of information through which students acquire information about rural areas [19]. Some of this information consists of fallacies[20]. The first fallacy is more typical of the European continent and identifies rural areas with suburban areas within Mediterranean countries, which leads to the generalisation of the rural exodus, which is confused with the depopulation process. The second fallacy consists of stating that rural areas have not experienced the negative impact of globalisation, in contradiction of the rejection that rural people have of the new methods of ecological agriculture, as it has led them to reintroduce methods of cultivation similar to the traditional ones and less damaging to the environment, which were banned by the directives of higher order agricultural policies. This worldview of rural life as being more retarded and less developed areas clashes with the problems of agrochemicals in some Latin American countries[1] and the availability of tourist sites in rural areas on some of the most relevant social networks [21,22].

On an international level, the situation of rural areas creates the need to include the sustainability of educational projects. Over the last decade the UNESCO has estimated that 80% of boys and girls out of a total of 172 million are not educated, live in rural areas and suffer a strong gender discrimination; the vast majority of the nearly 800 million illiterate people, whether they are children or adults, also live in rural areas. In developed countries, low producers have seen their incomes reduced due to the abuse of marketing and a decline in prices at source. Entrepreneurship and economic diversification conditions (endogenous industrialisation, rural tourism, etc.) are scarce and are mainly limited to peri-urban areas or areas with better communications with main urban centres. Migratory flows are directed towards these areas, leading to the depopulation of the most peripheral rural areas. With all of this rural area vulnerability at a global level, education becomes essential to combat inequalities between rural and urban areas, and as a consequence, the social and cultural gaps between men and women are widening.

Some innovative projects related to rural life have been created in the educational field. The interdisciplinary nature of the landscape has been valued in the United States PACERS programme to teach about rural areas by juxta positioning literary and artistic content [23]. The problems of Argentinean farm workers have been investigated by trainee teachers within the framework of Didactic Teaching of Geography Extension Projects at the Universidad del Litoral (Coastline University) in Argentina [24]. In the case of Chile, more prominence has been given to the local community through the creation of educational projects in the Problem-Based Learning field that helped to identify controversial situations in rural schools and the subsequent design of pedagogical strategies to promote active citizenship [25,26].In Mexico, female educators give support to teachers in rural schools, which belong to Rural Integration Centres, with the same philosophy as in the Peruvian department of Pasco, where young trainee teachers collaborate in the designing of didactic materials. This fieldwork should be accompanied by the impetus given to the use of technologies in rural areas in Colombia [27,28]. The European project "A ponte" allows collaboration between students and teachers in rural areas of northern Portugal and Galicia, with the aim of providing material and organisational resources, which improve education [29].

With this previous information, the study was implemented in Maceió (Brazil), Bogotá (Colombia) and Valencia (Spain). The interest was in analysing the perception that secondary school students (15 years old) have of the rural environment. The aim was to investigate the perception that students have of the rural environment based on mixed instrument that includes their drawings and to understand whether their explanation allows for the introduction of aspects related to the sustainability of these areas. Specifically, the idea is to diagnose the elements involved in the representation of the rural environment from school geography, while at the same time establishing guidelines to promote didactic strategies for these areas from a sustainability approach.

The perception reflected in schoolchildren's drawings affects their behaviour and decision-making, as has been specified on the basis of the relationship between geography and psychology from the behavioural perspective[30].Perception has become a more complex concept that resembles social representations, as traditions, experience and media information converge on this common-sense view of space [31]. Social representations and constructivism allow us to understand the influence of the social context on schoolchildren's learning. The symbolic object that generates the stimulus of the social representation justifies the response that each subject gives in the form of behaviour in society and gives meaning to this object [32]. This behaviour is reflected in space, especially because of the relationship between rural life and spatiality [1]. Thus, the schoolchildren's drawings provide information on the understanding of rural life in terms of social representations of landscape. The landscape is similar to the perceived area of the geography of perception and behaviour, but it must be understood as the filter that collects the social representation and compiles diverse elements (experiences, values, attitudes, opinions) that can be jointly assessed to approach the holistic knowledge of rural life from postulates close to sustainability.

On an international level, there are not many scientific studies which have analysed pupils' and students' representations of rural areas through drawings [19]. This has been done from the didactics of natural and social sciences to diagnose children's conceptions of biodiversity [33], the environment [34] and landscape [35–38].During teacher training, the representation of the environment [39] and sustainability [40,41] have been diagnosed with the intention of finding out about the school praxis of these educational contents.

Finally, the analysis of schoolchildren's perceptions of rural life allows us to approach their conceptions of the rural environment from assumptions related to sustainability. Therefore, this work should be considered as a first approach to the study of rural life in schools in Latin America. With these first findings on the teaching of geography, we can get some ideas to improve teacher training in sustainability based on the didactics of geography.

2. Materials and Methods

2.1. Design

This study uses a quantitative research approach with a non-experimental, cross-sectional, descriptive-correlational design. In line with the quantitative method, the research analyses the psychometric properties of an instrument to measure the perception of the rural environment of Latin American students (Brazil, Colombia and Spain).

2.2. Sample and the territorial context

The sample corresponds to the non-probabilistic incidental typology. The total number of participating schoolchildren is 300 aged 15 from schools in Brazil, Colombia and Spain. The selection of these schools was made by taking into account the territorial representation of the three countries, so that 100 schoolchildren were chosen in each of the three countries.

Schoolchildren in Colombia belong to socioeconomic strata 1, 2, 3. Socioeconomic stratification in Colombia refers to the classification of residential properties that must receive public services. In strata 1, 2 and 3 families usually live, who have a low economic income, so they are beneficiaries of subsidies in domiciliary public services [42]. Consequently, families in strata 1, 2 and 3, live in conditions of poverty or extreme poverty, have greater deprivations in the variables of education, food and nutrition, employment, economic dependency rate and housing and domiciliary public utilities [43]. In addition to subsidies from the Colombian state for the payment of public services, these families also receive assistance such as affiliation to the health system, financial aid for education and feeding children and the elderly, and subsidies for the purchase of a home[42]. Two of the educational institutions in the study have 60% of their schoolchildren in stratum 1. These schoolchildren belong to families with the highest deprivations in indicators of informal employment, health insurance, low educational achievement, and barriers to access early childhood services [43].

In the case of Brazil, the schoolchildren live in the coastal municipality of Maceió, in the state of Alagoas. Most of the participating schoolchildren are from middle-income families (with salaries between 3 and 5 SMI in 2021), with housing close to the centre and with a concentration around the coastal neighborhoods, although not too close to the beach. The other focus is Serraria, where exclusive condominiums (José Tenório, Rui Palmeira...) have been built for this type of families. As for the lower income groups (between 1 and 3 SMI), these are families with a certain instability in employment, so they do not have a fixed income and have difficulties in obtaining their own resources to access higher quality housing. Women tend to work in domestic services[44].

As far as Spain is concerned, the participating schoolchildren mainly reside in the province of Valencia. The schoolchildren come from rural, peri-urban, and urban area according to the criteria established in the Territorial Strategy of the Valencian Community 2030 [45]. This document offers a classification that divides the Valencian territory into three zones (the rural system, the intermediate strip and the 100 level), which correspond to rural, peri-urban, and urban areas. In the rural areas, the territory is mainly dedicated to forest; the population is dedicated to the agricultural sector and services are concentrated in the county capitals. The peri-urban areas have developed the industrial sector and are closer to the influential area of the city of Valencia, characterized by good land communications (road, rail, and metro) and the relocation of some outsourced services from the capital. The urban area belongs to the city of Valencia, where the schoolchildren come from different neighborhoods with average incomes and good access to basic services.

2.3. Instrument

The study has led to the design of a scale called the Scale of Perception of the Rural Environment among Ibero-American Students (SPREIE), which has used some previous studies as a model, which have analysed school conceptions of rural areas[6,46,38], the functions of rural areas in the European Charter for Rural Areas dated 1996[16] and specific research on sustainable education [40,33,47]. The final version of the tool consisted of 13 items, which were grouped into three correlated factors consistent with rural perception principals.

The format is Likert-type with five response options: never; mostly no; occasionally yes-occasionally no; mostly yes; and always.

2.4. Procedure

Several phases have been applied from design to data collection. First of all, the theoretical-methodological review of the design of the instrument itself, which showed that there is no existing structure that has measured the school perception of the rural environment on the Ibero-American scale. Therefore, we went on to the next phase or development of the necessary items or reagents. Thus, 60 items were designed with the aim of measuring three dimensions of the rural environment perception, following the theoretical foundations of this study: ecological landscape (30 items), cultivated landscape (18 items) and residential landscape (12 items).

In the third phase, the content of the survey instrument was validated by consulting nine university professors who were specialised in two fields: five in perception and social representations and four in didactics of rural areas. These experts made some changes to the items that were taken into account in the pilot test. This pilot test constituted the fourth phase, in which the survey instrument was answered by 50 students, the results of which led to some changes in the wording of some of the designed items.

In a fifth phase, the scale was used with the 300 students mentioned above. In the sixth phase, a series of t-tests were applied to compare the averages obtained for each item of the subjects in the groups with the lowest and highest scores (31% in both cases). In the seventh phase, the instrument was validated by means of an exploratory factor analysis for the first half of the sample and a confirmation factor analysis for the second half. These analyses have been placed in the results section.

Finally, some calculations such as scale reliability, means and frequencies were carried out. The recognition of differences in the perception of the rural environment per school term (the three terms of the academic year 2021-22 during which the drawings were produced in the three selected countries) was calculated using one-way analysis of variance (ANOVA), while the students' t-test for independent samples was used to determine the differences by gender and country. Data was obtained from IBM SPSS Statistics, 22.0.

3. Results

With the above procedure the results phase has been reached. The application of the exploratory factor analysis took into account the free factor structure by means of rotation of varimax principal components. First results such as KMO=0.772 and test of Barlett for sphericity (p≤000) indicate that the model is appropriate and does not contain sphericity.

In order to make the items part of the factors, three elements were considered, as follows: a) selection of items or rotations with a saturation equal to or higher than 0.65 in the rotated factor matrix; b) elimination of some items with similar contents in the same categories and c) exclusion of items with the permitted saturation but with low congruence compared to those that form part of the factor.

Based on the above referents, three categories or first-order factors resulted with an eigenvalue of 1 or higher, which explained 65% of the total variance. Thus, the resulting items were grouped into three categories: "Ecological landscape," "Cultivated landscape" and "Residential landscape". The following table (Table 1) shows the items, with saturations, similarities, variances and the eigenvalue of each of the rotated items.

253 **Table 1.** *Relation of factor, correlated and variance loadings*

Categories	Items	Saturation and correlated factors
Ecological landscape	Exclusively collects natural elements.	0.783 and 0.768
Ecological landscape	Natural elements predominate and anthropic elements (dwellings, buildings...) are included in a minority.	0,767 and 0.817
Ecological landscape	The drawings have a dual structure: housing in the centre and natural elements on the periphery.	0.708 and 0.726
Ecological landscape	Linear elements (trees, rivers...) are combined with surfaces (lakes)	0.694 and 0.724
Ecological landscape	Human representation is peripheral and decontextualized in the drawing.	0.681 and 0.756
Ecological landscape	References to the economic activity is basically idealised.	0.657 and 0.674
Cultivated landscape	Plots or fields of crops mainly predominate.	0.743 and 0.733
Cultivated landscape	Agricultural elements are combined with references to human beings (homes, buildings…).	0.759 and 0.788
Cultivated landscape	It can be seen that the people depicted are working in agricultural activities.	0.718 and 0.786
Cultivated landscape	Agricultural activity is differentiated from elements of nature.	0.664 and 0.774
Residential landscape	The housing units (country houses, hamlets, villages, ...) are represented in a generic way.	0.796 and 0.784
Residential landscape	Some details of the housing units (streets, buildings, squares...) are recognisable.	0.766 and 0.793
Residential landscape	A natural environment has been depicted around the housing unit.	0.712 and 0.754

254 Note: own elaboration.

255

256 The *Structural Equation Modelling Software* (EQS, version 6.1.) was then used to per-
257 form an analysis to confirm the factor structure. The model evaluated contained three in-
258 dependent factors (Table 1) with 6 items in the first factor, 4 in the second and 3 in the
259 third. Two further models with several correlated factors were also tested, and it was de-
260 cided to eliminate some items that were ambiguous, as they saturated the sample with at
261 least two factors.

Several indicators were used to assess goodness-of-fit, such as the chi-square X^2, the mean residuals (RMR), the standardised residuals (RMSEA), the goodness-of-fit index (GFI) and the comparative fit index (CFI). Following Carranza and Caldera (2018), the last four indexes are the most frequently used and have the lowest sample size experience. To achieve acceptable fits, the GFI and CFI values must exceed the value of 0.90 (the better the fit, the higher the value), while the RMR must give values close to zero to have a good fit, being lower than 0.10 to be considered acceptable. RMSEA values must be less than 0.08 to have an acceptable fit [48], while the X^2 ratio has no significant interpretation. The goodness-of-fit indexes can be found in Table 2.

The results of Table 2 warn that the model has been adjusted to 13 items, which is the biggest adjustment possible of interrelated factors, slightly higher than the GFI 0.90 value. This indicates that the values are sufficiently acceptable to continue with the interpretation of the data, as is also evidenced for the 0.06 value for RMSEA.

Table 2. *Goodness-of-fit indexes for the predicted models.*

Factor model	X^2 and P	CFI and GFI	RMR and RMSEA
One factor	148.61 and 0.01	0.89 and 0.71	0.09 and 0.06
Three independent factors	419.28 and 0.02	0.78 and 0.75	0.68 and 0.12
Three correlated factors with 13 items	33.81 and 0.08	0.95 and 0.92	0.03 and 0.06

Note: own elaboration.

From Cronbach's alpha, the reliability of each factor of the tool has been calculated, giving the following values: Ecological Landscape (α=0.793), Cultivated Landscape (α=0.914) and Residential Landscape (α=0.887). Therefore, these results show an optimal reliability for the measurement scale, which allows us to continue with the analysis of the results, since the psychometric values of the SPREIE scale are adequate and possess validity and reliability for this research.

Table 3 shows the descriptive statistics (mean and standard deviation), which values show that the perception of the rural environment among the 300 students from the three Latin American countries corresponds to an optimal range (average of 3.78), so that it is not possible to state with absolute conviction that there is a highly positive or clearly negative perception of the rural environment among Latin American students.

Table 3. *Synthesis of values regarding the perception of rural environment.*

Number of students (participants)	Minimum points	Maximum points	Average	Typical deviation
300	1	5	3.78	0.815

Note: own elaboration

The parametric tests were carried out with the normality and homoscedasticity analyses. The application of the Kolmogorov test showed that the variable perception of the rural environment conforms to a normal probability distribution. The Levene statistic shows that there is homoscedasticity between the variances of the groups of schoolchildren to be compared.

With the intention of diagnosing differences in the perception of the rural environment according to the students' gender (Table 4) Schoolchildren t test has been applied. The results of t (150) = -1.646 y p= 0.835, prove that there are no significant differences in the perception of the rural environment between male and female schoolchildren.

Table 4. *Descriptive statistics measuring the perception of the APS.*

Gender	Students	Average	Typical deviation
Male	165	3.43	1.117
Female	135	3.86	0.917

Note: own elaboration.

Regarding the differences in the perception of the rural environment (school time has been divided into three terms, according to the Spanish calendar) during the 2021-22 school year (Table 5), the application of ANOVA showed that no significant differences exist: F (3.316) = 0.731 y p= 0.814.

Table 5. *Descriptive statistics measuring the perception of the rural environment per term.*

Term	Students	Average	Typical deviation
First (September to December 2021)	100	3.64	1.017
Second (January to March 2022)	100	3.89	0.915
Third (April to June 2022)	100	3.61	0.943
Overall	300	3.78	0.815

Note: own elaboration.

In the final term, the differences have been identified regarding the perception of the rural environment according to the countries (Brazil, Colombia and Spain) by the t Student (Table 6). This test has proved that significant differences exist, t (300) = -2315 y p=0.041.

Table 6. *Descriptive statistics measuring the perception of the rural environment by countries.* .

Countries	Students	Average	Typical Deviation
Brazil	100	3.86	0.914
Colombia	100	3.61	0.935
Spain	100	3.74	0.903

Note: own elaboration.

Regarding the significance of the contents in the drawings, there has been a classification of the pictures according to categories, taking into consideration the geographical origin of the schoolchildren (Table 7). 53% of the drawings belong the ecological landscape category, with a large participation of schoolchildren from Brazil (75% of the total drawings). In the cultivated landscape category, pupils from Bogota represent almost 53% of the participation in this category, which accounts for 39% of the drawings in the three countries. With a greater difference compared to the first two categories, the representation of the rural environment as a residential landscape account for 8%, with slight differences between countries (the drawings by Spanish schoolchildren account for 45.8% of the total in this category).

Table 7. *Classification of the drawings according to the geographical origins of the schoolchildren.*

Countries	Ecological landscape	Cultivated landscape	Residential landscape	Overall
Brazil	53	36	11	100
Colombia	31	62	7	100
Spain	75	19	6	100
Overall	159	117	24	300

Note: own elaboration.

Based on this classification, the words most frequently used by schoolchildren were identified to explain their drawings. Table 8 shows the words associated with the category of ecological landscape: nature (n:221), animals (n:232), mountains (n:195) and trees (n:110). Nature was the concept which was most used by Brazilian schoolchildren (n:83), while animals (n:81) and mountains (n:71) were the words most used by Colombian schoolchildren. Schoolchildren from Spain made more use of the word trees (n:43) than the other two countries.

Table 8. *Frequency of words to designate the rural environment as an ecological landscape.*

Countries	Nature	Animals	Mountains	Trees
Brazil	83	74	58	36
Colombia	62	81	71	31
Spain	76	77	66	43

Note: own elaboration.

These words are part of a representation that is reflected in the schoolchildren's drawings for this first category (Figure 1). In general, most of the drawings had no people present, although it is true that some isolated dwellings appear, indicating that there is no established residential function. Therefore, the ecological criteria is emphasised for these first representations of rural spaces, as can be seen in the schoolchildren's explanations. For example: "My rural landscape drawing shows trees and mountains with vegetation. And a river with lots of water, as in all rural landscapes"; "I have depicted some animals and birds that live in the mountains of the rural landscapes further away from the cities"; The rural landscape is depicted in a natural area, and there is a country house in the center" and "In the rural landscape I have drawn a field in the mountains and a tree to which some birds flock, near a single dwelling."

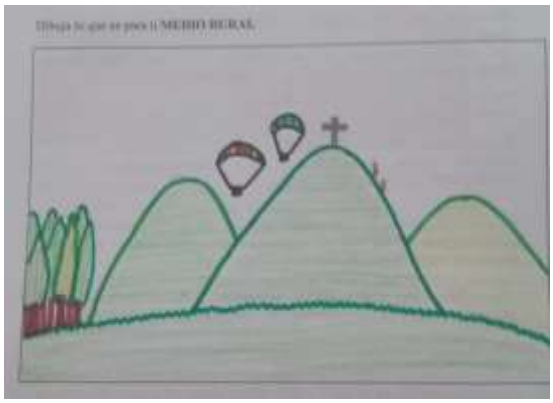

Figure 1. School representation of the rural area as a natural landscape.

In the second model of representation of a rural or cultivated landscape, most of the natural elements with which schoolchildren have identified the rural landscape in the previous category are maintained, but references to agricultural activity, especially agriculture, are included. As can be seen in Table 9, "field" is the word most used in the three countries, with little difference in the number of uses in the drawings. The word "crops" complements the concept "field," with a significant representation in Colombia (n:76), where the concept "animals" is also used more frequently (n:78), the same as in Spain (n:74). In Brazil, references to the field are predominant (n:81), with a greater difference

compared to Spain, where the three concepts had a more regular frequency. section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

Table 9. Words for the rural environment as a cultivated landscape.

Countries	Fields	Crops	Animals
Brazil	81	68	62
Colombia	84	76	78
Spain	79	72	74

Source: own elaboration.

Crops occupy the central area of the drawings and the peripheral elements are mountains that surround agricultural landscapes, where some homes can be seen (Figure 2) In this model emphasis is given to the economic criteria or production in the rural landscapes, which are mainly depicted as agricultural. On the one hand, the representation of the crop fields does not show the presence of any people who can work in them, while on the other hand, human beings are occasionally found busy on some farmland. The difference in the crops is relevant and explains the geographical area that the schoolchildren are from: the Mediterranean crops in Spain (grapevines, olive trees, orange trees…) in Colombia are cereals and industrial crops (coffee and sugar cane), which are common in Brazil. This is how the drawings have been explained in this second category by the schoolchildren: "They are fields where there are trees, crops and mountains, which form a rural landscape"; "The crop farms, which produce cereals and Columbian coffee and that are surrounded by nature"; "It's a rural landscape because there are crops and the families are dedicated to farming" and "Animals and farms providing food from rural areas".

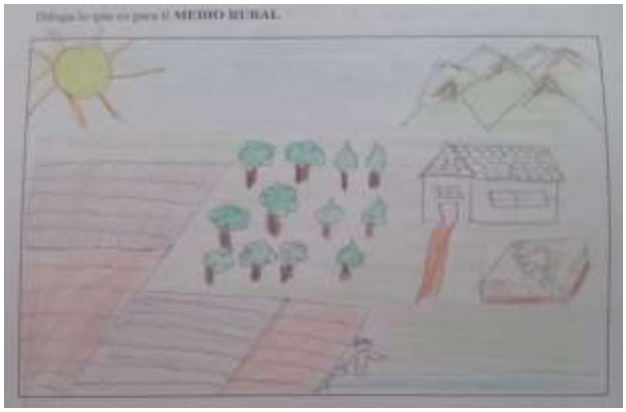

Figure 2. School representation of the rural area as a cultivated landscape.

The third model of a rural area or residential landscape is identified with housing areas (hamlets, villages, towns...). Pupils refer to the habitability for people who visit rural areas for leisure, tourism and to enjoy nature. Table 10 shows the words most frequently used by pupils: village, houses and nature. Village was mentioned 47 times, especially in Spain (n:22). Houses increases its frequency to 67, with similar usage between Colombia (n:24) and Spain (n: 26). Nature is the concept most frequently used by schoolchildren (n:92) in all three countries, but especially in Brazil (n:37) and Spain (n:33).

Table 10. Words for the rural environment as a residential landscape.

Countries	Village	Houses	Nature
Brazil	11	17	37

Colombia	14	24	22
Spain	22	26	33

Source: own elaboration.

The schoolchildren have not dispensed with reflecting the urban space. These mental schemes manifest the role of the rural-urban duality under a broader paradigm of rural-urban opposition. Unlike the previous categories, natural elements are in the minority, even non-existent, except for some trees or mountains that are attributed to the rural space. The schoolchildren have drawn the urban space in the foreground, showing the social and economic development of its inhabitants by means of vertical and high-rise buildings, vehicles and roads that express the urban agglomeration. In a lower plane or relegated to one of the two corners of the drawing, the rural landscape has been represented with lower houses framed in a natural environment (trees, plants, rivers...) (Figure 3). Occasionally they have drawn small plots of crops, sometimes with the people who cultivate them. The school children have expressed it by saying that: "It is a small town in the interior, where it has flowers, river and a city with people and cars (in this case in the center of the city), it is a town a little far from the center, which is closer to the rural environment, with a soccer field and children playing" and it is a landscape with rivers, cattle and harvest that shows that, the most important thing, is how they are dreaming of it from the city".

Figure 3. School representation of the rural area as a residential landscape.

4. Discussion and conclusions

Obtaining results from the SPREIE scale allows us to confirm that it is reliable, as it has been designed and validated with appropriate criteria in the context of a significant sample of secondary school students in three Latin American countries. Therefore, this instrument can be used in other educational institutions in the same countries that have not been considered in this study so that the results may be generalised and applied to other territorial contexts similar to those analysed here.

The study has revealed some findings hitherto unknown in the Ibero-American territorial framework. It can be confirmed that schoolchildren's average perception of the rural environment is optimal, that is, it does not offer highly positive or excessively negative results in terms of this typology of geographical areas. The application of this methodology in such diverse territorial contexts makes it possible to detect some of the characteristics of social representation. On the one hand, it shows that schoolchildren's perceptions are part of a representative system in which different rhetoric from the literature, art and even social science fields converge, as has been pointed out in some international studies[1,2,4].

On the other hand, schoolchildren's knowledge indicates that training received by teachers does not take into account the problems of rural areas[15,27]. Both factors affect the development of rural geography in schools, as teaching related to rural areas content

contributes to school children's citizenship education, as has been found in other Latin American countries [6,7,19].

The grouping of results according to categories allows some relevant interpretations to be made, which have an influence on holistic and systemic understanding of rural areas in schoolchildren's education. Moreover, the allusion to the multifunctionality of rural areas based on the assumptions of the 1996 European Charter for Rural Areas[16] ensures that the interpretation is close to the sustainability criteria. In fact, the variable perception acts as a complex analysis procedure that sifts through traditions, life experiences and other experiences that the subjects have created related to the rural environment, making the interpretation of spatial features possible in their pictorial representations, based on the landscape concept [1].

The ecological landscape category indicates that there is an idealised representation of rural areas in all three countries, with hardly any relevant differences in the analysis of the drawings. The intention of the school drawings in this first category is consistent with SDG 8 of the 2030 Agenda, insofar as schoolchildren have expressed their concern regarding the protection and conservation of natural resources, although it is true that only with an ecological purpose, rather than a cultural one, as other didactic research with primary schoolchildren has shown [34,36]. This ecological representation is consistent with other research that has analysed schoolchildren's drawings about environmental protection and the promotion of sustainability[33,37], as they lack a systemic view of territories and their functions, as well as reflecting true holistic thinking that understands rural territories within a global system, as has been done in the PACERS educational project [23]. With all of this, it can be confirmed that the schoolchildren's drawings can be classified as mental maps[49], as they show less cognitive complexity than the other two categories.

The representation of rural areas as cultivated landscapes refers to the concept of the economic function of rural territories. In line with some studies [50] they are drawings that can be considered as conceptual maps, as they reveal spatial features and some subjective elements, especially when considering human activity. The economic activities are mainly agricultural, with hardly any precise references to the economic diversification of rural areas in recent decades, including the endogenous industry and some types of tourism. The analysis of the content in these drawings shows that schoolchildren identify rural areas with the concept of countryside, according to the territorial organisation that has separated the two areas since historical times [18]. This fact is part of the representation of rural areas in social sciences[9], and especially in school geography. In textbooks, rural areas are identified with the agricultural production feature as an element of opposition and separation from urban areas [10,11,12]. To counteract this representation, collaborative work between universities and schools in Argentina has shown that it is possible to include the problems of rural territories told from the live experience in such areas[24].

As for the residential landscape category, the schoolchildren's drawings preferably fit into the cognitive maps category, as their content reflects the mental construction of the subjects and do not represent purely cartographic elements[51]. Although some drawings have depicted the internal morphological characteristics of rural areas (streets, churches, squares, houses...), no illustrations have been found that actively integrate rural areas with their natural or anthropised environment. This is an aspect that is in line with other research[13,14], which indicates the existing difficulties for educational projects to integrate local communities as part of their learning content. Consequently, schoolchildren's drawings have not shown the existence of social problems in rural territories, as other international studies have also indicated[9,15].

It should be taken into consideration that schoolchildren's access to information is mainly through the media. Indeed, 67% of schoolchildren in Spain use the TV, internet and social networks to find out about rural areas[19]. It should be highlighted that some fallacies[20], which have been reflected in the representation of rural areas by schoolchildren, have appeared on television. One of them is that which identifies rural areas with peripheral and mountainous areas, which results in a representation of depopulated areas

in contrast to the large population of cities. This has been identified in schoolchildren with the almost general absence of the representation of the human figure. The other fallacy is that rural areas have not been affected by the negative impact of globalization. This means that farmers have maintained traditional farming systems that have been discouraged by agricultural policies. The second fallacy is that rural areas have not experienced the negative impact of globalization, which is contradicted by the rural population's rejection of the new organic farming methods, as it has led them to reintroduce cultivation methods similar to the traditional and less environmentally damaging ones, which were banned by agricultural policy guidelines.

The combined interpretation of the categories system allows us to highlight some improvements for teacher training. In particular, teachers should have the ability to design teaching materials that are more in line with a representation that considers the social and environmental problems of rural territories, following in the footsteps of innovation groups (IRES, Gea-Clío) that function as curricular projects[52,53]. In fact, the schoolchildren's drawings about rural areas are a first step towards getting to know their previous ideas and initiating a communication process, according to a study [54]to generate strategies for the schoolchildren's civic integration. With all of this, it is possible to generate more in-depth considerations regarding the situation in rural areas and help schoolchildren to develop metacognition in relation to their own learning, in line with some Latin American studies [29,55].

In this research, the pictorial representations have had a diagnostic character, but these drawings should be created during the development and final evaluation phases of the didactic projects on rural life. During the course of the didactic projects, teachers should help schoolchildren to pose research questions that allow them to analyse the content of these pictorial representations, strengthening the collaborative work that reinforces education for citizenship, based on the stipulations of international studies [56-58]. In this study, schoolchildren's participation has been placed between the consultive and projective aspects [59], creating the necessary conditions for schoolchildren to have become aware of the academic and social significance of their participation.

The low reference in the pictorial representations to the social and environmental problems of rural areas should be a factor for the schoolchildren's drawings to become the starting point for the creation of educational projects that are more related to the living areas. In these situations, the schoolchildren's drawings have barely criticised certain problems such as gender inequality and the lack of technology in rural areas. In the first case, teachers should be aware of the role played by rural educators in Rural Integration Centres in Mexico, where teaching materials are produced with an innovative perspective [27]. Technological development has hardly been a problem reported by the Brazilian and Colombian schoolchildren who participated in this study, although some studies have pointed out that rural areas in some Latin American countries suffer from a high deficit of technological structures that put citizenship development at risk[28]. The application of technologies in education allows the implementation of other teaching strategies, such as Problem-Based Learning, which helps to identify problems that affect the life and work projects of people living in rural areas[25,26].

As for the differences in the school perception of the rural environment according to school terms, it should be noted that the results were slightly more positive in the second term. This is usually the longest school term and allows fieldwork to be carried out in any of its forms and needs for the projects implemented in the Ibero-American schools. This has been expressed by schoolchildren in some of the explanations of their illustrations, giving importance to trips to the countryside that enhance the active geography learning[60], especially in secondary education[61,62]. This encourages schoolchildren to seek a more realistic relationship between school education and institutions, which would lead to the creation of a more active citizenship in rural areas [14,63].

The differences by gender show that female schoolchildren have shown a slightly more positive and more consensual perception of learning than male, although without

showing highly significant differences. This is consistent with a study[46], which shows that girls are more sensitive to understanding changes in the rural landscape and valuing the way of life of the rural population. In a similar way, other research[38] identifies better learning abilities about sustainability among girls than boys.

On the other hand, being enrolled in schools in Brazil, Colombia and Spain reveals some more striking differences. The idealisation of rural life is present in all countries, as can be seen in the explanations given by schoolchildren in their drawings in any of the three models of representation. In Brazil, schoolchildren prioritised the representation of the ecological landscape and showed a strong opposition between a rural life related to the natural criteria and the more social perception of urban spaces. The cultivated landscape model has been more representative in Bogotá, where schoolchildren have taken some lived in landscapes as territorial references. In the case of Spain, and due to the growing models of peri-urbanisation, the schoolchildren have depicted the residential function of the rural environment, although it also has a considerable degree of being idealised. In any case, the schoolchildren's age in the three participating countries ensures that they possess a number of skills or abilities to express their images of the rural environment. Following a study[64], secondary school students have sufficient previous knowledge and more confidence when it comes to demonstrating some learning.

With all of the above, it is necessary to continue investigating the representations of the rural environment from the sustainability perspective. This is a relevant issue because the promotion of sustainability may clash with the idealised representation of the rural environment in society. It is therefore important to go deeper into a line of research which takes into account the influence of this representation on the problems that have been chosen to promote the sustainability of rural areas on a global level. In this sense, it is appropriate to ask teachers in rural schools about their teacher training in contents concerning rural areas, their representation of these areas and the teaching strategies they would use to promote sustainability competences among students who have been promoted to Compulsory Secondary Education.

Finally, it is also relevant to point out the importance of carrying out similar research in other schools in the Ibero-American countries participating in this study and in others in the same area. In the long term, it is interesting that academic research could clarify the obstacles and potentialities that appear in the creation of educational projects on sustainability through content related to rural life.

5. Limitations

As far as the limits of the present study are concerned, the descriptive and correlational approach itself may be a conditioning factor for discovering some less visible meanings in the schoolchildren's thoughts about rural life. The fact that it is the schoolchildren themselves who give the answers can be considered a biasing factor that should be reduced by including the voice of other agents, such as the teachers themselves, the school management team, the families and some members of the local institutions involved. With this new information, which should be gathered using high-quality methods (interviews, discussion groups, etc.), it would be possible to contrast the results obtained in this study and analyse the social reality of the territories from a school worldview with a more critical point of view.

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and C.F.G.; data curation, L.P. and C.F.G.; writing—original draft preparation, N.P.M and C.F.G.; writing—review and editing, D.G.M. and L.P.; visualization, D.G.M. and N.P.M.; supervision, C.F.G.; project administration, D.G.M.; funding acquisition, D.G.M. All authors have read and agreed to the published version of the manuscript."

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Data Availability Statement: The empirical information is in digital and printed archives of the Faculty of Education of the Universidad de Valencia and will be available for the next 5 years.

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