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# SCHOOL ENVIRONMENTAL PROJECT "PRAE" FROM THE PERCEPTION OF TEACHERS OF EDUCATIONAL INSTITUTIONS IN COLOMBIA

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## ABSTRACT

Environmental education is a key aspect of sustainability in schools. In this regard, the main objective of this study is to analyze the perception of Colombian teachers regarding the implementation of School Environmental Projects (PRAE) in the academic curriculum. To this end, the perspectives of teachers across Colombia were collected through multivariate analysis concerning the inclusion of these projects in school curricula. From this standpoint, an exploratory and confirmatory factor analysis was conducted. The results identified the following factors as explanatory of variable behavior: environmental sustainability, environmental awareness, interdisciplinarity, environmental knowledge, and teacher commitment. The most significant findings revealed that teachers show a high level of acceptance toward the implementation of such projects and demonstrate a willingness to engage in PRAE-related initiatives within the classroom context, which supports integrated mediation across interdisciplinary areas within educational institutions.

**KEYWORDS:** PRAE, Teachers, Academic Curricula, Educational Institutions.

## 1. INTRODUCTION

### 1.1. General Context of Research and Problem

The Sustainable Development Goals (SDGs) created by the UN in order to guarantee in and of the planet, that is, the generation of positive changes that benefit people and the planet. The SDGs that focus on environmental issues are numbered 3, 7, 9, 11, 12 and 13, these talk about the relationship of the existence of human beings with the environment and the consequences derived from their actions. The pillars of Education for Sustainable Development ESD show the interest in forming integral individuals and communities, by proposing learning to know, learning to do, learning to live together, learning to be and learning to transform oneself and society, as an approach to integral training (Gómez Agudelo, 2018).

Based on these considerations to operationalize the SDGs, at the level of national public policies, the School Environmental Project (PRAE) was created, these were born from the Presidency of the Republic of Colombia which, in use of its constitutional and legal attributes, institutes the School Environmental Projects for all levels of formal education and sets the criteria for the promotion of formal and informal environmental education in the country based on the Decree 1743 of 1994 (Hernández, 2015). According to the Ministry of Education, school environmental projects are defined as those pedagogical projects that promote the analysis and understanding of local, regional and national environmental problems and potentialities, with the generation of spaces for

participation to implement solutions in accordance with natural and sociocultural dynamics (Ministry of Education, 2005).

Environmental education is one of the best strategies for the training of individuals and groups within the framework of improving the quality of education and from the horizons of transformation of social dynamics in the direction of environmental sustainability (Scotta, Craparo, Valende, Sosa, & Espinosa, 2022). In view of these approaches, the execution of the actions proposed in the PRAE must have an impact not only within the educational institutions, but also recognize the local environmental context as a scenario for action. However, in the area of study it is not clear the impact of the PRAE in the context in which public educational institutions are immersed, therefore, it is necessary to answer the question: What are the perceptions of the school environmental projects "PRAE" of the teachers of the educational institutions of Colombia on the care and awareness of the environment?

### 1.2. Approaches to the Object of Knowledge and the State of the Art

The implementation of the school environmental projects "PRAE" in the curricular mesh of educational institutions in Colombia must be of vital importance for the formative development of students through education oriented to sustainable development and the vision that is held about it. In this order of ideas, some of the references for this approach of inquiry are supported by productions as can be seen in table 1.

*Table 1: State of the Art*

Year	Author/s	Scenario	Construct	Variable/category
2011	Elisa Inés Torres López	Bogota-Colombia	Environment and School Environmental Project (PRAE) at the Nicolás Esguerra School	The School Environmental Project (PRAE) is considered as the primary axis of school activity to build environmental awareness, it gives an opportunity to change the comfortable vision of seeing ecology simply as a branch of biology, and provides the opportunity to change traditional models, inviting students to request spaces and times to work in the search for environmental solutions for the institution and the school environment. seeking the development of values that guarantee well-being and the possibility of survival as a human species
2011	Luis Alfredo Obando Guerrero	Manizales-Colombia	ANATOMY OF THE PRAE	From the national level, the execution of these projects has been proposed through the development of five phases that make possible the creation of solid, viable and sustainable projects over time that also transcend the borders of the classrooms to project themselves towards the educational communities, in order to generate environmental awareness and the preservation of natural resources for future generations. thus guaranteeing the survival of the human species.
2015	Nidia Constanza Mora Hernández	Bogota-Colombia	Formulation of the school environmental project (prae) in the Departmental Educational Institution Pio X in the municipality of Chipaque, Cundinamarca.	Environmental education seeks to address the environmental problems not only of the institutions, but also of the area of influence in which activities that may generate a negative impact on the environment are carried out

2015	Ana María Arias Cardona Eliana Patricia Estrada Maya Lina María Rendón López	Aburrá Valley-Colombia	Characterization of the educommunicative processes of the educational institutions that make up the network of school environmental projects (PRAE network)	Energizing school environmental projects and particularly networking between educational institutions requires the implementation of educommunicative processes that transcend conventional schemes that are limited to informing about problems such as global warming or promoting solid waste separation activities to advance towards truly transformative actions of the school and its context.
2015	Marta Darley Ospina	Medellín-Colombia	The PRAE: A strategy for environmental training and the strengthening of territorial identity in the community of the La Pintada Educational Institution.	This study investigated the way in which a PRAE pedagogical proposal is constructed from the elements of the context for the strengthening of environmental training and the territorial identity of La Pintada Educational Institution through the design of various instruments that allowed identifying the conceptions of the various members of the community of La Pintada Educational Institution about the Environment. Environmental Education and the Territory, as well as the attitudes that teachers have towards environmental education and the PRAE
2015	Margareth Paola Vallejo Ovalle	Bogota-Colombia	Difficulties and possibilities in the integration of the areas of social sciences and natural sciences in the implementation of the prae, a case study, Francisco de Paula Santander school, Bosa locality	This study is relevant because of the contribution it makes to the positioning of environmental education in the educational institution where the author works, in the first instance because it allowed teachers to meet around reflection and discussion in relation to environmental education processes, followed by the manifestation of their willingness to link up and enrich their teaching practices, recognizing the need to qualify and broaden their vision of what is possible. Considering the possibility of articulating a dialogue of knowledge that allows the educational community to recognize that the school is not limited to the transmission of knowledge but also trains in the development of basic environmental competencies, necessary to achieve quality of life
2016	Carlos Alberto Velásquez Mejía	Medellín-Colombia	Design of a Methodological Proposal Based on Research, Action and Participation, for the Teaching of Environmental Education in the Framework of the School Environmental Project (PRAE), Colegio Campestre La Colina	the implementation of a research, action and participation methodology, within the framework of the PRAE of the Colegio Campestre La Colina, will raise awareness among the entire community so that, based on knowledge of the reality, solutions can be generated; an environmental awareness will be built, translated into a new citizen culture; sowing the seed of these values in these young people
2018	Mayeline Gómez Agudelo	Pereira-Colombia	Education for sustainable development. A look at PRAE school environmental projects	For the municipal and departmental bodies in charge of promoting environmental education, the School Environmental Projects (PRAE) can be a fundamental strategy to achieve the sustainable development goals and solve environmental problems.
2019	Julián Enrique Barrero García	Tolima-Colombia	The School Environmental Project (PRAE) as a pedagogical tool to strengthen Environmental Education in two public Educational Institutions in the municipality of El Espinal - Tolima.	This research addresses the importance of the School Environmental Project (PRAE) in two public institutions in the Municipality of El Espinal - Tolima, what has been proposed and designed and how it is minimally carried out and applied to practice in the institutions, by focusing it on the management, classification and final disposal of solid waste

Within the scope of the research process, it is found that the sources agree that the implementation of the school environmental projects "PRAE" in educational institutions should be considered of great importance with an appropriate plan that allows raising awareness and reasoning with respect to the environmental problems presented and that are manifested in the sustainable development goals set by the UN. and that it works together with what is proposed in the principles established in the article in

the newspaper "Al tablero" published by the Ministry of National Education (Mulguerza & Clameta, 2020). However, many of the studies are aimed at students and not at teachers, so the development of this research is pertinent to evaluate the perception of teachers with respect to the "PRAE" focused on the care and awareness of the environment. (Inzunza, Rivera, Castro, 2024).

## 2. METHODOLOGICAL DESIGN AND PROCEDURE

To achieve the objectives of the research, the present work is carried out from a non-experimental explanatory methodological approach that is used to analyze and understand a specific phenomenon or problem. This type of study focuses on the description and explanation of a phenomenon without actively intervening in it (Creswell, 2014). It is an approach that is used to establish relationships between variables and to gain a deep understanding of the phenomenon or problem being studied (Yin, 2018). To achieve this, the survey was used as a research technique and as an instrument the questionnaire with a Likert scale called: The perceptions of the teachers of the EI of Colombia from the "School Environmental Project "PRAE"

composed of 22 items in the affirmative sense, a Likert scale was used where "Never" is the non-knowledge or realization of the object and "Always" is the knowledge and realization of the object, therefore, the higher the average, the better the variable is evaluated.

### 2.1. Instrument Reliability Study

The instrument was subjected to expert validation by the teachers who are part of the Casa del Maestro research center through the implementation of a content validation systematization sheet, graded through a Likert scale where (1) it is unacceptable and (5) it is excellent, as well as the measurement of the coherence indicators. clarity, relevance and difficulty (See figure 1).

FORMATO DE EVALUACIÓN DE PRUEBA – VALIDEZ DE CONTENIDO							
Evaluador							
Fecha:		Prueba de:					
Indicadores							
1.	COHERENCIA	El ítem se corresponde con alguna de las evidencias declaradas para las competencias que se evalúan en la prueba de Ciencias naturales.					
2.	CLARIDAD	El ítem muestra una sintaxis y terminología apropiadas que no genera confusión o contradicción.					
3.	RELEVANCIA	El ítem es relevante desde la afirmación y evidencia que pretende evaluar.					
4.	DIFICULTAD	El ítem presenta un nivel de dificultad apropiado y hace parte en conjunto de un nivel de dificultad de la prueba.					
ESCALA DE VALORACIÓN							
1. Inaceptable 2. Deficiente 3. Regular 4. Bueno 5. Excelente							
Contenido			Evaluación señale con una X				
Ítem	Indicadores Generales	Observaciones	1	2	3	4	5
1.	COHERENCIA						
	CLARIDAD						
	RELEVANCIA						
	DIFICULTAD						
2.	COHERENCIA						
	CLARIDAD						
	RELEVANCIA						
	DIFICULTAD						

Figure 1: Reliability of the Instrument Based on the Likert Scale. In the Original Spanish Language.

### 2.2. Participants

The population of interest is made up of 203 teachers from different cardinal points of Colombia. Of the total of these participants who completed the questionnaires, 132 are women and 71 are men, with age ranges between 20 and 72 years. In this sense, 64% of the participants belong to public institutions while the remaining 36% to the private sector. Regarding the working days, 75.4% of the teachers surveyed carry out their activities in the morning, 15.8% in the afternoon, 4.4% at night and the remaining 4.4% indicated another type of day, that is, a single one. Regarding the distribution of roles, 32% are in primary school, followed by basic secondary school with 33%, middle school with 14%, coordinator with 0.5%, preschool with 8%, director 0.5%, psychocounselor with 0.5% and others with 12% support teacher. higher education, university professor and trainer. This information collection instrument is structured in three large blocks that constitute: i) Personal and academic data, ii) climate perception scale that measures environmental sustainability (4,9,19,21,22), environmental awareness (3,5,8,12,16,20), interdisciplinarity

(6,7,9,13,17,18) and environmental knowledge (1,2,10,11,14,15).

### 2.3. Quantitative approach, descriptive method

With the premise that the appreciation of teachers regarding the implementation of school environmental projects "PRAE" in different institutional contexts; These subjects have the power to offer valid opinions regarding the management and mediation of the aforementioned processes. Based on the statistical package Jamovi V. 2.3.18, an initial descriptive study of the responses is carried out together with the analysis of their trend and distribution, to complement this exercise an additional analysis was carried out that allowed the identification of both the correlations and covariances between the dimensions and variables proposed through the Exploratory Factor Analysis (AFE) and confirmatory (AFC).

## 3. RESULTS

### 3.1. Instrument

For this study, 24 theoretical items were constructed applied on a Likert-type scale with five (5) response options: Never (N), Almost Never (CN), Sometimes (AV), Almost Always (CS) and Always

(S). The validation of this instrument was carried out through the judgment of 3 experts who, "consist of requesting people with the quality of experts in the area of research, a judgment on the construction of the instrument, the verification that the reagents of this instrument can provide valid information on the perception of teachers in the implementation of school environmental projects "PRAE. (Cabero and Llorente, 2013:1). Expert judgment is a favorable validation method to verify the reliability of research that is defined as "an informed opinion of people with experience in a topic, who are recognized by others as qualified experts in it, and who can provide information, evidence, judgments and assessments" (Escobar-Pérez & Cuervo-Martínez, 2008:29).

**3.2. Reliability of the Instrument**

**Cronbach's Alpha coefficient**

Through the calculation of Cronbach's Alpha Coefficient, (suitable for questionnaires of several alternatives), in order to obtain the Alpha reliability coefficient, assumed as the consistency with which the instrument measures the indicators and thus guarantee the effectiveness of the measurement of such indicators and the questionnaire as a whole. Cronbach's alpha is an estimate of internal consistency (Cronbach, 1951), which indicates the magnitude of the covariance of the items (Morales, 1988) and to what extent the construct is present in the items (Oviedo & Campo-Arias, 2005). To this end, the instrument was tested with the statistical software SPSS v. 25, obtaining a coefficient of 0.981.

Estadísticas de fiabilidad	
Alfa de Cronbach	N de elementos
,981	24

Figure 2: Cronbach's Alpha Reliability Statistic.

Regarding the interpretation of the coefficients obtained for Cronbach's Alpha, Ruiz Bolívar (2013) states that a practical way of interpreting the magnitude of a Cronbach's reliability coefficient can be guided by the scale presented in Table 2.

Table 2: Interpretation of Cronbach's Alpha Reliability

Ranks	Magnitude
0.81 to 1.0	Very high
0.61 to 0.80	High
0.41 to 0.60	Moderate
0.21 to 0.40	Low
0.01 to 0.20	Very low

Note: table showing the ranges for the interpretation of reliability, by Ruiz Bolívar (2013).

As can be seen, the coefficient is close to the lower

limit of the interval that indicates "Very high" reliability in the interpretation table of the cited author, which shows that the instrument has adequate reliability and indicates that it has adequate levels of internal consistency.

**3.3. Exploratory Factor Analysis Questionnaire**

Within the instrument, 24 questions were parameterized under the Likert scale and, through an Exploratory Factor Analysis, it was possible to highlight factors that, when analyzed, contributed to a better understanding of the problem. Among the most important requirements that must be met is to obtain, first, a matrix in which the correlations between all the variables considered are located (Hair, Black, Babin, et al., 2009). This matrix is called the Pearson correlation matrix or Covariance correlation matrix. If this determinant is very low, then it means that there are variables with very high intercorrelations, and then it is feasible to continue with the factor analysis. However, the determinant must not be equal to zero, because in this case the data would not be valid. In the case of this study, when checking whether the correlation matrix is an identity matrix, that is, that the intercorrelations between the variables are zero, Bartlett's sphericity test is used, which consists of an estimate of chi-square from a transformation of the determinant of the correlation matrix. If the variables are not interrelated, then the Bartlett sphericity test must have a value (significance) greater than the limit of 0.05. In this case (Figure 3) this analysis presented a significance much lower than the 0.05 limit, since it was 0.00, which indicates that the data matrix is valid to continue with the factor analysis process.

Another analysis to take into account is the Kaiser-Meyer-Olkin index (KMO) (Figure 3), which is used to compare the magnitudes of the general or simple correlation coefficients with respect to the magnitudes of the partial correlation coefficients. If the sum of the squared partial correlation coefficients between all pairs of variables is low compared to the sum of the squared correlation coefficients, then the KMO index will be close to one and this will be considered positive and will indicate that factor analysis can be continued. But if low values are obtained with the KMO index, then it indicates that the correlations between pairs of variables cannot be explained by the other variables and, therefore, it is not feasible to carry out factor analysis since the KMO index will move away from zero. This is because when independent variables have common factors, the partial correlation coefficient between pairs of variables is low when the linear effects of the other variables are eliminated. KMO values between 0.5

and 1 indicate that it is appropriate to apply factor analysis to the matrix of data under study. In the case of the data matrix we are analyzing, a KMO of 0.965 was obtained, which indicates that the sample taken for the study is appropriate and that therefore the application of factor analysis can be continued.

Medida Kaiser-Meyer-Olkin de adecuación de muestreo		,965
Prueba de esfericidad de Bartlett	Aprox. Chi-cuadrado	5688,457
	gl	276
	Sig.	,000

Figure 3: Try KMO and Barlett. In the Original Spanish Language.

The conclusion about this first stage of factor analysis is that all types of analysis on the relevance and validity of the data matrix are successfully verified and passed. With this we can carry out the second stage which consists mainly of the extraction of the different factors through the grouping of the original variables into new variables that we will call indistinctly as "components" or "factors", which are combinations of the original variables.

3.4. Extraction of the initial and necessary factors that represent the original data

The selection of the main factors (principal components) using the principal components method can be seen initially from the sedimentation figure (Figure 3). Components whose eigenvalues

(eigenvalues) are greater than 1 (eigenvalues >1) are chosen. The figure indicates that two main components must be extracted, which are those that meet the aforementioned requirement.

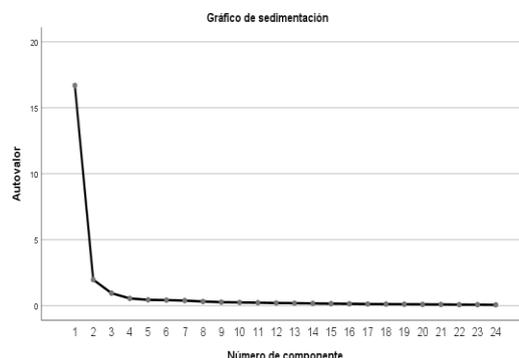


Figure 4: Sedimentation Graph. In the Original Spanish Language.

The total variance table explained (Table 3) explains in more detail the selection of the 2 main components. As can be seen in this table, only the first two factors have eigenvalues greater than 1 and explain 77.7% of the variance, this means that with these two factors 77.7% of the original problem can be represented, producing the loss of 22.3% of the original information represented by initial variables. In other words, only 2 factors are relevant to explain the behavior of the original variables of the problem.

Table 3: Total Variance Explained. In the Original Spanish Language.

Componente	Autovalores iniciales			Sumas de cargas al cuadrado de la extracción			Sumas de cargas al cuadrado de la rotación		
	Total	% de varianza	% acumulado	Total	% de varianza	% acumulado	Total	% de varianza	% acumulado
1	16,696	69,569	69,569	16,696	69,569	69,569	11,207	46,695	46,695
2	1,971	8,213	77,781	1,971	8,213	77,781	7,461	31,087	77,781
3	,943	3,931	81,712						
4	,545	2,270	83,982						
5	,438	1,825	85,808						
6	,419	1,745	87,552						
7	,383	1,596	89,149						
8	,310	1,293	90,442						
9	,264	1,101	91,543						
10	,241	1,003	92,545						
11	,223	,931	93,476						
12	,198	,827	94,303						
13	,183	,764	95,067						
14	,167	,696	95,763						
15	,152	,631	96,394						
16	,140	,585	96,980						
17	,120	,499	97,479						
18	,115	,479	97,958						
19	,105	,439	98,397						
20	,095	,394	98,791						
21	,086	,359	99,150						
22	,075	,311	99,461						
23	,069	,289	99,750						
24	,060	,250	100,000						

Método de extracción: análisis de componentes principales.

From this point, it is necessary to carry out an orthogonal rotation that will reduce ambiguities in the factorial loads of the variables and find a clearer solution. In practice, the goal of rotation methods is

to simplify rows or columns of the factor matrix for ease of interpretation. The rotation method used is VARIMAX which seeks to redistribute the variance along all the components in the load matrix. This

simplifies the model and obtains clearer results to identify the factors in each component, since this method approximates the high loads to 1 or -1 and the low loads of the non-rotated matrix to 0, thus eliminating the ambiguities existing in the non-rotated matrix. With this rotation we obtain new values and eigenvectors and also different percentages of explanation, but the total variation of the two components is maintained, which is 77.7%. Figure 5 shows the rotational factor load matrix of the cognitive dimension (applying Varimax).

**Matriz de componente rotado<sup>a</sup>**

	Componente	
	1	2
Item 22	,865	,328
Item 20	,850	
Item 23	,847	,342
Item 24	,846	,351
Item 18	,823	,325
Item 21	,818	,350
Item 9	,792	,370
Item 19	,784	,378
Item 13	,777	,379
Item 14	,775	,443
Item 16	,774	,442
Item 15	,771	,442
Item 10	,768	,438
Item 17	,751	
Item 11	,730	,458
Item 12	,716	,399
Item 5		,837
Item 1	,330	,830
Item 3	,451	,805
Item 6	,346	,804
Item 7	,393	,795
Item 2	,335	,789
Item 8	,426	,783
Item 4	,389	,770

Método de extracción: análisis de componentes principales.  
Método de rotación: Varimax con normalización Kaiser.<sup>a</sup>

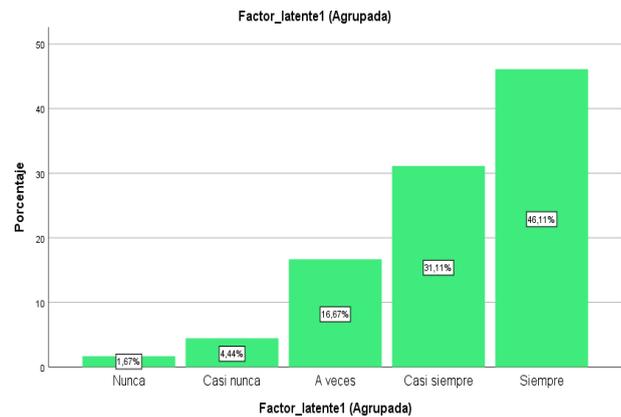
a. La rotación ha convergido en 3 iteraciones.

**Figure 5: Rotated Component Die. In the Original Spanish Language.**

As can be seen in Figure 5, the first factor is composed of fourteen (14) items (questions 9 to 24), while the second factor is composed of eight (8) items (questions 1 to 8). Given the characteristics of the questions, the factors were called: Factor 1. Curricular integration of environmental education; Factor 2. Shared responsibility in the implementation of the SAPs. In this way, we have reduced the original twenty-four (24) items to two (2) factors that represent two blocks for the study of the perception that teachers have about the implementation of the school environmental projects "PRAE" that explain 77.7% of the common variance.

The first factor, called Curricular Integration of Environmental Education, explains 69% of the common variance. It reflects how teachers relate to the inclusion of environmental issues and how

students perceive the importance of knowing and understanding these issues from the different academic areas taught in educational institutions. As well as the projection of ideas that solve environmental problems by generating awareness and working together to comply with the Sustainable Development Goals (SDGs) and the goals established for the improvement of environmental quality and knowledge of it in educational institutions.



**Figure 6: Factor Analysis 1. In the Original Spanish Language.**

When appreciating Figure 6 and in view of the assessment described above, it is possible to show that a corresponding percentage of 77.22% of teachers and principals value this factor in terms of Always and Almost Always. However, 6.11% of teachers and principals weight this factor with evaluations of Never and Almost Never, thus leaving 16.67% of teachers and principals with an evaluation in terms of Almost Always. These values are in agreement with those presented by Caridad Amado Paula, Acosta-Jesús Pérez López and Julio Jesús Sierra-Socorro (2019), who at the end of their research obtained superior results with a satisfaction index of 0.7, in the indicators evaluated, including the development of competencies and the learning of environmental education, considering that it is possible to transform the actions of teachers by involving in the teaching-learning process the integration of content related to environmental education in the different training components and educational scenarios, so that students are competent and acquire new experiences. For the factor, called Shared responsibility in the implementation of the PRAE, which explains 8% of the common variance and refers to the shared responsibility of all the actors involved in the implementation of the PRAE. This implies that teachers, directors, students and parents must assume their share of responsibility to promote environmental education and the generation of young researchers capable of providing solutions

according to the problems presented through research projects related to environmental issues in educational institutions nationwide.



**Figure 7. Factor Analysis 2. In the Original Spanish Language.**

When appreciating Figure 7 and in view of the assessment described above, it is possible to show that a percentage corresponding to 81.14% of teachers and principals value this factor in terms of Always and Almost Always. However, 5.55% of teachers and principals weighted this factor with ratings of Never and Almost Never, thus leaving a percentage corresponding to 13.33% of teachers and principals with ratings for this factor in terms of Sometimes. These values demonstrate the level of responsibility presented in the approach of different methods of interdisciplinary implementation with respect to the school environmental projects "PRAE" and how these infer in the decision-making in the environmental approach of the teachers, students, directors and parents who are part of the process.

#### 4. CONCLUSION

#### REFERENCE

- Alfredo, L., & Guerrero, O. (n.d.). *ANATOMY OF THE PRAAE*.
- Bohórquez, J. (n.d.). *EDUCATIONAL ESTABLISHMENTS*. Retrieved October 25, 2022
- De, E., & Cadavid-Velásquez, J. (n.d.). *THE PRAES FROM THE NORMATIVE-ENVIRONMENTAL: a space for school dynamization*. Escilda Rodríguez Calonge, Elvira Patricia Flórez-Nisperuza, Nabi del Socorro Pérez-Vásquez.
- Gómez Agudelo, M. (2018). Guest author\* Education for sustainable development. A look at PRAE school environmental projects. *Free Enterprise*, 15(2), 179–194.
- Hernández, N. (2015). *FINAL PROJECT PRAE IED PÍO X- NIDIA MORA HERNANDEZ U LIBRE*. Universidad Libre.
- Jaraba, E., & Torralvo, L. (2020). *STRENGTHENING OF THE ENVIRONMENTAL EDUCATION PROJECT (PRAE) ANTONIO DE LA TORRE Y MIRANDA EDUCATIONAL INSTITUTION, MUNICIPALITY OF LORICA-CÓRDOBA, 2019-2020* ELBER JARABA BUENDÍA LAURENS E. TORRALVO ESPITIA UNIVERSITY OF ANTIOQUIA NATIONAL FACULTY OF PUBLIC HEALTH HÉCTOR ABAD GÓMEZ MEDELLÍN-ANTIOQUIA 2020.
- Leidy, A. M., & Delgado, J. R. (2015). *The PRAE: A strategy for environmental training and the strengthening of territorial identity in the community of the La Pintada Educational Institution*. MARTA DARLEY OSPINA.
- Ministry of Education. (n.d.). *INSTITUTIONAL EDUCATIONAL PROJECT - PEI*. Retrieved October 25, 2022
- Ministry of Education. (2004). Educating in science: The Challenge! In *Basic Standards of Competencies in Natural Sciences and Social Sciences*.
- Ministry of Education. (2005). Educating for sustainable development. *Altablero No. 36*.
- Ministry of Education. (2005). *EDUCATING FOR SUSTAINABLE DEVELOPMENT*.
- Muguerza Amigorena, Maialen, & Chalmeta, Ricardo. (2020). Education for sustainable development: analysis

The School Environmental Projects Implementation Initiative "PRAE" is proposed as a strategy to address the environmental challenges of educational institutions, providing educational communities and individuals with a range of participatory tools, and supporting local environmental governance mechanisms for education, educational growth and participation through different approaches to social development based on the needs and expectations of the individual and society. After the analysis, it can be inferred that the perception of teachers of educational institutions at the national level with respect to the implementation of school environmental projects "PRAE" in curricular meshes presents a high rate of acceptance, taking into account the importance and responsibility of training young researchers capable of providing optimal solutions to the environmental problems found in their environment. and thus help the development of the tasks that give viability to the provisions of the Sustainable Development Goals (SDGs) created by the United Nations (UN), managing to demonstrate the impact that environmental education and the development of research projects have on young people who are trained for a sustainable future. This also leads to teachers demonstrating a strong commitment to environmental training and willingness to apply it in the context of areas of knowledge that can converge and enable the application of the principles of interdisciplinarity.

- of the Iturrama Secondary School. *RIDE. Ibero-American Journal for Educational Research and Development*, 11(21), e042. Epub Apr 23, 2021. <https://doi.org/10.23913/ride.v11i21.766>
- Otero, A. (2018). RESEARCH APPROACHES. *Methods for urban-architectural design*.
- Pérez, J., & Gardey, A. (2009). *Definition of environment - What it is, Meaning and Concept*. <https://definicion.de/medio-ambiente/>
- Pérez, J., & Merino, M. (2013). *Definition of Proportion - What It Is, Meaning and Concept*. <https://definicion.de/proporcion/>
- Pontificia Universidad Católica de Valparaíso. (2015). *CURRICULAR MODEL AND GUIDELINES FOR CURRICULUM DESIGN*.
- United Nations Development Programme. (2022). *Sustainable Development Goals*. [https://www.undp.org/sustainable-development-goals?utm\\_source=EN&utm\\_medium=GSR&utm\\_content=US\\_UNDP\\_PaidSearch\\_Brand\\_English&utm\\_campaign=CENTRAL&c\\_src=CENTRAL&c\\_src2=GSR&gclid=Cj0KCQjwteOaBhDuARIsADBqRej6r0sICoTtEun66h9IGqLLDreFcvhEuh89soObMIH6LbJsMpwJ2dkaAmSgEALw\\_wcB](https://www.undp.org/sustainable-development-goals?utm_source=EN&utm_medium=GSR&utm_content=US_UNDP_PaidSearch_Brand_English&utm_campaign=CENTRAL&c_src=CENTRAL&c_src2=GSR&gclid=Cj0KCQjwteOaBhDuARIsADBqRej6r0sICoTtEun66h9IGqLLDreFcvhEuh89soObMIH6LbJsMpwJ2dkaAmSgEALw_wcB)
- Ramos, C. A. (2015). THE PARADIGMS OF SCIENTIFIC RESEARCH. *Av. Psicol*, 23(1). [https://www.unife.edu.pe/publicaciones/revistas/psicologia/2015\\_1/Carlos\\_Ramos.pdf](https://www.unife.edu.pe/publicaciones/revistas/psicologia/2015_1/Carlos_Ramos.pdf)
- Sánchez, A. (2022). *What is Education?" Its Definition and Meaning 2021*. <https://conceptodefinicion.de/educacion/>
- Suescun, J., & Pulido, M. (2011). *PORTAL PRAE ONE STEP CLOSER TO THE SCHOOL WEB PORTAL PRAE AND CONTENT MANAGER JHON JAIRO SUESCUN ESPINEL MILTON ANDERSSON PULIDO UNIVERSIDAD LIBRE DE COLOMBIA FACULTY OF ENGINEERING SYSTEMS ENGINEERING PROGRAM*. Universidad Libre de Colombia.
- Andrew F. Hayes & Jacob J. Coutts (2020) Use Omega Rather than Cronbach's Alpha for Estimating Reliability. *But...*, *Communication Methods and Measures*, 14:1, 1-24, DOI: 10.1080/19312458.2020.1718629
- McDonald, RP (1999). *Theory of Evidence: A Unified Treatment*. Mahwah, New Jersey: Lawrence Erlbaum.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of test. *Psychometrika*, 16, pp. 297-334.
- Morales, P. (1988). *Measurement of attitudes in psychology and education: construction of scales and methodological problems*. San Sebastián: Tartalo, Universidad de Comillas.
- Oviedo, H. C. & Campo-Arias, A. (2005). Approximation to the use of Cronbach's alpha coefficient. *Revista Colombiana de Psiquiatría*, 34 (4), pp. 572-580.
- Campo-Arias, A., & Oviedo, H. C. (2008). Psychometric properties of a scale: internal consistency. *Rev Salud Pública*, 10 (5), pp. 831-839.
- Katz, M. H. (2006). *Multivariable analysis (2a ed.)*. Cambridge: Cambridge University Press