Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

# Beyond the Classroom: Sustainable Science Learning in Authentic Environments

Pedro Arcia-Hernández[1], Marco Mauricio Rosales-Cevallos[2], Patricia Margarita Rivera-Castañeda[3], José Rolando Bedoya-Ávalos[4], Nancy Elizabeth Pruneda-Ávila[5], Jorge Torres-Vásquez[6], Juan Manuel Martínez Zúñiga[7], Galvarino Casanueva-Yáñez[8]

## Abstract

*The objective of this paper is to study sustainable science learning in authentic environments, based on the perceptions of school-level teachers. The study follows a quantitative approach, supported by the positivist paradigm, for which data was collected using a dichotomous questionnaire applied to 42 teachers from various countries. The conceptual topics underpinning this work include (a) sustainable learning, (b) science teaching, and (c) authentic environments. Among the main results, it was found that transcending the traditional approach to science teaching facilitates the conversion of the abstract language of science into simpler and more easily understandable terms for students through didactic methodologies where practice is more fundamental than memorization. In this regard, it was concluded that when the traditional classroom approach is replaced by an innovative one, where the natural environment, daily practice, and the application of knowledge and concepts in real-life situations are the common denominators, more meaningful learning is achieved, and active participation is promoted, thus creating an authentic learning environment.*

**Keywords:** *Classroom, Sustainable Learning, Science, Authentic Environments.*

## Introduction

Today, education faces the challenge of training students not only in the acquisition of knowledge, but also in its effective application in real contexts. This challenge is especially important in science education, where understanding and applying abstract concepts is crucial to developing scientific competencies. Historically, science instruction has been based on theoretical and rote methods that, while necessary, often fail to promote deep and meaningful learning, much less emphasize the pillar of learning by doing in disciplines that are eminently practical.

In response to this need, the concept of sustainable learning has gained relevance in the educational field. This approach promotes an education that not only focuses on the acquisition of knowledge, but also on the development of skills and attitudes that allow students to apply what they have learned in a lasting and transferable way to different contexts. Authentic environments, which replicate or simulate real situations, are presented as ideal scenarios for the implementation of this type of learning. These environments offer students the opportunity to interact with study material in a practical and contextualized way, facilitating greater understanding and retention of scientific concepts.

Hence, this research, entitled "Beyond the Classroom: Sustainable Science Learning in Authentic Environments", focuses on exploring how these environments can improve the teaching and learning of

[1] Universidad de Talca, Chile, Facultad de Ingeniería y Negocios Universidad de Las Américas, Sede Providencia, Manuel Montt 948, Santiago, Chile, ORCID: https://orcid.org/0000-0003-4472-7642 Correo: Arciapedro30@gmail.com
[2] Universidad de las Fuerzas Armadas ESPE, Ecuador Orcid: https://orcid.org/0000-0001-9840-3761, Email: mmrosales@espe.edu.ec.
[3] Universidad Privada del Norte, Cajamarca, Perú.
[4] Jubilado de Secretaría de Educación, Antioquía, Colombia

[5] Universidad Autónoma de Nuevo León, San Nicolás de los Garza N.L., México https://orcid.org/0009-0007-3149-919X, Email: pruneda1966@hotmail.com

[6] Universidad Privada San Juan Bautista, Lima Perú

[7] Universidad Autónoma de Nuevo León, San Nicolás de los Garza N.L., México https://orcid.org/0009-0001-2599-5329, Email: jmmzmartz@hotmail.com

[8] Facultad de Ingeniería y Negocios Universidad de Las Américas, Sede Providencia, Manuel Montt 948, Santiago, Chile

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

science in school contexts, considering as a critical knot or problem to be studied the fact that the traditional teaching approach based on long and complex theoretical presentations is difficult to understand. coupled with the lack of a didactic, dynamic and participatory methodology that makes them abstruse and distant from scientific concepts. Another aspect described as critical is the little or no connection that exists in school environments between science and the real world, since if children are not shown how knowledge is applied in everyday life, they may perceive science as something abstract and not relevant to learning. All this is based on what is stated by "A positive and collaborative school environment is essential for the integral development of students" (Romero et. al., 2024, p. 147).

It is therefore a concern of the researcher to answer the following question: How does the use of authentic environments contribute to the promotion of sustainable science learning and to the understanding of scientific concepts by school-level students?

In this order of ideas, the objective of this conference is on the one hand; to generate truthful information to enrich the community of knowledge inscribed in the thematic line that is addressed and (b) massive dissemination of its results in rigor of the International Conference "Global Educational Convergences:

Innovation and Sustainability in Educational Research".

Meanwhile, the written product is structured in the following parts: (a) summary; (2) introduction; (3) literature review; (4) methodology; (5) results; (6) conclusions and (7) bibliographic references.

*Theoretical Framework*

Pedagogy is considered one of the most challenging professions, as teaching goes far beyond simply conveying information. It requires a combination of passion, creativity, and empathy to engage and motivate students in their educational process. From birth, the human being is a learner, and this condition implies both an individual and collective responsibility in those around him to teach. From childhood, children receive information that they process and understand as they advance in their formal education. Therefore, it is necessary to break with obsolete practices that prevent the transcendence of the art of teaching and learning anchored in traditional approaches. "Teachers do not always feel motivated to change their methodology, preferring to maintain the established dynamics for comfort and routine, which affects their pedagogical management" (20024, p. 24). In this sense, it is crucial to understand that learning in the school system is a progressive process, organized into cycles and levels, and that knowledge is presented through a methodologically filtered curriculum. This curriculum fragments knowledge into disciplines, each with its specific objectives and contents, and uses didactic transposition to convert pure knowledge into teachable knowledge. According to Chevallard (1991), didactic transposition transforms disciplinary knowledge into an appropriate format for teaching.

However, the review of specialized literature reveals some conceptual axes that are involved when we want to teach science to children in basic education more effectively. First, it is necessary to define *teaching strategies* that, according to Martínez and Zea (2004), "are means or resources to provide pedagogical help" (p. 141). For their part, Gutiérrez-Delgado and Gutiérrez-Ríos, (2018), argue that " *methodological teaching and learning strategies* with a playful approach are tools that help to make teaching become an interactive action within the classroom" (p. 2).

Another implicit aspect in the object that is studied, constituted from the imprint of the researcher, refers to *active learning* as the systematic and authentic procedure focused on teaching that is based on the involvement of students in the contents, materials and objects of learning through activities that promote the attitude to solve problems. think critically, act autonomously, reflect on real situations and any other action that promotes their active participation. Given the relevant role of those who teach, then it is also necessary to define *didactics* as: "the branch of Pedagogy has as its object of study the teaching-educational process, which is defined as that process that, in the most systematized way, is aimed at the integral formation of the new generations in which the student is instructed and educated, that is, it develops both their thinking and their feelings" (Mestre, Fuentes & Álvarez, 2012, p. 2).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

Of equal importance, it was necessary to review the concept of *scientific competencies*, extracting the following from the specialized literature: "When we speak of "scientific competencies" we refer to the ability to establish a certain type of relationship with the sciences. The relationship that professional scientists have with the sciences is not the same as that established with them by those who are not directly committed to the production of knowledge about nature or society" (Hernández, 2005, p. 1). It can be inferred from this argument that the relationship of children who come from precarious environments, backward areas or school spaces where the infrastructure and equipment to do science is not a common denominator, is weak, considering that they do not understand the abstract meaning of their concepts and have few possibilities of understanding the usefulness of science in real situations since they do not have equipment and materials for this purpose.

No less important, the concept of *authentic school environment* prevails, which was constructed through the systematization of the narratives of the subjects of information, using the techniques of coding, categorization and contrast (see annex 1).

In this regard, the ontological vision of the informants conceives an authentic school environment as an innovative and dynamic space where science, school actors, and the natural and community environment converge. This type of environment is distinguished by its ability to integrate learning with the real context, providing students with the opportunity to interact directly with their environment and apply scientific knowledge in a practical and meaningful way.

From the systematization it was also derived that in an authentic school environment, special emphasis is placed on the development of the affective and attitudinal domains of the students, covering all levels of schooling. This approach promotes not only the acquisition of knowledge, but also the development of positive attitudes towards learning and science.

Likewise, authentic school environments facilitate a scientific awakening in students, promoting a natural curiosity and a genuine interest in science. Through direct and practical experiences, students relate scientific concepts to their everyday lives, resulting in deeper and more lasting learning.

An authentic school environment is the ideal setting for implementing active learning methodologies. These methodologies, based on experience and active participation, allow students to learn by doing and learning by living together. This approach focuses on the pillars of knowing, doing and living together, developing scientific, transversal and relevant skills for the 21st century.

*Methodology Used*

The study is part of the methodological mixture supported by the complex thinking paradigm. Mixed research techniques were applied. The units of analysis are represented by two groups. The first refers to 42 Spanish-speaking teachers who were administered an attitude scale (Likert) to know the researchers' evaluations and on the other, key informants were investigated through an open question of a semi-structured nature from which categories of general analysis were raised that allowed classifying answers according to the nationalities of the teachers.

The informants considered were chosen because they meet certain requirements that, in the same educational context or in the same population, other members of the group or community do not meet. Meanwhile

"a key informant is the person who tells me about the phenomenon in relation to everything, who has extensive knowledge in relation to everything (Gutiérrez, 2015, p. 99).

Among the characteristics of these informants, it was considered to be in possession of the degree of teacher and to teach at school levels. The mixed instrument was designed through the Google Forms application and the so-called snowball or bounce technique was used to add new subjects who participated in the study.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

## Results and Discussion

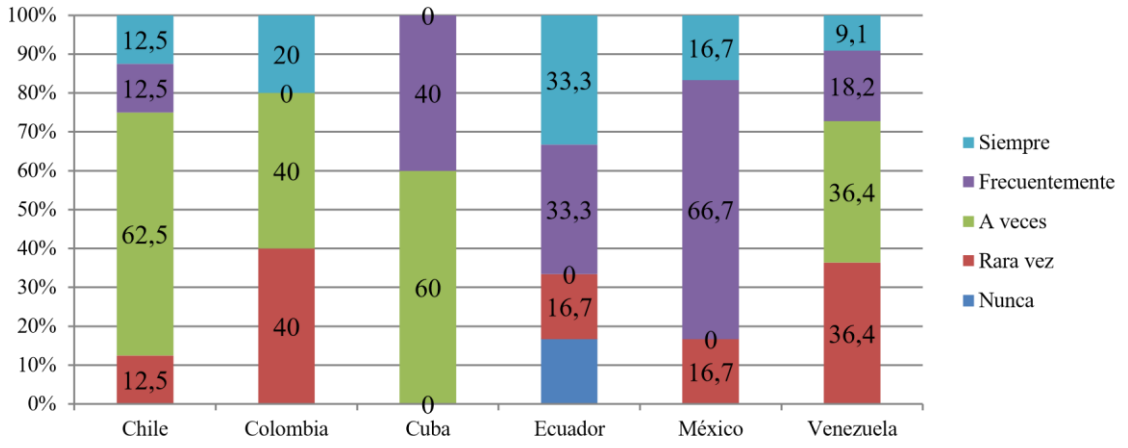
In the understanding of the section of the results, we proceed first to characterize the units of analysis of the study. In this regard, 41 subjects from six countries participated: Chile (19%); Colombia (12.2%); Cuba (12.2%); Ecuador (14.6%); Mexico (14.6%) and Venezuela (26.8%). The levels at which teachers teach correspond to 4.9% of initial education; 39% of primary education and 56.1% of secondary education. The type or institutional modality of the establishments in which teachers work is diverse, namely: public (75.6%); private or private (9.8%) and subsidized (14.6)%.

Next, the results are presented according to the statistical description of the items of the instrument applied, which are accompanied by their corresponding discussion.

**Table 1.** Frequency of Activities Outside the Classroom.

| How often do you organize learning activities outside the classroom for your students? | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Never | | Seldom | | Sometimes | | Often | | Always | | Total | |
| Country | Fa | % | Fa | % | Ago | % | Ago | % | Ago | % | Ago | % |
| Chile | 0 | 0,0 | 1 | 12,5 | 5 | 62,5 | 1 | 12,5 | 1 | 12,5 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 2 | 40,0 | 2 | 40,0 | 0 | 0,0 | 1 | 20,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 0 | 0,0 | 3 | 60,0 | 2 | 40,0 | 0 | 0,0 | 5 | 12.2 |
| Ecuador | 1 | 16,7 | 1 | 16,7 | 0 | 0,0 | 2 | 33,3 | 2 | 33,3 | 6 | 14,6 |
| México | 0 | 0,0 | 1 | 16,7 | 0 | 0,0 | 4 | 66,7 | 1 | 16,7 | 6 | 14,6 |
| Venezuela | 0 | 0,0 | 4 | 36,4 | 4 | 36,4 | 2 | 18,2 | 1 | 9,1 | 11 | 26,8 |
| | **1** | **2,8** | **9** | **20,4** | **14** | **33,1** | **11** | **28,4** | **6** | **15,3** | **41** | **100,0** |

**Fuente:** Base de daos de la investigación (2024).



Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

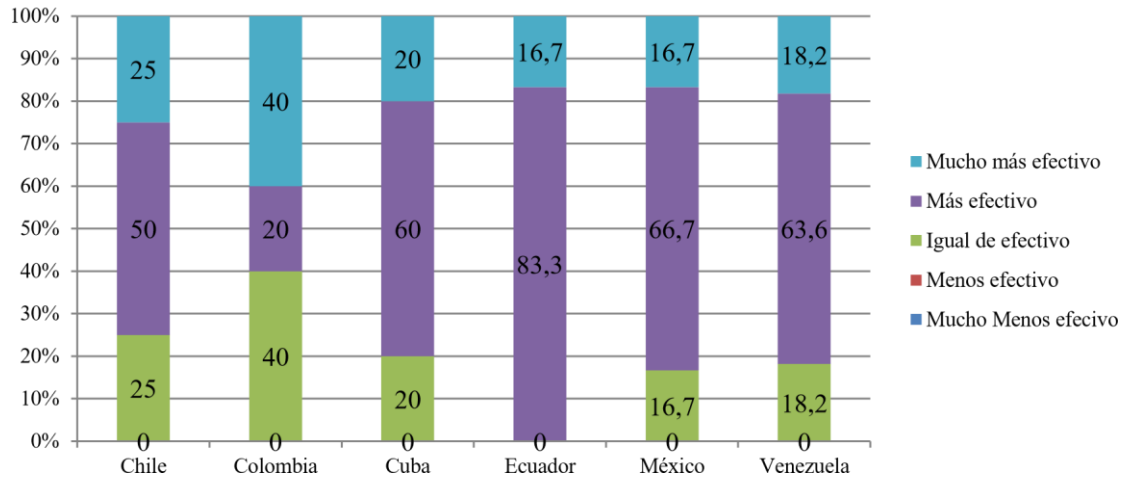
**Figure 1.** Percentage Distribution of the Indicator Frequency of Activities Outside the Classroom. in Original Language Spanish

The illustrations above provide a detailed overview of how often teachers in six Latin American countries organize learning activities outside the classroom for their students. In this regard, the results show that there is significant variation between countries in terms of the frequency of organization of learning activities outside the classroom. However, a common pattern is that most teachers in these countries organize such activities at least occasionally, with a notable percentage doing so frequently or always. This suggests a trend towards the still incipient use of authentic and practical environments for student learning in Latin America. Of the 41 respondents in total: 2.8% never organize activities outside the classroom; 20.4% rarely do so; 33.1% do it sometimes; 28.4% do it frequently and 15.3% always organize these activities. Meanwhile, the countries that stand out the most in terms of frequency of organizing learning activities outside the classroom are Mexico and Cuba.

**Table 2.** Effectiveness of Learning in Authentic Environments Vs Classroom Learning.

| How effective do you consider learning science in authentic environments compared to learning in the classroom? | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Much less effective | | Less effective | | Just as effective | | More effective | | Much more effective | | Total | |
| Country | % | Ago | % | Ago | % | Ago | % | Ago | % | Ago | % | Ago |
| Chile | 0 | 0,0 | 0 | 0,0 | 2 | 25,0 | 4 | 50,0 | 2 | 25,0 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 0 | 0,0 | 2 | 40,0 | 1 | 20,0 | 2 | 40,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 0 | 0,0 | 1 | 20,0 | 3 | 60,0 | 1 | 20,0 | 5 | 12,2 |
| Ecuador | 0 | 0,0 | 0 | 0,0 | 0 | 0,0 | 5 | 83,3 | 1 | 16,7 | 6 | 14,6 |
| Mexico | 0 | 0,0 | 0 | 0,0 | 1 | 16,7 | 4 | 66,7 | 1 | 16,7 | 6 | 14,6 |
| Venezuela | 0 | 0,0 | 0 | 0,0 | 2 | 18,2 | 7 | 63,6 | 2 | 18,2 | 11 | 26,8 |
| | **0** | **0,0** | **0** | **0,0** | **8** | **20,0** | **24** | **57,3** | **9** | **22,8** | **41** | **100,0** |

**Fuente:** Base de daos de la investigación (2024).



Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

**Figure 2.** Percentage Distribution of the Indicator Learning Effectiveness in Authentic Environments Vs Classroom Learning. in Original Language Spanish

According to the perception of the effectiveness of science learning in authentic environments compared to learning in the traditional classroom, according to the opinion of teachers of respondents. Of the 41 respondents, 20.0% consider that both types of learning are equally effective; 57.3% believe that learning in authentic environments is more effective; 22.8% consider that learning in authentic environments is much more effective and none considers that learning in authentic environments is less or much less effective.

Likewise, the results indicate that a large majority of teachers in the countries surveyed consider that learning science in authentic environments is more effective or much more effective than learning in the traditional classroom. Ecuador and Mexico stand out for having the highest percentages of teachers who consider learning in authentic environments to be more effective (83.3% and 66.7%, respectively). Colombia presents a balanced distribution between those who consider both methods equally effective and those who believe that authentic environments are much more effective. Hence, no opinions were reported that consider learning in authentic environments as less effective, which reinforces the positive perception towards these innovative teaching methods, especially when it comes to the teaching and learning of science in school contexts where the nomenclaturist language, the abstract semantics of scientific concepts, passive teaching methods, The disconnection with the real environment, among other aspects, makes it difficult to awaken the curiosity of children and adolescents to undertake life or vocational projects based on these disciplines.

**Table 3.** Most Commonly Used Resources for Learning Outside the Classroom.

| **What resources do you use most frequently in learning science outside the classroom?** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **Printed Materials** | | **Mobile Apps** | | **Laboratory Equipment Portable** | | **Direct observation** | | **Other** | | **Total** | |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 0 | 0,0 | 2 | 25,0 | 2 | 25,0 | 4 | 50,0 | 0 | 0,0 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 1 | 20,0 | 0 | 0,0 | 4 | 80,0 | 0 | 0,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 1 | 0,1 | 1 | 20,0 | 3 | 60,0 | 0 | 0,0 | 5 | 12,2 |
| Ecuador | 0 | 0,0 | 2 | 33,3 | 0 | 0,0 | 4 | 66,7 | 0 | 0,0 | 6 | 14,6 |
| Mexico | 0 | 0,0 | 1 | 16,7 | 0 | 0,0 | 5 | 83,3 | 0 | 0,0 | 6 | 14,6 |
| Venezuela | 1 | 9,1 | 1 | 9,1 | 0 | 0,0 | 9 | 81,8 | 0 | 0,0 | 11 | 26,8 |
| | **1** | **1,5** | **8** | **17,4** | **3** | **7,5** | **29** | **70,3** | **0** | **0,0** | **41** | **100,0** |

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

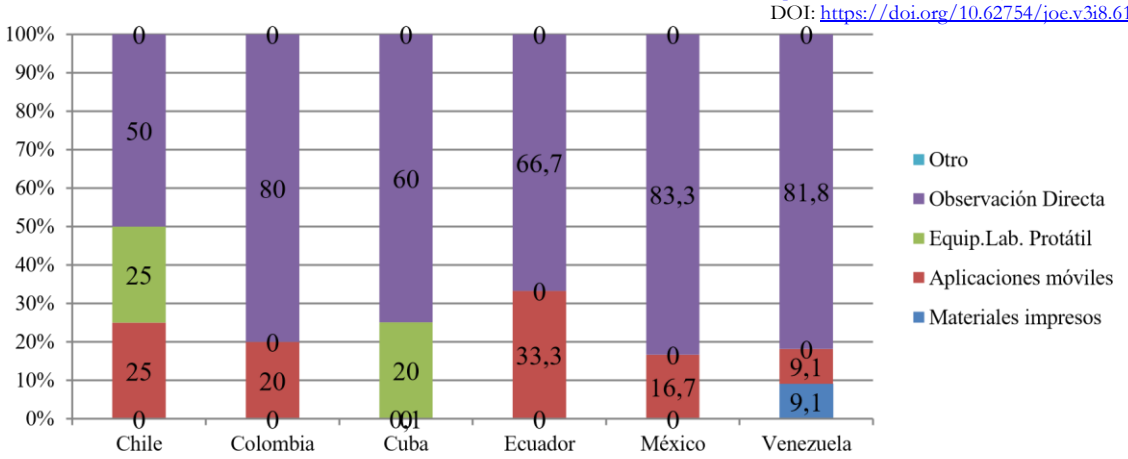



**Figure 3.** Percentage Distribution of the Indicator Most Used Resources for Learning Outside the Classroom. in Original Language Spanish

The above evidence shows the resources most frequently used by teachers in the six countries surveyed for science learning outside the classroom. The percentage distribution shows that of the 41 respondents, 1.5% use printed materials; 17.4% opt for mobile applications; 7.5% use portable laboratory equipment and 70.3% rely on direct observation. Direct observation is the most widely used resource in all countries, especially in Mexico and Venezuela, with a percentage of more than 80%. Printed materials and portable lab equipment are the least used, while mobile apps also have a moderate presence, especially in Ecuador and Mexico.

This suggests a strong preference for practical and observational methods in science learning outside the classroom where the need to replace expository lecture and compulsory book readings is imperative.

**Table 4.** Preparation for the Application of Scientific Knowledge in Real Situations.

| **How prepared do you think your students are to apply scientific knowledge learned in authentic settings to real-life situations?** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **Very unprepared** | | **Poorly prepared** | | **Neutral** | | **Well prepared** | | **Very well prepared** | | **Total** | |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 0 | 0,0 | 4 | 50,0 | 4 | 50,0 | 0 | 0,0 | 0 | 0,0 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 4 | 80,0 | 0 | 0,0 | 1 | 20,00 | | 0,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 1 | 0,1 | 3 | 60,0 | 1 | 20,0 | 0 | 0,0 | 5 | 12,2 |
| Ecuador | 2 | 33,3 | 0 | 0,0 | 2 | 33,3 | 2 | 33,3 | 0 | 0,0 | 6 | 14,6 |
| Mexico | 2 | 33,3 | 1 | 16,7 | 3 | 50,0 | 0 | 0,0 | 0 | 0,0 | 6 | 14,6 |
| Venezuela | 0 | 0,0 | 3 | 27,3 | 3 | 27,3 | 4 | 36,4 | 1 | 9,1 | 11 | 26,8 |
| | **4** | **11,1** | **13** | **29,0** | **15** | **36,8** | **8** | **18,3** | **1** | **1,5** | **41** | **100,0** |

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

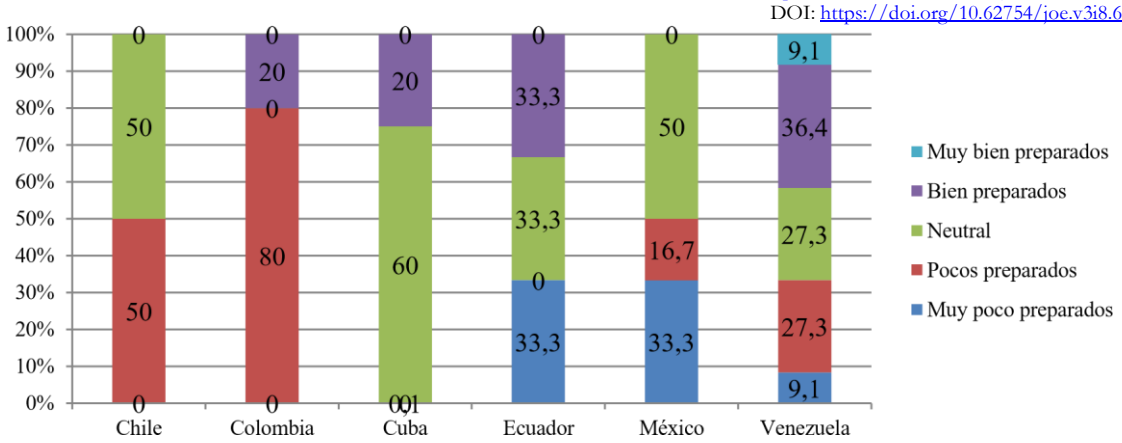



**Figure 4.** Percentage Distribution of the Indicator Readiness for the Application of Scientific Knowledge in Real Situations. in Original Language Spanish

In understanding the perceptions of the teachers consulted about how prepared their students are to apply the scientific knowledge learned in authentic environments to real-life situations, it is highlighted that of the 41 respondents, 11.1% consider that their students are very poorly prepared; 29.0% emphasize their students as unprepared, while 36.8% maintain a neutral perception. In addition, 18.3% characterize their students as well prepared and 1.5% describe their students as very well prepared.

Most teachers in Venezuela perceive their students as well prepared or very well prepared to apply scientific knowledge to real-life situations, which makes this country stand out in terms of positive perception. In contrast, Chile and Mexico have a more negative perception, with most teachers considering that their students are underprepared or very unprepared. Ecuador shows a balanced distribution of opinions, while Colombia has a divided perception with a high proportion of students considered unprepared.

**Table 5.** Difficulties Participating in Learning Activities in Authentic Environments.

| What is the main obstacle to engaging in learning activities in authentic environments? | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **Lack of time** | | **Insufficient resources** | | **Logistical constraints** | | **Lack of interest** | | **Other** | | | **Total** |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 1 | 12,5 | 3 | 37,5 | 2 | 25,0 | 1 | 12,5 | 1 | 12,5 | 8 | 19,5 |
| Colombia | | 00,02 | | 40,0 | 2 | 40,0 | 1 | 20,0 | 0 | 0,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 4 | 0,2 | 1 | 20,0 | 0 | 0,0 | 0 | 0,0 | 5 | 12,2 |
| Ecuador | 1 | 16,7 | 2 | 33,3 | 3 | 50,0 | 0 | 0,0 | 0 | 0,0 | 6 | 14,6 |
| Mexico | 0 | 0,0 | 2 | 33,3 | 4 | 66,7 | 0 | 0,0 | 0 | 0,0 | 6 | 14,6 |
| Venezuela | 1 | 9,1 | 6 | 54,5 | 3 | 27,3 | 1 | 9,1 | | 0,0 | 11 | 26,8 |
| | **3** | **6,4** | **19** | **33,2** | **15** | **38,2** | **3** | **6,9** | **1** | **2,1** | **41** | **100,0** |

**Other:** Absence of support from the managerial authority.

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

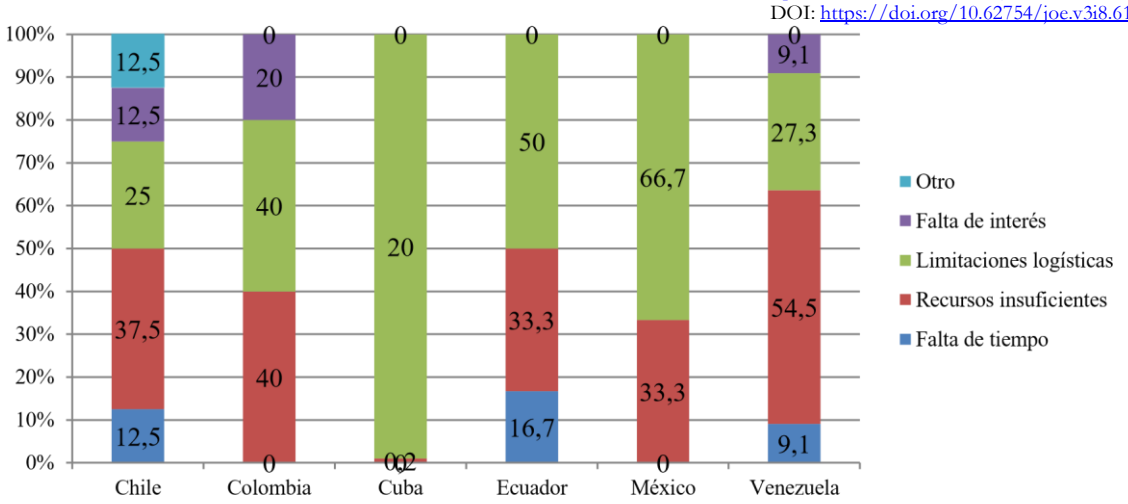



**Figure 5.** Percentage Distribution of the Indicator Difficulties in Participating in Learning Activities in Authentic Environments. in Original Language Spanish

Regarding the main obstacles faced by the surveyed teachers in organizing learning activities in authentic environments, the table shows that of the 41 respondents, 6.4% describe lack of time as the main obstacle, while 33.2% consider insufficient resources as the main critical node. Logistical limitations are incorporated into this finding with 38.2% and lack of interest with 6.9%. In the category of others, 2.1% of respondents believe that the absence of support from the management authority is a major obstacle.

The analysis shows that Venezuela and Cuba stand out for the high proportion of teachers who consider insufficient resources as the main obstacle. Mexico and Ecuador mainly face logistical constraints. Chile and Colombia have a more balanced distribution of obstacles, with a notable presence of insufficient resources and logistical constraints. This result highlights the need to address different types of barriers to improve participation in learning activities in authentic environments in each country.

**Table 6.** Appreciation of Collaboration in Authentic Environments.

| How would you rate collaboration between students during activities in authentic settings? | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **Very bad** | | **Suitcase** | | **Regular** | | **Good** | | **Very good** | | **Total** | |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 0 | 0,0 | 0 | 0,0 | 4 | 50,0 | 3 | 37,5 | 1 | 12,5 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 0 | 0,0 | 2 | 40,0 | 2 | 40,0 | 1 | 20,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 0 | 0,0 | 3 | 60,0 | 1 | 20,0 | 1 | 20,0 | 5 | 12,2 |
| Ecuador | 0 | 0,0 | 1 | 16,7 | 1 | 16,7 | 3 | 50,0 | 1 | 16,7 | 6 | 14,6 |
| Mexico | 0 | 0,0 | 0 | 0,0 | 2 | 33,3 | 4 | 66,7 | 0 | 0,0 | 6 | 14,6 |
| Venezuela | 0 | 0,0 | 0 | 0,0 | 4 | 36,4 | 5 | 45,5 | 2 | 18,2 | 11 | 26,8 |
| | **0** | **0,0** | **1** | **2,8** | **16** | **39,4** | **18** | **43,3** | **6** | **14,6** | **41** | **100,0** |

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

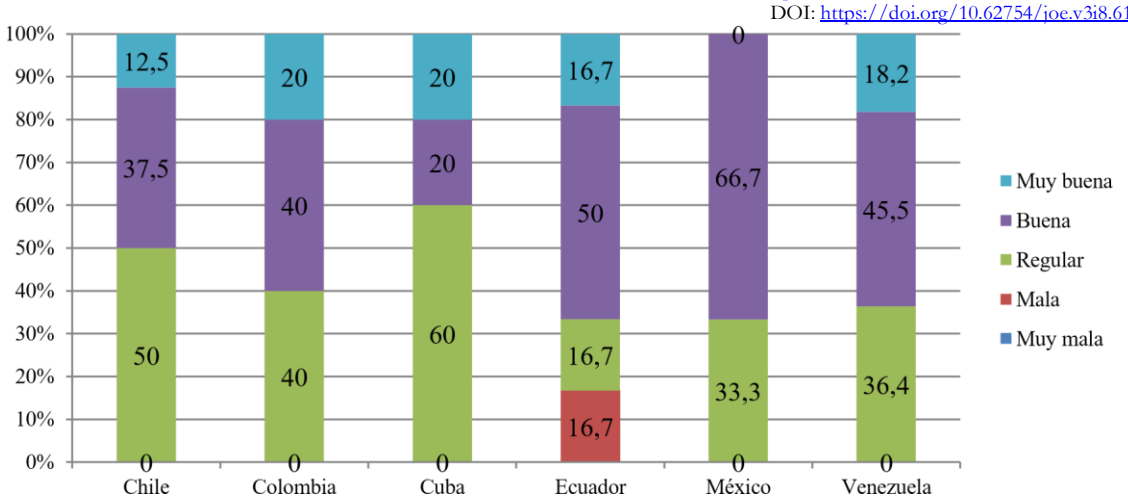



**Figure 6.** Percentage Distribution of the Indicator Assessment of Collaboration in Authentic Environments. in Original Language Spanish

Based on the table above, it can be seen that in general, collaboration between students during activities in authentic environments is considered good. If we look at the percentage that rates collaboration as good or very good, it ranges between 43.3% and 66.7% for most countries. Venezuela and Mexico are the ones with the highest values, with 45.5% and 66.7% respectively rating the collaboration as good and 18.2% and 0.0% rating it as very good. On the other hand, it is striking that in Cuba and Chile a considerable percentage of students rate the collaboration as regular (60.0% and 50.0% respectively). Meanwhile, it is important to continue researching and developing strategies that promote even more effective collaboration among students in these environments.

**Table 7.** Level of Support from Educational Institutions.

| What level of support do you receive from your educational institution to organize learning activities in authentic environments? | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **No support** | | **Little support** | | **Moderate support** | | **Quite a bit of support** | | **Lots of support** | | **Total** |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 0 | 0,0 | 4 | 50,0 | 3 | 37,5 | 1 | 12,5 | 0 | 0,0 | 8 | 19,5 |
| Colombia | 2 | 40,0 | 1 | 20,0 | 2 | 40,0 | 0 | 0,0 | 0 | 0,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 3 | 0,2 | 1 | 20,0 | 1 | 20,0 | 0 | 0,0 | 5 | 12,2 |
| Ecuador | 0 | 0,0 | 1 | 16,7 | 2 | 33,3 | 3 | 50,0 | 0 | 0,0 | 6 | 14,6 |
| Mexico | 2 | 33,3 | 1 | 16,7 | 3 | 50,0 | 0 | 0,0 | 0 | 0,0 | 6 | 14,6 |
| Venezuela | 2 | 18,2 | 4 | 36,4 | 5 | 45,5 | 0 | 0,0 | 0 | 0,0 | 11 | 26,8 |
| | **6** | **15,3** | **14** | **23,3** | **16** | **37,7** | **5** | **13,8** | **0** | **0,0** | **41** | **100,0** |

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

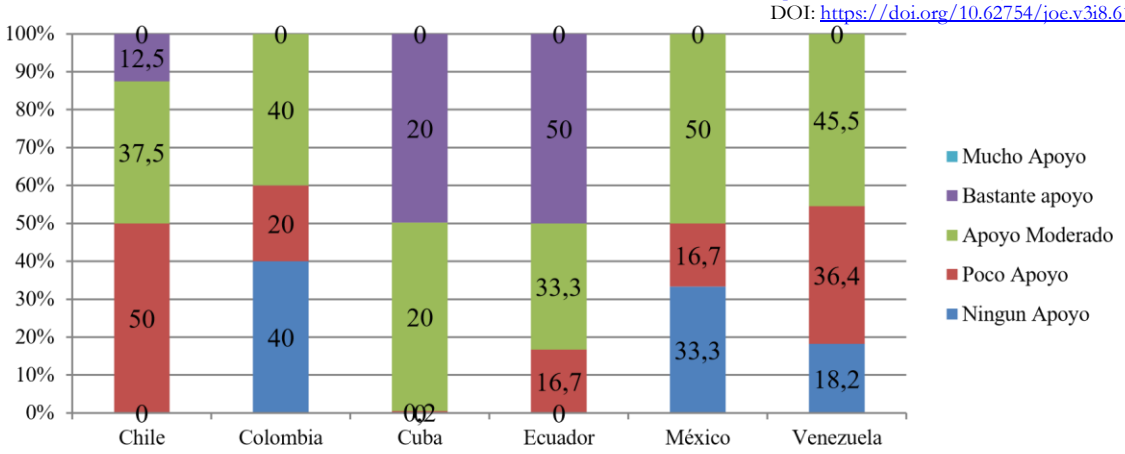



**Figure 7.** Percentage Distribution of the Indicator Level of Support from Educational Institutions. in Original Language Spanish\

Based on the above illustrations that group the results regarding the level of support that teachers receive from their educational institutions to organize learning activities in authentic environments, the analysis reveals that in most of the countries analyzed, institutional support is concentrated in the categories "Low support" and "Moderate support", which cover between 23.3% and 39.0% of cases. For their part, Ecuador and Venezuela are the countries with the highest levels of reported support, with a notable percentage of teachers who receive a lot or moderate support. Chile, Colombia, and Mexico show a predominant perception of little or no support, indicating a possible area for improvement to encourage greater participation in learning activities in authentic environments. Cuba has a high proportion of teachers who perceive little support, although moderate support and a lot of support are also reported. The relevance of the analysis of this item is that innovation in school contexts without the support of management teams has no chance of materializing.

**Table 8.** Frequency in the Assessment of Learning Derived from Authentic Environments.

| How often do you assess your students' learning after activities in authentic settings? | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Parents** | **Never** | | **Rarely** | | **Sometimes** | | **Often** | | **Always** | | **Total** | |
| | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** | **Ago** | **%** |
| Chile | 0 | 0,0 | 1 | 12,5 | 2 | 25,0 | 3 | 37,5 | 2 | 25,0 | 8 | 19,5 |
| Colombia | 0 | 0,0 | 0 | 0,0 | 3 | 60,0 | 2 | 40,0 | 0 | 0,0 | 5 | 12,2 |
| Cuba | 0 | 0,0 | 0 | 0,0 | 2 | 40,0 | 3 | 60,0 | 0 | 0,0 | 5 | 12,2 |
| Ecuador | 0 | 0,0 | 0 | 0,0 | 2 | 33,3 | 3 | 50,0 | 1 | 16,7 | 6 | 14,6 |
| Mexico | 0 | 0,0 | 0 | 0,0 | 2 | 33,3 | 3 | 50,0 | 1 | 16,7 | 6 | 14,6 |
| Venezuela | 0 | 0,0 | 1 | 9,1 | 3 | 27,3 | 6 | 54,5 | 1 | 9,1 | 11 | 26,8 |
| | **0** | **0,0** | **2** | **3,6** | **14** | **36,5** | **20** | **48,7** | **5** | **11,2** | **41** | **100,0** |

**Source:** Research Data Base (2024).

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

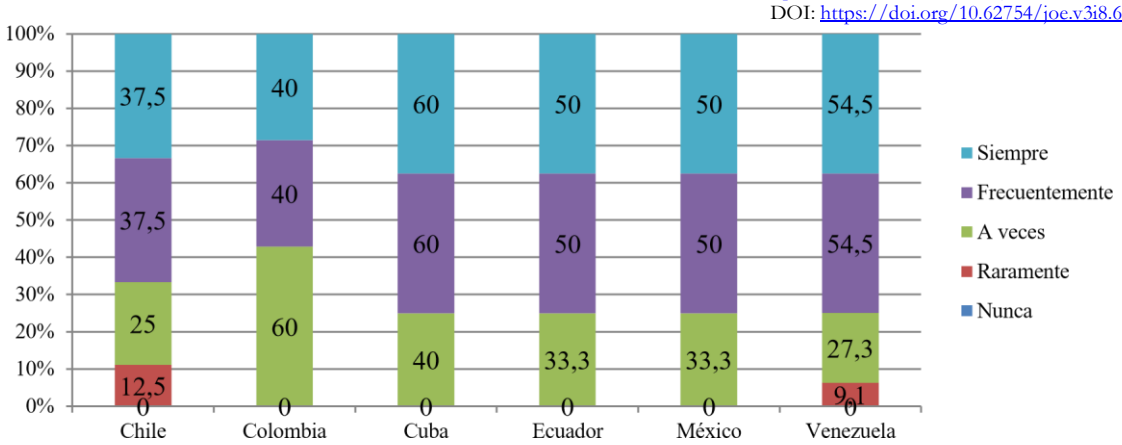



**Figure 8.** Percentage Distribution of the Indicator Frequency in the Evaluation of Learning Derived from Authentic Environments. in Original Language Spanish

In relation to the analysis of responses to the item: How often do you evaluate the learning of your students after activities in authentic environments?, the analysis shows that Venezuela and Cuba are the countries with the highest frequency of evaluation, with a high percentage of teachers who evaluate frequently. Colombia stands out for the high proportion of evaluation at times and the absence of evaluation rarely or always. Chile, Ecuador, and Mexico show similar patterns with a high frequency of evaluation, but also with a significant percentage of teachers who evaluate at times. While learning assessment is an important practice for teachers, the disparity between countries in the frequency with which it is carried out after activities in authentic settings is striking.

## Conclusions

The concluding state of this work describes a synthesis of its main aspects, the implications of the findings and provides a projection of possible future lines of research based on the results of the study.

### Main Aspects

Sustainable learning is an idea that aims to combine knowledge with educational practices in a way that not only facilitates the obtaining of information, but also develops skills and attitudes that last over time and are useful in different situations. The fundamental elements of sustainable learning are highlighted below.

An authentic school environment is an educational space that encourages active and meaningful learning, integrating theoretical knowledge with real situations relevant to students' lives. Rather than approaching learning in isolation, students engage in tasks and projects that replicate real-world challenges and problems. When it comes to science teaching and learning in school contexts, these environments transform the way students learn by connecting scientific concepts to everyday situations, actively participating in tasks and projects that simulate real challenges, allowing them to build a more solid and practical understanding of scientific principles.

In the teaching and learning of science for children and adolescents, the difference between a traditional classroom and an authentic classroom is fundamental. While the traditional classroom focuses on passive teaching methods, where the teacher teaches lessons and students memorize information, the authentic classroom encourages active and meaningful learning, as students participate in projects, experiments, and hands-on activities that connect scientific concepts to real-world situations, facilitating a deeper and more relevant understanding.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

## Implications of the Findings

The results of the study indicate that the adoption of active methodologies, such as project-based learning and hands-on experimentation, is crucial to improve students' understanding and interest in science by increasing their motivation and commitment to learning. Likewise, the research highlights the importance of fostering collaboration and teamwork among students in authentic environments. These skills are essential for their future success in both the academic and professional fields. By tackling real problems and participating in joint projects, students develop critical skills such as problem-solving and critical thinking, better preparing them for the challenges of the modern world in full dialogue with the Skills of the 21st Century.

The findings suggest that personalizing educational content based on students' interests and contexts can significantly increase their engagement and performance. Adapting the curriculum to make it relevant and meaningful to each group of students promotes more effective learning. In addition, allowing students to have a degree of control and decision-making in their projects fosters their autonomy and reinforces their sense of self-efficacy, crucial for autonomous and motivated learning.

The study also underscores the need to implement assessment methods that reflect the authentic approach to learning, such as project- and portfolio-based assessments. These methods allow students to demonstrate their understanding and application of scientific concepts in a more meaningful way than traditional exams. In addition, providing continuous and constructive feedback is essential for students to adjust and improve their learning strategies, promoting a mindset of growth and continuous improvement.

Regarding the implications for teacher training, it is essential that programs include training in active and collaborative teaching methodologies. Teachers must be prepared to design and facilitate dynamic and authentic learning environments. Likewise, encouraging the continuous professional development of teachers is essential for them to stay up to date with best practices and advances in science education, thus ensuring high-quality and relevant teaching for students.

## Projection of Possible Future Lines of Research

A key line of research is to analyse the effectiveness of active methodologies, such as project-based learning and practical experimentation, in diverse cultural and socio-economic contexts. This analysis will allow these methodologies to be adjusted to maximize their effectiveness in different school environments. In addition, it is essential to examine how these methodologies contribute to the development of 21st century skills, such as collaboration and critical thinking, in students of different ages and educational levels, and how these skills influence their academic and professional success.

Another relevant area is to investigate how to adapt the science curriculum to students' interests and contexts and to evaluate the impact of this personalization on their motivation, academic performance, and self-efficacy. It is also important to analyze the effectiveness of authentic assessment methods, such as projects and portfolios, compared to traditional assessments, to understand how these approaches affect the understanding and application of scientific concepts. In addition, it should explore how teacher training and professional development influence the implementation of active and collaborative methodologies in science teaching.

Finally, research should be done on how technology can be used to create authentic learning environments and improve the educational process. Evaluating how digital tools facilitate experimentation, simulation of real problems, and collaboration between students is crucial. In addition, it is important to explore the role of authentic learning environments in promoting educational equity, bridging gaps between different groups of students, and to analyze how these environments impact motivation and attitudes toward science.

Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 13034 – 13047
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.6168

## References

Gutiérrez, Daniel (2015). "Heuristics of Ethnography in the process of research in social sciences". (Yearbook of Social and Cultural Anthropology in Uruguay, ISSN 1510-3846, 2015).

Gutiérrez-Delgado, J., Gutiérrez-Ríos, C., & Gutiérrez-Ríos, J. (2018). Methodological strategies for teaching and learning with a playful approach. Journal of Education and Development, 45(1), 37-46.

Hernández, C. (2005). What are scientific competencies. National Educational Forum, 1-30.

Lliguin Muñoz, A. M., Aman Balseca, D. J., Echeverría Guzmán, Ángel Y., & Castillo Montúfar, C. R. (2024). Programa de formación continua en metodologías activas para mejorar la gestión pedagógica en Básica Superior: Continuing education program on active methodologies to improve pedagogical management in Upper Elementary. Revista Scientific, 9(Ed. Esp. 2), 20–41. https://doi.org/10.29394/Scientific.issn.2542-2987.2024.9.E2.1.20-41

Martínez, E. & Zea, E. (2004). Teaching strategies based on a constructivist approach. Journal of Education Sciences, 2(24), 69-90.

Mestre Gómez, U., Fuentes González, H., & Álvarez Valiente, I. (2012). Didactics as a science: a need for higher education in our times. Praxis Educativa, 8(8), 18-23. https://cerac.unlpam.edu.ar/index.php/praxis/article/view/423

Romero Espinosa, J. M., Vásquez Ramos, M. G., Ortega Jiménez, A. D., & Yaguachi Yanangomez, M. Y. (2024). Impact of classroom climate on the academic performance of second-year students in Ecuador

Ecuador. Magazine Scientific, 9(32), 145–168. https://doi.org/10.29394/Scientific.issn.25422987.2024.9.32.7.145-168