Cortés-Mármol, C., Alcántara-Manzanares, J., & Torres-Porras, J. (2026). Conception of the Sustainability of Schools and Pro-environmental Behaviour of the Educational Community. *Revista de Investigación Educativa, 44.* https://doi.org/ 10.6018/rie.627491

Conception of the Sustainability of Schools and Pro-environmental Behaviour of the Educational Community

Concepción de la sostenibilidad de los centros educativos y comportamiento proambiental de la comunidad educativa

Cristina Cortés-Mármol[1] , Jorge Alcántara-Manzanares and Jerónimo Torres-Porras

Department of Specific Didactics. University of Córdoba (Spain)

Abstract

UNESCO and the UN have promoted a shift in the global perspective on sustainable development, identifying education as a key tool for addressing current environmental issues. However, the educational community's perception of sustainability is rarely analysed as a single construct. Therefore, the objective of this study was to design and validate an instrument to understand and analyse the perception of the importance of sustainability in schools and the pro-environmental behaviour of headteachers, teachers, and families as the main educational agents. This study was conducted with 512 participants (67 headteachers, 263 teachers, and 182 families) from schools in the province of Córdoba (Spain). The results showed that the instrument had optimal psychometric properties, with high average scores for the educational community regarding the importance of sustainability, but average scores for pro-environmental behaviour, with a relationship between the two scales. Teachers had lower scores compared to the other educational stakeholders considered. Women showed a higher average score for pro-environmental behaviour than men, those with training in sustainability showed a

[1] **Correspondence:** Cristina Cortés-Mármol, m02comac@uco.es

higher average score than those without, and no differences were found between eco-schools and other schools. In conclusion, the necessity for ongoing teacher training and the usefulness of the instrument in establishing lines of action that promote the sustainability of the educational community are highlighted.

Keywords: sustainability; management; teachers; families.

Resumen

La Unesco y la ONU han impulsado un cambio en la perspectiva global del desarrollo sostenible, señalando a la educación como una herramienta clave para dar respuesta a la problemática ambiental actual. Sin embargo, la percepción sobre sostenibilidad de la comunidad educativa rara vez se analiza como un único constructo. Por ello, el objetivo de este estudio fue diseñar y validar un instrumento para conocer y analizar la concepción sobre la importancia de la sostenibilidad en los centros educativos y el comportamiento proambiental de las directoras y directores, del profesorado y de las familias como principales agentes educativos. Este estudio se realizó con 512 participantes (67 de dirección, 263 de profesorado y 182 de familias) de centros educativos de la provincia de Córdoba (España). Los resultados mostraron que el instrumento tiene valores óptimos en las propiedades psicométricas, con medias elevadas para la comunidad educativa respecto a la concepción sobre la importancia de la sostenibilidad, pero valores medios respecto a comportamiento proambiental, existiendo relación entre ambas escalas. El profesorado posee menores rangos respecto a los demás agentes educativos considerados. Las mujeres muestran un mayor rango promedio en comportamiento proambiental que los hombres, Las personas con formación en sostenibilidad muestran un mayor rango promedio que quienes carecen de esta formación y no se encuentran diferencias entre las ecoescuelas y el resto de los centros educativos. Como conclusión, se destaca la necesidad de formación continua docente y la utilidad del instrumento para establecer líneas de actuación que favorezcan la sostenibilidad de la comunidad educativa.

Palabras clave: sostenibilidad; dirección; profesorado; familias.

Introduction

Sustainability is a goal pursued by human beings to harmoniously preserve human society on the planet, protecting and providing a good quality of life for future generations (United Nations, 2015). Sustainable development is a process that helps to identify the changes that need to be made in values, management methods, and economic, ecological, and social criteria in order to mitigate global change and adopt a lifestyle in harmony with nature's possibilities (Novo, 2009). A recent systematic review (Isa and Halim, 2023) points out that pro-environmental behaviour is influenced by four factors: social (beliefs about the acceptance of pro-environmental behaviour in one's immediate environment), economic (the cost of ecological products or services), cultural (values and norms) and individual (environmental awareness).

Environmental awareness is the knowledge of human actions that have a positive or negative impact on the environmental balance (Rubina et al., 2020). Environmental knowledge is essential for raising awareness about the environment and influencing pro-environmental behaviour (Ridwan et al., 2023). From a more holistic view of the concept, environmental awareness integrates knowledge, perceptions, behaviours and attitudes (Laso Salvador et al., 2019). However, knowledge about sustainability issues does not in itself lead to measures to address these issues (Van Poeck et al., 2024). Therefore, a high level of environmental awareness and is not sufficient for pro-environmental actions to be taken (Mejía, 2020). Pro-environmental behaviour is defined as a set of actions taken by individuals to improve sustainability (Venhoeven et al., 2016).

The study by Rivera-Torres and Garcés-Ayerbe (2024) highlights the existence of different individual profiles of pro-environmental behaviour depending on the number and variety of pro-environmental actions they carry out. Thus, the actions of people with a low level of involvement focus on recycling. The actions of people with a low-medium level of involvement are also aimed at recycling, but some also focus on saving water, saving energy and avoiding the purchase of polluting products. Finally, the actions of people with a medium-high level of involvement are more diverse and intense. Examples of this are the purchase of green products or reducing car use.

Education is a key tool for responding to current environmental issues (Aznar et al., 2018), and including sustainability in education is necessary to ensure social justice (Olsson et al., 2022). Sustainable education aims to equip people with the knowledge, skills and values that will enable them to contribute effectively to building a sustainable future (Abdallah et al., 2024). The Action Plan for Environmental Education for Sustainability 2021-2025 (Ministry for Ecological Transition and Demographic Challenge, 2021) establishes the need to coordinate initiatives and launch new actions in the field of environmental education. The study conducted by Poza-Vilches et al. (2022) shows that some universities have difficulties in addressing sustainability from a global perspective that involves methodological change. Education for Sustainable Development requires schools and their agents to incorporate sustainability into their daily work (Guzmán Cáceres and Ortiz Flores, 2019). Consequently, the multiple agents of the educational community (management teams, teachers and families) must be involved, with shared responsibility (Andrés and Giró, 2016).

The headteacher, as an educational leader, is reflected in successful practices that should have an impact on improving the school, teaching practices and student learning (Bolívar, 2015). The role assumed by school leaders is fundamental to working towards social justice and sustainable development (Hernández-Castilla et al., 2020). One of the functions of school management is to make schools more environmentally friendly, which means transforming their organisation, content and the relationships between the people who form part of them, so that they are consistent with the approaches of models based on sustainability (Sanmartí and Pujol, 2002). Most schools

are favourable towards initiating school sustainability processes, as they have an environmental policy that is reflected in curricular activities, programmes and regulations, among other things. However, the culture of sustainability is not widespread in educational centres (Aznar, 2009). For their part, Ochoa-Ávila et al. (2016) warn that the shortcomings found in the environmental management of schools are harmful to the environment.

Research by Cortés-Mármol et al. (2019) shows that the concept of sustainability held by headteachers in Córdoba (Spain) is not related to their management of sustainability in the schools they run. 79.4% of the headteachers participating in the study did not carry out eco-audits to facilitate the detection of environmental needs and problems, 61.8% of the subjects responded that they did not have an organised system of measures to control water consumption in their school, 52.9% stated that they did not have a system of measures to control energy consumption, 58.8% did not coordinate and/or participate in projects to create curriculum materials related to sustainability, and 52.9% did not participate in research projects on environmental education and sustainable development. Furthermore, it has been identified that educational communities do not conceive of the environment as a dynamic interaction between its biophysical or social elements, but rather associate it solely with the natural environment and elements of the ecosystem (Jaramillo et al., 2017). Rendón López et al. (2018) emphasise the importance of taking into account all dimensions of sustainable development in education (social, economic, ecological and cultural), both locally and globally.

Teachers are another key educational agent in improving the sustainability of educational centres. Today's society demands competent and committed teachers to promote sustainability and Education for Sustainable Development (Timm and Barth, 2021). However, their vision of environmental education revolves mainly around the environmentalist, more naturalistic aspect. Teachers with this conception of environmental education must seek to address the environmental dimension from all perspectives of analysis and reflection: social, cultural, moral, economic and political (Galvis et al., 2019). Education for Sustainable Development as a teaching approach is effective in developing action skills for sustainability among students (Olsson et al., 2022).

Teacher training in sustainability is essential for the knowledge and implementation of educational interventions that contribute to sustainable social development (Arredondo-Cortés, 2020). Teaching strategies such as school patrols, recycling, informative posters, and school gardens should be used frequently in schools to strengthen students' environmental values (Eslava-Zapata et al., 2018). Likewise, providing educational spaces in which reasoning and action are put into practice, following observation and reflection, is essential for addressing the current sustainability crisis (Van Poeck and Östman, 2020). Therefore, it is necessary to address sustainability-related content from a multidimensional and interdisciplinary approach,

as students are sometimes unaware that our lifestyle affects elements of the environment, such as water (Pozo-Muñoz et al., 2023).

The family and school are the main educational agents, and collaboration and co-responsibility between them are essential to ensure a coherent educational context for students (Egido, 2015). Various studies (Azpillaga et al., 2014; Bartau et al., 2019; Reparaz and Naval, 2014) have shown that when schools involve the diversity of family members and agents involved in the context in decision-making, a positive impact is achieved. However, the study by Rodrigo-López et al. (2018) warns that families consider their level of collaboration to be lower than that indicated by teachers. Other research agrees that family collaboration in schools decreases as students get older (Alonso-Carmona, 2019; Beneyto et al., 2018; López-Larrosa et al., 2019). On the other hand, mothers are more involved than fathers (Alonso-Carmona, 2019; Rodrigo-López et al., 2018).

The Eco-Schools programme aims to improve sustainability in schools by conducting a self-analysis and correcting any deficiencies found, thereby improving educational practices related to sustainability (Díaz-Durán and García-Aguilera, 2013). However, there are several weaknesses evident in Eco-Schools. These include a lack of environmental awareness, external incentives and motivation among teaching staff, passivity, apathy and poor training among teachers, and a lack of a culture of sustainability in everyday matters, etc. (Gracia et al., 2023; Perales-Palacios et al., 2014).

Understanding the concept of sustainability in schools and the pro-environmental behaviour of management, teaching staff and families is essential for promoting sustainable management strategies, identifying training needs, learning about educational interventions with a positive impact on sustainable development, and establishing links for action and channels of collaboration with families. All these actions will promote environmental education and sustainability in schools, thereby contributing to improving the pro-environmental behaviour of society. The lack of instruments in the literature review makes the first general objective of this study necessary: the generation and validation of two scales to facilitate the collection of information on the perception of the importance of sustainability in schools and the pro-environmental behaviour of the educational community. Once both scales have been validated, it is appropriate to use them to analyse the information obtained with them so that their results can provide evidence that contributes to the development of proposals for improving the sustainability of educational centres. Consequently, the specific objectives of this research are:

1. To understand the educational community's perception of the importance of sustainability in educational centres.
2. To identify the pro-environmental behaviour of the educational community.
3. To establish whether there is a relationship between the educational community's conception of the importance of sustainability in educational centres and its pro-environmental behaviour.

4. To assess whether there are differences between the participating groups (management, teachers, families) with regard to the results of both scales.
5. To analyse the possible existence of significant differences in the perception of the need for sustainability in educational centres and pro-environmental behaviour, taking into account different variables (gender, training, membership of the Andalusian Eco-Schools Network).

The hypotheses arising from these objectives are as follows:

1. The educational community's conception of the importance of sustainability in schools is high.
2. The pro-environmental behaviour of the educational community is high.
3. There is a significant and positive relationship between the educational community's perception of the importance of sustainability in schools and its pro-environmental behaviour.
4. There are differences in both scales between the three groups, with headteachers having a higher perception than teachers and families regarding the importance of sustainability in schools and pro-environmental behaviour.
5. There are differences according to different variables, with higher values for females, those with training and those belonging to the Andalusian Eco-Schools Network.

Method

Participants

The sample was selected through incidental sampling, based on individuals' interest in the research, and consisted of 512 members of the educational community in the province of Córdoba (28.71% men and 71.29% women), aged between 23 and 65 (M_{age} = 45.54 years, *SD* = 8.42). The participants belonged to public (75.4%), private (1.8%) and state-subsidised private (22.8%) schools, of which 24% were in rural areas and 76% in urban areas. In addition, 29.5% of all educational centres participated in the Andalusian Eco-Schools Network (hereinafter RAE), compared to 41.4% that did not participate and 29.1% that did not know whether their centre participated in the RAE. On the other hand, 25.8% of all schools participated in the Aldea programme, compared to 43% that did not participate and 31.2% that did not know whether their school participated in the Aldea programme.

The sample was divided into three groups: 13.08% headteachers (n_1= 67), 51.37% teachers (n_2= 263) and 35.55% families (n_3= 182). The first group had an average age of almost 51 ($M_{(age)}$= 50.99 years, *SD* = 9.05, 37.3% men and 62.7% women), the teaching staff over 45 years old (M_{age}= 45.13 years, *SD* = 9.41, 33.5% men and 66.5% women) and the respondents representing families, just over 44 years (M_{age}= 44.13 years, *SD* = 5.39, 18.7%

men and 81.3% women). 26.9% of headteachers ($n_{(1)} = 18$), 20.5% of teachers ($n_{(2)} = 54$) and 19.2% ($n_{(3)} = 35$) had training in sustainability.

Instruments

The instrument consists of three sections: sociodemographic data, the *Scale of the educational community's conception of the importance of sustainability in educational centres*, and the *Scale of pro-environmental behaviour for sustainability.*

Sociodemographic data

The sociodemographic data collected refers to the characteristics of the members of the educational community in schools in the province of Córdoba (Spain). This data is as follows: sector or group to which they belong (management, teaching staff or families), gender, age, academic training, academic specialisation, whether or not they have received specific training in sustainability, ownership of the school (public, private or state-subsidised), type of centre (rural or urban), location of the centre, whether or not the centre belongs to the RAE and whether or not the centre participates in other activities of the Aldea Programme.

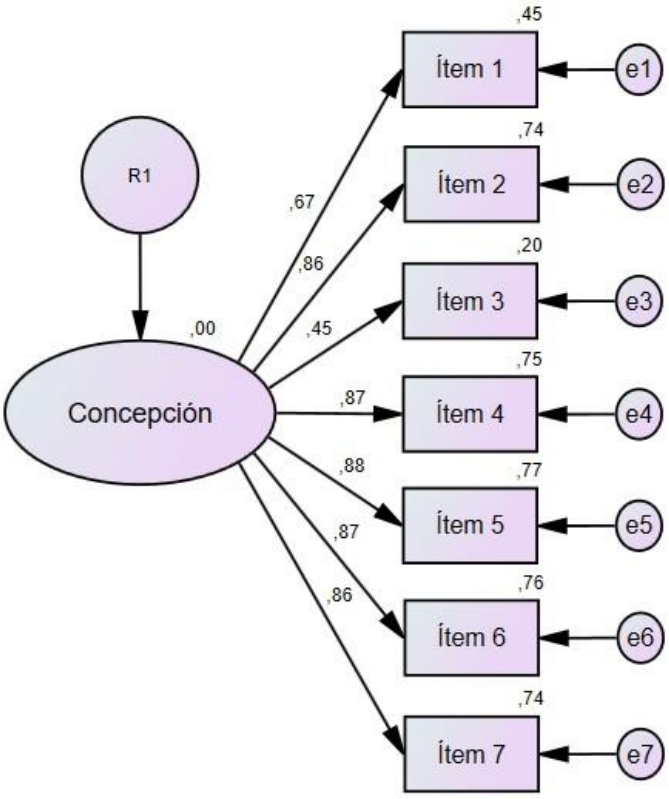
Scale of the educational community's perception of the importance of sustainability in educational centres

This scale aims to determine the importance that the educational community attaches to sustainability in educational centres (specific objective 1). It consists of seven Likert-type response items ranging from 1 to 5, where 1 is "Strongly disagree" and 5 is "Strongly agree".

The exploratory factor analysis resulted in a KMO of 0.926 and the variance explained by one factor was 63.75%. The scores on the different fit indices of the confirmatory factor analysis (CFA) are also adequate ($\chi 2 = 7.763$; df = 14; p = .901; CMIN/df = .555; NFI = .994; TLI = 1; CFI = 1; RMSEA = .000). Finally, Cronbach's alpha and McDonald's omega show high reliability of the scale ($\alpha = .89$ and $\Omega = .89$). Figure 1 shows the representation of the scale model after CFA.

Figure 1

Structure of the factorial model of the Scale of the educational community's conception of the importance of sustainability in educational centres.



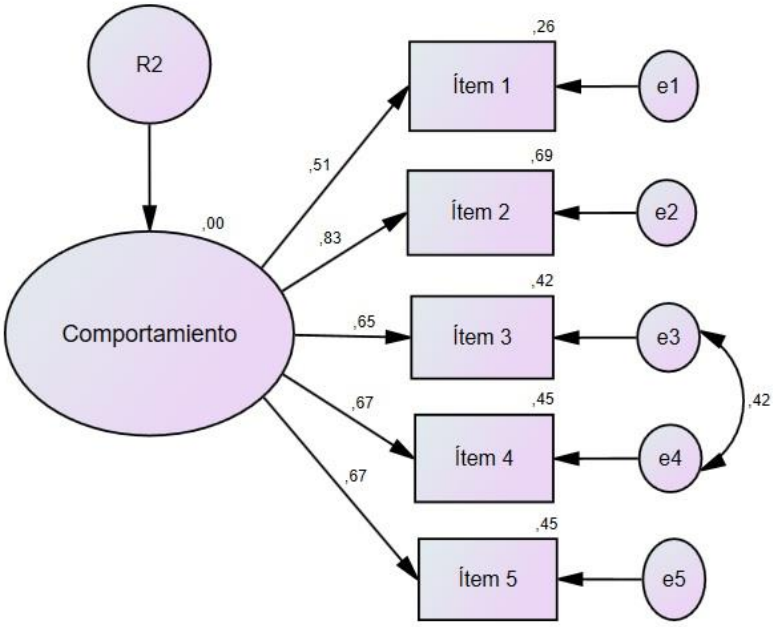
Pro-environmental behaviour scale for sustainability

This scale seeks to determine the pro-environmental behaviour for sustainability of members of the educational community (specific objective 2). It consists of five Likert-type response items ranging from 1 to 5, where 1 is "Strongly disagree" and 5 is "Strongly agree".

Exploratory factor analysis yielded a KMO of 0.808 and the variance explained by one factor was 57.25%. On the other hand, confirmatory factor analysis shows that the data obtain good scores on the different fit indices ($\chi 2 = 3.21$; df = 4; p = .506; CMIN/df = .803; NFI = .992; TLI = .1; CFI = 1; RMSEA = .000). Finally, Cronbach's alpha and McDonald's omega show high reliability of the scale (α = .804 and Ω = .804). Figure 2 shows the representation of the scale model after CFA.

Figure 2

Structure of the model of the Pro-Environmental Behaviour Scale for Sustainability.



Procedure

The study is descriptive in nature, and data collection was carried out using a survey as the instrument.

The procedure began with the creation of two questionnaires (the *Scale of the educational community's conception of the importance of sustainability in educational centres* and the *Scale of pro-environmental behaviour for sustainability*).

The instrument was reviewed by a group of experts in education for sustainability consisting of ten university professors in the field of Education Sciences, belonging to the departments of Specific Didactics (Didactics of Natural Sciences and Social Sciences), Environmental Psychology and Education, with a minimum of 10 years' experience, who were asked about the consistency, relevance and clarity of the items. Subsequently, Aiken's V was applied to these expert assessments, with values above 0.8 for the different items, reflecting a high degree of agreement, and the initial questionnaire was modified where necessary following the experts' recommendations.

All educational centres in the province of Córdoba were contacted by email and then followed up a second time by contacting some of them again by telephone and through their AMPAS (the contacts provided on the centres' websites). Participants were informed

that the data obtained would be analysed for scientific purposes only and under the confidential and ethical-professional commitment of the researchers, following the ethical standards of the Declaration of Helsinki. The instruments used in this research have been approved by the Human Research Ethics Committee (CEIH), as part of the Bioethics and Biosafety Committee of the [Hidden] (CEIH-22-39).

Data analysis

To statistically validate both questionnaires, exploratory factor analyses were performed using SPSS 29.0 (IBM, 2022) and confirmatory analyses were performed using SPSS Amos software (IBM, 2022), which allowed the definitive scales to be identified. These were finally subjected to Cronbach's alpha and McDonald's omega reliability analyses using SPSS 29.0 software (IBM, 2022).

To analyse the perception of management, teachers and families regarding their conception of sustainability in educational centres and pro-environmental behaviour (objectives 1 and 2), a Kolmogorov-Smirnov normality test was first performed. It was found that the data did not follow a normal distribution. Therefore, non-parametric statistics were used.

Secondly, the mean and standard deviation of each scale as a whole and of each item in particular were found using basic descriptive statistics.

Thirdly, Pearson's correlation coefficient was used to analyse whether there is a correlation between the concept of sustainability in educational centres and pro-environmental behaviour (objective 3).

Finally, to assess whether there are differences between the results on both scales for management, teachers and families (objective 4), and to identify which of the sociodemographic variables considered could be determinants of the concept of sustainability and pro-environmental behaviour (objective 5), the Kruskal-Wallis H and Mann Whitney U statistics were used.

All statistical analyses were performed using SPSS 29.0 software (IBM, 2022).

Results

With regard to the first objective, it can be seen that the average *score on the educational community's perception of the importance of sustainability in schools* is high, with a value of 4.13 out of 5 and a standard deviation of 0.73. As can be seen in Table 1, the results of the items range from medium-high to high values.

Table 1

Mean (M) and standard deviation (SD) of the items on the Scale of the educational community's perception of the importance of sustainability in educational centres.

	M	SD
Average PERCEPTION	4.13	.735
I see sustainability as a priority within the exercise of management functions.	3.88	.981
I believe that educational institutions should contribute to solving environmental problems.	4.23	.895
I believe that communicating environmental sustainability planning in schools is not relevant.	3.83	1.267
I consider it necessary to implement effective and efficient resource management measures in educational centres.	4.29	.828
I believe that educational innovation in sustainability is essential in the management of a school.	4.08	.912
I believe that training teachers in sustainability is fundamental to the effectiveness of education in this area.	4.18	.941
I believe that working on sustainability in the classroom can increase sustainable behaviour among students.	4.41	.799

With regard to the second objective, the average score on the *Pro-Environmental Behaviour Scale for sustainability* is 3.43, with a standard deviation of 0.84, as can be seen in Table 2.

Table 2

Mean (M) and standard deviation (SD) of the items on the Pro-Environmental Behaviour Scale for sustainability.

	M	SD
Mean BEHAVIOUR	3.43	.845
I often buy second-hand goods.	3.11	1.291
I avoid buying products from companies that do not care for their employees or the environment.	3.41	1.145
Most of the products I buy are locally produced.	3.33	1.042
I usually shop at neighbourhood shops rather than large supermarkets.	3.50	1.087
I prefer to buy items with little or no packaging.	3.81	1.060

The average values are lower than those presented in the previous scale, and the DT values are, for the most part, higher.

The third objective of this study is to establish whether there is a relationship between the educational community's perception of the importance of sustainability in schools and their pro-environmental behaviour. Pearson's correlation analysis has identified a significant positive correlation between the average score on the scale measuring perceptions of sustainability in schools and the average score on the scale measuring pro-environmental behaviour, albeit with a small effect size (Table 3).

Table 3

Results of Pearson's correlation analysis between the average perception of the importance of sustainability in educational centres (Perception) and the average pro-environmental behaviour (Behaviour).

		Conception	**Behaviour**
Average Conception	**Pearson correlation**	1	.269**
	Sig. (two-tailed)		.000
Average Behaviour	**Pearson correlation**	.269(**)	1
	Sig. (two-tailed)	.000	

The fourth objective of the research focuses on assessing whether there are differences between the participating groups (management, teachers, families) with regard to the results of both scales, finding that there are indeed differences. Headteachers have higher rankings in relation to the importance of sustainability in educational centres, with teachers having the lowest ranking. On the other hand, teachers are also the group that ranks lowest in pro-environmental behaviour (Table 4). Therefore, it is the group of teachers that attaches less importance to the sustainability of the school and, in turn, exhibits less pro-environmental behaviour.

Table 4

Results of the analysis of significant differences between the different members of the educational community (management, teaching staff and families) in the average perception of the importance of school sustainability (Perception) and the average pro-environmental behaviour (Behaviour) of the different educational agents.

	Rank			Kruskal Wallis H	p
	Management	Teaching staff	Families		
Concepción	290.48	235.13	274.88	11,916	.003
Performance	274.42	238.91	275.32	7,689	.021

The final objective is to analyse the possible existence of significant differences on both scales, i.e., in the conception of the importance of sustainability in educational centres and pro-environmental behaviour, taking into account different variables such as gender, training in sustainability and also with regard to the variable of belonging to the RAE.

There are no differences between men and women on the first scale, however, we do find differences on the second scale of behaviour at the community level, although not within the subgroups (Table 5).

Table 5

Results of the analysis of significant differences between women (W) and men (M) in the average perception of the importance of sustainability in the educational centre (Perception) and the average pro-environmental behaviour (Behaviour).

	Rank		Mann-Whitney U	Wilcoxon W	Z	p	N
	M	H					
Concepción Community	263.01	240.35	24,453.00	35,331.00	-1,573	,116	512
Concepción Address	36.12	30.44	436,000	734,500	-1,162	,245	67
Concepción Teaching	135,71	124.61	7,050,000	10,966.00	-1,120	,263	263
Concepción Families	90.91	94.06	2,429,000	16,455.00	-,315	,752	182
Behaviour Community	266.62	231.37	23,133.500	34,011.500	-2,446	**,014**	512
Performance Management	36.75	29.38	409,500	734,500	-1,501	,113	67
Conduct Teaching Staff	137,77	120.52	6690.000	10,606.00	-1,741	,082	263
Performance Families	92.09	88.91	2,428,000	3023.000	-,319	,750	182

Significant differences have been found in terms of sustainability training, both in the average score on the scale measuring the importance of sustainability in educational centres and in the average score on the scale measuring pro-environmental behaviour. People with sustainability training (N = 107) have higher averages in both cases than those who have not received such training (N = 405), as shown in Table 6. Furthermore, within the subgroups, it is the teaching staff who show differences according to training on both scales and, as shown above, they were the group with the lowest scores on both scales, which shows the influence of training on this group.

Table 6

Results of the analyses of significant differences between people with sustainability training (Yes) and people without training (No) in the average conception of the importance of sustainability in the educational centre (Conception) and the average pro-environmental behaviour (Behaviour).

	Rank		Mann-Whitney U	Wilcoxon W	Z	p	N
	Yes	No					
Concepción Community	294.30	246.51	17,623.00	99,838.00	-2,982	**,003**	512
Concepción Head Office	36.81	32.97	390,500	1,615,500	-0.720	,472	67
Concepción Teaching	158.16	125.24	4,230,500	26,175.50	-2,844	**,004**	263
Concepción Families	104.36	88.44	2,122,500	13,000.50	-1,614	,107	182
Behaviour CCommunity	303.45	244.10	16,643.50	98,858.50	-3,702	**,000**	512
Performance Management	40.50	31.61	324,000	1,549,000	-1,659	,097	67
Conduct Teaching Staff	156,39	125.70	4,326,000	26,271.00	-2,651	**,008**	263
Behaviour Families	106.71	87.88	2040,000	12,918.00	-1,907	,056	182

On the other hand, no significant differences were found in the perception of the importance of sustainability in educational centres, nor in the pro-environmental behaviour of the subjects whose centres are included in the RAE (Yes), those that are not (No) and those who do not know whether they belong or not (I don't know), contradicting the hypothesis that this variable would have a significant influence, as can be seen in Table 7.

Table 7

Results of the analysis of significant differences between people who are in centres that belong to the RAE (Yes) and those who are in centres that do not belong to the RAE (No).

	Rank			Kruskal Wallis H	p	N
	Yes	No	I don't know			
Concepción Community	262.38	245.61	266.04	2,022	,364	512
Concepción Address	36.21	33.42	-	.232	.630	67
Concepción Teaching	143.97	124,64	130.22	3,375	,185	263
Concepción Families	87.50	91.56	93.52	,445	,801	182
Performance Community	261.31	252.18	257.77	,353	.838	512
Performance Management	35.11	33.71	-	.057	.811	67
Conduct Teaching Staff	140.63	132.13	116.52	3.157	.206	263
Behaviour Families	87.03	91.42	93.81	.562	.755	182

Discussion and conclusion

Increasing individuals' level of environmental awareness is essential to providing a suitable environment for future generations (Bedolla Solano et al., 2016). Society's involvement in environmental issues is essential for progress towards sustainability (Juárez-Hernández et al., 2019). The instrument formed by the scales: *Scale of the educational community's conception of the importance of sustainability in educational centres and Scale of pro-environmental behaviour for sustainability* contributes to systematising the measurement of the level of awareness of the importance of sustainability in educational centres, as well as the pro-environmental behaviour of the main agents that influence the education of children.

The results relating to the first objective of the study highlight that the educational community has a high perception of the importance of sustainability in educational centres, thus confirming the first hypothesis. Although people may have knowledge about sustainability issues, this does not always translate into sustainable actions to address these issues (Van Poeck et al., 2024). Consequently, a high level of environmental awareness is not sufficient for pro-environmental actions to be carried out (Mejía, 2020). However, having a high regard for the importance of sustainability in schools is essential for developing sustainable behaviours and attitudes, as environmental awareness integrates knowledge and perceptions (Laso Salvador et al., 2019).

The pro-environmental behaviour of the educational community (the second objective of this research) is identified as medium-high, which partially confirms the second hypothesis. The results also reveal that the actions of people with a medium-high level of involvement are diversifying and intensifying, as evidenced by other recent

research (Rivera-Torres and Garcés-Ayerbe, 2024). Examples of this include buying second-hand products or purchasing mainly locally produced goods. High pro-environmental behaviour is vitally important in contributing to the goal set by the United Nations (2015) of protecting the environment and conserving ecosystems in order to ensure a good quality of life for future generations.

On the other hand, the results confirm that there is a relationship between the perception of the importance of sustainability in schools and pro-environmental behaviour (the third objective of this research), which implies a relationship between personal actions and the vision of an educational centre. This is essential for exerting influence and planning actions that should address the promotion of pro-environmental behaviour.

Furthermore, significant differences have been found between the groups within the educational community: headteachers, families and teachers (fourth objective of this research). Education for Sustainable Development involves a strategy for action by the school in general (Hernández-Castilla et al., 2020), but the research focuses on management teams with a new educational approach as privileged individuals for school improvement (Wang, 2016). The headteacher therefore plays a critical role in building the culture necessary for improvement processes. For this reason, they are more aware of the need for sustainability in schools, and their pro-environmental behaviour is consistent with this, as demonstrated by the results obtained in this research.

However, some people who manage educational centres do not manage the sustainability of the centres they run in a manner consistent with their conception of the importance of sustainability in them (Cortés-Mármol et al., 2019). Nevertheless, the results obtained provide new and encouraging data on the exercise of the management function, as headteachers are the agents in the educational community with the greatest understanding of the importance of sustainability in educational centres, as well as high pro-environmental behaviour (fourth objective of the study).

In turn, the results for teachers are noteworthy, as they are the group in the educational community with the lowest scores on both scales, i.e., they consider the sustainability of educational centres to be of lesser importance and, at the same time, they are the group that exhibits the least pro-environmental behaviour. There must be competent and committed teachers to promote sustainability and Education for Sustainable Development (Timm and Barth, 2021), as they are a fundamental part of the path to sustainability. However, as we will discuss below, continuous teacher training is essential in the field of sustainability.

Finally, with regard to the fifth objective of the research, the existence of significant differences in the conception of the need for sustainability in educational centres and pro-environmental behaviour according to different variables such as gender, training or membership of the RAE, the results show that there are differences between women and men in general in the educational community in terms of pro-environmental behaviour, with women being more committed. Similarly, the study by Severino-González et al. (2020) shows that women exhibit more socially responsible sustainable

behaviour than men. For their part, Brough et al. (2016) showed that men avoid demonstrating green or pro-environmental behaviour and warned of the presence of stereotypes, masculine identity with the absence of pro-environmental behaviour, and in the case of women, a greater relationship between feminine identity and pro-environmental behaviour.

The perception of the importance of sustainability in educational centres and the pro-environmental behaviour of individuals whose centres are included in the RAE do not show significant differences from those who are not included or those who do not know whether or not they belong. The lack of environmental awareness, motivation among teaching staff, insufficient training in sustainability for teachers, and the lack of a culture of sustainability in everyday matters, among others, are some of the weaknesses identified by Eco-Schools (Perales-Palacios et al., 2014) and could be the reasons for the lack of differentiation between some schools and others, as expected according to our hypothesis.

Subjects with training in sustainability show significant differences in their understanding of the importance of sustainability in educational centres, as well as in their pro-environmental behaviour, compared to subjects without training in sustainability. Teachers with sustainability training are the educational agents with significant differences. These results highlight the importance of sustainability training in understanding current environmental issues and influencing pro-environmental behaviour (Ridwan et al., 2023). Training teachers on sustainability is essential for them to contribute effectively to education for sustainability (Arredondo-Cortés, 2020). Educating for sustainability is educating for social justice (Olsson et al., 2022). Educating a conscious and critical citizenry through the Sustainable Development Goals offers the possibility for young people to become the main agents of change (Vila et al., 2018). Building a sustainable future depends on education for sustainability, through which people acquire knowledge, skills and values related to sustainability (Abdallah et al., 2024). Hence, people with training in sustainability show greater environmental awareness and more pro-environmental behaviour than people without training in sustainability. This highlights the need to create and facilitate training for active teachers, i.e. continuous or lifelong training, focused on updating and improving the skills and knowledge of practising teachers on education for sustainability.

We can conclude that the instrument formed by the scales: *Scale of the educational community's conception of the importance of sustainability in educational centres* and *Scale of pro-environmental behaviour for sustainability* is an effective diagnostic tool for educational centres and administrations to assess the current situation of educational centres from a sustainability perspective, considering the conception of the main educational agents.

There is a clear need to promote sustainable management strategies in schools, establish links for action and channels of collaboration with families, carry out educational interventions with a positive impact on sustainable development, and implement training related to sustainability for members of the educational community. Consequently, all

these actions could promote environmental education and sustainability in schools, while also contributing to improving the pro-environmental behaviour of society.

This research achieves its objectives, but it has limitations. The first would be the geographical scope. In order to establish more general results, the study could be extended using the same validated instruments to a geographical area within an autonomous community. Furthermore, it could be complemented with a qualitative study to provide more information on the different groups within the educational community. The results of the research open up relevant and necessary avenues for future research. The first should address the study of the impact of environmental awareness as a mediating variable in improving conceptions of teaching and learning issues related to sustainability in educational centres. A second line of research would be aimed at developing educational strategies and teaching resources geared towards increasing levels of environmental awareness. Another possible line of research that can be carried out with these validated instruments is to determine the relationship between the conception of the importance of sustainability and the pro-environmental behaviour of the educational community and the environmental awareness of schoolchildren, in order to assess its influence. Finally, the lack of significant differences between schools participating in the Aldea or Ecoescuela programmes and those not participating in these programmes highlights the priority of establishing another possible line of research for the education authorities and clarifying the causes of this absence of differences, analysing the impact of these programmes, evaluating their effectiveness and possible modifications for improvement.

References

Abdallah, A. K., Ismail, L. S., & Ismail, O. A. S. (2024). Foundations of Sustainability Education. Advances in human services and public health. In E. M. Alqodsi & A. K. Abdallah (Eds.), *Legal Frameworks and Educational Strategies for Sustainable Development* (pp. 185-208). IGI Global. https://doi.org/10.4018/979-8-3693-2987-0.ch011

Alonso-Carmona, C. (2019). Parental involvement, cultural capital and filial trajectory. Discursive practices and strategies. *International Journal of Sociology, 77*(3), e132. https://doi.org/10.3989/ris.2019.77.3.18.024

Andrés, S. C. and Giró, J. M. (2016). Family participation in school: a complex issue. *Journal of Programme and Public Policy Evaluation, 1*(7), 28-47. https://doi.org/10.5944/reppp.7.2016.16302

Arredondo-Cortés, S. A. (2020). Education and teacher training for sustainable social development: a commentary from socio-formation. *Religación, 5*(24), 39-48. https://doi.org/10.46652/rgn.v5i24.638

Aznar, P. M. (2009). School and sustainable human development: educational challenges at the local level. *Theory of Education. Interuniversity Journal, 14*, 151-183. https://doi.org/10.14201/2988

Aznar, P. M., Calero, M., Martínez-Agut, M. P., Mayoral, O., Ull, À., Vázquez-Verdera, V., & Vilches, A. (2018). Training Secondary Education Teachers through the Prism of Sustainability: The Case of the Universitat de València. *Sustainability, 10*(11), 4170. https://doi.org/10.3390/su10114170

Azpillaga, V. L., Intxausti, N. I., & Joaristi, L. O. (2014). Involvement of families in highly effective schools in the Basque Autonomous Community. *Bordón, 66*(3), 27–37. https://doi.org/10.13042/Bordon.2014.66302 Bartau, I. R., Azpillaga, V. L. and Aierbe, A. B. (2019). Family-school-community collaboration according to secondary school management teams. *Journal of Educational Research, 17*(2), 86-102. https://bit.ly/3ZGswIU

Bartau, I., Azpillaga, V., and Aierbe, A. (2019). Family-school-community collaboration according to secondary school management teams. *Journal of Educational Research, 17*(2), 86-102. https://bit.ly/3ZGswIU

Bedolla Solano, R., Miranda Esteban, A., Bedolla Solano, J. J., and Castillo Elías, B. (2016). Environmental education for sustainability to be considered in curriculum design. *Atlante. Education and Development Notebooks*, *2*. https://www.eumed.net/rev/atlante/2016/02/curriculo.html

Beneyto, M., Castillo, J., Collet-Sabé, J. and Tort, A. (2018). Can schools become an inclusive space shared by all families? Learnings and debates from an action research project in Catalonia. *Educational Action Research, 27*(2), 210-226. https://doi.org/10.1080/09650792.2018.1480401

Bolívar, A. B. (2015). Pedagogical leadership in a learning community. *Parents and Teachers,* (361), 23-27. https://doi.org/10.14422/pym.i361.y2015.004

Brough, A. R., Wilkie, J. E. B., Ma, J., Isaac, M. S., & Gal, D. (2016). Is Eco-Friendly Unmanly? The Green-Feminine Stereotype and Its Effect on Sustainable Consumption. *Journal of Consumer Research, 43*(4), 567–582. https://doi.org/10.1093/jcr/ucw044

Cortés-Mármol, C., Alcántara-Manzanares, J., & Torres-Porras, J. (2019). Educational leadership in sustainability. In J. A. Marín Marín, G. Gómez García, M. Ramos Navas-Parejo and M. N. Campos Soto (Eds.), *Inclusion, Technology and Society. Research and Innovation in Education* (pp. 1803-1815). Dykinson.

Díaz-Durán, M. D., & García-Aguilera, F. J. (2013). Environmental education and sustainable development: programmes, opportunities and proposals. In J. C. Tójar Hurtado & J. J. Martín Jaime (Eds.), *CAPEA. Training professionals in environmental education* (pp. 45-62). Ediciones Aljibe. https://hdl.handle.net/10630/37580

Egido, I. G. (2015). The relationship between family and school. An overview. *Educational participation, 4*(7), 11–18. https://www.educacionfpydeportes.gob.es/dam/jcr:a6ada8eb-986d-4e20-8ee6-886f8f6e7bc2/pe-n07-art01-iegido.pdf

Eslava-Zapata, R. A., Zambrano-Vivas, M. V., Chacón-Guerrero, E. J., González-Júnior, H. A., & Martínez-Nieto, A. J. M.-N. (2018). Teaching strategies for promoting environmental values in primary education. *AiBi Journal of Research, Administration and Engineering*, 6(1), 62-69. https://doi.org/10.15649/2346030X.476

Galvis, C. J. R., Perales, F. J. P., & Ladino, Y. O. (2019). How do teachers in rural Colombian schools implement environmental education in their classrooms? *Educational Contexts,* (23), 101-123. http://doi.org/10.18172/con.3519

Gracia, J., Torres-Porras, J., and Alcántara-Manzanares, J. (2023). Overview of the implementation of a 30-year programme on environmental and sustainability education in Spain. *Environmental Education Research*, *30*(2), 265-282. https://doi.org/10.1080/13504622.2023.2252623

Guzmán Cáceres, M. and Ortiz Flores, L. O. (2019). The Modern Prometheus: The School Principal as a Mediating Leader for Social Justice and Sustainable Development. *International Journal of Education for Social Justice (RIEJS), 8*(1), 63-78. https://doi.org/10.15366/riejs2019.8.1.004

Hernández-Castilla, R., Slater, C., and Martínez-Recio, J. (2020). Sustainable development goals: a challenge for schools and school leadership. *Teaching Staff. Journal of Curriculum and Teacher Training, 24*(3), 9-26. https://doi.org/10.30827/profesorado.v24i3.15361

IBM. (2022). *IBM SPSS Statistics for Windows (Version 29.0)* [Software]. IBM Corp. https://www.ibm.com/products/spss-statistics

Isa, N. S. and Halim, L. (2023). Challenges and Strategies to Develop Pro Environment Behaviours Among Middle School Students: A Systematic Literature Review. *International journal of academic research in business & social sciences,13*(11), 1504-1525. https://doi.org/10.6007/ijarbss/v13-i11/19499

Jaramillo, S. F. C., Alzate, L. N. M., & Cardona, J. D. R. (2017). An exploratory study on the conceptions of environmental education among members of the community of two educational establishments in the department of Antioquia. *Bio-grafía*, *10*(19), 1352–1359. https://doi.org/10.17227/bio-grafia.extra2017-7309

Juárez-Hernández, L. G., Tobón, S., Salas-Razo, G., and Carno, A. E. (2019). Sustainable development: education and society. *M+A, Electronic Journal of the Environment, 20*(1), 54-72. https://bit.ly/3gZzoff

Laso Salvador, S., Marbán Prieto J. M., and Ruiz Pastrana, M. (2019). Design and validation of a scale for measuring the environmental awareness of future primary school teachers. *Profesorado. Journal of Curriculum and Teacher Training, 23*(3), 297-316. https://doi.org/10.30827/profesorado.v23i3.11181

López-Larrosa, S., Richards, A., Morao, S. A., & Gómez-Soriano, L. (2019). Teachers and trainee teachers' beliefs about family-school relationships. *Aula Abierta, 48*(1), 59–66. http://doi.org/10.17811/rifie.48.1.2019.59-66

Mejía, B. A. M. (2020). Relationship between environmental awareness and ecological behaviour. *Centro Sur*, *3*(2), 74-85. https://doi.org/10.37955/cs.v4i2.66

Ministry for Ecological Transition and Demographic Challenge. (2021). *Action Plan for Environmental Education for Sustainability (2021-2025).* https://www.miteco.gob.es/es/ceneam/plan-accion-educacion-ambiental/plandeaccioneducacionambientalparalasostenibilidad2021-202508-21_tcm30-530040.pdf

United Nations (2015). *Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015 (A/RES/70/1).* United Nations General Assembly https://bit.ly/42UcmhJ

Novo, M. V. (2009). Environmental education, a genuine education for sustainable development. *Education Magazine,* Special Issue, 195-217. https://bit.ly/3zhMTBp

Ochoa-Ávila, M. B., Gallardo-Milanés, O. A., Pérez-Campdesuñer, R. F., & Ávila-Ávila, R. M. (2016). Technology for comprehensive environmental management in educational institutions. Application in Holguín. *Holguín Sciences*, *22*(1), 69-84. http://www.redalyc.org/articulo.oa?id=181543577004

Olsson, D., Gericke, N., & Boeve-de Pauw, J. (2022). The effectiveness of education for sustainable development revisited – a longitudinal study on secondary students' action competence for sustainability. *Environmental Education Research, 28(*3), 405-429. https://doi.org/10.1080/13504622.2022.2033170

Perales-Palacios, F. J., Burgos-Peredo, Ó., & Gutiérrez-Pérez, J. (2014). The Eco-Schools programme: A critical assessment of strengths and weaknesses. *Educational Profiles, 36145*(145), 98-119. https://doi.org/10.1016/S0185-2698(14)70640-3

Pozo-Muñoz, M. P., Martín-Gámez, C., Velasco-Martínez, L. C., and Tójar-Hurtado, J. C. (2023). Research and Development of Environmental Awareness about Water in Primary Education Students through Their Drawings. *Education Sciences, 13*(2), 119. https://doi.org/10.3390/educsci13020119

Poza-Vilches, F., García-González, E., Solís-Espallargas, C., Velasco-Martínez, L. C., López-Alcarria, A., Estrada-Vidal, L. I., Jiménez-Fontana, R., Rodríguez-Marín, F., Puig-Gutiérrez, M., Tójar Hurtado, J. C., and Gutiérrez-Pérez, J. (2022). Greening of to the syllabus in faculties of education sciences through sustainable development goals: the case of public Andalusian universities (Spain). *International Journal of Sustainability in Higher Education, 23*(5), 1019–1044. https://doi.org/10.1108/IJSHE-02-2021-0046

Rendón López, L. M., Escobar Londoño, J. V., Arango Ruiz, Á. J., Molina Benítez, J. A., Villamil Parodi, T., & Valencia Montaña, D. F. (2018). Education for sustainable development: approaches from a Colombian perspective. *Revista Producción + Limpia, 13*(2), 133-149.

Reparaz, R. and Naval, C. (2014). Conceptual bases for family participation. In State School Council (Ed). *Family participation in school education* (pp. 21-34). Technical General Secretariat, Sub-Directorate General for Documentation and Publications, Ministry of Education, Culture and Sport. https://hdl.handle.net/10171/37128

Ridwan, N. M. R., Frimawaty, E. and Herdiansyah, H. (2023). Analysing urban communities' level of environmental awareness for a future sustainable use of plastic packaging. *International Journal of Sustainable Development and Planning, 18*(2), 377–383. https://doi.org/10.18280/ijsdp.180205

Rivera-Torres, P. and Garcés-Ayerbe, C. (2024). Development of pro-environmental behaviour in individuals and its determinants. *Reis: Revista Española de Investigaciones Sociológicas,* (163), 59-78. https://doi.org/10.5477/cis/reis.163.59

Rodrigo-López, M. J., Martínez-González, R. A. and Rodríguez-Ruiz, B. (2018). School-family relationship as a protective factor against transgressive behaviour in adolescence. *Open Classroom, 47*(2), 149-158. https://doi.org/10.17811/rifie.47.2.2018.149-158

Rubina, M. E. T., Padilla, J. E. A. C., and Gutiérrez, M. C. C. (2021). Environmental awareness through education: State of the Art. *Teacher training. Ibero-American Journal of Education, Special 1*, 1-28. https://doi.org/10.31876/ie.vi.117

Sanmartí, N. and Pujol, R. M. (2002). What does "training for action" entail in the school setting? *Research in Schools,* (46), 49-54. https://bit.ly/3GhB81x

Severino-González, P., Romero-Argueta, J., Villalobos Antúnez, J. V. and Garrido Véliz, V. (2020). Social Responsibility of Higher Education Students. Motivations for its Development in Times of Covid-19 in Chile and El Salvador. *Utopía y praxis latinoamericana: revista internacional de filosofía y teoría social, 25*(7), 439-452. https://produccioncientificaluz.org/index.php/utopia/article/view/33746

Timm, J.-M. and Barth, M. (2021). Making education for sustainable development happen in primary schools: the role of teachers. *Environmental Education Research, 27*(1), 50–66. https://doi.org/10.1080/13504622.2020.1813256

Van Poeck, K. and Östman, L. (2020). The Risk and Potentiality of Engaging with Sustainability Problems in Education—A Pragmatist Teaching Approach. *Journal of Philosophy of Education, 54*(4), 1003-1018. https://doi.org/10.1111/1467-9752.12467

Van Poeck, K., Vandenplas, E., & Östman, L. (2024). Teaching action-oriented knowledge on sustainability issues. *Environmental Education Research, 30*(3), 334-360. https://doi.org/10.1080/13504622.2023.2167939

Venhoeven, L. A., Bolderdijk, J. W., & Steg, L. (2016). Why Acting Environmentally-Friendly Feels Good: Exploring the Role of Self-Image. *Frontiers in Psychology, 7*, 1846. https://doi.org/10.3389/fpsyg.2016.01846

Vila, I., Alguacil, M., and Murga-Menoyo, M. Á. (2018). *Education for global citizenship: Proposals for education committed to the Sustainable Development Goals.* UNED.

Wang, T. (2016). School leadership and professional learning community: Case study of two senior high schools in Northeast China. *Asia Pacific Journal of Education, 36*(2), 202-216. https://doi.org/10.1080/02188791.2016.1148849

Date received: 1 September 2024
Review date: 4 September 2024
Date of acceptance: 20 May, 2025