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SCHOOL MANAGEMENT IN PROMOTING SECONDARY STUDENTS' ATTITUDES ON WATER SUSTAINABILITY.

EL PAUJIL CAQUETÁ, COLOMBIAN AMAZON

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Abstract:

This article is the result of a research study carried out with 69 high school students from the Agroecological Amazonian Educational Institution (IEAA) of El Paujil Caquetá, Colombian Amazonia. The objective of the study was to stimulate the attitudes of the students towards the sustainability of water through school management. Within the framework of action research, a likert scale survey was applied at two points in time: at the beginning and at the end of the implementation of a systemic curriculum proposal designed by thirteen teachers to promote water sustainability and thus counteract the anthropocentric actions of the inhabitants of the Amazon region that affect water systems. When contrasting the attitudes of the students before and after the incorporation of the teaching of water sustainability to the class plans of the areas of the secondary education curriculum, it was evidenced that the students improved their behavior in aspects such as saving water, reducing the use of plastic, placing waste in the right place, reducing polluting practices, planting trees and taking care of water sources.

Keywords: attitudes, conceptions, curricular proposal, water sustainability.

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LA GESTIÓN ESCOLAR EN LA PROMOCIÓN DE ACTITUDES DE LOS ESTUDIANTES DE SECUNDARIA SOBRE LA SOSTENIBILIDAD DEL AGUA.
EL PAUJIL CAQUETÁ, AMAZONIA COLOMBIANA

Resumen:

Este artículo es el resultado de una investigación realizada con 69 estudiantes de bachillerato de la Institución Educativa Agroecológica Amazónica (IEAA) de El Paujil Caquetá, Amazonia colombiana. El objetivo del estudio fue estimular las actitudes de los estudiantes hacia la sostenibilidad del agua a través de la gestión escolar. En el marco de la investigación acción, se aplicó una encuesta con escala likert en dos momentos: al inicio y al final de la implementación de una propuesta curricular sistémica diseñada por trece docentes para promover la sostenibilidad del agua y así contrarrestar las acciones antropocéntricas de los habitantes de la región amazónica que afectan los sistemas hídricos. Al contrastar las actitudes de los estudiantes antes y después de la incorporación de la enseñanza de la sostenibilidad hídrica a los planes de clase de las áreas del currículo de educación secundaria, se evidenció que los estudiantes mejoraron su comportamiento en aspectos como el ahorro de agua, la reducción del uso de plástico, la colocación de residuos en el lugar adecuado, la reducción de prácticas contaminantes, la siembra de árboles y el cuidado de las fuentes de agua.

Palabras clave: actitudes, concepciones, propuesta curricular, sustentabilidad hídrica.

A GESTÃO ESCOLAR NA PROMOÇÃO DE ATITUDES DOS ALUNOS DO ENSINO MÉDIO SOBRE A SUSTENTABILIDADE DA ÁGUA.
EL PAUJIL CAQUETÁ, AMAZÓNIA COLOMBIANA

Resumo:

Este artigo é o resultado de uma investigação realizada com 69 estudantes do ensino secundário da Instituição Educativa Agroecológica Amazónica (IEAA) em El Paujil Caquetá, na Amazónia colombiana. O objetivo do estudo era estimular as atitudes dos alunos em relação à sustentabilidade da água através da gestão escolar. No âmbito da investigação-ação, foi aplicado um inquérito em escala de likert em dois momentos: no início e no fim da implementação de uma proposta curricular sistémica concebida por treze professores para promover a sustentabilidade da água e, assim, contrariar as acções antropocêntricas dos habitantes da região amazónica que afectam os sistemas hídricos. Ao contrastar as atitudes dos alunos antes e depois da incorporação do ensino da sustentabilidade hídrica nos planos de aula das áreas do currículo do ensino médio, ficou evidente que os alunos melhoraram seu comportamento em aspectos como economizar água, reduzir o uso de plástico, colocar o lixo no lugar certo, reduzir práticas poluidoras, plantar árvores e cuidar das fontes de água.

Palavras-chave: atitudes, concepções, proposta curricular, sustentabilidade da água.

1. INTRODUCTION:

Freshwater scarcity is a growing problem worldwide (Zisopoulou & Panagoulia, 2021). In addition, water contamination and unsustainability are growing proportionally to population increase (Brelet-Rueff, 2000; Silva et al., 2019; García et al., 2019; Bermejo et al., 2020). Even, in the Amazon thousands of inhabitants have difficulties in accessing clean water for consumption (Rocha dos Santos et al., 2018; Monni et al., 2018; Crispim & Fernandes, 2022), despite the high rainfall and huge water reserve that the region possesses (Marin & Burgel, 2020); therefore, it is imperative to preserve water systems to ensure access to the vital liquid to guarantee life on the planet (Al-Nuaimi, & Al-Ghamdi, 2022), since access to clean water is an essential right of every person without preference of nationality, ethnicity and beliefs (Li & Wu, 2019).

In addition, deforestation in the Amazon region is a growing process of conversion of natural areas into land for agricultural and Livestock production (Blanco et al., 2008; Weng et al., 2019). Thus, in 2022, the Caquetá region contributed 15.5% of deforestation in Colombia (IDEAM, 2022), thus affecting the water balance (Gobernación del Caquetá, 2020), water retention (Ryplova & Pokorny, 2020; Seják et al., 2022) and temperature stability (Njoh, et al., 2022). Therefore, promoting attitudes of protection of the Amazon rainforest from the curriculum is to guarantee humanity, among others, the following ecosystem services: freshwater supply (Pichel et al., 2019), carbon dioxide absorption and biodiversity protection (Chocas et al., 2013).

In this context, the purpose of the research was to promote favorable attitudes towards water sustainability through the design and implementation of a systemic curriculum proposal with the participation of teachers and students of the tenth and eleventh grades of the Institución Educativa Agroecológico Amazónico (IEAA), municipality of El Paujil Caquetá, Colombian Amazon. The IEAA has an enrollment of 1050 students in preschool, elementary and middle school (SIMAT, 2022), 52 teachers and 3 directors.

Following the sequence of action research (Kemmis and McTaggart, 1992), this article compares the attitudes of the students, identified in the diagnostic and evaluative phases; that is, it contrasts the attitudes of the students before and after the implementation of the curricular proposal for teaching water sustainability (application phase).

Attitudes affect people's beliefs and behavior; therefore, in order to change people's attitudes it is necessary to modify their conceptions (Jančius et al., 2021). In other words, attitudes are the ways in which people externalize their values (Mendieta-Hernández & Gutiérrez-Gómez, 2014).

Holistically, school management addresses curricular, administrative, social, environmental and attitudinal aspects inherent to the educational community (Quintana, 2018). Consequently, the present research proposed to design and implement a curricular proposal based on teachers' conceptions about teaching water sustainability, in order to promote attitudes of adequate use of the vital liquid in students.

2. METHODOLOGY:

This article describes the results of the final phase of an action research process that addressed three objectives: in the first objective, an interview with open-ended questions was conducted with thirteen teachers in order to investigate their conceptions about the contents, methodology, didactic strategies and evaluation to be implemented in the teaching of water sustainability (Florez-Sterling et al., 2021); in addition, a likert scale type survey (entry test) was applied with the intention of determining the students' attitudes regarding water sustainability prior to the implementation of the curricular proposal (Olmos-Rojas et al., 2021).

In the second objective, the thirteen teachers from the different areas of the middle school level designed and implemented a systemic curriculum proposal to promote water sustainability among

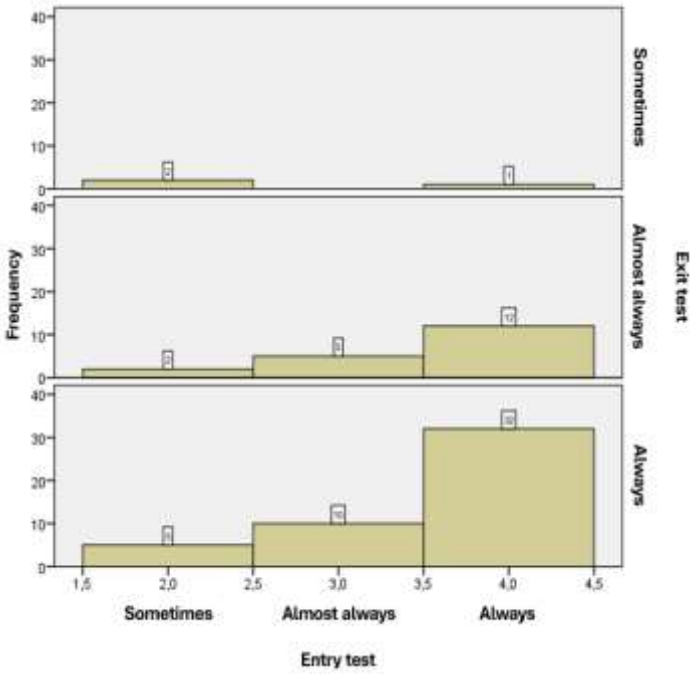
students in the tenth and eleventh grades. On the other hand, in the third objective, to which this article refers, a test was designed according to the likert scale structure (validated by four experts with doctoral training) and was applied to 69 students in the tenth and eleventh grades (39 females and 30 males, whose ages range between 15 and 18 years), with the purpose of comparing the attitudes of the students at the beginning (entry test performed in objective one) and at the end (exit test) of the implementation of the curricular proposal for water sustainability.

The likert scale items described possible student attitudes regarding: saving water in daily activities such as brushing and showering, reduction in the use of plastic, disposal of waste in containers, actions to avoid water pollution, reuse of water, amount of water consumed at home, cost of the bill, protection of water sources. Each of the items had four response options (never, almost never, almost always and always). The interpretation of the information used the technique known as content analysis, and the Statistical Package for the Social Sciences (SPSS) software was used to generate graphs from the data.

3. RESULTS AND DISCUSSION:

This section presents a comparison of students' attitudes about water use at two points in time: a) an entrance test was applied to determine students' attitudes before the curricular training process with emphasis on water protection; b) an exit test was conducted to determine students' attitudes towards water after the implementation (during the second semester of the year 2022) of the systemic curricular proposal for teaching water sustainability.

Figure 1. Students' attitudes during tooth brushing.



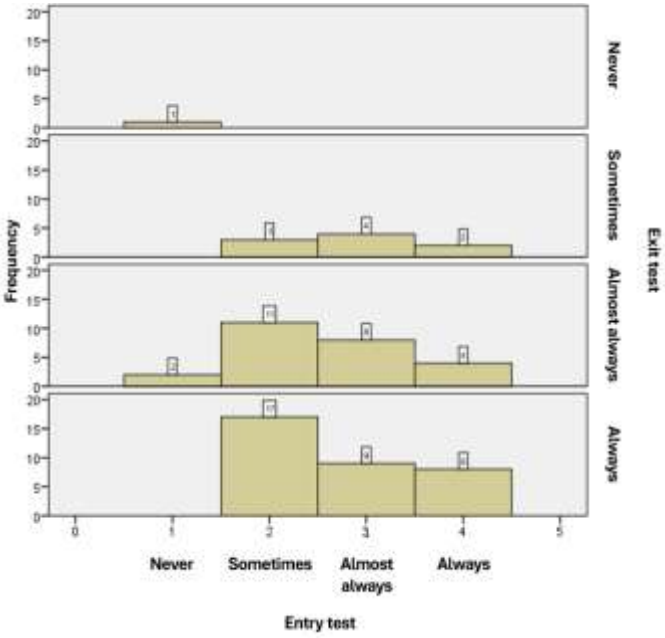
Source: SPSS software elaboration (2022)

The results of the exit test applied to the 69 middle level students of the IEAA reveal a positive change in attitudes towards turning off the water tap while brushing their teeth, taking into account that 13% of the students stated in the entrance test that they did it sometimes, and in the final test this response option represents only 4% (see figure 1). Therefore, 9% of the students demonstrate another attitude towards the practice of this activity in the second test, distributed as follows: almost always (6%) and always (3%).

Likewise, figure 1 allows concluding from the findings of the exit test, that the students registered in the response options "almost always" and "always" correspond to 96% of the total surveyed, each with 28% and 68% respectively. Thus, it is clear that students are more aware of the importance of contributing from their homes to the conservation of water resources. Finally, the challenge is to achieve environmental awareness and sensitization of all students, with the purpose

of promoting the change of habits and the new water culture (Suárez, 2021).

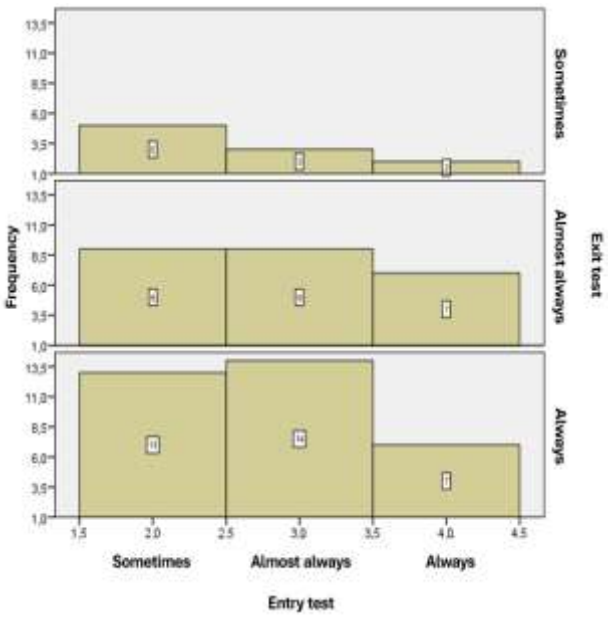
Figure 2. Students' attitudes towards water leaks.



The findings of the exit test conducted with the 69 IEAA students reveal a notable change in attitudes towards reporting water leaks in order to seek an adequate solution, taking into account that 49% of the students indicated in the entry test that they never did it or only reported it on some occasions, and in the final test these response options are equivalent to only 14% (see figure 2). Thus, the 35% of students who reveal another attitude towards the practice of this activity in the second test are distributed as follows: almost always (6%) and always (29%).

As a complement, figure 2 allows us to determine, compared to the results of the exit test, that the students registered in the response options "almost always" and "always" correspond to 86% of the total surveyed, each with 36% and 50% respectively. Thus, it is clear that students promote actions to ensure the detection and repair of leaks that affect the performance of water resources in the educational center. Finally, the challenge is to create environmental awareness in all students, with the objective of ensuring efficient water management (Chavesta, 2018).

Figure 3. Students' attitudes towards the disposal of used plastic bottles.



The results of the exit test applied to the 69 IEAA students reveal a significant change in attitudes related to the deposit of disposable plastic bottles in containers, taking into account that 39% of the students stated in the entrance test that they did it sometimes, and in the final test this response option represents only 15% (see figure 3). Therefore, the 24% of students who demonstrated another attitude towards the practice of this activity in the second test, state that they now always perform this action. In addition, 2% of those who initially chose the option "almost always" indicate that they now always perform this activity.

Likewise, figure 3 allows us to conclude from the findings of the exit test that the students registered in the response options "almost always" and "always" correspond to 85% of the total, each with 36% and 49% respectively, that is, that approximately half of the respondents show a favorable attitude and a high level of awareness in the use and handling of plastic bottles. Thus, it is

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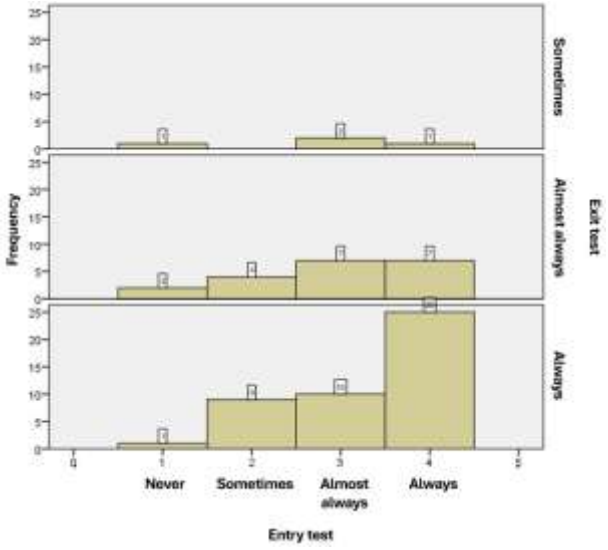
evident that students have good environmental habits and their degree of commitment to water preservation is high. Reducing and depositing plastic waste in the indicated place is a friendly act with water ecosystems (Moqbel et al., 2020), therefore, it is pertinent to motivate the educational community to create and preserve habits that promote respect for water sources and facilitate solid waste collection and separation practices (Contreras, 2021).

Figure 4. Students' attitudes towards waste generated during programmed river trips.

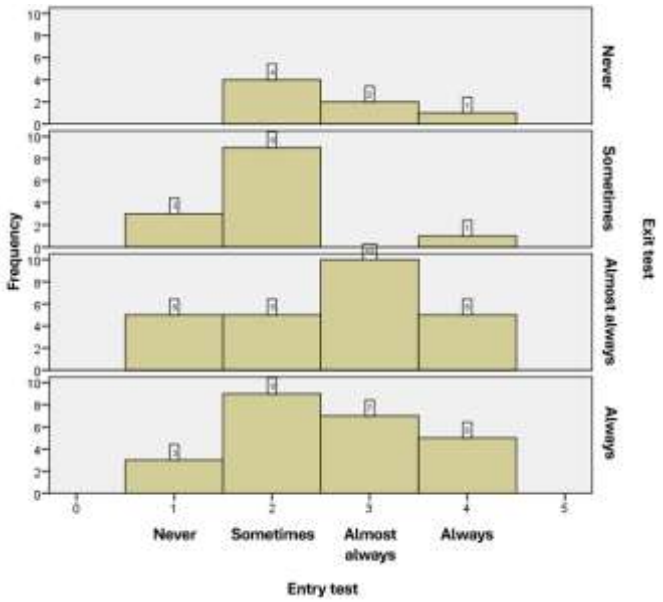


Source: SPSS software elaboration (2022)

The results of the exit test applied to the 69 IEAA students reveal a positive change in attitudes regarding waste collection on walks to prevent high levels of water pollution, taking into account that in the entrance test 6% of the students stated that they never did it, 19% on some occasions, and in the final test these response options represent only 6% (see figure 4). Therefore, the 19% of the students who demonstrate another attitude towards the practice of this activity in the second test are distributed as follows: almost always (2%) and always (17%).

Likewise, figure 4 allows concluding from the findings of the exit test, that the students registered in the response options "almost always" and "always" correspond to 94% of the total surveyed, each with 29% and 65% respectively. Thus, it is clear that students are now more responsible when they visit the various water sources, which demonstrates their interest in caring for the environment and the natural heritage of the territory. Finally, the challenge is to strengthen the awareness processes to consolidate the identity, awareness, and the way of thinking and acting of the students with respect to the environment (Marines, 2021). Contrary to the above, inadequate waste disposal generates diverse environmental, social and economic impacts (Nolasco et al., 2021).

Figure 5. Students' attitudes towards water saving.



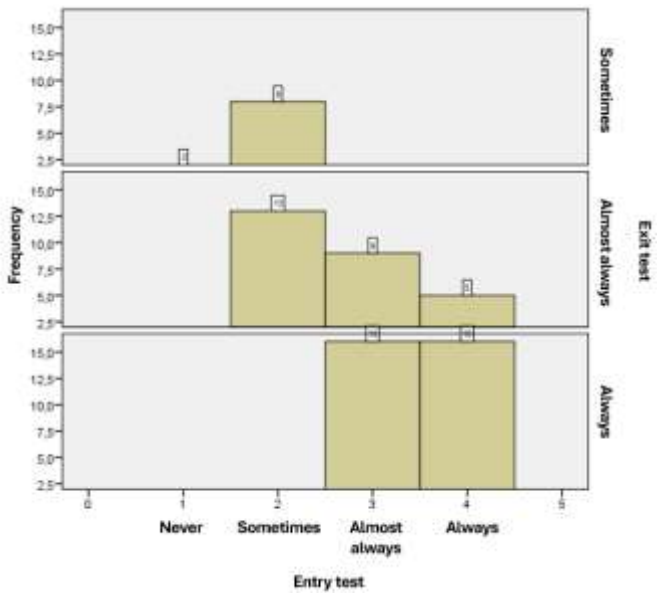
Source: SPSS software elaboration (2022)

The findings of the exit test conducted with the 69 students reveal a notable change in the attitudes associated with asking family and friends

to contribute to saving water, taking into account that 55% of the students indicated in the entrance test that they never did it or only made this request at certain times, and in the final test these response options are equivalent to 29% (see figure 5). Thus, the 26% of students who reveal other attitudes towards this request in the second test are distributed as follows: almost always (8%) and always (18%).

As a complement, figure 5 allows us to determine, compared to the results of the exit test, that the students registered in the response options "almost always" and "always" correspond to 71% of the total surveyed, each with 36% and 35% respectively. Thus, it is clear that students recognize their role in society, and they take action to call on citizens to protect natural resources. Finally, the challenge is to encourage the practice of this kind of actions in those students who show negative attitudes, seeking that all students become promoters of attitudes to consider water as a source of life and promote the sustainable use of water resources (Quispe, 2019).

Figure 6. Students' attitudes towards water pollution.



The results of the exit test applied to the 69 students reveal a significant change in the attitudes related to actions to prevent high levels of water pollution, considering that 33% of the students stated in the entrance test that they never did it or only executed it on some occasions, and in the final test this response option represents only 15% (see figure 6). Therefore, the 18% of these students who demonstrated another attitude towards the development of this activity in the second test are distributed as follows: almost always (3%) and always (15%).

Likewise, figure 6 allows us to conclude in relation to the findings of the exit test, that the students registered in the response options "almost always" and "always" correspond to 85% of the total, each with 39% and 46% respectively, that is, that approximately half of the respondents show a favorable attitude in relation to the execution of actions to reduce the high levels of water contamination. Thus, it is evident that the students have reflected on the need to strengthen the sense of belonging, create habits and carry out various activities in their daily lives to avoid the generation of serious environmental problems in the region, which can affect the quality of life of the inhabitants. In conclusion, the objective is to implement strategies within the framework of environmental education, seeking to recognize the impact of the issue of water saving in the area and increase the planning of actions aimed at energizing the attitudes of students (Contreras, 2021).

Figure 7. Students' attitudes towards co-responsibility in water saving.

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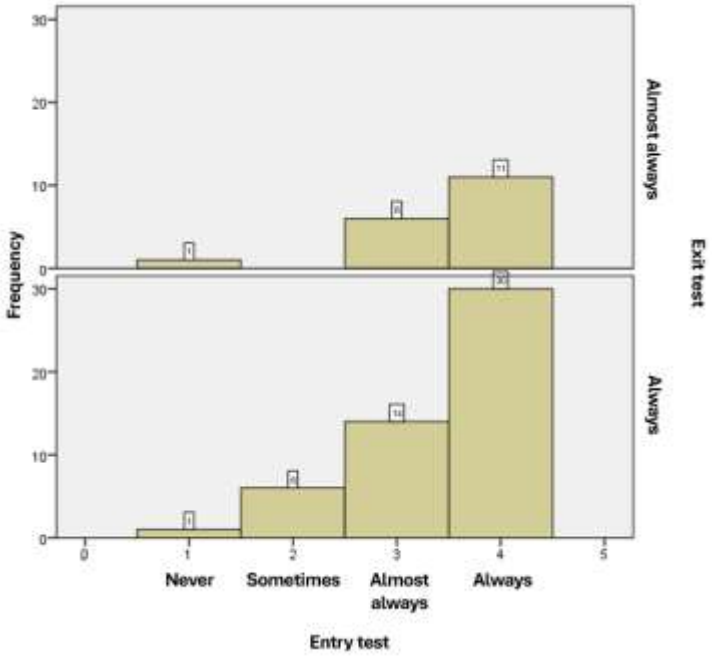
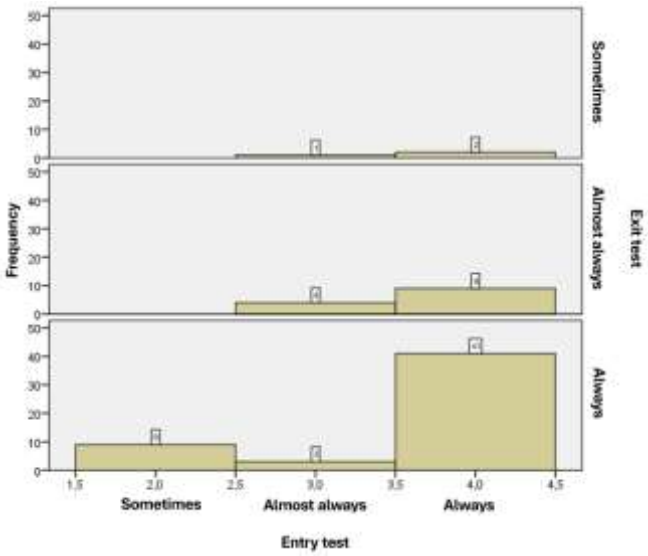


The results of the exit test applied to the 69 students show a positive change in attitudes regarding turning off the water faucets that other people have left open, taking into account that 12% of the students stated in the entrance test that they never did it or sometimes turned them off, and in the final test this response option was not represented (see figure 7). Therefore, all of these students who demonstrated another attitude towards the practice of this action in the second test, state that now they always perform this action. In addition to this, 3% of those who initially chose the option "almost always", now indicate that they always perform this activity.

Likewise, figure 7 allows us to conclude from the findings of the exit test that the students registered in the response options "almost always" and "always" correspond to 100% of the total number of students surveyed. Thus, it is clear that students have increased their level of awareness at home, in the educational institution and in other places they frequent, being more observant and assuming positions oriented towards saving water and preserving this vital resource for the conservation of life and the planet. Finally, the challenge is to continue in the educational process to strengthen the new water culture and maintain this way of thinking and acting in the school community (Marines, 2021).

Figure 8. Attitudes of students to save water in the shower.



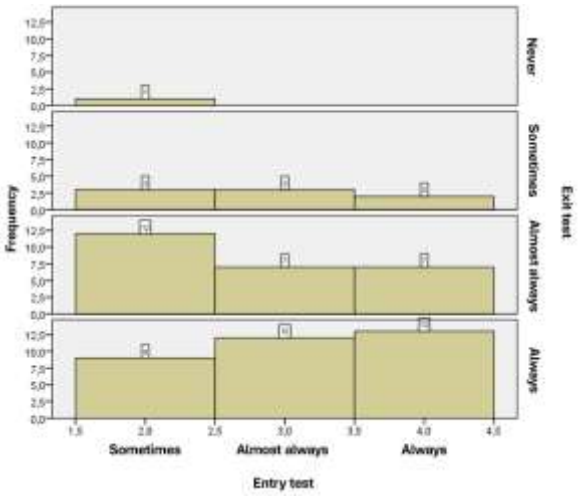
Source: SPSS software elaboration (2022)

The findings of the exit test conducted with the 69 students reveal a notable change in attitudes regarding turning off the water faucet while showering, taking into account that 13% of the students indicated in the entrance test that they only did it sometimes, and in the final test this response option is equivalent to only 4% (see figure 8). Thus, the 9% of the students who reveal another attitude towards the practice of this activity in the second test are distributed as follows: almost always (7%) and always (2%).

As a complement, figure 8 allows us to determine, compared to the results of the exit test, that the students registered in the response

options "almost always" and "always" correspond to 96% of the total surveyed, each with 19% and 77% respectively. Thus, it is clear that students attach a high degree of importance to saving water in their homes, given that showering involves a considerable expenditure of this element. Finally, the challenge is to develop this type of actions in educational centers and other places where showers have been installed, and thus also contribute to the reduction of water consumption (Suárez, 2021).

Figure 9. Attitudes of students regarding the level of awareness of proper water use.

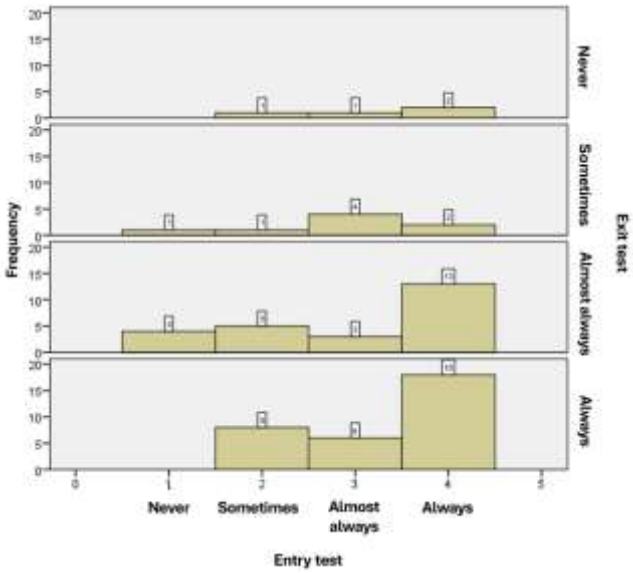


Source: SPSS software elaboration (2022)

The results of the exit test applied to the 69 students reveal a significant change in the attitudes related to the feeling of guilt when wasting this precious liquid for the population, taking into account that 36% of the students stated in the entrance test that they did it sometimes, and in the final test this response option represents only 13% (see figure 9). Therefore, the 23% of the students who demonstrate another attitude towards this feeling in the second test are distributed as follows: almost always (6%) and always (17%).

Likewise, figure 9 allows us to conclude from the findings of the exit test, that the students registered in the response options "almost always" and "always" correspond to 87% of the total, each with 38% and 49% respectively, that is, that approximately half of the respondents feel guilt when they do not use the vital resource efficiently. Thus, it is evident that students have been increasing their level of awareness and sensitization to the need to ensure the proper use of water, as well as its protection and preservation in the different spaces of coexistence and interaction of human beings. In conclusion, the objective is to develop a training process to promote active, positive and transforming attitudes within the community (Quispe, 2019).

Figure 10. Students' attitudes towards the cost of the water bill.



The findings of the exit test conducted with the 69 students denote a notable change in attitudes regarding knowledge about the monthly cost of the water bill in their homes, taking into account that 29% of the students indicated in the entrance test that they have never analyzed this topic or only on some occasions have learned about the aspects associated with the collection bills, and in the final test these response options

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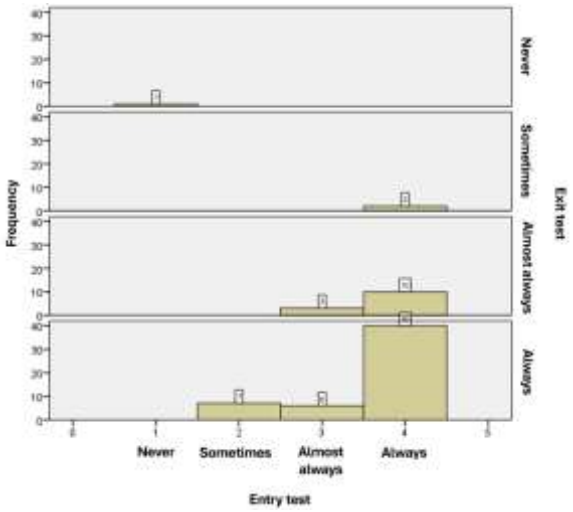
are equivalent to only 18% (see figure 10). Thus, after applying the second test, it is identified that 11% of these students with another attitude reveal that they do it almost always. Likewise, of the students who initially chose the option "always", 5% now indicate that they almost always analyze the value of the invoice.

As a complement, figure 10 allows us to determine, compared to the results of the exit test, that the students registered in the response options "almost always" and "always" correspond to 82% of the total number of respondents, each with 36% and 46% respectively. Thus, it is clear that students show interest in knowing about the monthly billing, and from there they become aware of the importance of knowing the cost of the service. Finally, the challenge is to contribute to the definition of measures for saving and preserving water in households (Calero & Salas, 2022).

Figure 11. Students' attitudes towards the convenience of saving water in the municipality.



The results of the exit test applied to the 69 students reveal a change in the attitudes related to the need to save water in the municipality of El Paujil, taking into account that 12% of the students affirmed in the entrance test that they have never considered that the efficient use of water is important in this territory or only sometimes have thought that it is necessary to treasure this natural resource, and in the final test this response option represents only 4% (see figure 11). Therefore, the 8% of students who demonstrate another attitude regarding the relevance of this action in the second test are distributed as follows: almost always (6%) and always (2%).

Likewise, figure 11 allows us to conclude from the findings of the exit test, that the students registered in the response options "almost always" and "always" correspond to 96% of the total, each with 19% and 77% respectively, that is, that most of the respondents show a high level of awareness and a favorable attitude towards the need to save water in the municipality of El Paujil. Thus, it is evident that the students have a global vision of the territory, and also consider it necessary for the educational institution to propose strategies and adopt practices to contribute to water conservation. Therefore, it is advisable to strengthen environmental education processes in order to raise awareness among the entire student population and to create a strategy to conserve water resources (Gómez, 2022).

4. CONCLUSIONS

The above results corroborate that education is an effective component in promoting students' attitudes towards water sustainability. From this logic, the implementation in the IEAA of the systemic curricular structure with emphasis on the formation of values towards the protection of water ecosystems, generated attitudinal changes in students related to saving water in daily activities, reducing the use of plastic bottles, disposal of waste in containers, awareness of water sustainability, valuation of the ecosystem services of water, reuse of washing machine water for cleaning floors and latrines, and storage of rainwater for domestic activities.

Likewise, the findings allow concluding that the incorporation of the teaching of the sustainability of this important natural resource to the lesson plans has had positive repercussions, due to the fact that the processes developed in each of the areas of the secondary education curriculum promote knowledge about the different topics associated with water, promote awareness in the students and contribute to the strengthening of environmental awareness, which has an impact on the generation of empathy and the valuation of the natural heritage of the territory.

Finally, it is important to highlight that the systemic curricular proposal developed by thirteen teachers becomes an interdisciplinary tool to transform the students' perspective and develop responsible attitudes towards the environment, through expectations, motivations, values and positive and participatory life experiences.

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