



Revista Luna Azul
ISSN: 1909-2474
revista.lunazul@ucaldas.edu.co
Universidad de Caldas
Colombia

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Ojeda Rosero, Elizabeth; Bravo Peña, David Andrés; Gómez Delgado, Yamile Andrea

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Revista Luna Azul, núm. 50, 2020

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Disponible en: <https://www.redalyc.org/articulo.oa?id=321769998012>


DOI: <https://doi.org/10.17151/luaz.2020.50.12>

Investigación original


Educational Processes for Volcanic Risk Management (VRM) at an Educational Institution (EI) in The Department of Nariño (Colombia)

Procesos Educativos para la Gestión del Riesgo Volcánico (GRV) en una Institución Educativa (IE) del Departamento de Nariño (Colombia)


Elizabeth Ojeda Rosero ¹ deliza75@udenar.edu.co
University of Nariño, Colombia

 <https://orcid.org/0000-0003-1862-6354>

David Andrés Bravo Peña ² dbravo890@udenar.edu.co
University of Nariño, Colombia

 <https://orcid.org/0000-0002-7527-3746>

Yamile Andrea Gómez Delgado ³
andreagomezdelgado@udenar.edu.co
University of Nariño, Colombia

 <https://orcid.org/0000-0003-0775-8917>

Revista Luna Azul, núm. 50, 2020

Universidad de Caldas, Colombia

Recepción: 18 Julio 2019

Aprobación: 19 Octubre 2019

DOI: <https://doi.org/10.17151/luaz.2020.50.12>

Redalyc: <https://www.redalyc.org/articulo.oa?id=321769998012>

Abstract: **Objective:** to analyze the educational processes in Volcanic Risk Management (VRM) of the project of Education in Emergencies (EiE) at the Institución Educativa San Bartolomé (IESBA) in the Municipality of La Florida in the Department of Nariño (Colombia). **Method:** it is a qualitative study oriented from the historical-hermeneutical paradigm including ethnographic elements. Its participants were students, teachers and administrative staff of the IESBA. The techniques and instruments for collecting information included participant observation, individual and group semi-structured interviews, personal communications and document review. The constant comparison method was used for information analysis. **Results:** the interaction and the communication in the educational institution, as well as the community participation lead to the adoption and the strengthening of the knowledge referred to the VRM, from the different teaching strategies that involve not only the educational community, but also the community in general. **Conclusions:** the work done by the IESBA is consistent with the needs and demands of the context in which it is set, highlighting from the EiE project, elements such as community participation and institutional and inter-institutional work. This study shows a strategy that can be replicated in diverse EI that are highly exposed to the volcanic risk. Finally, considering inclusive education is also an indicator of improvement.

Keywords: Volcanic risk management, education, risks, emergencies, volcanoes, environmental education.

Resumen: **Objetivo:** analizar los procesos educativos en Gestión del Riesgo Volcánico (GRV) del proyecto de Educación en Emergencias (EeE) de la Institución Educativa San Bartolomé (IESBA) del Municipio de La Florida en el Departamento de Nariño (Colombia). **Método:** es un estudio cualitativo orientado desde el paradigma histórico-hermenéutico que incluye elementos etnográficos. Sus participantes fueron estudiantes, docentes y personal administrativo del IESBA. Las técnicas e instrumentos

de recolección de información incluyeron observación participante, entrevistas semiestructuradas individuales y grupales, comunicaciones personales y revisión de documentos. Para el análisis de la información se utilizó el método de comparación constante. **Resultados:** la interacción y la comunicación en la institución educativa, así como la participación comunitaria conducen a la adopción y el fortalecimiento de los conocimientos referidos a la GRV, a partir de las diferentes estrategias didácticas que involucran no solo a la comunidad educativa, sino también a la comunidad en general. **Conclusiones:** el trabajo realizado por el IESBA es acorde con las necesidades y demandas del contexto en el que se sitúa, destacando del proyecto EeE, elementos como la participación comunitaria y el trabajo institucional e interinstitucional. Este estudio muestra una estrategia que puede ser replicada en diversas IE altamente expuestas al riesgo volcánico. Finalmente, considerar la educación inclusiva también es un indicador de mejora.

Palabras clave: Gestión del riesgo volcánico, educación, riesgos, emergencias, volcanes, educación ambiental.

Introduction

The Galeras Volcano, located in the department of Nariño (Colombia), is considered one of the volcanoes with the most recurrent eruptive activity in the country (Torres, Ponce and Gómez, 2017). In the High Volcanic Threat Zone (HVTZ), which refers to the area closest to the active crater, in which volcanic phenomena such as lava, pyroclastic or mud flows, ballistic projectiles (falling stones), shock waves and high concentration of toxic gases can occur (Villalobos, Ojeda and Luna, 2019), there are seven municipalities: Pasto, Nariño, Sandoná, Consacá, Yacuanquer, Tangua and La Florida. This research was carried out in La Florida where the Institución Educativa San Bartolomé (IESBA in Spanish) is located.

In this regard, the IESBA, subject and setting of this research, has carried out regionally, nationally, and internationally known risk management processes (Luna, Zambrano, Ceballos and Ojeda, 2019), and has focused on generating and implementing educational strategies for self-management based on joint work for the active coping with the Volcanic Risk (VR) to which they are exposed every day (Tabares, Melo, Ojeda, Ceballos and Zambrano, in press). That is why, in 2006 this EI began the creation of an Education in Emergencies (EiE) project, which is based on comprehensive risk-management processes. This project develops educational and pedagogical elements within the curriculum by integrating and articulating popular and scientific knowledge regarding the types of risks, in particular VR (Muñoz, 2006).

Within the framework of this initiative, this institution incorporated a new subject into the study plan, the “*Cátedra Galeras*” in 2015. This fact allowed the transversal approach of knowledge regarding the phenomena that can affect the life and integrity of people and their assets, in order to develop self-care values, resilience and decision-making capacity for the protection of life (Tabares et al., - in press).

In this way, the EiE project seeks to make the educational community of the IESBA, made up of parents, students, teachers and administrative staff, develop competencies related to making decisions about natural

disasters, and at the same time, take measures and actions before, during and after an emergency. For this reason, the construction of the aforementioned project involved aspects such as regulations, conceptual foundations and their articulation with the other dimensions of community development in addition to the particular experience of community actors, from a self-care and social fabric approach to a latent threat in the community: the VR (Muñoz, 2006).

Consequently, the actions carried out by this institution, aimed at providing its educational community with protection and prevention tools against various types of risks, mainly the imminent VR to which they are exposed are consistent with the processes in Disaster Risk Management (DRM). Therefore, as an element that justifies this research, it is pertinent to return to the concept of DRM from Law 1523 of 2012, which is understood as:

A process aimed at the formulation, execution, monitoring and evaluation of policies, strategies, plans, programs, regulations, instruments, measures and permanent actions for the knowledge and reduction of risk and for disaster management, with the explicit purpose of contributing to safety, well-being, people's quality of life and sustainable development (Congreso de Colombia, 2012, p.1).

Taking into account the concept previously exposed, and applying it to the educational field, the Ministry of National Education (MEN), the United Nations Fund (UNICEF) and The Foundation for the Refugee Education Trust (RET) with the participation of the departmental secretariats of education of Nariño and Putumayo (Colombia) have developed an EiE project, which seeks to highlight the regional learning regarding various emergencies in these two departments (Ministry of National Education of Colombia, 2011). Taking into consideration the territorial understanding, the National Unit for Disaster Risk Management (UNGRD, 2013) highlights the importance of generating changes in behavior aimed at harmonizing the relationship between society and nature.

Besides, considering the problem of this EI and the contextual understanding of the phenomenon, it is important to highlight the valuable contribution of education in the processes of social transformation. As a consequence, it is essential to emphasize on the contribution from and to the Psychology field, as it enables and favors the subjective understanding and significance of the context and the phenomenon addressed, in addition to focusing on the importance of community participation.

That is why, in response to the needs of the institution regarding the generation of memories of its self-management processes, the present research has the general objective of analyzing the educational processes for VRM in the Education in Emergencies (EiE) project of the Institución Educativa San Bartolomé (IESBA) of the Municipality of La Florida, Department of Nariño (Colombia). The specific objectives are: (a) to identify the educational and training strategies related to the EiE project, (b) to identify the social aspects of interaction and communication in

relation to the educational processes in VRM and the EiE project in this EI, (c) to recognize the mechanisms of community participation in the EiE project in this EI, (d) to identify the administrative processes related to the educational processes in VRM and the EiE project in the EI.

Method

Type of study and design

The present research is qualitative and seeks to make a global approach to social situations in order to explore, describe and understand them inductively, taking up the knowledge that the different people involved have (Del Canto, 2012). The following are among the main characteristics of this type of research: (a) it is inductive, (b) it is flexible, (c) it has a holistic approach, and (d) it states that all perspectives are valuable and seeks to achieve a detailed understanding of each of them.

Furthermore, this research comes from the historical-hermeneutic paradigm, as it allows access not only to observable facts, but also to records of the relationships and interactions that occur between the members of the social environment studied (Valdivieso and Peña, 2007). Regarding the ethnographic contribution, social, cultural, economic and political contexts were taken into account for the analysis (Murillo and Martínez, 2010).

Participants

Eighty-two people who belong to this EI participated, including 10 teachers, 2 collaborators of the administrative staff, 35 students from the first, second and third grades corresponding to one of the headquarters of the educational establishment, and 35 students from the seventh, eighth, ninth and eleventh grades of the main headquarters of the institution. Two students and a teacher participated as key informants (Table 1). The participants were intentionally selected as key informants using the snowball sample technique, which suggests identifying cases of interest from a person who knows someone who may be a good candidate to participate (Martínez-Salgado, 2012).

Table 1

Shows the number and role of the participants interviewed.

Role in the EI	Number of participants
Teachers	10
Administrative staff	2
Students first grade	14
Students second grade	10
Students third grade	11
Students seventh grade	12
Students eighth grade	6
Students ninth grade	8
Students eleventh grade	9

Source: this research.

Information gathering techniques and tools

Various research techniques such as the following were used: (a) participant observation, (b) semi-structured individual and group interviews, (c) documentary review, (d) field diary. Participant observation made it possible to visualize educational strategies inside and outside the classrooms, such as the performance of emergency brigades in evacuation drills due to volcanic eruption, the interaction and intersubjective construction of reality in the educational context, all this in order to understand how this educational community acts in the face of VR (Guber, 2001).

The 14 individual interviews (10 with teachers, 2 with students and 2 with administrative staff) and 9 group interviews with students (carried out with groups of minimum 6 participants and maximum 14) allowed to better understand some of their perceptions thanks to the diversity of opinions, experiences, reflections, motivations and ways of acting (Díaz-Bravo, Torruco-García, Martínez-Hernández and Varela-Ruiz, 2013).

The documentary review allowed to visualize and interpret the written institutional documents such as the Institutional Educational Project (PEI in Spanish) and the school guidelines for risk management, the institutional guide for incorporation of VRM into the curriculum, and the VRM work strategies created by teachers and the EI students, in addition to audiovisual reports, including photographs and videos related to activities such as fairs, talks, exhibitions, presentations made regarding the VRM inside and outside the institution.

Information analysis

The constant comparison method was adopted (Yepes and Molina, 2015). In this context, open, axial and selective coding were used according to the series of steps proposed by Glasser and Strauss (1967),

which were approached as follows: (a) comparing incidents applicable to each category, and (b) integrating categories and their properties. Lastly, a review and analysis of each of the final categories was carried out, reaching the moment prior to the formulation of substantive theory. The above according to the objective of the present study.

Procedure

The research was developed in different phases, initially the key informants were selected (2 students and 1 teacher), and the other participants were identified through the use of the snowball sampling technique. Subsequently, semi-structured individual and group interviews were administered, the latter only with students. The criteria for organizing the groups were, voluntary participation and same academic grade. The information collected was recorded in a field journal and it allowed the definition of the 4 emerging categories. Afterwards, the data was classified in each category and the analysis and interpretation of the results was carried out. Finally, the information collected was shared with the educational community in order to validate the research.

Results

The following results were organized into 4 categories that emerged in the research process: (a) teaching and training methodology, (b) social aspects of interaction and communication, (c) community participation mechanisms, and (d) administrative processes related to DRM education.

Teaching and training methodology

This category shows that most of the participants highlight the high artistic potential of the educational community in the creation of work material in DRM and VRM. They state that these tools are later used in some subjects, strengthening the transversality of the risk-management curriculum with the PEI. In this report, some teachers state that they use electronic media to search for information on teaching methodologies. However, they claim that they do not have enough adequate teaching techniques aimed at people with hearing and cognitive impairment. Some teachers comment: *"I often look for information on the Internet to complement the topics that I have to address with students", and "for working with students with disabilities we would like to receive training, because many times we do not know how to work with them"*.

In this sense, although language teachers affirm that they work on the educational processes for VRM through readings, verses, stories, fables and poetry, and specify that students do not only read texts, but also produce them. Mathematics, statistics and physics teachers, for instance, state that they do not have enough strategies to work in VRM as a transversal axis in their work plan, they comment: *"we need more strategies*

for Risk Management work in our subjects, maybe we could work together with other subjects, that would be better”.

Furthermore, teachers refer to the concept of resilience, which is understood by them as: *“the ability to submit to pressure without breaking down”*, and as *“the ability of human beings to live with risk, having the answers to the threats they face”*. This aspect is worked through the reading and analysis of literary works, where various adverse situations and the capacity of the characters to overcome them are recognized. Thus, they favor the educational community to develop this capacity in the face of the volcanic risk to which they are exposed. An example of this is the work with the literary work *“The Little Prince”*.

The speech of the majority of the participants revealed that an effective educational strategy was the implementation of emergency brigades within the institution. They are a great support both in evacuation and emergency drills and in real risk situations. Within the EI, evacuation drills are carried out periodically; also Cardio-Pulmonary Resuscitation (CPR) training is given by the fire department in order to provide input to students on what to do in case of a real emergency.

The students state that these types of activities facilitate the understanding of the VRM approach, since there is not only theoretical learning but also practice. Among the most relevant expressions are: *“I liked it when the firefighters came to teach us CPR, it is something more practical”*, *“It is good to know what to do in case of an eruption of the Galeras, but we understand better when we practice it”*.

Regarding VRM education, some interviewed students state that it is approached through master classes as well as recreational and didactic strategies such as games, riddles, videos, and educational trips, among others. These is one of the student’s comments: *“sometimes the classes have a lot of theory and we don’t like it so much, but when we put it into practice and do things as we learn them in the classroom, it is more fun, so we learn better”*. Additionally, they mentioned the development of study techniques such as the DRM dictionary, which they explain like this: *“When we study an unknown word or a new topic in each class, we look it up in the dictionary. So we can study from the dictionary too”*.

In this sense, some of the participants, both students and teachers of first, second and third grade of elementary school comment that the work related to the EiE project for them is reflected in the teaching and practice of prevention and self-care behaviors: *“We teach children to take care of themselves not only at school, but also on the street, in the park, even in their own houses, everything that has to do with the risks that exist in the environment where they live”*, *“They teach us that we should look at both sides of the street before passing it, or to play in the park without talking to people we don’t know, and there are also evacuation drills in case the volcano erupts”*.

It is important to recognize the work of some teachers and students who develop different learning and teaching strategies in VRM. Although some members of this educational community consider that there is not a sufficient amount of educational work material within the institution,

they make use of experiential techniques and production of recreational and artistic material for educational work in DRM.

Some of the experiential strategies are: (a) “lecturezas”, which is a didactic strategy where students can interact with nature and its surroundings and get to know different kinds of risks. They refer to it as: *“it is a reading of nature, to get to know Her”*; (b) “claustrophobia test”, this is a group workshop where students find their eyes completely covered with a blindfold so that they cannot see anything and must perform some actions, such as walking through a natural terrain, for example a mountain, and identifying elements of their environment. A teacher comments: *“the students go hand in hand leading a life line, teamwork is evident because one supports the other”*. This is done in order to demonstrate and reflect on the importance of the senses; (c) DRM mingas; (d) DRM brigades and committees; (e) educational cinema, this strategy allows, through the visualization of an educational film or video, to approach DRM from different perceptions; (f) recycling fairs, among others.

In the same way, some of the materials produced by the educational community are: (a) video library, defined by the participants as: *“a library of educational videos on Risk Management”*; (b) “vulcanoteca / litoteca”, it is a strategy that refers to a series of articles, books and other sources of information regarding the DRM and VRM; (c) DRM travel notebook, in which each student records their perceptions on their ecological outings; (d) DRM dictionary; (e) “preguntario”, it is a strategy that allows students to record their concerns in reference to DRM and subsequently respond to them with the help of teachers, other students or scientific texts; one participant expresses: *“There are approximately 28 educational work strategies, with the students we create a lot of material, so we also learn”*.

Also, the participants of the tenth and eleventh grades of high school explain that they address different types of risks unlike the other students of the institution and comment that the EiE project for them corresponds to work in occupational hazards: *“We study topics related to occupational risks and we are studying an occupational health technician program”*, and *“Somehow they prepare us for work”*.

In addition, some of the participants in this research recognize their motivation towards carrying out pedagogical trips in various municipalities: *“We like pedagogical trips, hopefully more could be done and with more people, so that more people know about this, also so that we, as students, can get to know the risks of other places and know how they work and face them there”*.

Social aspects of interaction and communication

The interaction with the participants showed that communication among teachers of the EI in its different headquarters is limited, which can sometimes make it difficult for the educational community to participate in different institutional DRM and VRM events. A teacher recognizes

this problem and says: *"It is necessary to have a meeting with all teachers to talk and try to solve this communication problem"*.

It is also important to highlight the initiative of some teachers and their motivation to solve this problem. They propose fluid communication by electronic means, through the creation of institutional and informative pages and groups on social networks such as *Facebook*, *Blogspot* and *WhatsApp*, participation in radio media, and the implementation of information media such as information boards and school newspapers. A teacher comments: *"We have a WhatsApp group exclusively for teachers where we share some information of interest, but it is clear that sometimes more communication is needed"*, *"Notices or information about Risk Management fairs or events are usually posted on the billboards"*. Additionally, the willingness of some teachers to provide meeting spaces for the socialization of strategies that could be implemented in the institution stands out, as one teacher expresses: *"Along with the students in the language subject, we created a story that had the Galeras volcano as the protagonist, that's how we work on the production of texts, we could share that strategy"*. Some teachers report that it would be important not only to share these strategies with the educational community, but also to extend them to the community in general.

In the institutional self-management of this EI, the information created by the educational community itself and the information available on virtual platforms, such as scientific articles and educational guides on DRM and VRM have played a fundamental role in the educational work, both for the strengthening the curriculum, and for updating information disseminated in the different media present in the institution. A teacher comments: *"along with the students we have created several strategies to work on Risk Management, each teacher in their subject and some things for general work"*.

The educational campus has an alarm and signaling systems in case of emergencies. However, some teachers express their concern because the institution does not have an alarm system or a signaling methodology in case of emergencies for people of the institution with hearing or cognitive disabilities. In this regard, a teacher comments: *"it is necessary for teachers to be more practical in their work, to work with people with hearing and cognitive disabilities they could use visual agendas, pictograms, silent theater, artistic strategies are very good"*, and *"It is also necessary to design an alarm system, because many times they do not know what to do when the Galeras wakes up"*.

Finally, some teachers and students express their dissatisfaction with the inter-institutional and intersectoral cooperation and articulation mechanisms for the development and maintenance of DRM processes. Some students share their perceptions about the importance of joint work in the entire community resident in the HVTZ. They show their motivation by proposing communication strategies and inter-institutional work, such as knowing how other institutions work on DRM and VRM, and also publicizing the way they approach it. Some comments of the participants are: *"We want to share our work with the*

whole community, that's why we hold DRM and VRM fairs, and we have also participated in events in Colombia and outside the country as well".

Community participation mechanisms

Participation may be affected in some cases, particularly because communication among the different headquarters of the EI is not fluid or permanent, and also because of the economic conditions of the families. Some teachers commented: *"Sometimes it is difficult for families to pay for their children's insurance and without it they cannot go to the school trips", "Sometimes we do not find out about the activities planned by the school, therefore we do not participate"*. However, students state that they feel motivated and willing to participate in DRM work activities inside and outside the institution.

The majority of teachers emphasize that the participation of the community linked and not linked to EI is of the utmost importance, which is why this work inquired about strategies to facilitate interaction in the community. Regarding this matter, a strategy called "intergenerational dialogues" was reported, it consists of the possibility for students to share and talk with older people about experiences related to the Galeras Volcano and the DRG. A participant commented: *"It is an interesting strategy since it is possible to know the meaning of Galeras for today's students, and how older people, with more experiences with the Volcano see it"*.

Administrative processes related to DRM education

These processes that EI has work plans with external institutions, physical resources that allow specific activities such as training for teachers and students on topics of interest addressed in the DRM have been used. However, some teachers express the need to receive training in reference to their work with people with disabilities, they highlight the work of some institutions and professionals that support the matter of school inclusion. Some participants say: *"Several institutions come here to do activities with students, it would be good if institutions also came to train us on working with people with disabilities"*.

Educational community resources have been managed to carry out activities locally and to favor participation in national and international activities. Some teachers and participants of the administrative staff state that it is possible to access the resources available in institutions of the national risk management system or international entities in order to strengthen the EiE project and the DRM processes that have been developed within the institution. Some teachers mention: *"Although the school has the support of the Municipal Risk Management Council and the University of Nariño, it is important that perhaps other institutions help us with the possibility of improving much more"*.

It is also important to mention that this educational community is recognized for its work in DRM and VRM. In this sense, the participants of this research manifest the important role that some teachers and students play on behalf of the institution in national and international events. Some participants comment: *"Our work in DRM has allowed us to travel to events in Colombia and abroad, we have participated in events in Perú, Uruguay, Ecuador, Chile and Colombia"*.

Within this category, there is a problem that externally influences some educational work processes within the institution, the lack of economic resources in some families. This situation influences whether the students can access to the insurance, which is necessary to participate in activities outside the educational campus.

Lastly, some participants report that government investment, both in the EI and in the Municipality where it is located, is low, which is why the economic resources for the implementation of the DRM plan and the work material for the development of the project of EiE are very limited. Some teachers express: *"The government does not help us much with money, that is why we continue thinking of more strategies and making more material, otherwise we could not work well"*.

Discussion

The purpose of this study was to analyze the educational processes for VRM, emphasizing the implementation of the Education in Emergencies (EiE) project at the Institución Educativa San Bartolomé (IESBA) of the Municipality of La Florida, Department of Nariño (Colombia). The results show that, considering the administrative processes and the institutional aspects, this community responds to the contextual needs by developing various educational strategies for DRM, in addition to highlighting the social aspects of communication focused on community participation in favor of the teaching-learning processes in EI. Considering the above, it is essential to mention that through these strategies, the IESBA has managed to strengthen the cultural identity of its community. In coherence with the results of this study, Ojeda-Eraso, Jurado-Romero & Ojeda-Rosero (2018) state that, from the theory of social representations, the processes that involve community participation as understanding of different perceptions, beliefs, feelings and other cognitive elaborations that the community establishes involving the Galeras volcano, facilitate the approach to people and their reality, in addition to promoting respect for their cultural identity through the recognition of the popular knowledge that it possesses, its traditions, idiosyncrasies and the relationship between man and nature.

Regarding the administrative field, the institutional self-management of this community and its interest in facing the needs existing in its context is evident; since it complies with the approach of educational and training strategies for the development of competencies that allow better understanding and practice, not only in actions from a preventive

approach against risk, but also in the relationship of human behavior with the various problems and environmental events. Bearing this in mind, the findings of this study meet the guidelines of the Home Office and the Ministry of Justice (2010), because the role of education in favor of the development of cognitive, procedural and attitudinal competencies and capacities that improve awareness about risk in different contexts is emphasized. This has led members of educational communities to become thinkers and visionaries of the territory they inhabit, they also encourage each individual to extend their environmental training to their different areas of personal, familiar, professional and social development (Ministry of Environment and Sustainable Development MINAMBIENTE, 2016).

In this sense, the IESBA has integrated the EiE project into its curriculum, which is a relevant initiative for coping from the principles of prevention and self-care against VR. Thus, it is important to highlight the value that has been given to the contextual situation and community participation in the development of these new practices within the curriculum. Supporting the aforementioned, Jiménez and Kreisel (2018) in their study carried out in Mexico, refer that educational proposals have been created in some EI, taking into account community participation, which has become an important field of innovation in the construction of schools and different pedagogies. For this reason, the participation of families, students and teachers is essential in the construction of educational projects for the community, as well as contributing to joint reflection on contextual problems and their possible solutions.

It is coherent that educational institutions develop projects that encourage the approach of scientific information and popular knowledge in order to promote pro-environmental thoughts, beliefs and attitudes, which motivate healthy decision-making, facilitating processes of social organization and, therefore, greater community participation. Therefore, it is relevant to contrast this approach with the findings of Cuaical and Sánchez (2018), as they report in their research that students and instructors validate the importance of addressing scientific issues around volcanoes, since it enables the understanding of the environmental aspect regarding volcanic risks, in addition to promoting an approach with the members of each EI and the formation of networks of new contacts.

Additionally, the arrangements that this educational community has done with external institutions for the education in VRM must be recognized. Evacuation drills with the support of government institutions and CPR training sessions with the Fire Department have been carried out in this EI. These processes tend to strengthen the actions proposed within the framework of the educational work in VRM and the EiE project, which constitutes the development of vital tools to face an emergency, taking into account that in this case they have developed this tools from the threat posed by the Galeras Volcano. Consistent with the above, Mora, Gallego and Ojeda (2011) validate the importance of articulating all the institutional and inter-institutional work initiatives

in order to transform them into institutional inputs and tools to face an emergency.

Additionally, Cuaical and Sánchez (2018) in their study refer that part of the volcanic risk prevention activities have been focused on the production of didactic materials for various audiences, and the education with the active participation of the communities. In line with the study carried out by the aforementioned authors, the IESBA also develops a self-management commitment. Most of the participants in this study also agree that there are diverse difficulties regarding the social aspects of communication and community participation processes. The IESBA faces this situation by using different means of communication, both computer and face-to-face, for the dissemination of pertinent information that makes it possible to increase community participation and favor communication processes as a transversal axis, some examples of these are billboards of information located in the facilities of the institution and the use of virtual platforms.

Since the communication and community participation processes facilitate the development of various teaching-learning strategies, it is convenient to point out that one of the most prominent aspects acknowledged both by students and teachers were the game-related teaching strategies developed at EI. Through game strategies, dynamics and practices, students become more involved and participate, not only in carrying out the activity but also in proposing improvement strategies for more effective learning. In this sense, this result is consistent with the guidelines proposed by the Ministry of Education (2015), as they refer that this type of strategies can be used as tools for learning, managing emotions and social relationships, as well as recreational activities. Therefore, these activities can be used to strengthen the capacities of students to act appropriately in emergency situations.

One of the findings of the present study is that the participants consider that art is one of the most important aspects, not only for teaching and learning in VRM, but also for the construction of didactic work material and as a means of interpersonal communication. In this regard, authors such as Hermann (2009) affirm that art has played a high social role, since it has become not only a form of education, but also a means of communication and socialization that promotes creative thinking and makes it possible to create suitable conditions for the construction of sensitive, reflective and critical students in the face of the various problems of society.

Also, teachers of this EI were concerned about working with people with disabilities, but they report that it is an aspect they want to work on. Regarding this matter, the importance of training the IESBA staff is validated, as previous studies indicate that inclusive education makes it possible to link students in situations of vulnerability of different types in the same environment, taking advantage of their differences to enrich all the community (Beltrán, Martínez and Torrado, 2015). Finally, regarding the motivation that teachers refer to training in inclusive education, Ramírez (2017) affirms in his study that teachers

assume the influences of the environment as challenges that stimulate their work. Therefore, from a community perspective, their training and development are part of the conglomerate of actions that prepare them to adapt and respond to the student's needs, as well as contribute to the development of society and its members, and innovate their professional activities.

Conclusions and recommendations

This research invites all educational institutions and society in general to reflect on the importance of implementing educational processes for VRM, based on EiE projects and the approach to environmental education. Additionally, it is important to share and divulge a strategy that can be replicated in various EI that are exposed to the volcanic threat, since this would provide fundamental elements for the development of action plans in order to prevent and mitigate the consequences of a catastrophic event.

Besides, educational strategies based on the creation and use of recreational, artistic, theoretical and practical tools are considered one of the strengths of the EiE project. Bearing in mind that cognitive processes and protective behaviors are developed in scenarios such as these, the importance of including aspects of Environmental Psychology and Environmental Education in all EI, beginning with the construction of knowledge based on the subjective understanding of beliefs, experiences and actions of the community in its relationship with the environment, is vital.

The group construction of educational material is recognized as a scenario that has allowed the creation of communication and community participation processes aimed at reducing risk and appropriating knowledge. Therefore, it is important that these tools are shared with the community in general and that more spaces of this type are provided, achieving higher levels of community participation. However, it is still necessary to investigate the effectiveness of the different teaching-learning strategies used in this context.

Recreational and artistic tools are inputs that can greatly support the strengthening of communication in educational contexts, not only in general, but also in those specific elements that allow education in DRM, community participation and administrative aspects related. Therefore, it is necessary to continue studying and investigating strategies that lead to a general improvement of school dynamics.

Likewise, the presence of some techniques and strategies regarding the work in the EiE project guided by the approaches of inclusive education is highlighted, nevertheless, there is concern about not having enough training in this regard. Therefore, it is recommended to evaluate the possibility of implementing a training program to address strategies specifically focused on this area, in order for the educational community to have the necessary tools to meet the educational needs of each student.

Finally, in coherence with the fulfillment of the objectives of this research towards the analysis of the educational processes for VRM in the EiE project within the IESBA, the findings derived from this process with the educational community consolidated a significant understanding of the subject studied based on the intersubjective construction of reality from the perspective of the actors involved.

Acknowledgments

The authors appreciate the valuable contributions of MS. Edwin Gerardo Luna Tascón, professor in the Psychology Program of the University of Nariño, who took part in the tutoring of this project.

We wish to express our gratitude to the directors, teachers and students at the Institución Educativa San Bartolomé, for their participation and collaboration in the research process. We also highlight the participation of the teacher Néstor Aurelio Muñoz, a professional who is truly committed to Education and Disaster Risks Management.

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Notes

Potential conflict of interests: Within this investigation there was no conflict of interest.

Sources of financing: This study had financial support from the University of Nariño and the Mayor's Office of the Municipality of La Florida (Nariño).

How to cite: Ojeda Rosero, D.E., Bravo Peña, D.A., Gómez Delgado, Y.A. (2020). Educational Processes for Volcanic Risk Management (VRM) at an Educational Institution (EI) in The Department of Nariño (Colombia). *Revista Luna azul*, (50), 229-243. Doi: 10.17151/luaz.2020.50.12.

Notas de autor

- 1 Psychologist, Ph.D. in Psychology, Autonomous University of the State of Morelos, México. Teacher research from CONEPSI Group and IADAP Group. E-mail: deliza75@yahoo.com. <https://scholar.google.com.mx/citations?user=ewf52wMAAAAJ&hl=es>.
- 2 Psychologist. E-mail: dbravo890@hotmail.com. https://scholar.google.com/citations?user=5CKFj_kAAAAAJ&hl=es.
- 3 Psychologist. M.A in Psychology, Autonomous University of the State of Morelos, México. Teacher research from Psicología y Salud Group. E-mail: andreagomezdelgado21@gmail.com. <https://scholar.google.com.mx/citations?user=iaj7KJAAAAAJ&hl=es>.