DOI: 10.5902/19834659 29642

SUSTAINABLE RURAL AREA PROJECT: THE ALLIANCE OF PERMACULTURE, SCHOOL ENVIRONMENTAL EDUCATION AND SUSTAINABLE MANAGEMENT OF SMALL RURAL PROPERTY

Received on: 27/10/2017
Approved on: 17/07/2018

Ana Claudia da Rosa[1]
Sonia Salete De Grandi[2]
Maria Goretti Rocha Farias[3]
Lúcia Rejane da Rosa Gama Madruga[4]
Marina de Alcântara[5]
Marcia Helena dos Santos Bento[6]

ABSTRACT

This article presents the experience of interaction between higher and elementary education in the Sustainable Rural Area Project, a concrete environmental education experience developed by students in the sixth grade of the José Paim de Oliveira Field School. The project was designed with the support of researchers from the Architecture and Business Administration courses of the Universidade Federal de Santa Maria (UFSM), as well as of a businessman with practical permaculture experience. In the initiative, the students built a model of a sustainable rural property shaped by permaculture principles, receiving the first prize at the II Municipal Science, Technology, and Sustainability Fair of the Municipal Education Network (MEN) of Santa Maria, RS, Brazil. This study employed a qualitative approach, along with participant observation and a focus group. In the results section, we present the project development, the making of the model, and the experiences reported by the students. In practical terms, the project contributed to the pedagogical practice in the school and the exchange of experiences. In theoretical aspects, we sought to integrate learning theory into the acquired knowledge and sustainable experiences, inserting permaculture principles in the sustainable management of a small rural property and revealing the articulator role of the administrator in different spheres of society.

Keywords: environmental education, permaculture, experiential learning, small rural property management.

1 Degree in Administration from the UFSM, Master's Degree in Administration from the UFSM e phD in progress in Administration from the UFSM. Santa Maria – Rio Grande do Sul. Brasil E-mail: ana.claudiadarosaa@gmail.com
2 Degree in Science from the Unijuí, com Specialization in Science Teaching from the UFSM. Currently is a teacher in Municipal School of Elementary Education José Paim de Oliveira, in Santa Maria. E-mail: degrandi.sonia@gmail.com
3 Maria Goretti Rocha Farias Degree in Pedagogy from the UFN, Master's Degree in Teaching Humanities and Languages from the UFN. Santa Maria – Rio Grande do Sul. Brasil. E-mail: go.rfarias@yahoo.com.br
4 Degree in Administration from the UFSM, Master's Degree in Production Engineering from the UFSM e phD in Agribusiness from the UFRGS. Santa Maria – Rio Grande do Sul. Brasil. E-mail: luciagm@ufsm.br
5 Degree in Architecture and Urbanism from the UFSM, Degree from the Special Program for the Graduation of Teacher Education for Vocational Education from the UFSM, and Master's Degree in Cultural Heritage from the UFSM. Santa Maria – Rio Grande do Sul. Brasil. E-mail: marinadealcantara@hotmail.com
6 Degree from the Special Program for the Graduation of Teacher Education for Vocational Education from the UFSM, Degree in Accounting Sciences from the UFSM, Master's Degree in Production Engineering from the UFSM and phD in progress in Administration from the UFSM. Santa Maria – RS. Brasil.
E-mail: marciabento@politecnico.ufsm.br

1 INTRODUCTION

One of the aspects that surround elementary education is the insertion of the environmental issue in daily school both from taking caution about the school's environmental impacts and for introducing the theme in the educational process. This insertion must occur not only through the classes but also using an interdisciplinary and transversal bias that allows broadening the horizons of environmental issues for the whole community (JACINTHO, 2011). Environmentally correct behaviors must be learned in practice in daily school life, contributing to form responsible citizens. To this end, education must be committed to sustainable development, clarifying to the students the importance of each one's attitudes to improve their reality, demanding from schools the commitment to change in favor of sustainability (UNESCO, 2005; LEFF, 2015; UNESCO, 2002).

There are many available inputs and concepts to conduct change in this direction. Permaculture, used in this study as a conceptual scheme, has the tools to make environmental education more effective and practical since it represents a way of seeking answers and solutions that escape the hegemonic standard and the commonly instituted practices. Hence, it brings together school, scientific, and traditional knowledge, promoting an active engagement for the solution of environmental and social problems in rural areas. In the school environment, permaculture principles may connect the children to basic facts that guide vital processes and, when combined with rural property management, may provide sustainable development in a viable and safe way for the small family farmer (SOARES, 1998; LOOS-SANTANA; LIMA, 2014).

It is up to the educator, therefore, to choose the path that best promotes student learning, using a process that provides the development of behaviors compatible with effective solutions to environmental issues. In this context, environmental education is seen as a set of factors that lead to interdisciplinary and transdisciplinary pedagogical actions to ensure the teaching-learning process effectively occurs (SOUZA, 2012).

From this perspective, the experience reported in this study used permaculture as the basic concept to promote learning. Therefore, this study aimed to report the phases and results of the development of a project of a sustainable rural property by elementary school students from a rural school, with the help of educators, university professors, and volunteers, who brought their knowledge and experiences to the school locus. The model was presented by the students at the II Municipal Science, Technology, and Sustainability Fair of the Municipal Education Network (MEN) of Santa Maria, RS, Brazil, in which the students were awarded the first place.

2 ENVIRONMENTAL EDUCATION IN SCHOOL

The relationship between education and sustainable development is present in international discussions since the first United Nations Conference on the Human Environment (UNCED) held in Stockholm, Sweden, in 1972, and the first Intergovernmental Conference on Environmental Education held in Tbilisi, Soviet Union, in 1977, when the main guidelines for Environmental Education in the world were established. Education is vital for preparing individuals for a sustainable society and, despite representing the fundamental role in the development of a socio-environmental awareness, is not able to implement sustainability without concrete measures being taken (LAUDER et al., 2006; JUCKER, 2002).

In Brazil, the National Environmental Education Policy (NEEP), Law 9795/1999, pro-

posed the insertion of Environmental Education (EE) in all levels and modalities of the educational process as an essential and permanent component of national education. NEEP foresees the development of EE as an integrated, continuous, and permanent practice, emphasizing that it should not be implemented only as a course or specific curricular component (BRASIL, 2007). In 2012, through a specific resolution, the Curriculum Guidelines for Environmental Education were established, reaffirming its integrative nature.

The Brazilian National Environmental Education Program (NEEPro), one of the principal governmental EE programs, considers environmental education as a viable option for building a sustainable Brazil, which is understood as a socially just and environmentally secure nation (BRASIL, 2005). EE is an essential dimension in elementary education, referring to a sphere of interactions based on personal and social development, i.e., on the relationship with the environment (SAUVÉ, 2005).

For its implementation as a transformative policy, it is necessary to establish an environmental education process capable of potentializing, signaling, and consolidating alternatives that break and transform behaviors, values, attitudes, lifestyles, and forms of production that are dominant in society (LOUREIRO, 2012). This process, besides being a resource that may instigate in people the interest in preserving the environment they live in, thus achieving proper and correct sustainability, also has potential to be a management instrument due to its capacity to intervene in the process of social construction of reality. By exercising a relational and integrated view of the environment and encouraging active citizenship, the process allows conquering participation and mobilization spaces in different management scales (ROOS; BECKER, 2012; GUIMARÃES, 2001).

Therefore, EE allows students to develop notions of citizenship, because the pedagogical practice is committed to the construction of values, concepts, abilities, and attitudes capable of allowing the understanding of the reality of life and the lucid and responsible actions on the environment of individual and collective social actors (LOUREIRO, 2012). As a result of inserting EE in all levels of education, the solutions have increasingly required joint and integrated work from professionals of the most diverse fields, as well as the need for a creative vision and the development of a cooperative attitude in schools. The development of interdisciplinary projects that help in the promotion of values for sustainability is already routine (FERRAZ, 2008).

Hence, there is a development of the skills and values that will lead students and the community to rethink and otherwise evaluate their daily attitudes and respective consequences on the environment. Therefore, EE is essential to make people aware, once it promotes the implementation of projects, ideas, opinions, and works related to sustainability and environmental preservation. This study used permaculture as a contribution of knowledge to integrate EE in school with the nature of the investigated object, a Field School, in an attempt to promote the environmental and sustainable conscience directly to the students and indirectly to their families.

Permaculture is particularly suited to schools because it offers fun and sustainable ways of working the environment, once the students who engage in environment-related activities improve their attitudes, likely becoming adults committed to their environment (LEGAN, 2004). The idea of performing environmental education using permaculture to promote school sustainability has been developed and experimented in several places such as the Eco-Schools in Portugal and Chile and, in Brazil, at the Professional Education Center of the Vale do Caí, in the city of Feliz (RS), at Escola Autonomia (Florianópolis, SC), in some municipal schools of São José do Cerrito (SC), Pirinópolis (GO), and Porto Alegre (RS), which are assisted by the Continuous Environmental Education Program of the Fundação da Gaia (FERRAZ, 2008).

The report presented herein describes the learning cycle of a group of students who experienced the elaboration and execution of a project of a sustainable rural property that had permaculture as conceptual support scheme.

2.1 PERMACULTURE AND ENVIRONMENTAL EDUCATION IN RURAL PROPERTIES

Created by Australians Bill Molison and David Holmgren in the mid-1970s, permaculture is defined as "a set of consciously designed landscapes that reproduce patterns and relationships found in nature and, at the same time, produce abundant and sufficient food, fibers, and energy to meet local needs" (HOLMGREN, 2013, p. 33). This system was shaped as a synthesis of surviving ancestral cultures combined with the knowledge of modern science, creating solutions and technologies anchored on sustainable development, bringing together ideas, skills, and ways of life that must be reinvented with the purpose of making people able to provide for themselves while guaranteeing natural capital for future needs (HOLMGREN, 2013; JACINTHO, 2011).

Anchored on the shoulders of Ecology, permaculture views ecological relations also as affective relationships, as it is based on the interactions of living and non-living beings with each other, glimpsing how they affect and are affected. Its purpose is to improve the quality of affectivity among people and of them with the world and its principles, making clear the holistic concern with the relations that involve human beings in their habitat (LIMA, 2012; MORROW, 1993).

The permaculture principles (MOLLISON; SLAY, 1998; LEGAN, 2004) may be applied in any climate or scale and are fundamental to a good sustainable project. They are:

Each element is positioned relative to another so that they are mutually supportive (everything is connected);

Each element performs many functions (targeting connections);

Each important function is supported by more than one element (especially the basic needs, which must be supplied in two or more ways);

Efficient planning of the use of energy for the house or settlement in zones (according to the amount or frequency used) and the sectors (identification of where the sources of energy - wind, water, light - enter the space);

Predominance of the use of biological resources over fossil fuels;

Local energy recycling;

Observation and imitation of nature (working together with nature: sun, rain, wind, natural element patterns, diversity);

Establishing cycles of storage and transport of nutrients, water, and energy, storing and using them before they are lost; and

Transformation of problems into solutions (creativity).

A permacultural project involves the conscious planning, deploying, and maintaining of productive ecosystems that have the diversity, stability, and resistance of natural ecosystems, resulting in the harmonious integration between people and the landscape, providing food, energy, housing, and other material and non-material needs in a sustainable manner (SOARES, 1998).

Permaculture is not pedagogy nor does it intend to be, but the permacultural actions, values, principles, and objectives present a concrete vision, gathering tools for an educational practice in favor of life on the planet. By making it happen and being successful in their projects, permaculturists from around the world have given continuity to the lessons learned (LOOS-SANTANA; LIMA, 2014).

By linking secular knowledge to the discoveries of modern science, permaculture also

emerges as a promoter of integrated sustainable development of rural property in a viable and safe way for the family farmer. In addition to the diversification of production, unlike conventional agriculture, it seeks to balance the use of natural resources, actively acting on the process of transition to sustainable agriculture (TOMASETTO; LIMA; SHIKIDA, 2009; SOARES, 1998). This sustainable economic, social, and ecological development may be achieved by incorporating technologies suited to different local conditions, by the aggregation of durable goods and services, and, mainly, by a new vision of resource use, energy supply to the system, and appreciation of local knowledge (FERRAZ; MARQUES; SKORUPA, 2003).

Rural management is a branch of management that employs administrative functions to efficiently use resources and obtain rewarding and continuous results in conducting a rural business. Its primary concern is to achieve the most profitable combination of the diverse production factors, seeking to optimize the farmer's results. This management is related to the ability to manage resources that are natural (elements that come from the land, water, climate, and natural vegetation), human (people that live and work on a property), and of capital (goods and services created, purchased, or provided) (SILVA, 2013).

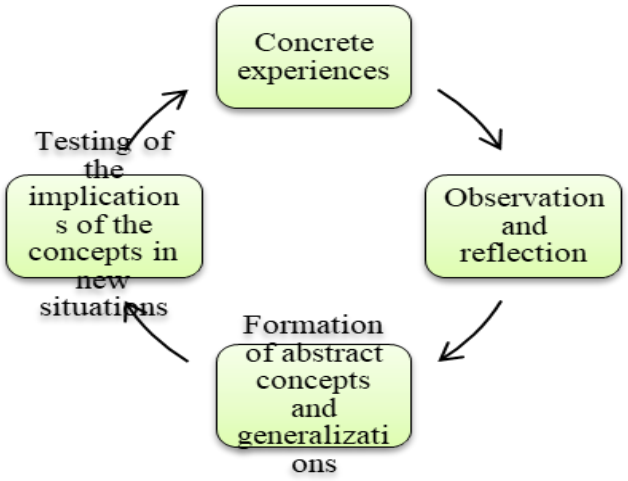
In this sense, the organization and participation of family farmers in the local development process should seek income distribution and social equity and, at the same time, promote a more balanced relationship with nature (TOMASETTO; LIMA; SHIKIDA, 2009). From this perspective, rural property management based on permacultural principles becomes an instrument to study and practice EE in the school environment, allowing students to transmit this knowledge and its application beyond the school setting.

The culture of sustainability and environmental citizenship are results of a pedagogical approach that must combine learning from everyday life, whereas EE centers on objectives and actions to develop projects in which the importance of real-life and everyday contexts in the building of knowledge that allows changing the reality stands out. Thus, the school agenda must be addressed, prioritizing themes that emerge from the demands of the community (GUTIÉRREZ; PRADO, 2013). In this sense, education and learning are keys to achieve sustainable development (BARTH; RIECKMANN, 2012).

2.2 THE EXPERIENTIAL LEARNING CYCLE

By creating learning environments where students may reflect and act on reality, the education system will have a greater opportunity to achieve its goal. The Experiential Learning Cycle (ELC) (KOLB; RUBIN; MCINTYRE, 1978) addresses the development of attitudes, knowledge, and skills in a cycle where knowledge is formed from the transformation of the experience lived by the individual. The learning process is both active and passive, both concrete and abstract, and may be conceived as a four-stage cycle: (1) concrete experience, (2) observation and reflection, (3) formation of abstract concepts and generalizations, and (4) hypotheses to be tested in the future that will lead to new experiences, as illustrated in Figure 1.

Figure 1 – Experiential Learning Cycle



Source: adapted from Kolb, Rubin and McIntyre (1978, p. 38).

The ELV repeats itself frequently, presenting a direction governed by a person's felt needs and goals so that the learning styles become highly individual both in direction and process. The stimulus of the experiential learning cycle may emerge from classroom practices or more innovative teaching methodologies such as the coordination of self-development through participation in the developed activity and the execution of questionings and research that contribute to the learning process, as well as extrapolating the walls of the classroom in order to be part of the student's reality and the means with which he/she interacts (GONÇALO; BITENCOURT; MANCIA, 2003).

In turn, EE cannot lose sight of the need for citizen participation in the search for alternatives and solutions to serious environmental problems, be they local, regional, or global (CASTRO; CANHEDO JR, 2005). Hence, promoting the interaction among EE, permaculture, and sustainable rural property management by means of a project has shown to be an instigating experience for the group of professionals involved, since it was a potential action to develop attitudes, knowledge, and abilities of the students on behalf of sustainability and all the concepts that surround it.

3 METHODOLOGICAL ASPECTS

The Sustainable Rural Area Project was developed at the José Paim de Oliveira Rural School with the purpose of engaging the students in sustainable activities in the school environment. One of such activities involved the preparation of a model that reproduced a sustainable rural property, allowing the participation of the sixth-grade students in the II Municipal Science, Technology, and Sustainability Fair of the Municipal Education Network (MEN) of the city of Santa Maria, RS, Brazil. The model development was supported by collaborators from the Universidade Federal de Santa Maria (UFSM) (two researchers from the Business Administration course, a professor and four students from the Architecture course), an agricultural technician (teacher in the school), four teachers from the rural school, and a volunteer with experience in building permacultural projects.

The methodological course took place in two moments: (i) project elaboration and model preparation, and (ii) report of the students on the experiences. During the development

and elaboration of the project, we made a participant observation (MOREIRA, 2004). The instruments we used included follow-up of the student and teacher routines, school visits, meetings and interviews with students and specialists, teacher reports, teacher orientation, the study of the involved themes, and notes. This stage culminated in the preparation of the project that was sent to the Science Fair.

After the elaboration of the project, the model was prepared. For this, the academics and the architecture professor were involved, along with the volunteer with experience in permacultural projects. These experts guided the students both in the preparation of the elements and in the definition of the scope, designing the distribution of each element in the model built by the students under the supervision of the professor who coordinated the activity at the school. The students visited a sustainable rural property near the school and attended a lecture by the agricultural technician.

The experiences of the group in making the model, as well as their participation in the Municipal Fair, were reported using a focus group (MORGAN, 1997) carried out at the school, in which the participating students interacted over the topics suggested by the researchers. The focus group included twelve students and one teacher. Data collection was performed in a classroom at the school during class hours, lasting approximately forty minutes. The students gathered around in a circle and data was collected in audio format and video recording, later analyzed employing the content analysis technique (BARDIN, 2014).

4 RESULTS: PROJECT AND MODEL DEVELOPMENT

The project design involved students in all phases, with the theme defined from questions in the classroom about an activity or content of interest that involved sustainability and contemplated the students' locus of experience. Then, several activities were developed in the Sustainable Rural Area Project according to the four stages of the Experiential Learning Cycle necessary for a project to involve the students (FERRAZ, 2008). In the identification and planning, analyses were made of some local realities in which the community families are inserted and, in this stage, the school teachers contacted the researchers at UFSM to aid in the elaboration of the model.

Once the scope of the model was defined, the project implementation was started. At this time, studies and research were performed in the classes taught at the school, which involved themes such as energy forms, possibilities for reusing space and all the material produced in a rural property, waste treatment, agroforestry, collection of rainfall, green roofs, ecological fossa, production and generation of alternative incomes in small rural properties, composting, environmental and social issues, and recycling, among other elements that constituted the model.

Several possibilities for building a sustainable rural property (permaculture principles) with the maximum possible reutilization and a low economic investment were demonstrated. From this perspective, developing the environmental education project, the school promoted to students and the community a fundamental understanding of the existing environmental issues resulting from the human presence in the environment, as well as their responsibility and critical roles as citizens in the construction of a better world.

After several visits and meetings among the UFSM researchers, the owner of the sustainable farm, and the school teachers, all the elements that should be present in the model were defined. In the following stage, at the university's atelier, the Architecture professor, with the help of four students, began to prepare the basis of the model using materials reused from

the residues of models developed in the Architecture course. From the base of the model, the Architecture professor made a visit to the school and, along with the sixth-grade students, completed the model.

During the preparation, the students were willing to learn and employ their sustainability knowledge on the rural property that was being shaped in the model. The elaboration of the model followed the permaculture principles, and all elements were produced to optimize the natural resources, with the model divided into permacultural zones. Such zones are more or less concentric areas of use intensity, which describe the power and science of people that work from the focus point, a house, as shown in Figure 2.

Figure 2 – Permaculture zones

Source: adapted from Holmgren (2013, p.233).

Based on these permacultural zones proposed by Holmgren (2013), the zones of the model were constituted of the following elements:

Zone 0: sustainable house and ecological fossa;

Zone 1: vegetable garden and greenhouse;

Zone 2: orchard, henhouse for raising chickens, sty for pigs, and shed to store agricultural inputs;

Zone 3: planting sugarcane, cassava, beans, and maize crops;

Zones 4 and 5: river, native forest, and wild animals.

The model sought to reflect the irregularities of the land in order to more realistically demonstrate the aspects of the sustainable rural property, as well as to list the elements and cultures that are common to the properties in the school area. Also, in Zone 0, the location of the house was planned to take advantage of sunlight in the morning, with the sustainable house having a green roof to take advantage of and retain heat, as well as a cistern for reusing rainwater. It was also sought to show the preservation of the native forest in Zone 4 and the riparian forests in the river and on the road. Photograph 1, below, shows the finished model:

Photograph 1 – Model of the sustainable rural property

Source: Rosa (2016).

Next, Photograph 2 reveals the details of Zone 0 (sustainable house and ecological fossa), Zone 1 (vegetable garden and greenhouse), Zone 2 (orchard, henhouse for raising chickens, sty for pigs, and shed to store agricultural inputs), and Zone 3 (planting sugarcane, cassava, beans, and maize crops).

Photography 2 – Detail of Zones 0, 1, 2, and 3

Source: Rosa (2016).

Photograph 3 shows in detail Zones 4 and 5 (river, native forest, and wild animals):

Photograph 3 – Detail of Zones 4 and 5

Source: Rosa (2016).

After the model was completed, the four students responsible for the presentation at the Municipal Fair were chosen who, with the help of the school teachers, planned and rehearsed their presentation. The Fair was held on November 25th, 2016, at the Municipal Sports Center (MSC). The sixth-grade students took first place in the Beginning Years category, something un-

heard of at the school. This fact surpassed the expectations of all those involved in the project, revealing the importance of the integration between school and university given that the knowledge extrapolated the classroom reaching the community.

The result of this project made possible for the school to value the work of the students, who may feel capable and proud of their intervention, thus stimulating confidence and solidarity through practices developed in the project that can make a difference in the environmental quality of the school and the community (FERRAZ, 2008).

4.1 REPORT OF THE EXPERIENCE OF STUDENTS INVOLVED IN THE PROCESS

The learning process is described by the ELC: (1) concrete experience, (2) observation and reflection, (3) formation of abstract concepts and generalizations, and (4) hypotheses to be tested in the future, which will lead to new experiences.

The concrete experience in developing the project stands out from making the model and participating in the Municipal Fair. The students were asked about what they most liked in the experience, their activities, the difficulties in group work, and the help of the teachers during the process.

> [...] what I most liked was actually everything, because without education we would be nobody [...] [STUDENT C].

One goal brought by the students was to expose the reality of rural people to those who live in the city, revealing the importance of preserving rural areas:

> [...] so people who live in the city can have a sense of what rural people can do [STUDENT B].

The students said that the group work was good because they helped each other in elaborating the model, revealing that only one or two colleagues showed no interest in helping. They also stressed the importance of the help from the teachers. Also, they said that the choice of the students that would present the model in the Municipal Fair occurred by the willingness of four of them to do so, without generating conflict among students.

About the experience of presenting at the Fair, the students said they liked doing so, and they believed to have explained it well. Two of them revealed they preferred presenting at the Municipal Fair than at the school itself because at the Fair they had contact with other people, showing the work developed at the school, which can be observed from the following statement:

> [...] I liked this work because it taught other people who were there, and also the teacher said to the other colleagues who were angry about losing to a model, she said that the model was not simply a model, that a real work had been done, it was developed having in mind a future for us to do [...] [STUDENT A].

In line with the student's statement, we point out the complexity of the model's elaboration, which involved several people and listed innumerable elements that may be inserted in a rural property. Moreover, the class said it was the first time that they performed a work that involved creating a model. One of the students also stressed the search for the attention of the work evaluation committee at the time of presenting the model.

In agreement with the student statements, we emphasize that for environmental education to be transformative, it must be articulated with social change, transforming pedagogy into a political practice with the cooperation among educators and other cultural actors, thus creating critical learning spaces in and out of school. The reason for this is that changes will not occur from the top down, but rather with the direct participation of students, teachers, community, and environment, in a complex dynamics (TRISTÃO; RUSCHEINSKY, 2012; GIROUX, 2003).

The importance of this cooperation and the participation of all individuals involved in the process was made clear with the obtained result, i.e., with the achievement of the first place at the Fair. About this, the statement of one of the students drew attention: "[...] it was cool because we are the smallest class in the school and we were able to bring a trophy back to school [...]" [STUDENT B]. The teacher also stated:

> [...] when the first place was announced, it was lovely. [...] We became serious, looking at each other. I said: "let's go, we have to receive the prize". [...] So it was very good, it was terrific. I think their speech, their posture, everyone's affection [...]. And, of course, the entire structure, the model was beautiful, our model was stunning [...] [TEACHER].

The teacher also emphasized the accent characteristic of the rural area that two of the students had, an aspect that positively attracted the attention of the evaluation committee during the presentation.

The students also pointed out a negative aspect at the Fair: a boy was mocking the model, which motivated their union to continue defending their ideas during the presentation, ignoring the mockery. Also, the students mentioned learning aspects, saying they learned and taught with the experience, going in the direction of observation and reflection.

Regarding observation, reflection, and formation of concepts, the researchers asked the students about the learned concepts, questioning if they could teach something to other people from the experience. The students talked about preserving nature and taking advantage of what it offers:

> [...] not spending so much energy, that if people did what was learned there would not be so much pollution [...] [STUDENT A].

From the students' statements, it is possible to observe awareness about the concepts of sustainability and preservation of nature during the development of the model, which is also revealed in the following statement from one of the students when questioned about what it means to be sustainable:

> [...] saving is good for our pockets and for nature as well, it wouldn't be to spend and spend, and that spending, and created trash and this and that and nature becomes increasingly dirtier, and the environment dirtier for people [...] [STUDENT A].

When asked whether they could teach something with the knowledge they acquired from this experience, the students stated they could teach about the importance of preserving riparian forests:

> [...] I think we could teach about rivers, the water, there are such beautiful rivers here and all without trees around, with erosion. If there is a beautiful sanga or a river, we must tell people not to remove the trees [...] [STUDENT A].

From this perspective, school education must not only promote such knowledge but also encourage skills and values that will guide and motivate the students towards sustainable lifestyles. Thus, regarding the test of the implications of the concepts in new situations, some students took the experience home, telling it to their relatives: parents, aunts, uncles, grandmothers.

The students reported they would take the knowledge learned to implement at home, such as the ecological fossa. One of them has already applied one of the learned concepts in his daily life making a composting at home. This student also revealed that his mother believed it was necessary to spend much money to "put into practice" all the ideas proposed by the model, stating that "[...] doing sustainability, it takes a lot of work [...]" [STUDENT C]. Another student pointed out a different problem: the space required to insert sustainable solutions. At that moment, the teacher said that, for example, what they learned about the ecological fossa "wasn't that expensive". One of the researchers also referred to the use of reusable materials.

When asked about what they could change from the new knowledge they acquired, one of the students remembered the garbage issue, saying that people should not throw garbage on the ground, but collect it. Also, a second student mentioned the dengue issue, stating that one should not leave standing water. Thus, this student brought an important implication of the concepts learned, going from the application in rural properties to health care. Therefore, we observed that school education must be committed to sustainable development, making it clear to students the importance of each one taking some attitude to change their reality (UNESCO, 2005).

Moreover, they remembered they could bring the learned concepts to the school itself, such as a vegetable garden so students can learn to cultivate for their own consumption. The teacher also pointed out:

> [...] you are in the sixth grade, so you have the seventh, eighth, and ninth grades to stay in school. Many things here at the school, we need to change: rainwater pickup, which is something you have to battle for, garbage, the fossa, making a sustainable structure [...]. Let's work for this, let's start making changes, starting now, let's work so that things that were learned there are applied at school. Changing the electrical system for solar panels, let's make this survey, see the possibilities [...] [TEACHER]

We highlight the importance of incorporating sustainable principles into the daily life of the school itself, because environmentally correct behaviors must be learned in practice, in the everyday school life, thus contributing to form responsible citizens. Therefore, environmental citizenship and the sustainability culture will necessarily be the results of the pedagogical practice that combines learning from everyday life (GUTIÉRREZ; PRADO, 2013; LEFF, 2015).

5 FINAL CONSIDERATIONS: LEARNING AND ITS CONTRIBUTIONS

"Those who teach, learn by teaching
and those who learn, teach by learning"
Freire (p.12, 2014).

The completion and participation in the Sustainable Rural Area Project yielded diverse teachings to all the involved, from the project participants to the community. In the report of the planning of the model, all the stages involved in the process were highlighted, listing the elements used in the model based on permaculture principles (HOLMGREN, 2013) and exceeding all expectations with the achievement of the first prize in the Beginning Years category of the Municipal Fair.

Through the project, the role of the administrator in the most diverse spheres of society as articulator for the promotion of sustainability stands out, since the researchers of the field, when contacted by the school teachers, sought the help and the connection of diverse professionals, making it possible to elaborate and prepare the model.

The pedagogy of environmental education fosters participation through cooperation, the valorization of the human creative potential, and the interconnection of diverse fields of knowledge, assuming the complexity of the socio-environmental reality (FERRAZ, 2008). This education is, potentially, a management instrument due to its ability to intervene in the process of social building of the reality (GUIMARÃES, 2001) by encouraging environmentally adapted practices and active citizenship that allows the expansion of popular participation and mobilization.

In practical terms, this study contributed to the pedagogical practice in the school environment and allowed an exchange of experiences among professionals of the most diverse fields of knowledge. The reported experiences brought practical gains not only for the students but the society since the results extrapolated the school walls with the students bringing home the acquired knowledge.

This project also presented theoretical results, in which contributions to the development of science are evidenced when seeking the insertion of the theory of experiential learning (KOLB, RUBIN, and MCINTYRE, 1978) in the acquired knowledge and the sustainable experiences, as well as the insertion of permaculture principles in the sustainable management of a small rural property, revealing the important articulation role of the administrator in different spheres of society.

Regarding the aspects that could be improved, we point out the didactic and methodological issues specific to qualitative research, both in terms of the involved subjects as of the aspects captured by the researchers during the study such as the focus group, in which few students expressed themselves making it impossible to give a complete account of their experiences.

The suggestions go into the field of education focused on sustainability in the school environment. It is intended to broaden the perspective of the development of the teaching of sustainability in this area. We point out that there is a research project being carried out which includes the university researchers and whose objective is to organize a base of practical actions that allow the teaching of sustainability in the classroom, seeking subsidies in similar experiences developed in other educational institutions.

The researchers wish to continue the development of activities at the school, applying the knowledge acquired in elaborating the model. Furthermore, they seek to broaden the project

and take the discussions and knowledge about the sustainable experiences to the other schools of the Municipal Education Network of the city of Santa Maria, RS, Brazil. Lastly, we point out the role of the Business Administration researchers in articulating among the contacts of the various professionals, organizing meetings and the elaboration of the model's design.

REFERENCES

BARDIN, L. **Análise de Conteúdo.** Lisboa: Edições 70, 2014.

BARTH, M.; RIECKMANN, M. Academic staff development as a catalyst for curriculum change towards education for sustainable development: an output perspective. **Journal of Cleaner Production**, v. 26, p. 28-36, 2012.

BRASIL, Lei nº 9.394 de 20 de dezembro de 1996. Estabelece as diretrizes e bases da educação nacional. **Diário Oficial da República Federativa do Brasil**, Brasília, DF, 20 dez. 1996. Disponível em: <https://www.planalto.gov.br/ccivil_03/Leis/L9394.htm> Acesso em: 10 dez. 2016

_____. Lei nº 9.795, de 27 de abril de 1999.Política Nacional de Educação Ambiental**. Diário Oficial da República Federativa do Brasil**, Brasília, DF, 27 abr. 1999. Disponível em: <http://www.planalto.gov.br/ccivil_03/leis/L9795.htm> Acesso em: 10 dez. 2016.

_____. Ministério do Meio Ambiente. **Programa Nacional de Educação Ambiental – ProNEA**. 3. ed. Brasília: Editora do Ministério do Meio Ambiente, 2005.

_____. **Vamos cuidar do Brasil:** conceitos e práticas em educação ambiental na escola. Brasília: MMA, MEC, 2007.

CASTRO, M. L. de; CANHEDO JR., S. G. Educação Ambiental como Instrumento de Participação. In: PHILIPPI JR., A.; PELICIONI, M. C. F. (Ed.). **Educação ambiental e Sustentabilidade**. Barueri: Manole, p. 381-400, 2005.

FERRAZ, J. M. G.; MARQUES, J. F.; SKORUPA, L. A. **Indicadores de sustentabilidade em agroecossistemas.** Embrapa meio ambiente: Jaguariúna, SP. 2003.

FERRAZ, M. L. C. P. **Sustentabilidade das Escolas Municipais de Ensino Fundamental:** Estudo de caso em Ubatuba, Estado de São Paulo, Brasil. São Paulo, 2008. Tese (Doutorado em Ciência Ambiental) – Programa de Pós-graduação em Ciência Ambiental, Universidade de São Paulo.

FREIRE, P. **Pedagogia do oprimido.** 34. ed. São Paulo: Paz e Terra, 2014.

GIROUX, H. A. **Atos impuros:** a prática política dos estudos culturais. Porto Alegre: ARTMED, 2003.

GONÇALO, C.; BITENCOURT, C.; MANCIA, L. O Desenvolvimento de Competências: uma experiência baseada na proposta andragógica e na aprendizagem vivencial. In: ENCONTRO NACIONAL DOS CURSOS DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO, 27., São Paulo, 2003, **Anais...** São Paulo: ANPAD, p. 1-18.

GUIMARÃES, M. Educação Ambiental e a Gestão para a Sustentabilidade. In: SANTOS, José Eduardo dos; SATO, Michele (Org.). **Contribuição da Educação Ambiental à Esperança de Pandora.** São Carlos/SP: RIMA, 2001, p. 183-195.

GUTIÉRREZ, F.; PRADO, C. **Ecopedagogia e Cidadania Planetária.** 3. ed. São Paulo: Cortez, 2013.

HOLMGREN, D. **Permacultura:** princípios e caminhos além da sustentabilidade. Tradução: Luzia Araújo. Porto Alegre: Via Sapiens, 2013.

JACINTHO, T. R. dos S. **Educação para sustentabilidade:** turismo ecopedagógico no centro de Permacultura Asa Branca e implantação de um espaço permacultural na Escola Classe Jardim Botânico. Brasília, 2011. Dissertação (Mestrado em Engenharia Florestal) – Departamento de Engenharia Florestal, Universidade de Brasília.

JUCKER, R. "Sustainability? Never heard of it" Some basics we shouldn't ignore when engaging in education for sustainability. **International Journal of Sustainability in Higher Education**, v. 3, n. 1, p. 8-18. 2002.

KOLB, D. A.; RUBIN, I. M.; MCINTYRE, J. M. **Psicologia Organizacional:** uma abordagem vivencial. São Paulo: Atlas, 1978.

LAUDER, H. et al. Education, globalization and social change**. Oxford University Press:** Oxford, 2006.

LEFF, E. **Saber ambiental:** sustentabilidade, racionalidade, complexidade, poder. 11 ed. Petrópolis, RJ: Vozes, 2015.

LEGAN, L. **Escola Sustentável:** ecoalfabetizando pelo ambiente. Imprensa Oficial, São Paulo, 2004.

LOOS-SANTANA, H.; LIMA, C. S. Representações de crianças sobre a natureza a partir de uma perspectiva ecológica afetivamente ampliada da vida. **Educação (UFSM)**, v. 39, p. 201, 2014.

LOUREIRO, C. F. B. **Trajetória e fundamentos da educação ambiental.** 4 ed. São Paulo: Cortez, 2012.

MOLLISON, B.; SLAY, R. M. **Introdução à permacultura**. Brasília: MA/SOR/PNFC, 1998.

MOREIRA, D. A. Pesquisa em Administração: Origens, usos e variantes do método fenomenológico. **Revista de Administração e Inovação**, v. 1, n. 1, 2004.

MORGAN, D. L. Focus group as qualitative research. In: MORGAN, D. L. **Qualitative Research Methods Series**. London: Sage Publications, cap. 1, p. 6-17, 1997.

MORROW, R. **Permacultura Passo a Passo**. Trad. André Luis Jaeger Soares. Austrália: Kangaroo Press, 1993.

ROOS, A.; BECKER, E. L. S. Educação ambiental e sustentabilidade. **REGET**, v. 5, n. 5, p. 857 - 866, 2012.

SAUVÉ, L. Educação ambiental: possibilidades e limitações. **Educação e pesquisa**, v. 31, n. 2, p. 317-322, mai./ago. 2005.

SILVA, R. A.G. da. **Administração Rural Teoria e Pratica**. 3 ed. Curitiba: Juruá, 2013.

SOARES, A. L. J. **Conceitos básicos sobre permacultura.** Brasília: MA/SDR/PNFC, 1998.

SOUZA, M. A. da S. C. **Análise do processo ensino e aprendizagem de Educação Ambiental em microbacia hidrográfica.** Jaboticabal, 2012. Tese (Doutorado) – Faculdade de Ciências Agrárias e Veterinárias, Universidade Estadual Paulista.

TOMASETTO, M. Z. C.; LIMA, J. F.; SHIKIDA, P. F. A. Desenvolvimento local e agricultura familiar: o caso da produção de açúcar mascavo em Capanema - Paraná. **Interações**, v. 10, n. 1, p. 21-30, jan./jun. 2009.

TRISTÃO, M.; RUSCHEINSKY, A. A educação ambiental na transição paradigmática e os contextos formativos. In: RUSCHEINSKY, A. (Org.). **Educação ambiental:** abordagens múltiplas. 2. ed. Porto Alegre: Penso, p. 289-312, 2012.

UNESCO. **Contributing to a more sustainable future:** quality education, life skills and education for sustainable development.2002. Disponível em: <http://unesdoc.unesco.org/images/0014/001410/141019e.pdf> Acesso em: 10 mai. 2017.

UNESCO. **Década da educação das Nações Unidas para um desenvolvimento sustentável, 2005-2014:** documento final do esquema internacional de implementação, 2005. Disponível em: <http://unesdoc.unesco.org/images/0013/001399/139937por.pdf> Acesso em: 03 mar. 2017.