School gardens: pedagogical and learning actions as an alternative for environmental education in a school in the municipal network of Campo Grande, MS, Brazil

Hortas escolares: ações pedagógicas e de aprendizagem como alternativa para a educação ambiental em uma escola da rede Municipal de Campo Grande, MS, Brasil

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ABSTRACT
School gardens are important teaching tools and contribute to the teaching/learning of students. The present article portrays the importance of an organic garden within the school space through its pedagogical and learning actions in a school in the municipal network of Campo Grande, Mato Grosso do Sul, Brazil. Such environments are multidisciplinary and contribute to healthy eating practices, helping students to re-educate themselves and pointing out improvements in their quality of life since they involve aspects of socialization and cooperation. In addition, they strengthen the community's relationship with the school, bringing together all the social elements involved, contributing to the development of a sense of responsibility and commitment to the school environment.

Keywords: Mandala, Organic Garden, Educational Garden, Learning.
RESUMO
As hortas escolares são importantes ferramentas de ensino e contribuem para o ensino/aprendizagem dos alunos. O presente artigo retrata a importância de uma horta orgânica dentro do espaço escolar através de suas ações pedagógicas e de aprendizagem em uma escola da rede municipal de Campo Grande, Mato Grosso do Sul, Brasil. Tais ambientes são multidisciplinares e contribuem para práticas alimentares saudáveis, ajudando os alunos a se reeducarem e apontando melhorias em sua qualidade de vida, pois envolvem aspectos de socialização e cooperação. Além disso, fortalecem o relacionamento da comunidade com a escola, reunindo todos os elementos sociais envolvidos, contribuindo para o desenvolvimento de um senso de responsabilidade e comprometimento com o ambiente escolar.

Palavras-Chave: Mandala, Jardim Orgânico, Jardim Educativo, Aprendizagem.

1 INTRODUCTION

Environmental education is an educational practice that involves socio-environmental realities in the environment in which we operate. According to law 9,795/99, which institutes the National Environmental Education Policy and defines environmental education as:

The processes through which the individual and the community build social values, knowledge, skills, attitudes, and competencies aimed at the conservation of the environment, common use of the people, essential to the healthy quality of life and its sustainability” (BRASIL, 1999).

The school is an essential tool for the practice of Environmental Education, being this space of knowledge, learning, and construction of the citizen. There are several approaches within environmental education, one of which is the pedagogical gardens, which can be worked within interdisciplinarity and collectivity. School gardens of a pedagogical nature, act as a living laboratory, enriching and enabling various activities within the environmental perspective, as well as food (Morgado, 2006).

Gardens are pedagogical learning tools that enable increased consumption of fruits and vegetables, the construction of healthy eating habits, the recovery of regional and local habits, collaborative and cooperative relationships, as well as the reduction of costs related to school lunches. (Muniz e Carvalho, 2007). Thus, with the implementation of vegetable gardens in schools, educators can develop, monitor, and encourage such practices that are important for health and well-being.
In the perspective of learning, the gardens in mandala format, consist of flowerbeds around, arranged in circles that contribute to the integration and interaction between the student and the environment. The word mandala comes from Sanskrit and means circle, being used in different cultures and religions, as well as within pedagogical concepts and practices (RAMOS, 2006).

The mandala garden fits within the concept and movement of permaculture. Mollison (1998), defines permaculture as a “design system for the creation of sustainable environments” to benefit life in all its forms. Venkat (2017) reinforces the term when reporting permaculture as a conscious project that integrates landscape and people by providing food, energy, shelter, as well as other needs in a sustainable context.

In the school environment, the mandala garden contributes significantly to the integral training of the student, since the theme encompasses different areas of knowledge and can be developed throughout the teaching-learning process, through vast pedagogical applications with real situations, involving education environment, and food.

The Municipal School Sister Edith Coelho Netto has as its object of study/learning an organic pedagogical garden in a mandala format in which students and school professionals are involved in various educational activities. In this sense, the present work aims to analyze the importance of a pedagogical garden in a mandala format in this school space through its pedagogical and learning actions.

2 METHODOLOGY

Our object of study is the mandala-type organic garden at the Municipal School Sister Edith Coelho Netto, located in Campo Grande, MS, Brazil (Latitude: -20.41688; Longitude: -54.62676). The methodology used in the present work consisted of action research. Manzato & Santos (2012) defines action research as social research, where participants and researchers interact collaboratively to approach actions and solve problem situations that affect the local community.

The vegetable garden is an important non-formal space within the school as it encompasses basic education students (early childhood education and elementary education I and II), being built at the end of 2014 in a circular format, mandala type, with 12 (twelve) flower beds (Figure 1).

In 2015, the garden's pedagogical activities began with students through (1) training of monitors; (2) practical classes; (3) scientific initiation work, extending until
2019. These activities were developed in partnership with the school's science laboratory, a relationship between the governing teachers of that space and the students (Figure 1).

Figure 1. Pedagogical organic garden at the Municipal School Sister Edith Coelho Netto.

Source: Authors, 2018.

2.1 TRAINING OF STUDENT MONITORS TO ASSIST IN PRACTICAL CLASSES AND MAINTENANCE OF THE GARDEN:

The training of student monitors (5th to 9th years) with the governing teachers of the science laboratory began in March 2015. Throughout the year, students learned and put into practice the techniques of soil correction and preparation, planting, maintenance with plant extracts and inoculant EM-4 (biological input that includes microorganisms present in the soil), as well as irrigation and harvesting.

The vegetables were harvested by the students, especially in the morning, delivering them to the school kitchen, for the school cooks to prepare the salad that is served with the school lunch.

The student monitors also made follow-up visits for the maintenance of the garden and weekly study and learning meetings, totaling a workload of 10 hours per week that occurs during the school shift. In addition to monitoring students, the other students of the school, during classes, carry out the garden maintenance activities, such as watering, harvesting, as well as application of natural repellent extracts for their maintenance.

2.2 PRACTICAL CLASSES:

The practical classes took place relating theoretical contents studied in the classroom to practice, from early childhood education to elementary school II.
Educational practices within the garden space were carried out based on interdisciplinarity, addressing general themes and healthy eating.

About healthy eating, classes were held with various classes at the school, where students learned about techniques for monitoring the development of vegetables from planting to harvest. The student monitors, along with the teachers in the school's science laboratory, were responsible for driving.

Classes with general themes in the garden involved the student working on the practice of various themes and content focused on the skills proposed in the municipal curriculum framework, putting into practice the knowledge acquired in theory.

2.3 SCIENTIFIC INITIATION

The scientific initiation activities were carried out with students from the 6th to the 9th years. The work was developed using the pedagogical garden as a research object. The students learned to work on the stages of scientific initiation, from choosing the theme, executing the project, and presenting the results at scientific fairs.

3 RESULTS AND DISCUSSION

The activities developed in the pedagogical garden of the Municipal School Sister Edith Coelho Netto promoted a social education focused on collective work, didactic and multidisciplinary activities. The main actions within the didactic, pedagogical and learning perspective in the years 2015 to 2019 will be presented:

3.1 TRAINING OF STUDENT MONITORS:

The vegetable garden provided students with the opportunity to return to school during their shift when working on maintaining the school vegetable garden. Students have the possibility to learn about the nutritional value of vegetables present in the garden, about the use of organic fertilizers, and about the risks of pesticides, thus improving their eating habits and, consequently, that of their families.

During the maintenance of the garden, there is an important commitment by the students (Figure 2). The cleaning of the garden and irrigation brought the agents closer to a reality that until then was unknown and new.
Figure 2. Students monitors in the work of maintaining the vegetable garden.

Students learned to care for and respect nature. The creation of the vegetable garden came to contribute and strengthen this thinking of a responsible and committed agent with the environment. Such ideas are reinforced by Amaral et. al., (2009) and Santos et. al., (2020) they worked with school garden, also found positive results. Their data reveal that the vegetable garden can become a great educational resource for teachers, as it would encourage students to consume healthy foods and to understand the importance of the environment and their care.

The space needs constant maintenance and daily care. Seeking support from the family to help with activities and care for the garden is a stimulus that is present during actions throughout the year by the school team. It was found that to develop a project of this nature, the partnership of everyone within the school community is necessary. Teachers, other employees, and students working in the garden of the Municipal School Sister Edith Coelho Netto developed a link of care with the school environment from the moment they connected with simple activities of soil management, planting, watering, and harvesting (Figure 3).
3.2 PRACTICAL CLASSES

Practical classes were held with early childhood education and elementary education I and II with different themes. The practical pedagogical activities in early childhood education had the partnership of the extension project of the Catholic University Dom Bosco (UCDB) under the supervision of professor Dr. Lucas Castro Torres, in addition to the students who monitor the garden (Figures 4 and 5).

This joint action was very positive, providing a sense of accomplishment and satisfaction among those involved. Therefore, the learning actions between teacher/student and monitor/ student/teacher contributed to a loving and respectful connection with the work that was taking place. Such gestures described above can be taken beyond the walls of the school, to its social, family, and personal context.
The students learned that when they arrive at the fairs and markets, the vegetables go through a life cycle that they were able to follow during the work. This moment of discovery provided students with knowledge of where the food comes from and how this cultivation process takes place.

Pimenta and Rodrigues (2011) had as results in their work that the foods are grown inside the school environment start to have a new meaning for the children, a new look, because they can see that, before reaching the shelves of the markets, the food went through the whole process of “growth” that they were able to experience.

In addition to classes with early childhood education, vegetables from the garden served as a base for snacks and salads for practical classes where the monitors participated as multipliers together with the teachers on the importance of healthy eating (Figure 6).

Figure 6. Student monitors in the harvest of the vegetable for the school snack.

Source: Authors, 2016.

According to Fernandes (2007), the school garden allows enrichment of food and changes in eating habits, in addition to bringing the entire school community closer to contact with nature. The author defends the benefits that the school garden brings to the student as this environment, when producing nutritious and accessible food, unites theory and practice so that learning becomes satisfactory.

Students during healthy eating classes have the opportunity to try the vegetables and identify the taste and learn to taste the food, exploring the senses and flavors. Such action makes it possible to work on the nutritional value of foods and their energy groups within the question of healthy and balanced food. Besides, students take vegetables to their homes, extending the benefits of this space beyond the school walls, to their homes (Figure 7).
In these classes, students, when learning the techniques of hygiene, manipulation, and use of food, can take such teachings to their homes. Thus, the link between school and family is strengthened so that the theory triggers the practice, especially in their homes.

Magalhães (2003) observed in his studies that using the vegetable garden as strategies to stimulate the consumption of legumes, vegetables, and fruits, is possible to improve the children's diet. Another interesting factor is that vegetables and spices when grown in the school garden and, when they are present in food, are very successful, that is, everyone wants to taste them since it is the result of the work of students who participated in the planting process, irrigation and harvest.

Multidisciplinary actions with elementary school students along with the leading math teacher where mathematical concepts of circumference and radius were worked, relating the theoretical content to the practical activity in the garden space (Figure 8). During the class, concepts about the mandala garden, its characteristics, and the social and environmental importance of this environment were also addressed. Sampaio et al., (2019) portray that the pedagogical gardens in mandala format when used in interdisciplinary classes contribute to insert an environmental education focused on sustainable, social agriculture and that stimulates bonds between the community (school/student/family) and integrates man with nature.
3.3 SCIENTIFIC INITIATION

Voluntary students of scientific initiation from the 6th to the 9th years of the school carried out scientific research in the organic educational garden and participated in municipal and regional science fairs. The organic garden, a non-formal learning space fits into this perspective, as it is a pedagogical and multidisciplinary environment (Figures 9 and 10).

Figures 9 and 10. Undergraduate students with work carried out in the organic pedagogical garden at municipal and regional scientific fairs.

Teaching science in a decontextualized and fragmented way has made it challenging to develop student's skills in the classroom. For this to occur, it is necessary to propose problem situations that encourage students to look for answers (Carvalho, 2004).
Thus, the scientific initiation project for elementary education allows students to appropriate the knowledge experienced and developed and become able to apply it in their daily lives, making the student the protagonist of their learning by promoting the development of skills suggested by the Curriculum Parameters for High School (BRASIL, 2000) which are representation and communication, research and understanding and socio-cultural contextualization.

4 CONCLUSION

Agriculture contemplates the assumptions of agroecology and urban agriculture, which when taken to urban schools as pedagogical practices of learning and collectivity, attends the demands related to the practical exercise of breaking disciplinary boundaries and the perception of how eating habits and human relationships with the environment in which they are inserted are constituted.

Such practices involve cognitive, subjective, and emotional aspects, in addition to the articulation of several disciplines that contribute to enrich the methods of using and learning between teacher and student, thus forming a subject with more authenticity and autonomy. In this sense, agriculture is a valuable tool to achieve several important objectives of environmental education and education and health.

The vegetable garden when inserted into the school is an important tool for the development of a variety of pedagogical practices aimed at environmental education and health-promoting the union between theory and practice in a contextualized and dynamic way, strongly contributing to the teaching and learning process, in addition to strengthening interpersonal relationships through collective and cooperative work.

An important role for the survival of vegetable gardens within school spaces must be developed and stimulated by the teaching staff and school management: it is about planning, execution, and maintenance of vegetable gardens so that principles of organic horticulture, planting methods, care for the soil, the countryside-city relationship, among others, are inserted into the community (internal and external) through pedagogical practices.

The activities carried out in the garden, involving the participation of several members of the school community (parents, teachers, students, and school administrators) strengthen the community's relationship with the school, bringing together all the social elements involved, contributing to developing a sense of responsibility and commitment to the school environment.
The pedagogical garden of the Municipal School Sister Edith Coelho Netto established collective attitudes and activities. The students in general developed a taste for the activities of handling the land and their care. The learning actions carried out in this space promoted the opportunity for many children to establish contact with nature and greater knowledge of what it can bring to their well-being.

The teacher, by enabling ways that can stimulate and encourage a diet with more nutritional value and, also, offering socialization within an open and creative space offers the student several ways of interacting and integrating with the environment and the beings involved.

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