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SOCIAL AND ENVIRONMENTAL RESPONSIBILITY FROM THE USE AND DISCARD OF MEDICINES

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ABSTRACT

The Environmental Education as a possibility to unify knowledge in the school context contributes to the formation of citizens who are critical and active in the preservation of the Environment. This study presents an analysis about the accomplishment of an Environmental Education Project with the generative theme of the use and disposal of medicines, in this way the objective was to investigate the students' perception of the use and disposal of medicines and the degree of information regarding its implications in relation to public health and / or the environment and so promote actions that reach the school community in order to raise awareness, awareness and guide to the correct final destination. The study was developed in 2017, with 95 students, from the State School Pedro Macedo in Curitiba - PR. It was possible to conclude that the thematic of the medicines contributes to the socio-environmental Responsibility with the development of actions that allow the minimization of the negative environmental impacts, potentializing discussions that emerge from the relations between human beings, society and nature.

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INTRODUCTION

Environmental Education (EE) interferes in our lives and discussing it favors understanding of reality and social participation. Jacobi (2003) points out that EE longs for "a new way of looking at man's relationship to nature, based on a new ethic, which presupposes other moral values and a different way of seeing the world and men." We have in the incorrect use and disposal of medication a problem that must be discussed in the school context in order to avoid negative environmental impacts. It is estimated that there are more than 60,000 chemical compounds in use in modern societies and that about 500 new chemicals are put on the market annually. Environmental pollution has accompanied the technological and industrial advance. The development of large urban centers has led to contamination of air, water and soil as a consequence of energy production and use, production and use of industrial and pharmaceutical chemicals, and increased agricultural activity (LIMA, 2003). Thus, Environmental Education as a continuous and permanent process must reach all phases of formal, non-formal and informal education; it should also examine environmental issues from a local, regional, national and even international point of view, assessing their causes, consequences and complexity (DIAS, 2004). The transformation of materials into finished products and the provision of services by companies are activities that generate waste. The union of an increasing number of people on the planet who consume more and more products and services tends to significantly increase the amount of garbage that is thrown into the environment every day. One type of waste that has a strong impact on public health and the environment is the disposal of medicines, which can contaminate water and soil, which lead us to the following reflection: where do such substances go? Medications, when discarded in inappropriate places, such as toilets or lavatories, dissolve into a toxic spot. Discarded in household refuse can contact other humans, contaminating them, either in the landfill, controlled landfill or landfill they are transformed into pollutants, that is, into a toxic substance, called leachate or percolated liquid, that can infect the the ground, the water table, the rivers and the atmosphere. Both, when contaminating the water, run through the sewage network of the city until arriving at a treatment plant, in the case of cities that have this service. The toxic drug patch is not treated like normal sewage because it needs a special process, which does not occur in the treatment plant. From the treatment plant, untreated pharmacological wastes are released into rivers, lakes and seas, thus aggravating pollution in the environment.

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It is assumed that the purchase of medicines by the population in the drugstores or pharmacies must be made with the proper guidelines of a doctor. In these establishments it is the duty of the pharmacist to perform the correct dispensing, explaining the dosage of the medicines and clarifying doubts. The accumulation of drugs in the homes encourages self-medication and inappropriate disposal and, therefore, constitutes a risk to health and the environment (GASPARINI; GASPARINI; FRIGIERI, 2011). With the evolution of medicines, besides the advantages in the fight against diseases there are problems arising from their manufacture and use. Leftovers from previous treatments, or even the dispensing of medications in excess of the due treatment and incomplete or incorrect prescription, together with the impossibility of fractionation of some of these products (Eickhoff and Heineck, Seixas, 2009), can cause their accumulation and subsequent expiry of the period of validity.

The lack of information regarding the correct disposal of medicines overdue and / or disabled by the population generates an inappropriate disposal. According to Gasparini *et al,* (2011), the inadequate disposal is done by the majority of people for lack of information and dissemination on the damages caused by the medicines to the environment and also due to lack of collection points. The solution to this problem is an Environmental Education Policy, with campaigns in the school environment with a wide population, elucidating the importance of disposal in appropriate places and the risk of not doing so. One of the effective measures would be the mandatory adoption in the whole country of the fractionation of medicines, in which only the correct amount of treatment will be included, avoiding possible leftovers, so that the population can obtain drugs in the ideal quantity for the treatment that they want (BORRELY *et al*, 2012). Given the reality of drug consumption in our country, the final destination that is given to medicines and the consequences to the health of the population and the environment, this research aims to investigate the relationship of students with medicines and the degree of the population studied regarding the correct disposal of medicines and their implications in relation to public health and / or the environment and from there suggest measures in the school community in order to raise awareness and guide the correct disposal of medicines. In order to promote collective action among manufacturers, reverse logistics is constantly discussed, a subject of great importance for measures that predict the final destination of the medicines collected. The purpose of reverse logistics is to adopt the correct disposal of medicines and reuse (which requires in-depth studies), a measure aimed at reducing undesirably discarded drugs, stimulating sustainable consumption in order to reduce the impacts environmental impacts. This measure is included in the National Policy on Solid Waste (SEMINAR, 2012). Today in Brazil there is a great diversity of regulations and initiatives in the states and municipalities of collection, return, donation and disposal of drug residues by the population. This is due to the fact that there is not yet a specific regulation at the national level related to the disposal and final disposal environmentally adequate waste of medicines discarded by the population. The National Council for the Environment, Resolution 358 of April 29, 2005 provides for the management of waste from generation to disposal, in order to meet environmental and public health and occupational health requirements, without prejudice to the joint responsibility of all those individuals and legal entities that, directly or indirectly, cause or can cause environmental degradation. The National Health Surveillance Agency, in turn, uses Law No. 12,305, of August 2, 2010, which establishes the National Policy on Solid Waste, with the purpose of preserving public health and protecting and improving the quality of the environment. This law also becomes part of the National Environmental Policy and is articulated with the National Environmental Education Policy, regulated by Law No. 9,795, of April 27, 1999, with the Federal Basic Sanitation Policy, regulated by Law No. 11,445 of 2007 and Law No. 11,107 of April 6, 2005, which deals with the treatment and final disposal of health care waste (BRAZIL, 2010). The Ministry of Health and the Ministry of Environment deal with solid waste of pharmaceutical origin. The sanitary and environmental monitoring bodies are responsible for the legal instruments, for the promotion of research and for the inspection, to ensure that the activities that generate waste of this nature give them the appropriate destination (FALQUETO; KLIGERMAN; ASSUMPTION, 2010). These organs have the same objective, which is the preservation of public and environmental health through measures to control the medicines offered to the population.
The main agents that generate residues of medicines are the pharmaceutical industries and, distributors, pharmacies, drugstores and hospitals. Pharmaceutical industries generate a considerable amount of solid waste due to the return and collection of medicines from the market, to the disposal of rejected medicines by the quality control and losses inherent in the process (FALQUETO *et al,* 2010).

Distributors, pharmacies, drugstores and hospitals are in compliance with technical regulations described by the National Agency of Sanitary Surveillance and The National Council for the Environment, which consider that these actors are generators of health care waste from all services related to human health care or animal, drugstores and pharmacies of manipulation and distributors of pharmaceutical products. Thus, they must prepare the Health Services Waste Management Plan (PGRSS), to be done by a professional registered in the class council (FALQUETO *et al*, 2010). However, such commercial establishments as pharmacies, drugstores and health centers are not required by law to collect medicines (UEDA *et al*, 2009). However, according to Aligleri (2009), there is a scenario where companies "need to accept and commit themselves to the consequences and impacts of their decisions and actions, as well as responding to the demands of all those affected by their activities" (ALIGLERI, 2009: 9). As a way to contextualize the actions in a school space, a Project of Action in the School was developed and applied to foment the process of Environmental Education from the social responsibility, discussing the socio-environmental problematic of the discard of medicines in an incorrect way and promoting a campaign with the collection of overdue drugs for disposal at stations that adequately perform the final disposal of these. Socio-environmental responsibility has been gaining ground in world discussions, due to the greater awareness of both society and companies. The latter consider social responsibility in addition to its economic performance (GARCIA, 2002). In this way, the socio-environmental responsibility must occur from the companies that make the sale of medicines being responsible for their collection and the awareness of the population for the correct disposal of them. According to Alvarenga and Nicoletti, The population has its share of responsibility in the process and must be informed and involved in the process of awareness of the generation of waste as well as the importance of the

rational use of medicines as one of the measures necessary to reduce the leftovers due to unnecessary acquisition or non-compliance with the proposed therapeutic scheme (ALVARENGA AND NICOLETTI, 2010: 1). Therefore, it can be said that the health condition is related to the socio-environmental context. If there is a clean and healthy environment to live with, then it will also be conducive to health, since according to Alvarenga and Nicoletti (2010), besides the generation of waste, the domestic disposal of medicines are issues to be widely discussed and studied at the level of public health in that collective responsibility is required to minimize the overuse of drugs by the population.

However, everyone has the right to live in a healthy environment, but for this it is necessary to the collaboration of the collective in the preservation and maintenance of natural resources. For this, the essential actions are to preserve and care, to achieve better living conditions. For this care with the environment to become concrete actions, it is necessary to become aware of and change attitudes. Therefore, it is understood that, through Environmental Education, it is possible to develop awareness and social-environmental responsibility from the use and disposal of medicines, in which it adds meanings to attitudinal changes by disseminating these practices and propagating those knowledge to minimize impacts drugs can cause to the environment.

MATERIALS AND METHODS

The study was carried out at the Pedro Macedo State College in Curitiba, Paraná, from May to November 2017, with a sample of 95 students, students of the High School and Integrated Technician in Information Technology and Administration of the Pedro Macedo State College in Curitiba, Paraná. The research takes place in the perspective of Participant Research. Borda (1988) established some methodological principles of Participant Research beginning with Authenticity and Commitment. Authenticity in the sense of producing a knowledge that starts from the knowledge of its subject-object, constituted in the community practice, demonstrating with transparency and honesty a commitment with the knowledge to be constructed contributing to the specific principles of Science without the need of the disguise as subject of origin of the area bounded for the study. Brandão (1988) understands participatory research as a shared process of deconstruction, construction, and reconstruction of knowledge in transformative and emancipatory action. Briefly, the participant research integrates four purposes so defined by it:

a) it responds directly to the practical purpose for which it is intended, as a means of knowledge of issues to be collectively worked on;
b) it is a dialogical instrument of shared learning and, therefore, [...] has an educational and, as such, politically formative vocation;
c) it participates in broader and more continuous processes of progressive construction of popular knowledge and, in the limit, it could be an additional means in the creation of a popular science;
d) it shares, with popular education, a broad and complex trajectory of empowerment of popular movements and their members (BRANDÃO, 2006: 46).

The Participant Research begins by recognizing that there is a close relationship between social science and intervention in reality with a view to overcoming the difficulties of a particular social group. This means that science is not the end in itself, but an instrument of systematic questioning for the construction of the knowledge of daily life and human destiny (MINAYO, 2001; BRANDÃO, 2006). Because it is critical-dialectic, the Participant Research seeks to involve the researcher and the researcher in the study of the problem to be overcome, knowing its cause and collectively building the possible solutions. For Participant Research, the knowledge of individuals constructed in the daily life of community life are important parts of the process of knowledge construction (BRANDÃO, 2006). The guiding principle was the presentation of the Project to raise awareness and campaign on the use and disposal of medicines. A questionnaire was given to investigate and know about the use and disposal of medications in order to know the profile and relationship of the students with the medications. In addition, students were asked to discuss with their families the main drugs that are used by them, as well as the perceptions or practices with the leftovers of medicines and discard them. After knowing the profile and relation of the students about the medicines, a Didactic Sequence in the discipline of Biology was held that could discuss about the importance and responsibility regarding the use of medicines, the dangers of self-medication and the biological and harmful effects in the organism from cartoons, videos that portray concern about the growing use of drugs in Brazil.

Later understanding of the effects on the metabolism and physiology of our body was taught and guided to the students involved in the correct disposal of overdue or unused medications, alerting them to the dangers of having medicines at home and the use of the same. In order to verify the effectiveness of the project to raise awareness about social responsibility regarding the use and disposal of medicines, talk wheels were held to explore in an exploratory way the concepts learned by the groups and participation in the exhibition of the works for the other students of the group. Pedro Macedo State College. The conversation wheel as a working tool was not chosen without first confronting the need to provide our research with a character of scientificity, which implies characterizing it as qualitative in nature and determining its position as a legitimate approach to the search for scientific knowledge , since this type of research "[...] is a means to explore and to understand the meaning that individuals or groups attach to a social or human problem" (CRESWELL, 2010: 26). After this stage, a campaign was established to collect overdue drugs in partnership with the Municipal Health Secretary in October and November, in order to raise awareness of the importance of correct disposal of overdue medicines and to guide how many actions should be taken when they are not more in use or expired.

RESULTS

The Awareness Project regarding the correct use and disposal of medicines began on May 05 and is remembered as the National Day for the Rational Use of Medicines. The date was created to alert the population to the health risks caused by self-medication. Aiming to highlight the role of indiscriminate use of drugs and self-medication as the main responsible for the high rates of drug intoxication (BRAZIL, 2015). It sees as an important landmark for research, since starting from the assumption that it is an emerging problem when the indiscriminate use of medicines will be retreated and

considering also that "self-medication poses risks to the health, since the intake of substances of inadequate form can cause reactions like dependence, intoxication and even death "(BRAZIL, 2015). After inserting the students in the discussion of the importance of discussing subjects on the use and disposal of medicines, a questionnaire was applied in which they could answer about the relation and conceptions about the use of medicines, the students enrolled in the age group between 14 and 19 60% of females and 40% of males.
It has been found that students are aware of a range of drugs used by them and their families as shown in Figure 1.

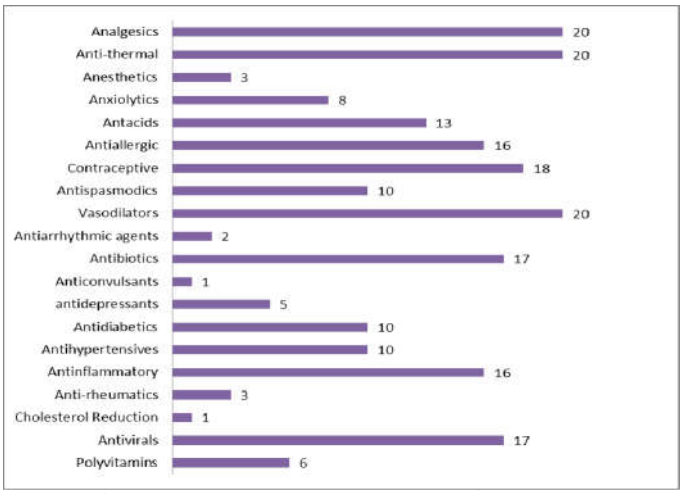

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Figure 1. Medications used by the families of the participating students

A variety of medications are used by students and their families. It can be noticed that the drugs most used by those involved are vasodilators, antipyretics, analgesics, in view, that the city of Curitiba that has unstable climate tending to change temperature quickly to the cold. Followed by contraceptives in which students report in discussions the use to control and regulate menstruation. Still on this list is observed the use of large numbers of antivirals, antibiotics, anti-inflammatories, antiallergics, among others. It was stated by students that a large proportion of these drugs are easily bought in pharmacies with no prescription or medical prescriptions, a practice that is highlighted by students that induces self-medication. These reports are a constant preoccupation in which I pointed out long ago by Pacheco (1978), Garrafa (1983) and Barros (1995), who pointed out that at least 35% of drugs purchased in Brazil were made through self-medication. However, if the Brazilian tends to self-medicate, it is also because he does not find availability of the most accessible health services, he needs to stand in line for a few hours and sometimes wait days and even months to be seen by a doctor. The low purchasing power of the population and the precariousness of health services contrast with the ease of obtaining medicines, without payment of a prescription and without a prescription in any pharmacy, where, often, there is the stimulus of the clerk interested in winning a commission by the sale. Although inadequate consumption and consumption of drugs have also been observed among the most privileged strata of society, since this practice occurs through cultural inheritance, instinctively without any rational basis, easy access, among others. They report that there is a very large facility for the acquisition of these drugs, without the need for a prescription, as has long been discussed by Pacheco (1978) and Garrafa (1983) when they affirm that "Self-medication is growing and often abusive, erroneous and indiscriminate number of prescriptions, are occurring worldwide. " Bottle (1983) states that no drug is completely innocuous to the body, the incidence of undesirable effects increases daily, leading to drug iatrogeny, a cause of high number of hospitalization. According to Medeiros, Moreira and Lopes, "Drugs prescribed and purchased by the population end up accumulating in homes, whether intentionally or not. These leftovers are usually discarded in the common garbage, or through the sewage, or are stored, forming the so-called 'Home Pharmacy' "(MOREIRA and LOPES, 2014: 2). Often this storage is not suitable, exposed to high temperatures or in humid environments. And when it is necessary to consume it, most of the time the validity and appearance of the medicine is not evaluated and when the date of expiration and appearance is verified and, judged not to have conditions, its disposal ends up occurring directly in the household waste, sewage or discarded in vacant lots. From the students' understanding of the use and recognition of medications, their perception of the use or disposal of these medicinal components as shown in Figure 2 is investigated.

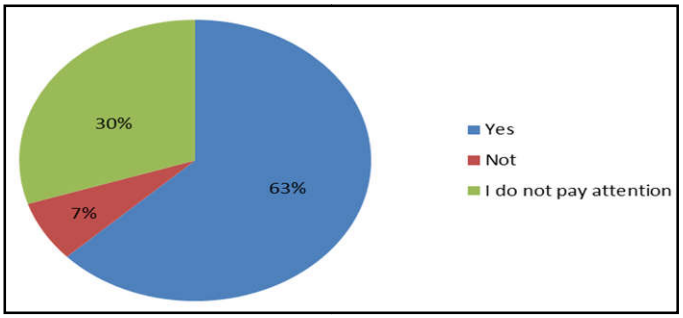

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Figure 2. Perception of leftover medication after treatment termination

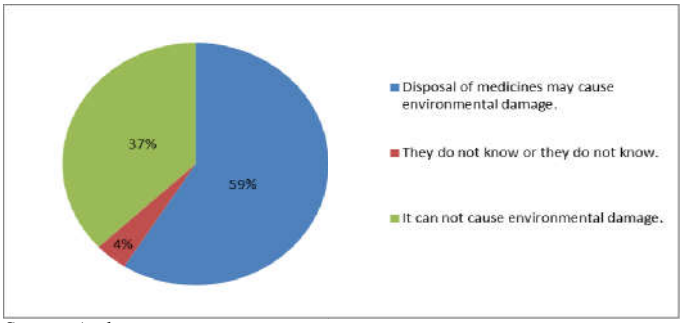

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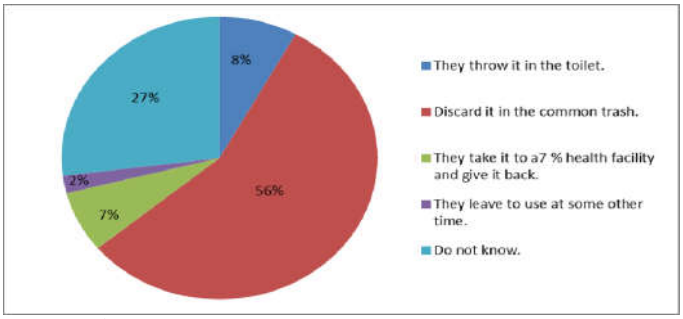
Figure 3. Perception about the disposal of medicines can harm the environment

It was also verified that 63% of the participants affirm that they perceive the leftover medication after the end of the treatment and 37% do not pay attention. It is constantly discussed by the Ministry of Health and competent bodies about the risks caused by both self-medication as well as the environment. Thus it is necessary to understand the students' perception about the disposal of drugs in the environment as presented in Figure 3 and described below with their statements. When investigating whether the students feel that the disposal of the drugs can harm the environment as observed in Figure 3, it was obtained that 59% (slightly more than half) know that the incorrect disposal of medicines can cause environmental problems, followed by 37 % who do not know and 4% do not think medicines can cause environmental

damage. Of students who understand that the disposal of medicines can cause negative impacts to the environment are expressed by them in the following words: "It can contaminate the environment with toxic and toxic substances", "Intoxication or death of animals", "Intoxication of people related to treatment with the garbage "," Contamination of food from the food chain "," Contamination of the soil ". According to Viana *et al.,* (2016: 59), "changes in the environment caused by anthropic activities may be negative, destructive or degradation of natural resources". Disposal in the environment can cause numerous impacts, one of which is the contamination of the remaining clean water reserves. According to Medeiros, Moreira and Lopes (2014: 3), "drugs can affect living organisms by metabolic and molecular pathways, hormonal disorder of organisms caused by contraceptives and bacterial resistance caused by antibiotics," are some of the effects that may occur in the environment. We are still investigating with students about the practice with drugs overdue in their residences as shown in Figure 4. It was verified that common waste is the main form of disposal of overdue drugs (56% of the participants), however when they are placed in the trash they are bringing risks to health and the environment, because according to Cruz, *et al.* (2017), studies show that more than 200 pharmaceutical products have been identified in the world's freshwater systems and may contribute to the development of antimicrobial resistance. Being that only a small amount seeks to give a correct destination to these materials.



Source: Authors

Figure 4. What is done with overdue medications in your home?

It is observed that 27% of the students do not know what is done with the expired drugs, 8% play in the toilet and 7% they deliver to some health agency of Curitiba, which is correct according to DRC - Resolution of the Collegiate Board 44 / 09 which establishes which establishments may participate in collective collection of expired drugs (BRASIL, 2009). We have that 2% use the medicines even though they have expired. According to information from the Ministry of Health (2014), this "can have serious health consequences, such as allergic reactions and addiction, and the habit can increase the resistance of microorganisms and inhibit the effectiveness of the remedies." In many Brazilian municipalities, solid waste collection and disposal services are still deficient. Data indicate that in 2014, the total generation of solid urban waste (MSW) in Brazil was approximately 78.6 million tons. Of the 71,260.45 million collected MSW, 41.6% were destined to landfills or controlled landfills (ABRELPE, 2014). Bueno et al. (2009) state that drug residues are discarded in different ways. In the health services, pharmacies and distributors, the waste must be submitted to treatment and specific final disposal. In the residences the medicines destined to the discard are usually deposited in the common trash or thrown in the toilet or the toilet, which is incorrect. It is noticed that the population does not know where to deposit their residues of medicines. In order to systematize the results, important numbers and journalistic material on the use and disposal of drugs in Brazil were presented. In addition, the final results of the questionnaire answered by the participants of the project and thus allowing reflections and showing possible actions that can be taken on the correct disposal of overdue or unused drugs, as well as the implications of improper disposal in the environment. The students participating in this project participated in a series of talks, lectures and debates aimed at perceiving themselves as agents responsible for the maintenance of the environment in which they live, since the majority of the population does not practice consistent habits in relation to consumption and disposal of medicines or even by the deficit disposal. Subsequently, the collection of medicines for final destination was carried out as shown in Figure 5.

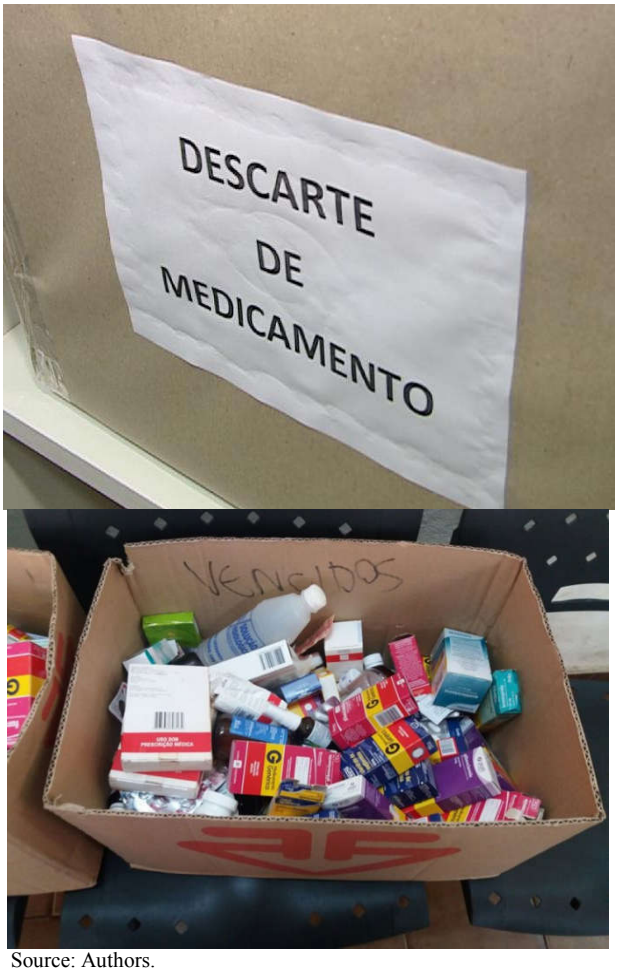


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Figure 5. Drug Collection Campaign at school

The campaign for the collection of medication at school, as an action of the Awareness and Social Responsibility Project was based and based on a project to receive residential medicines carried out by the City Hall of Curitiba, Regional Pharmacy Council, Union of Pharmacists and Federal University of Paraná being structured based on Municipal Law 13,978 / 12 and State Law 17.211 / 12, which served as a model for the implementation of reverse logistics of medicines in all countries and with the participation of approximately 50 establishments related to the health sector (PARANÁ, 2014). Leff (2001) emphasizes the impossibility of resolving the growing and complex environmental problems and reversing

their causes without a radical change in the systems of knowledge, values and behaviors generated by the existing rationality dynamics, based on the economic aspect of development. By introducing students into a Campaign for Socioenvironmental Responsibility in Environmental Education in the daily school life, there is a reflexive, renovating and transforming activity of reality inside and outside the classroom, since it is a knowledge that induces practice and surpasses the physical barriers of school, developing everywhere the multipliers have access. Because lack of knowledge prevents students and the school community from engaging in practices such as discarding medications correctly without harming the environment. According to KRASILCHIK (2005), "group activities are more productive than individual activities because they stimulate the spirit of cooperation and increase the discussion among young people about the activities being carried out." In addition, in engaging the first discussions of the "Common sense", crossing the scientific knowledge in the different areas, it was verified that the students recognize the importance of the contextualization of the acquired information and many others that could contribute to the more detailed study on the discard of medicines and to make possible the knowledge about other subjects that do not are usually discussed by the media, families, or school. The Campaign does not cancel out the forms of power that all knowledge entails, but it requires the willingness to share power, that is, to share a knowledge and a power that is aware of not owning. It is about not hiding your own knowledge / power, but, on the contrary, make it discursive and accessible to the understanding of others. (GATTÁS and FUREGATO, 2006).

Conclusion

From the realization of this work of socio-environmental responsibility using Environmental Education from the perspective of the use and disposal of medicines, it was possible to verify that students and their respective families maintain inappropriate habits regarding the use of medicines, since most are unaware of the correct form of drug disposal, use the stock of medicines and use them without proper medical prescription, often putting at risk their own health, or their families and the environment. In addition, the disposal is extremely worrying, since a portion of the population does it in common trash, having as destination the contact with the soil and with the water, causing its contamination. In this way, it is remarkable the need for constant interventions, which contribute mainly to the awareness of the correct use and disposal of medicines, since only disclosing information is not enough. It is necessary to propose actions that enable people to assume their role as citizens responsible for the environment in which they live. Therefore, the actions of this project had an important role in raising awareness and awareness of the people belonging to the school community, as well as providing important reflections about our actions as beings that rely on natural resources for a good life. For the results achieved, a continuous alert is still needed, to propagate and encourage constant campaigns, having the school as an institution of great influence in the life of the students, besides fulfilling its social function allows the students to raise awareness and respect with the environment, promoting the Environmental Education and highlighting their potential, raising the adoption of personal postures and constructive social behaviors, collaborating to build a healthy environment.

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