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ASSESSMENT OF LEVEL OF AWARENESS ON ELECTRONIC JUNK IN THE CITY OF LUZIÂNIA

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ABSTRACT

This work aims to analyze the level of awareness of the population of the city of Luziânia regarding the use and disposal of electronic waste. Through a qualitative exploratory case study, the research included bibliographical research and semi-structured interviews. Electronic junk (e-waste) is composed of materials of information technology and communication in disuse, having in its structure highly polluting substances. These materials have grown significantly with increasing population and rapid obsolescence. In Brazil, the alternatives of their final destination are still projects of innovative entities, but there are no national management directives, in addition to not having reliable estimates of their volume, and legislation in force to know their negative impacts. It is known that e-waste contaminates the environment by the presence of metals such as lead, mercury and cadmium in its composition. The results found in this study demonstrated possible new actions to raise awareness about the best use and sustainable solutions in improving the living conditions of the population.

INTRODUCTION

According to Acosta et al. (2008), rapid technological evolutions, such as constant innovations and new versions, improve the performance and use of equipment, making computer products have an increasingly short life cycle. The demands of new programs or new versions of the operating systems require an update in the first three or four years of use, because they become obsolete. Making the useful life of these products extremely short, and encouraging the acquisition of new versions. The discards of the electronic equipment considered inadequate to the use should receive the appropriate treatment and do not receive, some could be reutilized, depending on the state of conservation, through recycling. The manufacturing companies should be willing to receive this garbage to reuse some new equipment or carry out campaigns to recover these machines for later donation (Ferreira & Ferreira, 2008). The speed of technological change and commercialization causes an increase in the disposal of products. In the last decades the need to equate the destination of the goods and their constituent materials after the original use and its final disposition has increased (Zikmund & Stanton, 1971). According to Dias (2002), environmental degradation comes from increasing and unnecessary consumerism, mainly due to the concept of development by the concentration of goods and wealth.

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For the author cannot be called the technological materials of garbage, being that garbage is what does not and is of no use, in this sense the garbage culture must disappear and give space to the culture of solid waste, that is, materials to be Reused.One of the main aspects to be observed is that recycling, in addition to reducing environmental impacts, reuse represents an economic and social opportunity, generating employment and income. What was once a problem becomes a solution (Dias, 2002). The objective of this work is to analyze the level of awareness of the population of Luziânia regarding the use and disposal of electronic waste. Through a qualitative exploratory case study, the research also included bibliographic research and semi-structured interviews.

This article is structured in five sections. In this section we present, besides the introduction, the definition of the research problem, the objective, the justification and importance of the study and the structure of the present research. Section 2 brings the theoretical framework, with the formation of a conceptual and theoretical basis, which provide support for the development of this study. Section 3 presents the method used and the techniques and methodological procedures used. Section 4 describes the results obtained in the research. Finally, section 5 presents the purpose of the article, how it was achieved, the limitations of the study, suggestions for improvements and future research.

Literature review

Some characteristics of electronic waste prevent them from being treated in conjunction with other types of waste, because it has non-biodegradable components and cannot be destined to landfills. These have as characteristics its composition with various ferrous metals, non-ferrous metals, glass, plastic and other materials. Iron and steel are the most commonly found materials and account for almost half of the total weight. Plastics are the second largest component found, accounting for 21% of electronic waste. Non-ferrous metals, including precious metals, represent 13% of the total weight of electronic equipment (Silva et al., 2013). Reverse logistics has always been associated with product recycling activities and environmental aspects (Stock, 1992, Barry et al., 1993, Kopicki et al., 1993, WU and DUNN, 1995, Kroon and Vrijens, 1995).

According to Barbieri and Dias (2002); Lacerda (2002); Leite (2003), the physical flow of products should be an important tool for the sustainability of organizations. Tibben-Lembke (2002) highlights and compares traditional logistics with reverse logistics, presenting different flows of information and goods in each. For Tibben-Lembke (2002) there is a parallel between the reverse logistics and the product life cycle, so that in each phase of the cycle, reverse logistics can be used in a different way, reducing losses with products that do not would be used. The concept of reverse logistics depends on the view of the different segments, such as: in the distribution companies, reverse logistics is the return of goods sold, and to industries is the return of defective products (Buxbaum, 1998, Zikmund and Stanton, 1971). The benefits of reverse logistics relate to: environmental demands that lead companies to worry about the final destination of products and packaging generated by them (Hu et al., 2002), secondly the economic efficiency, allowing the generation of gains (Minahan, 1998), and finally the company's image gain to its shareholders, raising the prestige of the brand and its image in the market (Roger and Tibbenlembke, 1999; Daugherty et al., 2001). According to Gerbase and Oliveira (2012), electronic waste is made up of appliances, computers, radios, televisions, cell phones and other goods that are damaged, obsolete or broken. These residues became a major challenge, due to the innumerable environmental problems caused (Leite et al., 2014).

According to Mousinho (2008), recycling is defined as the process by which a used material returns as raw material to the production cycle, being again transformed into a consumer good, designated by the set of actions related to the reuse of used materials which would be discarded, making it a great example of completely sustainable activity. As such, recycling is one of the good tools to tackle the waste problem. The ease of purchasing personal computers has made it increasingly common in most residences (Corner and Corso, 2013). Regarding the significant growth in the last years of the consumption of computers in Brazil, Lira et al. (2014) says that "today there are 118 million personal computers in the country, equivalent to 3 machines for every 5 inhabitants" (p.107). Martins et al. (2014) point out that more and more the production of electronics is increasing and with a short life cycle. Nowadays, searches for innovative products and with differentiated technologies allow them to be disposed of more easily in the environment, since their life cycles are shorter, favoring the acquisition more frequently (Freitas et al., 2015).

According to Almeida et al. (2015), electronic waste is a current problem on planet Earth, these are generated more and more in large quantity and because of technological obsolescence, their consumers end up swapping equipment faster and more current ones, generated a lot of technological scrap, This improper disposal brings several damages to health and the environment. For Umair et al. (2015), e-waste is recycled in developed countries, stored, landfilled or sent to developing countries. According to Hadi et al. (2015), there is a great public outcry in certain areas of the world by the transfer of toxic waste to "recycling". For Marchi (2015, p.102) "The National Policy on Solid Waste meets the set of principles, objectives, instruments, guidelines, goals and actions adopted by the federal government." For Delucis (2014) Public Management has a direct link with electronic waste, mainly in relation to policies and sustainable public procurement and the disposal of electronic waste, through actions to manage the disposal of these materials. Particularly because electronic waste has created a worldwide environmental and health problem because of the generation of diverse hazardous compounds, including persistent organic pollutants (Hea et al., 2015). Mazza et al. (2014) confirm that waste management has been a major concern and a major cause of problems across the globe. Silva et al. (2014), affirm that Brazil is one of the leaders in discarding of cell phones, TVs and printers. According to Pereira et al. (2014), the surveys report the concern with the destination of electronic waste, showing that environmental education is one of the possible ways to mitigate the problem.

Methodological procedures

As for the research methodology, this work consisted of a qualitative exploratory case study. As for the media, the research was bibliographical, as it relied on information contained in books, websites and articles on the environmental management of electronic waste and semi-structured interviews. Regarding the ends, the research was exploratory, since it is carried out in an area in which there is little knowledge accumulated and systematized. Mattar (1998) states that "exploratory research is often used to broaden knowledge about a particular subject." For the execution of the field research, we opted for standardized interviews, with previously formulated questions, through the technique of questionnaires. According to Lakatos and Marconi (2003), the questionnaire is a data collection instrument consisting of a series of questions, which must be answered in writing and without the presence of the interviewer. The population of this research includes 522 people from the city of Luziânia. Content analysis was used as a strategy for analyzing the research data. According to Trivinos (1987), the content analysis includes three phases: pre-analysis, material exploration and treatment of results. In the pre-analysis, the collected material was organized, and a precise work plan was established, with well-defined procedures. The material exploration phase involved procedures such as coding, classification and categorization of the material collected. The treatment phase of the results involved the reflection and the intuition, with empirical bases, establishing relationships and deepening the connections between the verified ideas.

RESULTS AND DISCUSSION

The research had as profile common people of the population of the municipality of Luziânia, being 83.7% up to 20 years,

15.5% between 20 and 40 years and only 0.8% over 40 years. This is because most of the interviewees were students from public schools in the municipality of Luziânia. As shown in Figure 1.

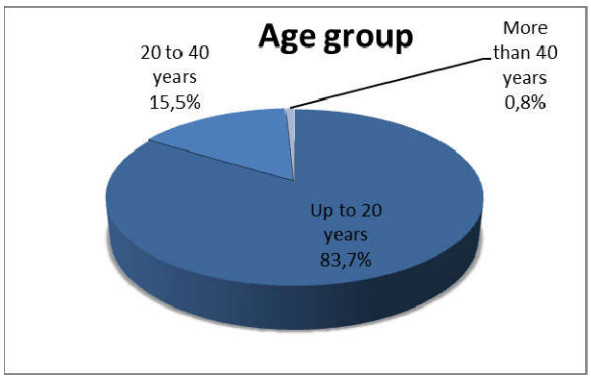

Figure 1 - Age range of respondents

When questioned if they knew what e-waste was, 77.3% said yes, as shown in Figure 2.

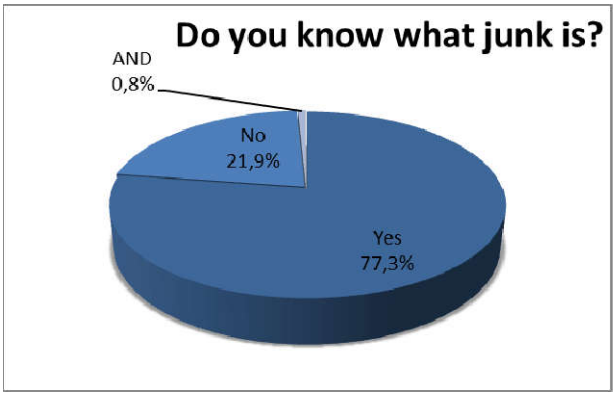

Figure 2. Knowledge about e-waste

Although most respondents did not succeed in saying in their own words what e-waste is. When asked about how many appliances and electronics they owned in their homes, 45.9% said they had between 11 and 20, 35.1% said they had more than 20, and only 18.9% reported having 0 to 10. As shown in Figure 3.

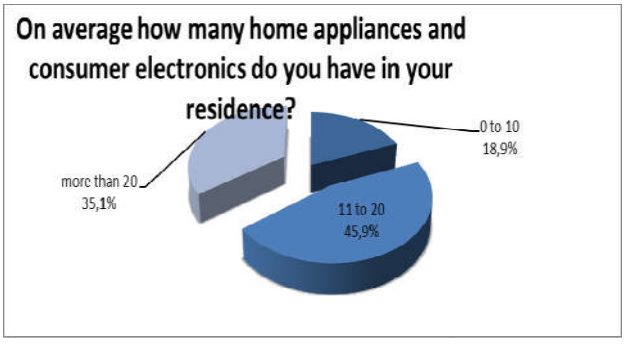

Figure 3 - Average number of devices that respondents have in their homes

Demonstrating an auto index of these types of appliances in their homes. Asked about the fate given to home appliances and electronics, 68.8% said they put in the common trash, 15.6% discarded anywhere (for example, in vacant lots), 12.5% said they had sold to third parties (for example, old fero) and only 3.1% said they had returned the company from which they purchased the product. As shown in Figure 4.

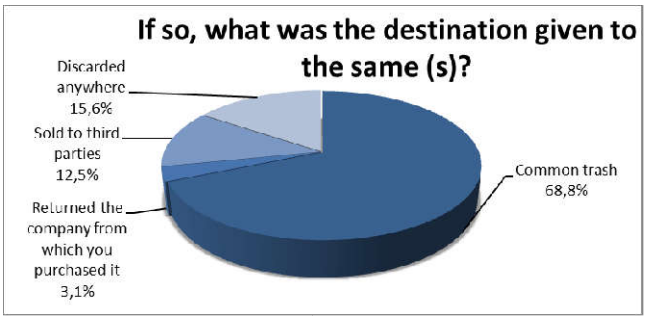

Figure 4 - What is the destination given to the interviewees' devices

Asked if they were aware of the damage caused by inappropriate disposal, 60.5% said yes and 39.5% said no. As shown in Figure 5. Although few can correctly express what these damages would be.

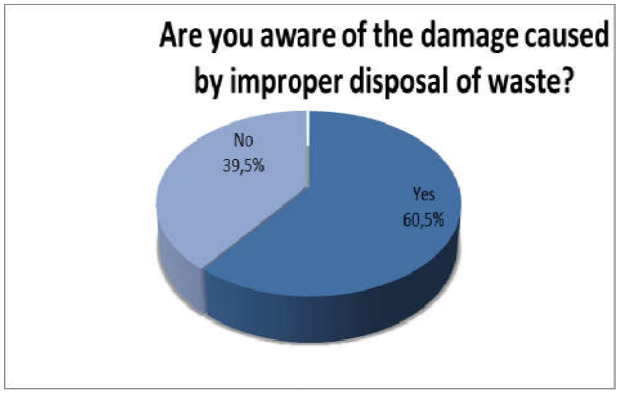

Figure 5 - Knowledge of damage caused by improper disposal of electronic waste

Asked if Luziânia has a suitable place to deposit e-waste, 95.3% said no, while only 4.7% said yes. As shown in Figure 6.

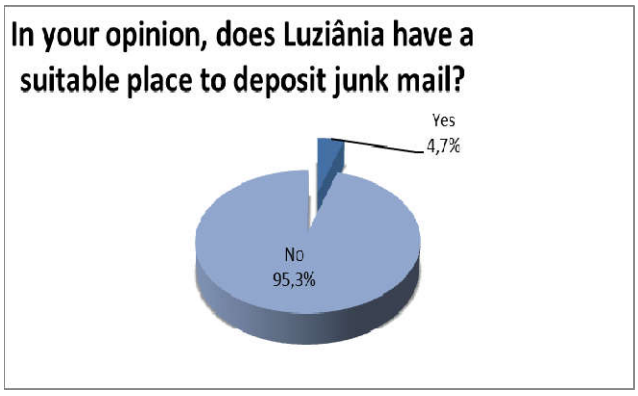

Figure 6 - Knowledge if Luziânia has a suitable place to deposit the electronic junk

When questioned about the best fate of electronic waste, 80.5% said they were companies where the material was acquired, 5.5% only said to be to the city council (common trash) and another 12.5% could not say which is the best destination. As shown in Figure 7.Asked what Luziânia companies offer to the consumer, in relation to the useful life

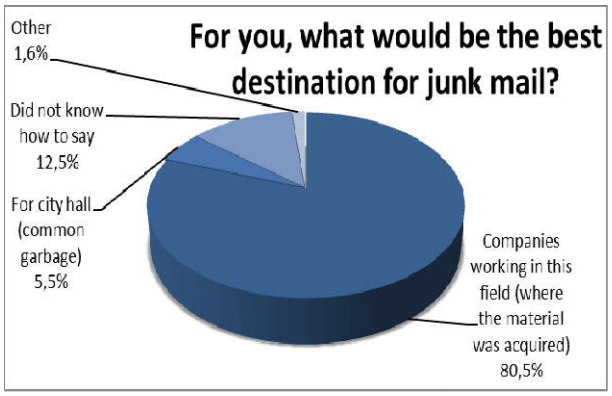

Figure 7 - Knowledge about the best destination for electronic junk

of the handsets, these 90.6% say that after the purchase the consumer is responsible, and only 4.7% said that the companies received the devices back. As shown in Figure 8.

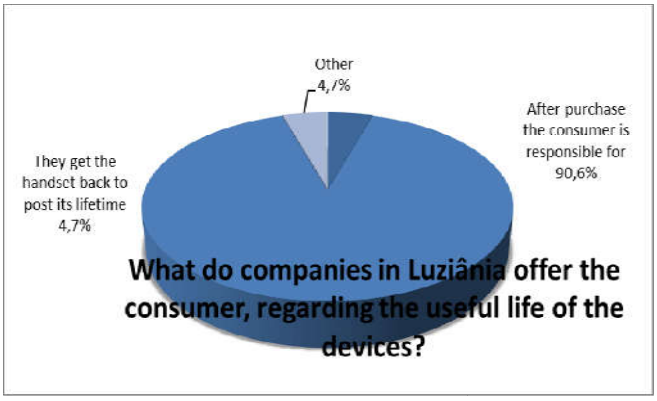

Figure 8 - Knowledge about what companies in Luziânia offer the consumer, regarding the useful life of the devices

When asked if it is necessary to work on awareness raising, almost all (98.4%) said they needed it, and only 1.6% said they did not. As shown in Figure 9.

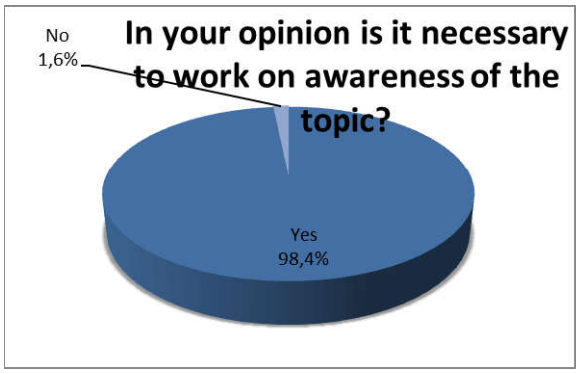

Figure 9 - Knowledge if it is necessary to work on awareness of the theme

Asked how these awareness works should be, 35.2% said they were through educational advertisements on radio and TVs, 32% believe that they should be with school projects, 16.4% think they should be with leaflets and 16, 4% through lectures. As shown in Figure 10.Asked if there should be a law that obliges companies that manufacture home appliances and electronics to receive those articles back when they no longer serve, 91.5% said yes, and only 8.5% said no. As shown in

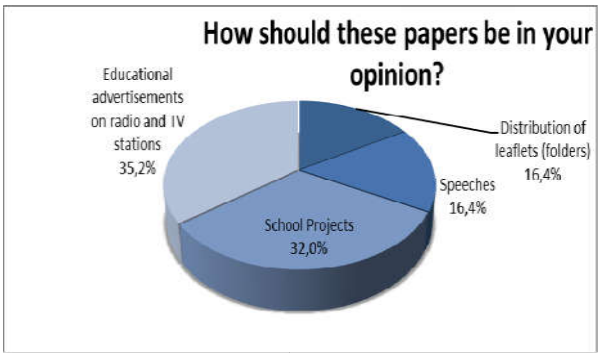

Figure 10 - Knowledge about how awareness should be

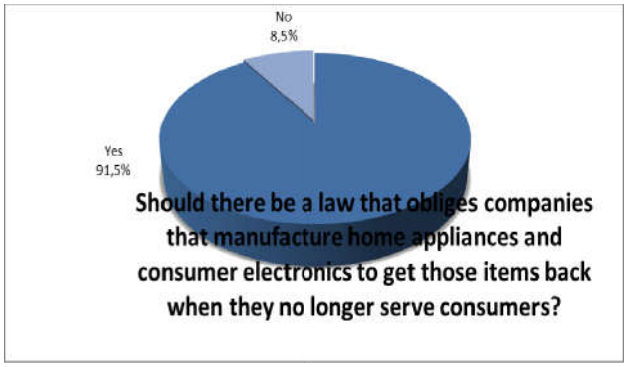

Figure 11 - Knowledge if there should be a law that obliges companies to receive the devices back

Figure 12 - Knowledge about what you need to approve a law that ensures the correct handling of electronic waste

Figure 11. When questioned whether in their opinion it depends on the approval of a law that would ensure the correct management of these wastes, 51.8% said that they were of the agility of the government and of authorities in a whole; 30.5% said they were from demonstrations coming from citizens and 14.6% did not know what to say. As shown in Figure 12.

Conclusion

This study aimed to analyze the level of awareness of the population of Luziânia regarding the use and disposal of electronic waste. Through a qualitative exploratory case study, the research also included bibliographic research and semi-structured interviews. The theoretical approaches that served as foundations for the development of the present research, together with the empirical findings found, contributed to the local context, making suggestions for improvements in this or other cities. Looking at the results of this research, we visualize that although the vast majority, more than 80% know that the best destination for electronic waste are the companies where the material was acquired, almost 70% said they have already discarded electronic devices in the common trash and

almost 20 % Discarded anywhere, such as vacant lots or sidewalks. More than 90% said that after the purchase the consumer is responsible for assigning these materials to the end of their useful life, and only about 5% said that the companies received the devices back. Which shows certain contradictions. Regarding whether it is necessary to work on awareness of the topic, almost 100% agreed that yes. As for the best form of awareness, these were very divided, between educational advertisements on radio and TV, school projects, distribution of leaflets and lectures. Some have come up with more than one or all brands.

Concerning that there should be a law that would oblige the companies that manufacture the home appliances and electronics to receive those articles back when they no longer serve, more than 90% said yes. More than 50% said they depended on the agility of the government and authorities as a whole to approve this law, and more than 30% said they needed demonstrations from citizens, and some said they needed both. Both politicians and the population. After analyzing the data obtained through questionnaires and based on the bibliographical study used as a reference, it is suggested the development of projects aimed at raising awareness and dissemination to the population about this type of waste, the risks of inadequate treatment and Need to find and support solutions. For the continuity of this research it is suggested the realization of new studies in this and other cities, for comparison or confirmation of the results found.

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