



An investigation of barriers to self-management among informal recyclers

Uma investigação acerca das barreiras para a autogestão dos catadores de materiais recicláveis

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ABSTRACT

This article describes an experience related to the project 'Addressing Exclusion to Ensure Inclusion' at the Federal University of Technology - Paraná (UTFPR), Curitiba. Participation in this community engaged project raised questions about the self-management of informal recyclers, specifically by attending three events that happened in 2023: (1) a public hearing about the new solid waste management plan for the city of Almirante Tamandaré, (2) the First Seminar on Popular Recycling, and (3) the international release of the short documentary film "Island: to Exist and Resist". Through observations in these events, a discussion arose about the working conditions of informal recyclers, their self-management and the barriers they face. In addition, an artificial intelligence (AI) tool was used, the GPT Chat, whereby this question was placed: "What are the main barriers to self-management inside the shed of the informal recyclers?". The response provided by the AI was aligned with the observations from participating in this project. It is concluded that it is essential to keep opening spaces for this discussion among stakeholders, including the academic community, to enhance knowledge about barriers to self-management of informal recyclers and propose practices and strategies to overcome them.

KEYWORDS: Informal recyclers. Recycling. Self-management. Solid waste.

RESUMO

Este artigo descreve uma experiência relacionada ao projeto de extensão 'Atentar-se à Exclusão para Contribuir com a Inclusão', realizado na Universidade Tecnológica Federal do Paraná (UTFPR). A participação neste projeto de extensão despertou questões sobre a autogestão dos catadores de materiais recicláveis, vindas principalmente de três eventos realizados em 2023: (1) audiência pública sobre o novo plano de gestão de resíduos sólidos em Almirante Tamandaré, (2) Primeiro Seminário de Reciclagem Popular, e (3) lançamento internacional do documentário de curta metragem "Ilha: Existir e Resistir". Através de observações nesses eventos, surgiu a discussão sobre condições de trabalho dos catadores, a autogestão e barreiras enfrentadas na rotina laboral. Além das discussões, foi usada uma ferramenta de inteligência artificial (IA), o Chat GPT, em que foi colocada a questão: "Quais são as principais barreiras para a autogestão dentro dos barracões dos catadores de materiais recicláveis?". A resposta produzida pela IA foi similar ao que vem sendo analisado neste projeto de extensão. Concluiu-se que é importante seguir abrindo espaços para essa discussão entre os envolvidos, incluindo a comunidade acadêmica, para ampliar o conhecimento sobre as barreiras para a autogestão dos catadores de materiais recicláveis e propor práticas e estratégias para superá-las.

PALAVRAS-CHAVE: Catadores. Reciclagem. Autogestão. Resíduos Sólidos.

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INTRODUCTION

The generation of solid waste is a contemporary issue discussed worldwide because, when not properly managed, it may result in economic, social, and environmental concerns. Yearly, the weight of solid waste produced is approximately 2 billion tons worldwide (ONU, 2018). The Brazilian population in 2022 produced 81.8 million, and it is estimated that 39% of those still need to be adequately destined (ABRELPE, 2023). This scenario shows the importance of informal recyclers because they are estimated to collect 90% of the recyclables produced in Brazil (MENDES, 2023). The Brazilian National Policy of Solid Waste (in Portuguese, known as PNRS) states that municipal and state governments are responsible for municipal solid waste management (BRASIL, 2010). The PNRS indicates an obligation for governments to promote the diversion of recyclables and encourage the creation of cooperatives or associations of informal recyclers. Even though the need to promote better working conditions is cited in the PNRS, most informal recyclers still suffer from social exclusion, lack of recognition and adequate payment. Moreover, these workers tend to be exposed to occupational health and safety risks because they only sometimes have appropriate working conditions.

This article brings some insights into the barriers to self-management regarding the work of informal recyclers. Observations and dialogues were based on the activities related to the community engaged project 'Addressing Exclusion to Ensure Inclusion', mainly through interaction with two partner associations: 'Island' and 'To Recycle and Clean'. These associations are in the city of Almirante Tamandaré, Paraná state, Brazil. The topic of challenges to self-management among informal recyclers was made clear through discussion in the three events: (1) a public hearing about the new municipal solid waste management plan of Almirante Tamandaré, (2) the First Seminar on Popular Recycling, and (3) the international release of the short documentary film "Island: To Exist and Resist". Furthermore, using an artificial intelligence tool (AI) to investigate the question: "What are the main barriers to self-management inside the shed of the informal recyclers?" has brought complementary insights.

METHODOLOGY

The observations happened through participating in the community engaged project "Addressing Exclusion to Ensure Inclusion" and, more specifically, on three events. Out of the three events, two were fully organized by members of this project.

The first event was a public hearing about the proposed new municipal solid waste management plan of Almirante Tamandaré. The event was organized by the consulting company which propose the new plan, as the city of Almirante Tamandaré hired this consulting. The event happened in June of 2023 in Almirante Tamandaré, whereby the plan was presented and discussed with the population and the recyclers.

The second event was the First Seminar on Popular Recycling. Members of this project organized the event in partnership with the National Movement of Informal Recyclers (in Portuguese, known as MNCR). The event happened in August of 2023, in Curitiba, at the UTFPR, but was also broadcast through the YouTube channel of the MNCR. Therefore, it was a hybrid event. This Seminar brought together some informal recyclers and researchers to discuss the emerging concept of popular recycling. At that seminar, the keynote speakers also answered questions about the barriers of informal recyclers to



achieving self-management. As of September 2023, the recorded video had achieved approximately 580 views.

The third event was the international release of the short documentary “Island: To Exist and Resist”, in September 2023. However, this event was organized simultaneously in two countries: by a professor in Canada, in the city of Guelph, and by the members of this project in Brazil, in Curitiba, at the UTFPR. It was also a hybrid event broadcast through the YouTube channel of the Department of Community Engaged Projects (in Portuguese, known as DEPEX-CT). Following the film's screening, a discussion about the informal recyclers' working conditions was carried out.

Beyond the observations from these three events described above, the question “What are the main barriers to self-management inside the shed of the informal recyclers?” was placed in the GPT Chat. GPT stands for generative pre-trained transformer. The GPT chat is an AI tool that analyzes large volumes of data through an algorithm with neural networks to generate answers to any question or command (UOL, 2023).

RESULTS AND DISCUSSION

Through the observation of the barriers to self-management of informal recyclers in this community engaged project, “Addressing exclusion to ensure inclusion”, preliminary results indicated some issues such: (a) lack of support from the government; (b) lack of financial resources; (c) absence of training and education among workers; (d) inadequate diversion of recyclables in the source of generation; (e) competition for recyclables against the business largest generators of recyclable materials; and (f) income insecurity. Among the reasons for these issues could be that most informal recyclers are not officially recognized as workers or hired by the state.

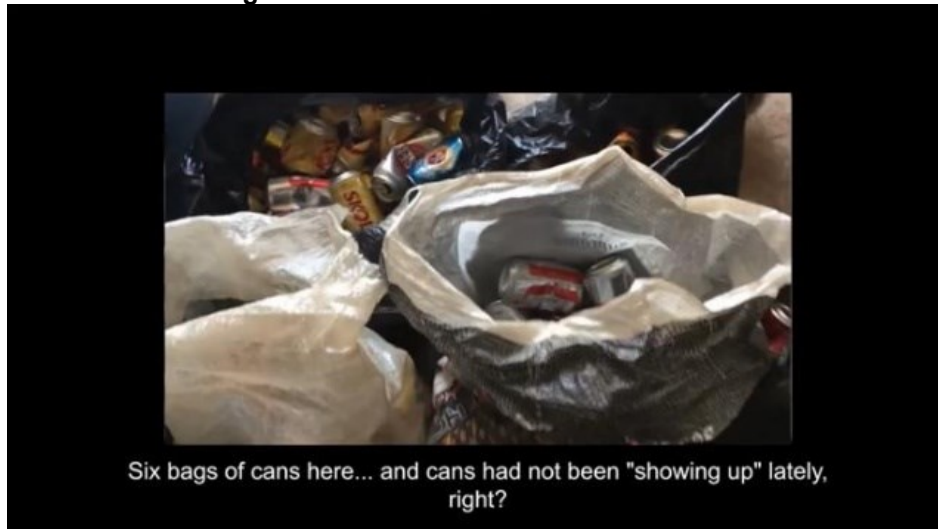
The lack of support from the government and the lack of financial resources are some of the main challenges that informal recyclers face. It is expensive to take all the legal documents to open an association and/or cooperative, so many recyclers prefer to continue working individually and informally. Some of the associations and cooperatives have an agreement to collaborate with the municipality or state but still need a fixed income, remaining insecure about their financial condition.

Another barrier they face is related to the logistics behind the collection of recyclable materials by the cities. For instance, in 2017, in the shoot of the short documentary film “Island to Exist and Resist”, produced by this project, it was noticed that the drivers of the truck from the municipality, who are public employees of the city, were stealing the aluminum cans from the informal recyclers (Figure 1). Aluminum cans are one of the most valuable recyclables for trading. This is a severe issue, discussed in the international release of the short documentary film (Figure 2), which shows how much work needs to be done to improve the logistics behind the collection of recyclable materials by the cities.

Also, another issue that must be addressed is the inadequate separation of organic and recyclable waste in the source of generation before arriving at the informal recyclers' hands. For example, it was noticed that the two partner associations of informal recyclers received approximately 18% of residues mixed with the recyclables, which could cause harm to recyclers, considering the potential of containing medicine and other harmful objects (ECOLIBRA, 2022).

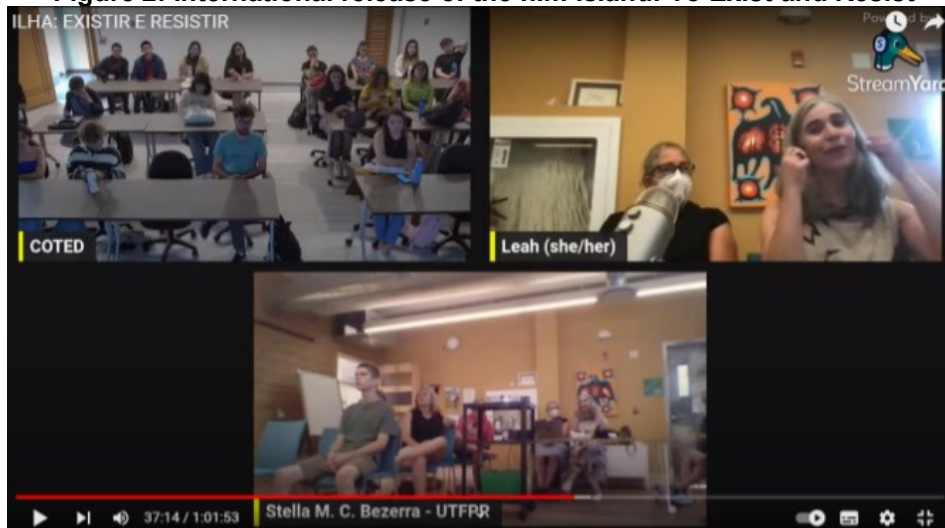
In addition, there needs to be more access to formal education and training on self-management for the recyclers. It was pointed out in the First Seminar on Popular Recycling (Figure 3) that of all the informal recyclers in Brazil, approximately 78% don't have a complete elementary education. In that way, most members of associations and cooperatives depend on non-governmental organizations (NGOs) or other institutions to support the administration work.

Figure 1: Scene of stolen aluminum cans



Source: own authorship, 2023

Figure 2: International release of the film *Island: To Exist and Resist*



Source: own authorship, 2023



Figure 3: Organizers of the First Seminar on Popular Recycling



Source: own authorship, 2023

As an extra tool for investigating this issue, the question “What are the main barriers to self-management inside the shed of the informal recyclers?” was placed in the GPT Chat. The AI response has brought the following topics: (a) the lack of legal recognition; (b) limited access to resources; (c) health and safety hazards; (d) income insecurity; (e) social stigma; (f) limited access to education and training; (g) environmental challenges; (h) lack of market access; (i) fragmented and unorganized structure; (j) limited access to credit and financial services; (k) inadequate separation and collection systems; and (l) gender disparities of the informal recyclers. Therefore, these topics brought about by AI were aligned with the issues discussed in the three events observed.

CONCLUSION

The insights presented in this article - on the barriers to self-management of informal recyclers - were obtained from the space provided by the community engaged project for the informal recyclers to bring their perspective. This space also allowed the contact and exchange of experiences between the informal recyclers and other stakeholders, including the academic community. The GPT Chat has brought complementary information on the barriers to self-management of informal recyclers. However, the AI also indicated that there is a need to engage in person with the recyclers to analyze the situation better, discuss, and try to bring solutions to improve their self-management.

It is essential to mention that with the improvement to self-management of the informal recyclers, there are many gains, such as occupational health and safety training, investment in the working conditions inside the sheds, development of partnerships to acquire new equipment, and a democratic way of working among them. Also, it is noteworthy that the benefits from proper self-management strategies among informal recyclers may translate into societal gains. For example, the recycling cycle will function better and contribute towards protecting the natural environment and promoting savings of natural resources. Therefore, further investigation to overcome barriers to self-management of informal recyclers and the continuation of this project will emphasize the need to expand the connection between informal recyclers and governmental and non-governmental institutions to develop strategies and work together to improve municipal solid waste management in the cities.



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CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

ABRELPE. **Panorama dos Resíduos Sólidos No Brasil 2022**. Associação Brasileira das Empresas de Limpeza Pública e Resíduos Especiais. 2023. Disponível em: <https://abrelpe.org.br/download-panorama-2022/>. Acesso em: 08 set. 2023.

BRASIL. Lei Federal no 12.305, de 02 de agosto de 2010. **Institui a Política Nacional de Resíduos Sólidos**. Brasília, 02 de agosto de 2010. Disponível em: https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm. Acesso em: 08 set. 2023.

ECOLIBRA. Diagnóstico e Prognóstico. Plano Municipal de Gestão Integrada de Resíduos Sólidos de Almirante Tamandaré – PR, Setembro de 2022.

MENDES, R. **Personal communication**. Discussion at the First Seminar on Popular Recycling. August 2023.

ONU. **Humanidade produz mais de 2 bilhões de toneladas de lixo por ano, diz ONU em dia mundial**. 2018. Disponível em: <https://brasil.un.org/pt-br/81186-humanidade-produz-mais-de-2-bilh%C3%B5es-de-toneladas-de-lixo-por-ano-diz-onu-em-dia-mundial>. Acesso em: 08 set. 2023.

UOL. Como usar o Chat GPT para acelerar a divulgação do seu negócio com inteligência artificial. 2023. Disponível em: <https://meunegocio.uol.com.br/blog/chatgpt/> . Acesso em: 17 set. 2023.