

Textile waste as a resource for teaching, technology and art

Abstract

The theme of sustainability in relation to textile production carries several discussions on behalf of awareness and responsibility towards consumer action and the recycling of waste still inevitably generated. In this sense, the culture of fast fashion widely disseminated causes serious problems related to textile disposal, being relevant the opportunities for experimentation and research that present themselves as attempts to minimize the waste problem. Considering this, this work bet on the educational context as an opportune space to unveil knowledge related to sustainable development in the midst of alternative technologies. Thus, textile residues were used as a potential raw material as a pedagogical/artistic resource, being unusual for the students. This experience/life provoked discussions with potential views to the juvenile criticality facing consumption actions, as well as made us reflective about possible educational measures about the theme of waste and its disposal on the Planet. This is an experimental research action with the purpose of answering the hypothesis about the re-signification of textile waste in order to expand the students' repertoire, collaborating with their personal poetics in critical and creative possibilities based on environmental education.

Keywords: textile waste, artistic processes, sustainability, environmental education, elementary school

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Introduction

The most recent research on the theme of the textile industry in Brazil is categorical when it comes to the environmental impact of the waste generated. Although economically productive, developing employment and income, it presents great challenges when it comes to minimizing the problems related to the environment. It is worth noting, that since the National Policy on Solid Waste (PNRS),¹ Federal Law n. 12.305/2010, in Brazil, the states and municipalities have been instigated to build their own norms with prescriptions on the management of urban solid waste (ZONATTI, 2016).²

It is relevant to emphasize that these PNRS measures mean a leap towards the issues involving the generation and disposal of solid waste, especially with the elaboration of actions that call for shared responsibility regarding the life cycle of products. From it, it is possible to foresee the incentive for reuse and recycling as a way to minimize environmental impacts, as well as the creation of social, technical, and political instruments such as environmental education (EE) actions. We emphasize that EE actions are expected to occur even before the PNRS with the implementation of the federal law n. 9795/1999 National Policy for Environmental Education (PNEA).³

Given this scenario, it is necessary to reflect on the contexts of academic research, since there is a wide range of possibilities to be discussed about textile waste being the educational area a concentration of studies that suffers an emptying of research proposals. We affirm this by means of a search in the catalog of theses and dissertations of CAPES open data⁴ between 2016 and 2020 in which the keyword "textile waste" was filtered in the tables. As a result, we found 22 papers, in which 16 were available for reading. In the papers we found there is no combination of the word "education" in the keywords. Demonstrating that this duo: textile waste and education are not yet priorities that go together in Brazilian research. However, when we read the full papers, we observed the term education being mentioned in the research that cites the PNRS as a guiding document. This survey

gave us clues to the absence of the educational field, especially with regard to formal basic education and the context of schools.

From these follows, the urgency of the discussion in a broad way in society, with a view to the responsibility of all facing the actions of consumption. As far as environmental education is concerned, there are several measures that can be taken, and the context of basic education is one of the fundamental steps to start this theme. With the purpose of promoting the engagement of children and young people in favor of a critical and creative thinking in face of the problems related to sustainability. Because of this, we mobilized ourselves to apply research experiences in the educational context in public schools, with the intention of specifically meeting the PNRS regarding the non-generation, reduction, reuse and recycling of textile waste.

In this direction, we outlined a research laboratory plan with 7th grade students from a public school in the city of Curitiba, Paraná. Thus, the handling of textile waste was used as a pedagogical resource in art classes, focusing on the experience with alternative sustainable technologies in order to assess the potential or not of textile waste as a support in artistic processes. In the same way, with the objective of expanding the repertoire of the adolescents in relation to actions for the Planet's sustainability through artistic processes, we bet on the waste as an alternative support, having the cow parade movement as an inspiration for creative action.

In the midst of all this, we remain curious to understand to what extent the use of textile waste as teaching material for artistic activities can be configured as alternative sustainable resources, even if they are produced with technologies that have a great impact on nature? We bet on the hypothesis that textile wastes are constituted materialities with great potential to encourage aesthetic thinking in critical methodological proposals. The re-signification of waste is a bias in environmental education to discuss conceptual bases regarding the responsible act of consumer action.

Fashion and consumption: a discussion around sustainable development

According to Pezzolo,⁵ the advent of the industrial era promoted the acceleration of the productive scale provided by machines. This reveals both benefits and conflicts arising from the use of technologies and the optimization of profits. However, the industrial revolution did not foresee the problems related to the natural environment, the need for deliberate extraction of natural resources, and the carrying capacity of the planet, issues discussed after the second half of the twentieth century. According to Sachs,⁶ the awareness about the environment was awakened from historical events such as the Hiroshima bomb and man's trip to the moon in 1969.

On the other hand, important events occurred in the world that tried to discuss and set goals for the major issues on the sustainability of the planet. The concept of ecodevelopment or sustainable development proposed by Sachs,⁶ is a widely discussed approach that proposes harmony between the social, economic, and environmental dimensions. In this scenario, Brazil presents itself as a context in which this triad is very emerging, because we still have among us multiple actions that are questionable in relation to social and economic issues when combined with the environmental issue.

Within this context, the growth of the textile sector in Brazil calls our attention because the industry has exceeded its production volume every year. In 2020, according to data from IEMI by Abit,⁷ production resulted in a total of 1.91 million tons. And this reveals that the economy of this sector has been heated, generating jobs and contributing to the development of the country. However, regarding the waste generated by the textile industry we still have a lot to overcome in terms of development, especially in educational projects for sustainable development.

Hence, we must look at the Sustainable Development Goals (SDGs),⁸ of the United Nations Agenda 2030, in relation to education for sustainable development. As there are indications of actions aligned with the PNRS plan in relation to non-generation, reduction, recycling and reuse, proposals that can be undertaken in educational projects that are dedicated to considering the issue of sustainability. Above all, in what corresponds to SDG 12: responsible consumption and production, which relates to the discussion on consumer behavior. Related to this is the fulfillment of goal 5 which proposes, by 2030, the reduction of waste generation through strategies of prevention, reduction, recycling, and reuse.

Hence the need for large-scale debate on a pattern of textile consumption consistent with sustainability, and it is at this point that we find the biggest problem, because in view of the majority proposals of the fashion market this pattern does not correspond to the planet's balance. We have seen different styles being operated with recurrent changes, causing very fast fashion trends that inhabit the desires of people of all classes. Along with this, it cannot be denied that low cost clothing carries in itself variables about the possible dangers to the environment, due to little or no investment in sustainability and in the lives of those who operate this production.⁹

From these surveys, we dare to state that formal and non-formal educational means are a possible way for urgent changes to occur. Thus, we have the responsibility to expand the formation of consumers committed to sustainability. In Brazil, the National Policy for Environmental Education (PNEA) 9795/99 is the initiative to make Environmental Education an essential and permanent component. PNEA 9795/99 has as its principle the democratization of

knowledge established in relation to the environment in a holistic and interdisciplinary way.

Importantly, according to Sauv e,¹⁰ the purpose of environmental education is placed in the possible interactions between personal and social development of the environment in which we live in an essentialist dimension. Generating from this the feeling of belonging to such an extent that we feel the urgent need to act. Therefore, the author warns us that environmental education is related to our position towards conservation and conscious consumption, in the use of natural resources with intelligence to know how to manage common goods.

From this it follows that when we rely on the PNRS and PNEA we have environmental education (EE) and scientific and technological research as part of the relevant instruments for waste management. Thus, when dealing with textile waste we are thinking about the future of the planet with urgent measures that call us to reflect on interdisciplinary educational processes with a view to the multiple educational contexts, from early childhood.

Resignification of waste in the educational context: an emerging approach

It is worth noting that in formal education to which EA corresponds the PNEA promotes the idea that the discussion is present in all stages of basic education. Similarly, it is not characterized as a subject of the curriculum, but should be present as an integrated, continuous and interdisciplinary educational practice. This justifies the fact that the same document points out that the environmental dimension needs to be present in teacher education, at all levels and in all subjects.

Based on this, we can consider, supported by Morin¹¹ that education for sustainable development is totally related to contents pertinent to the life of the learner. According to this author, there is a crisis in education that is based on the enclosed politics of disciplines that do not communicate, thus, he calls for interdisciplinarity in the midst of the possibility of tightening the bonds of knowledge. Likewise, it denounces that there is important knowledge for life that is absent in the teaching programs.

From this perspective, we are not surprised by the fact that the topic of education does not appear in the Brazilian theses and dissertations that address the theme of textile waste, with all the necessary priority. However, we understand that this absence regarding research goes against the urgent need to incite measures against the consumer culture accentuated by fast fashion so widespread worldwide.

Our clothes are getting cheaper and cheaper, they follow faster and faster fashions, and are produced and sold in greater and greater quantities. All this corresponds to a new fashion system that is apparently here to stay: "fast fashion. Fast fashion, better known as fast fashion, is a practice of large international fashion companies and distribution networks that have managed to seduce their clientele thanks to the constant updating of the design of their pieces and the low prices of their products.⁹

Therefore, we emphasize that this is a topic that needs to be present in research and, likewise, can be present in curriculum components since early childhood education. Especially, if there is the possibility to discuss it from hands-on proposals, which according to Papert¹² is the method of learning by doing in articulation between thinking and doing. Thus, the idea is to incorporate environmental education in its contents in a contextualized way and on the way to constant transformation of realities.

The school as a research setting

The idea proposed by PNEA that EE is an educational practice that can be developed at all levels of education, without being tied to only one curriculum component mobilized us to experiment at the level of scientific research. This investigation was outlined by the contours of action research with an exploratory approach of qualitative nature. Thus, we understand that according to Thiollent¹³ in this type of research there is a common problem that is discussed in a collaborative way.

Thus, we justified that our question was posed on the hypothesis of textile waste as a possible educational resource and as a mobilizer of debates about sustainability through reuse. The young people, in turn, had never experienced the use of textile waste as a support for artistic expression, and this was an experience in which we bet together. Likewise, we took advantage of the moments amidst the creative processes to raise questions about responsible consumption.

In this sense, the students, together with the researchers, tested the textile residues to prove their potentiality as materiality in artistic educational processes. In this way, the problem surrounding these residues discarded by seamstresses in the Curitiba region, which accumulate and may have a polluting destination, would thus tend to gain the status of raw material. In view of this, we took the challenge of experimenting with the premise of not buying new fabrics, but rather testing whether the waste could be a good material for the proposal.

Given this scenario, we used the prescribed foundations of education for sustainability aligned to the cow parade art movement. In this movement, the artists use a cow made of fiber as a support for their paintings. We point out that the cow parade art movement was started by Pascal Knapp in the 1990s, this artist made several sculptures of cows that were used as a support for unusual paintings. The idea was spreading and until today several artists around the world use the same method to expose their cows in the streets. The interesting thing is that each sculpted cow carries within it a concept that the artists express imbued with aspects of contemporary art. This way, art is popularized, generating provocations in the midst of exhibitions from individual and collective readings; these are new ways of relating to art.

For this experimentation stage, the students had previously studied about the cow parade movement and were in the midst of the creative process, sketching their first ideas about the cow parade theme. Thus, inspired by this movement they were invited to reflect on a theme that awakened something in them, that was related to something they wanted to express. And as part of the pedagogical experimentation, we applied as a method the proposal to use as a support the textile residues kindly donated by the seamstresses.

The teacher and researcher drew a mold of a cow and sewed it to the residues so that each student could use it. From that, as can be seen in Figure 1, the textile residues for the filling were selected and cut until they became small pieces that would fill the inside of the cows.

After filling the cows' bodies and heads, the students glued the open ends together and made up the ears, tails, and other parts according to the sketched proposal.

It is worth mentioning that until this moment, some debates were introduced about the residues and about the possibilities of reuse, while the students slowly told about their experiences and habits related to textile consumption. Since we are dealing with teenagers, it is very common for them to be face to face with the media universe that advocates the consumption of brands that for them reveal what

fashion is. According to SALCEDO (2004, p. 26),⁹ supported by the Real Academia de la lengua Española, "fashion is the use, mode or custom that are in vogue during a given period, or in a given country, especially with regard to clothing, fabrics and accessories."



Figure 1 First stage of experimentation with textile waste.

Source: the authors, 2022

In light of this, the teacher/researcher stood in as a mediator of the topics about consumption and fashion amidst the process of making the cows. In many moments they told about the influencers that are, by them, revisited in the social networks and their role as marketing promoters, facing the retailers, who spread the use of certain styles of clothes, accessories, makeup among others to the young public. The existence of this niche observed by the marketing interests by companies is diffused by mass culture that according to Lipotevsky¹⁴ "has become a formidable machine commanded by the law of accelerated renewal, of ephemeral success, of seduction, of marginal difference."

From this reflection, we can say that education is a privileged space that needs to form people capable of becoming aware in the face of consumerist appeals, form critical citizens and intentionally defenders of the Planet. Especially because, in the midst of the media flood, this fight becomes disloyal if there are not more and more intellectuals involved with this cause.

Given this scenario, it is relevant to consider the importance of these mediated conversations with the students. We reiterate that they took place in the middle of the hands-on process, in which the students were drawing and painting their productions, as shown in Figure 2. Thus, in a fluid and playful way they were gradually revealing their consumption desires and, likewise, being asked about the environmental issue. These were interesting opportunities to hear their ideas and thus understand where the main spaces that seduce juvenile minds operate.



Figure 2 The cow as a support for the drawing and painting process.

Source: the authors, 2022

During this journey, the cows gradually gained artistic contours and became unique proposals based on each student's ideas. That is how we had the initiative of exhibiting the works at the school's

art exhibition, as shown in Figure 3. For that day we had 33 cows painted with the characteristics chosen by them, which were titled and organized as in a museum exhibition.

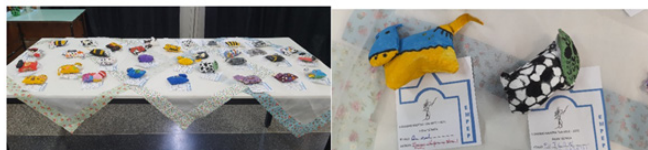


Figure 3 Exhibiting the cows in the art show.

Source: the authors, 2022

In this way, cows of all kinds appeared: bee cow, futcow, strelacow, LGBTQI+, cow hell, gamer cow, Coraline cow, black cow, tik tok cow, pajama cow, Uny firmann, bat cow, Colovaca, Cow-station, unicorn, period, Naruvaca, raybow ray, among others

The Betina's cow comes on the scene

Given the students' positive reaction to the use of textile residues in artistic processes involving the cow parade movement, the researchers felt mobilized to propose for the art exhibition, in the same way, a cow sculpture. Thus, we boldly built a cow of approximately 100cm by 50cm so that the visitors of the exhibition could interact with it. Our purpose was aligned with the processes advocated by contemporary art in which the relationship with the artistic object becomes the experience, per se, the art form.

We can infer, based on Bourriaud,¹⁵ that from the 1990s on artists concentrate more and more on the relationships that their artistic project can arouse in the public, and this relationship becomes the art form itself. From this we were guided by the desire to invite more people to reflect on and take upon themselves the issue of textile waste through intervention. The cow we sewed was made exclusively from indigo patches, sewn one by one, and filled with 100% small textile waste. It was taken to the exhibition along with a message that was the ludic invitation to interact in the cow and thus mark freely, as can be seen in Figure 4, with the stripes that were arranged in the exhibition.



Figure 4 Cow made 100% from textile waste for the art show.

Source: the authors, 2022

This proposal caught the attention of students from the whole school, as well as visitors from the community who had the chance to visit the exhibition. Little by little people felt at ease to play, draw, write and color the cow. At the end we could notice that there were several interferences from the public.

The cow's destination was the school's kindergarten class, for they were the children who symbolically demonstrated the most contact with it. They loved the opportunity to paint the cow and thus earned

the right to have it in their classroom as a collective toy. The children in this class christened her with the name Betina, and she is currently the children's favorite toy, as can be seen in Figure 5:



Figure 5 Preschool children with Betina the cow.

Source: the authors, 2022

This educational proposal accounted for the use of approximately 15kgs of textile waste. It is worth mentioning that after the exhibition we had a moment in class dedicated to evaluate with the 7th grade students the artistic experience we had. They indicated that the practice had been enjoyable and showed contentment with their production. Likewise, they asked questions about the use of used clothes to transform them into other objects. We took the opportunity, besides answering their questions, to expose the problem we face on the planet with the generation of waste and, from this, we understand that the students showed interest in being part of the change in the way they look at textile waste. Once they asked about future proposals like this one.

The students' participation in all stages of the proposal indicates that the sustainability approach, in the midst of artistic processes, can be a relevant strategy to broaden the debate in interdisciplinary educational processes. Likewise, it was understood that the curricular component Art can be a way to approach the debate about consumption, making visible to students the access to recycling and reuse alternatives of textile waste.

Analysis and conclusion

The actions performed in this experimental research revealed that textile waste is a pedagogical resource that can be considered as a sustainable alternative technology. In the specific case in which the cow parade movement was the inspiration for the pedagogical proposal, there was a widening of repertoire in relation to the support used, giving the students the opportunity to go beyond the sulfite paper, understanding the textile waste as a powerful raw material as a pedagogical resource. In a special way, the students' participation in all the steps of the teaching action demonstrates that they had the possibility to express their personal poetics through this resource, as well as, reflect on the problem of textile waste.

The hypothesis that textile waste can be a materiality with potential for the planning of educational proposals can be proven, even though in their production large-scale technologies with polluting potentialities are employed. By experimenting with them, the students could perceive the possibility of giving new meanings to the residues. Environmental education actions can nurture creative and poetic thinking, and are aligned with education for sustainability. They can be motivations for discussions about what we need to live well on the planet, to understand the role of textile waste in our economy, and

how we can cooperate so that the Earth shelters us and caresses us with its light and colors.

This experience has shown us that planning about this theme mixed with playfulness is necessary, because the possibility of seeing something made by their own hands, with their ideas and marks printed on the artistic object, transcends thinking and elevates the discussions. And this transformation goes from the opportunity to go beyond, as well as in a rethinking about the consumer posture, bringing to itself part of the responsibility. It is believed that the methodology that focuses on doing from a context brings greater contributions to the students' knowledge. Dealing with the issue of textile waste, as well as with responsible consumption in oral presentation processes with the use of theoretical issues needs to be overcome. In this experience we realized that when students have the freedom to access materials and create with them, a channel for further debates opens up.

It is necessary to point out that this work was established on an experimental basis, about the recycling of textile waste, and from that we realized the need to raise the discussions and practices having responsible consumption as a guiding purpose. We are aware that for this to happen, it is necessary to have more debates about this issue in education, as well as practices in different curricular components in interdisciplinary projects. Likewise, it is necessary that the contexts of research on textile waste embrace education as a possibility for investigation, since the paths have been discovered.

This experimentation has given us proof that the teaching associated with recurring measures can come together in the construction of a critical thinking that will result in a conscious consumer who will be able to make more sustainable choices. The lack of this has demanded, even from companies that have the sustainability mark in their production, a strong investment in employee training. Measures that are extremely necessary. However, the basic educational context also needs to address this issue, since the school is the territory of knowledge that goes beyond common sense and is committed to the integral formation of the human being. Therefore, the terms that affect their survival as well as that of their ancestors cannot be left out. We are talking about taking care of ourselves when we take care of the environment, because we are part of it. Nobody is born knowing how to do it, if they are not caught by these ideas in a broader way.

In this sense, we emphasize that in addition to meeting the PNEA, all curriculum components can and need to lean into propositions that turn to the theme of sustainability. In this exploratory experience we worked on recycling and reuse, and this made us realize that it is necessary to have proposals that work with more emphasis on the non-generation of waste. Hence, we invite more research and practices at different levels of formal or non-formal education to discuss textile waste.

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Conflicts of interest

Declare if any conflict of interest exists.

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