


**ENGENHARIA TÊXTIL E APLICAÇÃO DOS PRINCÍPIOS DA SUSTENTABILIDADE:
EXPERIÊNCIAS DE ENSINO-APRENDIZAGEM****TEXTILE ENGINEERING AND APPLICATION OF SUSTAINABILITY PRINCIPLES:
TEACHING-LEARNING EXPERIENCES****INGENIERÍA TEXTIL Y APLICACIÓN DE PRINCIPIOS DE SOSTENIBILIDAD:
EXPERIENCIAS DE ENSEÑANZA-APRENDIZAJE**

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RESUMO

O presente trabalho é o relato de resultados de uma disciplina do Curso de Engenharia Têxtil, da UFSC, *campus* Blumenau. O projeto foi desenvolvido em parceria com a Associação de Cegos do Vale do Itajaí (ACEVALI) e teve como objetivo central desenvolver subprojetos de tecnologias assistivas com base na interação social. A metodologia utilizada foi a pesquisa bibliográfica e de campo, associada à projetual, buscando aprofundar conceitos pertinentes, como moda inclusiva e sustentabilidade. A partir de algumas entrevistas, foram capturadas várias necessidades, como: a reformulação dos uniformes institucionais, a criação dos uniformes esportivos paralímpicos *goalball* (praticado por alguns associados) e a reorganização do brechó. Portanto, dentre os produtos gerados pelos subprojetos, elenca-se o desenvolvimento dos uniformes institucionais e do *goalball* e uma reconfiguração do brechó. Como resultados, constatou-se uma interação entre universidade e comunidade, proporcionando aos acadêmicos envolvidos maior conhecimento sobre as diferentes dimensões da sustentabilidade, arte brasileira e regional.

Palavras-chave: Tecnologias assistivas. Interação social. Moda inclusiva. Uniformes esportivos paralímpicos *goalball*.

ABSTRACT

The present work reports the results from the discipline "Introduction to Design and Fashion" in the Textile Engineering Course at UFSC, Blumenau campus. This project was developed in partnership with the Association of Blind People of Vale do Itajaí (ACEVALI) and aimed to develop assistive technology subprojects based on social interaction. The methodology combined bibliographic and field research with design principles, focusing on key concepts such as inclusive fashion and sustainability. Through interviews, several

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needs were identified, including the redesign of institutional uniforms, the creation of Paralympic goalball sports uniforms (used by some members), and the reorganization of the thrift store. Consequently, the subprojects produced institutional and goalball uniforms and reconfigured the thrift store. This project facilitated interaction between the university and the community, enhancing the participants' understanding of various aspects of sustainability, as well as Brazilian and regional art.

Keywords: Assistive technologies. Social interaction. Inclusive fashion. Paralympic goalball sports uniforms.

RESUMEN

El presente trabajo reporta los resultados de la disciplina «Introducción al Diseño y a la Moda» del Curso de Ingeniería Textil de la UFSC, campus de Blumenau. Este proyecto se desarrolló en colaboración con la Asociación de Ciegos del Vale do Itajaí (ACEVALI) y tuvo como objetivo desarrollar subproyectos de tecnología de asistencia basados en la interacción social. La metodología combinó la investigación bibliográfica y de campo con los principios del diseño, centrándose en conceptos clave como la moda inclusiva y la sostenibilidad. A través de entrevistas, se identificaron varias necesidades, como el rediseño de los uniformes institucionales, la creación de uniformes deportivos paralímpicos de goalball (utilizados por algunos miembros) y la reorganización de la tienda de segunda mano. En consecuencia, los subproyectos produjeron uniformes institucionales y de goalball y reconfiguraron la tienda de segunda mano. Este proyecto facilitó la interacción entre la universidad y la comunidad, mejorando la comprensión de los participantes de diversos aspectos de la sostenibilidad, así como del arte brasileño y regional.

Palabras clave: Tecnologías de asistencia. Interacción social. Moda inclusiva. Uniformes deportivos paralímpicos de goalball.

INTRODUCTION

This paper addresses the results of the discipline Introduction to Design and Fashion, which incorporates, through a project, the Curricular Practices of Innovation and Regional Development and Social Interaction (PIDRIS), of the sixth phase of the Textile Engineering Course at UFSC, Blumenau campus.

The main objective of the project was to propose subprojects for the inclusive development of ACEVALI, in co-production with the institution's members, based on reflection on the different dimensions of sustainability.

Among the pillars of sustainability, the social and cultural were privileged. What concerns social sustainability was contemplated here through the development of products for people with visual impairment and the involvement of other participating institutions. As for cultural sustainability, the contemplation of art as one of the aesthetic expressions inherent to human creation was highlighted.

The methodology used, in addition to the projectual, favored bibliographic and field research, seeking to generate the deepening of pertinent concepts, such as inclusion, accessibility, inclusive fashion, universal design, assistive technologies, sustainability, as well as Brazilian art and Brazilian artist chosen as the theme-inspiration of the products.

METHODOLOGIES, RESEARCH AND RESULTS: DIALOGUES BETWEEN TEXTILE ENGINEERING AND SUSTAINABILITY

As previously exposed, the work presented here is the result of the teaching-learning process of the discipline Introduction to Design and Fashion (PIDRIS) of the sixth phase of the Textile Engineering Course at UFSC. The course project allowed connections with the **research project** "Fashion is for everyone: study of the principles of Universal Design applied to clothing" and with the **extension project** "Technologies for inclusive development: co-production of assistive technologies for the blind in social interaction", both coordinated by the teachers who teach the course. These projects are also part of the studies of the CNPQ research group - Center for Regional Development and Innovation (NUDRI), whose objective is to "promote **teaching, research and extension activities**, with a focus on social interaction and regional development in the Itajaí Valley, stimulating social and technological innovation"⁴ inside and outside the Federal University of Santa Catarina (Emphasis added).

The main objective of the work was to work in an integrated way with ACEVALI's members, trying to contemplate all the demands observed for the creation of the

⁴ Information available at: <http://nudri.blumenau.ufsc.br/>. Accessed on: 10.jul. 2017.

subprojects. In this way, the partnership with the professionals and associates of the institution involved was fundamental, so that a system of relational work, co-production and co-creation was created. Based on this principle, a set of actions was created that were developed in the discipline, which allowed the relationship between the activities and the knowledge built throughout the semester.

ACEVALI is an association that serves blind and/or people with low vision and is located in the municipality of Blumenau, Santa Catarina. It offers habilitation or rehabilitation services for the development of participants in their different potentialities and abilities, as well as contributes to greater personal, family and community autonomy. According to the direction, the association was founded on February 28, 1987 and its focus of action is the literacy of the visually impaired through the Braille system, as well as the transfer of notions of guidance and mobility. Currently, the institution has its own headquarters and has 200 registered members, 40 of whom are frequent members. It offers different activities to members such as: handicraft workshop in which baskets, garlands, napkin holders, among other products made with newspaper, choir, braille literacy, digital literacy with computer classes, guidance on mobility. It caters to the adult public, covering an age group ranging from 20 to 85 years old. It raises funds, promoting events such as pasteladas, fairs and tolls. The biggest source of income comes from a kiosk that sells snacks. The second largest source of income comes from a thrift store located in the basement of the institution.

The methodology favored bibliographic and field research, with the use of social research of observation of the participants, which consists of the real participation of knowledge in the life of the community or group. In this type of research, the observer/researcher assumes, at least to a certain extent, the role of a member of the group. Therefore, it is a technique by which one arrives at the knowledge of the life of a group from within itself. Initially, interviews were conducted with the principal, the social worker and the associates. From this first contact, some needs were verified, such as: the reformulation of institutional uniforms, the creation of Paralympic goalball sports uniforms (practiced by some members) and the reorganization of the thrift store. Based on these demands, the students organized themselves into groups to develop subprojects aimed at the needs pointed out.

To start the creation of the institutional uniforms, some older members were interviewed, who reported some problems found in the current ones and gave different suggestions on how they would like the new ones to be created. Likewise, the director suggested some colors, fabrics, shapes and functionalities that she considered important to be contemplated in the new costumes. The same procedure was carried out to create the

uniforms of the *goalball team*. For this subproject, some associates who are part of the team and the coach were interviewed.

For the reorganization of the thrift store, the director of the institution, some associates who bought items from the thrift store and the person responsible for organizing and selling the pieces were interviewed. Using open questions, we sought to detect the real needs of the subjects involved.

The methodology used for the development of the collection was the methodology created by Doris Treptow (2013), which is described in her book "Inventing Fashion: Collection Planning" and contemplates the steps normally used to create and conceive a fashion collection.

Thus, after research, theoretical foundation of the subprojects, data collection and analysis, proposals for institutional uniforms, *goalball uniforms* and restructuring and organization of the thrift store were elaborated.

The objective of the team that developed the institutional uniforms was to propose beautiful, ergonomic uniforms that met the needs pointed out by the members, improving their identification at events, trips and in their daily use.

One of the points raised by the members was the choice of fabric. They would have to have a pleasant touch, not wrinkle, be practical to wash and have good thermal comfort, helping with perspiration in the summer and heating in the winter. The collar of the shirt should be wide to make it easier to put on. The jacket used in winter should have large, zippered pockets to prevent documents, keys or wallets stored there.

Thus, men's and women's uniforms were created to be worn in summer and winter. According to the board, the predominant colors should be blue and white, colors of the institution's logo. The white shirts would be used mainly by people who work with the sale of snacks, at the kiosk of the terminal. The uniform proposals selected by the management and users follow the criteria commented. Figure 1 illustrates two pieces that were created:

Figure 1: Proposals created for ACEVALI's institutional uniforms.



Source: MIRANDA; RABBIT; GONÇALVES AND SILVA, 2017.

The fabric of the blouse is comfortable, perspires well and tends to wrinkle less. The collar is wide and has the same height as the neckline in front and back. The institution's

logo is embroidered and transcribed in braille. The fabric chosen to make the polo shirt has the same characteristics, differing only in the composition and structure of the fabric. The created jacket has a kangaroo pocket and a detachable zipper at the closure. The fabric wrinkles little, has a simple and practical cleaning, has good perspiration and good thermal comfort.

In addition to the institution's colors, the color chart was complemented with colors abstracted from some works by the painter Gonalo Borges, studied throughout the research. Works that had shades of colors that closely resembled those of the institution itself were selected. Gonalo is considered an inclusive artist and paints his works with his mouth and feet. He is currently a member of the Association of Mouth and Foot Painters (APBP).

The team that developed the *goalball uniforms* created pieces for the men's and women's team and aimed to improve the performance and comfort of the athletes. In Blumenau, according to the coach of the sports team, the sport is associated with the School Paraspport Association of Blumenau (APESBLU). They already had a uniform and, through the interviews, it was possible to perceive the points that needed to be improved, such as the lack of thermal and ergonomic comfort and the low quality of the materials used.

Goalball , also known as goalball, is a game played by athletes who are visually impaired and its main objective is to throw a ball with their hands into the opponent's goal. Each team plays with three starting players and three substitutes. The uniform, both male and female, consists of the following pieces: shirt, pants, elbow pad, knee pad, and glasses.

The pieces were created taking into account all the technical standards of the sport. Some important points for the development of the uniforms were pointed out by the athletes: use of light fabrics that facilitate perspiration and that are resistant (due to the friction with the ground when catching the ball), wider collar, modeling more adjusted to the body, greater efficiency of men's sports underwear in reducing the impact with the ball. Therefore, all the points raised were accepted.

The fabrics for making the blouses and pants were chosen for their characteristics of perspiration, resistance and malleability, aiming at the best performance of the players. For greater intimate protection of the athletes, a silicone blanket was chosen. This choice took into account the fact that the material is more resistant, better absorbs impact and is more hygienic. The entire color palette of the collection was abstracted from the work "The

Fisherman", by visual artist Marcelo Cunha, a painter who paints his paintings with his mouth and feet and is a member of the Association of Painters of Mouths and Feet (APBP).

Figure 2: Uniforms created for the *goalball* team.



Source: CESCHINI *et al*, 2017.

Two teams created actions to reorganize the thrift store. As the interviews indicated that the thrift store was the second largest source of income for the institution, the subprojects developed aimed at actions that would result in an increase in revenue. With the country's economic crisis, the institution ended up losing some partners who donated stock clothes to be sold at the thrift store. Thus, the first action was to create a campaign to collect donations, which was publicized on the UFSC page, on the course page, and shared on social networks, email contacts and blogs of columnists in the city.

The campaign lasted a month and generated the collection of more than 560 clothes, 40 underwear, 70 accessories and 25 pairs of shoes. Some pieces were new and had minor defects, as was the case with the underwear. After a screening of the donated items, certain pieces were considered unfit for sale. The items were separated by categories: adult, female, male and child. Figure 3 records the moment of delivery of the articles to the institution.

Figure 3: Delivery of the clothes collected in the campaign to the thrift store.



Source: Personal archive, 2017.

Some donated pieces were customized. The objective of the customization was to take advantage of pieces that had minor defects, add value to some articles, increase sales, leave the pieces with a slightly more contemporary aesthetic. In this process, winter 2018 trends were used as inspiration. Among them, the *artsy trend*, inspired by works of art. In this case, the works that are part of the collection of visual artist Antônio da Silva, an artist who works with inclusive art, were chosen.

The pieces that had stains were recovered and dyed, using the *tie day* technique. In pieces that were pierced, *patches*, lace, embroidery, different trims were applied. That is, many details were applied in relief so that people with visual impairments could perceive some different elements of the piece. Some denim pieces were faded and torn to acquire the look of the *destroyed style*.

Figure 4: Donated pieces that were customized.



Source: Personal archive, 2017.

The reorganization of the thrift store was thought out together with the members. One of the items worked on was accessibility so that people with disabilities had greater mobility and autonomy to choose their pieces. Many members buy their clothes at the thrift store, given the difficulties they face in buying clothes and shoes in conventional stores. The pieces were separated by colors, sizes, styles and categories, such as women's, men's and children's. The best pieces were placed on mannequins and on a rack at the entrance to the thrift store. Some pieces were also selected that were photographed and disseminated on social networks to increase demand and sales. The photos were tagged with the *hashtag* #PraCegoVer, with a detailed description of the pieces, such as fabrics, colors, size, as well as the location of the thrift store and the value of the piece.

Figure 5: Organization of the thrift store (before and after).



Source: Personal archive, 2017.

FINAL CONSIDERATIONS

ACEVALI's institutional uniforms and the Paralympic uniforms of the *goalball* team were reformulated according to the data obtained from the field surveys. The technical drawings, technical sheets and all the details of the pieces were made for their manufacture. The next step is to find companies that are interested in sponsoring the manufacture of the uniforms.

In the first semester of 2018, two students who were part of the development of *the goalball* uniforms became scholarship holders of the extension project and are continuing it.

According to the thrift store saleswoman, all the customized pieces were quickly sold. In addition, donations and the demand for pieces in the space have increased, due to the sharing of information on social networks.

One of the factors for the use of works of art as an element of inspiration was as a way to expand the aesthetic repertoire in the creative process. Thus, as it is a collection of uniforms, during the process of generating alternatives, it was decided to abstract only the colors from the works.

The current purpose of the discipline teaching project is to continue with the partnership with ACEVALI and propose new reconfigurations for the thrift store, collecting and customizing more pieces, publicizing the space and products on social networks, as well as developing the Paralympic uniforms of the athletics team (practiced by some members).

In this way, it is perceived that the objectives of the work initially outlined were achieved, evidencing the possibility of acting in an integrated way, providing interaction between university and community. The work on display provided the academics involved with greater knowledge about the different dimensions of sustainability, Brazilian and regional art, in addition to provoking the perception of social responsibility in the face of the very diverse world in which we live and of which we are a part.



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