



Sustainable futures, the role of material library in fashion & design education

Futuros sustentáveis, o papel de uma materioteca na educação em moda e no design

Futuros sostenibles, el papel de una biblioteca de material en la educación de moda y diseño

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Abstract: The relationships between fashion, design, and materials promote important reflections on sustainable development, social, environmental, and cultural responsibility. In this sense, biodiversity can be understood as a cultural heritage of intangible value, capable of being added to different productions and in the training of new professionals. Thus, this research presents connections on sustainability through the actions, over 13 years, of the *Materioteca* of the University of Pará, a collection of materials focused on Amazonian biodiversity. The research is classified as exploratory and the method employed is the case study. As results, analyses of the collection samples, curation process, research & development initiatives, and organization of exhibitions are presented. In addition, the article presents associations of the actions with the Sustainable Development Goals [SDGs] of the 2030 Agenda. The main result identified is the contribution of the space to educational initiatives, with participatory approaches, and the synergy with SDG 4 – Quality Education and SDG 12 – Responsible Consumption and Production.

Palavras-chave: education; raw material; material collection; material selection; biodiversity.

Resumo: As relações entre moda, design e materiais promovem reflexões importantes sobre desenvolvimento sustentável, responsabilidade social, ambiental e cultural. Nesse sentido, a biodiversidade pode ser compreendida como um patrimônio cultural de valor intangível, capaz de ser agregado em diferentes produções e na formação de novos profissionais. Desta forma, a presente pesquisa apresenta conexões sobre sustentabilidade através das atuações, ao longo de 13 anos, da Materioteca da Universidade do Pará, um acervo de materiais com foco na biodiversidade amazônica. A pesquisa é classificada como exploratória e o método empregado é o estudo de caso. Como resultados, são apresentadas análises sobre as amostras do acervo, processo de curadoria, iniciativas em Pesquisa & Desenvolvimento e organização de exposições. Além disso, o artigo apresenta associações das ações com os Objetivos do Desenvolvimento Sustentável [ODS] da Agenda 2030. Identifica-se como principal resultado a contribuição do espaço para iniciativas educativas, com abordagens participativas, e a sinergia com o ODS 4 – Educação de Qualidade e ODS 12 – Consumo e Produção Responsáveis.

Keywords: educação; matéria-prima; coleção de materiais; seleção de materiais; biodiversidade.

Resumen: Las relaciones entre la moda, el diseño y los materiales promueven importantes reflexiones sobre el desarrollo sostenible y la responsabilidad social, ambiental y cultural. En este sentido, la biodiversidad puede entenderse como un patrimonio cultural de valor intangible, capaz de incorporarse a distintas producciones y a la formación de nuevos profesionales. Así, esta investigación presenta las conexiones con la sostenibilidad a partir de las acciones desarrolladas, a lo largo de 13 años, por la Materioteca de la Universidad del Estado de Pará, una colección de materiales centrada en la biodiversidad amazónica. La investigación se clasifica como exploratoria y el método empleado es el estudio de caso. Como resultados, se presentan análisis de las muestras de la colección, del proceso de curaduría, de las iniciativas de Investigación y Desarrollo y de la organización de exposiciones. Además, el artículo presenta asociaciones entre las acciones desarrolladas y los Objetivos de Desarrollo Sostenible [ODS] de la Agenda 2030. El principal resultado identificado es la contribución del espacio a las iniciativas educativas, con enfoques participativos, así como su sinergia con el ODS 4 [Educación de Calidad] y el ODS 12 [Producción y Consumo Responsables].

Palabras clave: educación; materia prima; colección de materiales; selección de materiales; biodiversidad.

Introduction

The fashion industry, historically known for its negative impacts, is challenged to adopt sustainable practices and less polluting processes. Designers must become progressively more efficient in their choices, with the aim of reducing waste and promoting a fairer society. This issue has generated ongoing developments that lead both designers and consumers to rethink their everyday attitudes, through a reorganization of each citizen's worldview [Berlim, 2016].

Thus, responsible production and consumption are understood as global challenges in different Fashion and Design projects. This commitment is also present in the United Nations [UN] 2030 Agenda, through the Sustainable Development Goals [SDGs].

Amazonian biodiversity and its inputs have been used in the food and cosmetics sectors as a source of raw materials, in addition to being the subject of intense discussions, workshops, fairs and other events that are taking place and will take place in Belém (Pará, Brazil) on the eve of COP 30 – United Nations Conference on Climate Change. One of the first steps to make this happen is to encourage engagement in recognizing the importance of this biodiversity and its sustainable use for local communities and the world.

Biodiversity as a regional/local cultural heritage becomes an intangible value that can be added to products through Fashion or Design. In this way, seeds, fibers or wood, once an integral part of a product, carry within them the value of the forest, the value of the riverside dwellers, extractivist workers, or Indigenous peoples who collected seeds and fruits or extracted and processed fiber. Intangible aspects that become tangible, in the form of value for the region.

The use of materials is rooted in human culture, much more than one might imagine. Historically, the development and advancement of society were directly linked to the skills of producing and manipulating materials for human needs. In some cases, it is common to associate certain civilizations with their relationship with materials, such as the Stone Age, Bronze Age or Iron Age [Callister; Rethwisch, 2016]. Since materials are the basis for Design and Fashion projects, capable of determining the limits and opportunities for a product, as well as being responsible for its materialization, the selection of materials is of utmost importance in product development.

Due to the diversity of existing materials and their characteristics, it is important for designers, engineers, architects or planners to study and analyze materials in terms of their characteristics and production processes, and possible impacts on the environment. Adapting materials education, with the integration of different tools and methods to understand the tangible properties of materials alongside their tangible effects, is a vital necessity when considering current professional practices.

The objective of creating a Materials Library is to compile materials so that professionals [such as designers, architects or engineers] and students can access the variety of samples and encourage the use of different existing materials. The UEPA Materials Library is a project that is a space open to the public and at the service of knowledge about Amazonian materials and their production processes. Linked to the Bachelor's Degree in Design, the space offers a collection of samples divided into six classes of materials.

In view of the topics presented, this article explores connections between sustainability and biodiversity through the actions of the UEPA Materials Library over 13 years. The research is classified as exploratory, with an in-depth investigation of a specific case, within a real-world context, aimed at proposing a dimensional model for structured fitting systems. It is hoped that the article will contribute to the literature dedicated to the actions and experiences of Materials Libraries, as well as to research related to the topics discussed.

Perspectives on sustainability in fashion, design and materials

Sustainability is the subject of ongoing dialogue among consumers, researchers, and designers, with in-depth engagement amid the crisis and the impacts of climate change. To meet current demands, in 2015, The United Nations convened a General Assembly that resulted in the document entitled “Transforming Our World: the 2030 Agenda for Sustainable Development”. This document was prepared following a structure with 17 objectives, as shown in Figure 1.

Figure 1. Sustainable Development Goals



Source: UN [2015]

According to the World Design Organization, sustainability-oriented design processes in fashion and design, linked to sustainability, can provide an innovative perspective on the challenges of the 2030 Agenda. The organization identifies the role of designers as relevant in SDG 3 - Good health and well-being; SDG 6 - Clean water and sanitation; SDG 7 - Affordable and clean energy; SDG 9 - Industry, innovation and infrastructure; SDG 11 - Sustainable cities and communities; SDG 12 - Responsible consumption and production; SDG 17 - Partnerships for the goals [WDO, 2020].

A relevant aspect in sustainability-oriented agendas is the strong impact that the fashion and design industries have on biodiversity. Clothing supply chains, for example, are directly linked to soil degradation, conversion of natural ecosystems and water pollution. Most of the negative impact comes from three stages in the value chain: raw material production, material preparation and processing, and end-of-life [Granskog *et al.*, 2020].

The current scenario highlights the need for collaborative efforts, which can be driven or based on the 2030 Agenda. Thus, it becomes relevant to categorize and identify connections among its guidelines so that they can be applied to disseminate sustainable alternatives, whether through communication, education, clean production processes, or alternative materials [Thakker; Sun, 2023].

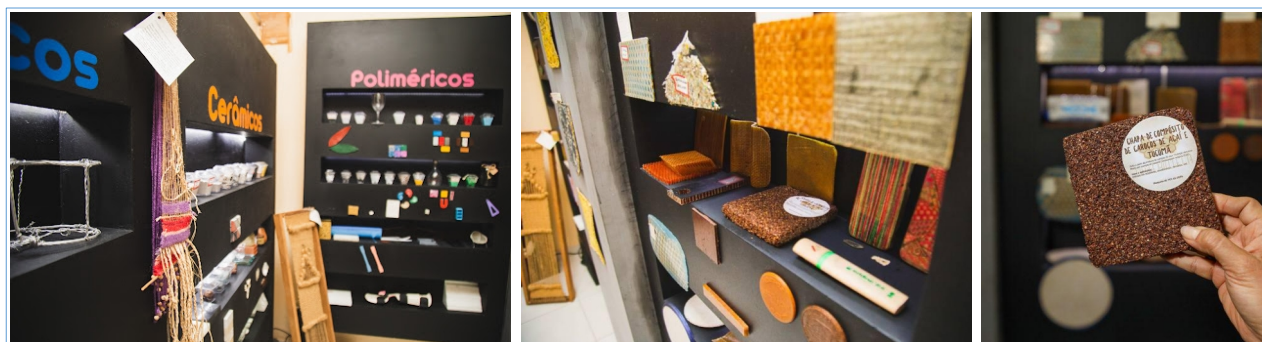
In the Amazon context, the vast biodiversity and natural wealth offer enormous potential for the development of sustainable practices in fashion and design. The conscious exploration of resources such as natural and organic fibers and plant materials can promote ecological and innovative alternatives, reducing the environmental, social, and economic impact of industries. By incorporating practices, respect ecosystems, designers can create products that combine functionality and respect for the environment, in a responsible and inclusive consumption cycle.

Material Library UEPA

Material libraries are spaces for research and documentation, through a physical and/or digital database, that function as instruments for knowledge production, access to data and dissemination of information [Del Curto; Bertoldi, 2018]. Materials have always been considered one of the foundations of design education. The methodologies applied to materials and teaching have fluctuated over the years, reflecting changes in the local context and the renewal of institutional approaches in educational spaces [Bak-Andersen, 2021].

The Material Library UEPA is located in the Center for Natural Sciences and Technologies, on Campus V of the State University of Pará [UEPA]. The initiative, as shown in Figure 2, was implemented with the objective of offering academics on the campus, and the general community, technical information on materials and production processes, through tactile and visual interaction with samples present in the consumer goods industries [Santos *et al.*, 2012]. The organization of the space is conducive to creativity and innovation; the arrangement of the information seeks to offer visitors the ability to relate materials and processes with the production chains existing in the North region.

Figure 2. UEPA Material Library Space



Source: ASCOM UEPA [2023] – adapted by the authors

One of the project's educational activities involves supporting courses in the Bachelor's Degree in Design, which involve fashion education and product development, such as: Materials and Processes, Modeling, Project and Sustainable Design. In addition to physical space, the initiative also has activities in the digital environment. Dedicated to the academic public and people interested in design, materials and sustainability, the account @materiotecauepa [Instagram] uses different resources to share part of the collection and communicate the project's activities [Cohen; Santos, 2022b].

Traditionally, materials are classified as metallic, polymeric, ceramic and composite. With the need to know the materials that the forest has long offered us, and to recognize their importance in the development of the local economy, the class of natural materials was created, which, for the purposes of this project, are defined as natural materials of plant origin, where we find various fibers, alternative woods, seeds, among many others. The “textiles” class found relevance in this project, since it is an important area for Fashion and Design, in addition to the existence of a textile industry in the state of Pará.

Since the beginning of the project, in 2012, the implementation of the UEPA Material Library required studies on different fields of knowledge, on the categorization of materials, organization and curation of exhibitions, organization of scenographic spaces, educational processes and the dynamics in museum spaces. The studies were important for the foundation of the project's work and initiatives over the years [Cohen; Santos, 2024]. Currently, research and activities with participatory approaches are being carried out, aimed at sustainable development, the formation of critical thinking and the use of space for teaching and learning.

Methodological Procedures

Regarding the methodological procedures, the data and information were collected through exploratory research. According to Gil [2016], exploratory investigations seek to provide an overview of a given fact, in addition to contributing to the explanation of certain phenomena and/or causes. The method applied involved an in-depth investigation of a specific case within a real-world context, aimed at proposing a dimensional model for structured fitting systems, which consists of researching one or more cases, in a way that allows for broad and detailed knowledge. The investigation aims to analyze and record facts in order to later interpret them in a narrative way [Silva-Neto; Leite, 2023].

Thus, during the first stage of the research, the analysis of the activities related to the Materioteca's operations over 12 years was carried out. The survey of actions related to obtaining samples from the collection, the curation process, Research & Development initiatives and the organization of exhibitions was delimited. The objects of study were obtained through visits to the space, searches in the space's archives and web materials available on institutional pages.

To associate the actions with the Sustainable Development Goals, during the second stage of the investigation, a framework was created to relate the actions described in the text with the targets set out in SDG 4 – Quality Education and SDG 12 – Responsible Consumption and Production. The information on each target was transcribed from the technical material of the 2030 Agenda [UN, 2015].

Results and Discussions

To organize the collection samples in a didactic manner, we first sought to understand the classification found in the classical literature on the subject. Thus, the classification described in the book “Materials Science and Engineering – An Introduction” [Callister; Rethwisch, 2016] was adopted. Traditionally, materials are classified as metallic, polymeric, ceramic and composite. As an innovation, two classes were added to the collection's exhibition design: textile and natural materials.

In total, the space has a collection of more than 600 samples. In the metallic materials class, there are samples of ferrous and non-ferrous metallic materials [aluminum, copper, tin, magnesium, recycled aluminum, bronze alloys, etc.]. In the ceramics class, there are samples of mineral materials [inputs] that are part of the ceramic industry chain, ceramic, cementitious, lithic products and small red ceramic artifacts. In the polymers class, there are samples of vinyl coatings, recycled polymer tablets and small 3D printed artifacts. In the composites class, there are samples of polymeric composites, cementitious, biocomposites and products with composite materials.

In addition to the class of natural materials, which includes raw materials representing the Amazonian plant biodiversity, the class of textile materials was also added to the project, since it is an important area for Fashion and Design, considering that many plant fibers already classified as natural materials of plant biodiversity, such as Miriti, Curauá, and Tururi, can be transformed into textile artifacts.

Another important factor in the creation of this class in the project was the existence of a textile hub in the state based on the cultivation of jute fiber. Bringing this discussion to the Amazonian context is relevant since the classification of textiles is widely found and categorized in the area of textile engineering and technology, the acquisition of textile materials and processes, and the classification of fibers.

In the textile materials class, the space has 70 samples of textile fibers, synthetic and/or natural fabrics, organized in reels, woven fabrics, knitted fabrics or processed artifacts. As for natural materials, the space categorized 80 samples of plant origin, including: fibers, seeds, recycled paper, petioles, wood and products of cellulose origin, organized in blocks, screens, sheets, granules, and processed products – organized in [Table 1](#).

Table 1. Classification of the collection directed to the Textile and Natural class

Material Library UEPA Collection				
Class	Samples Types	Samples Geometry	Main materials	Applications in Fashion and Design projects
Naturals	Samples of plant origin [plant fibers, seeds, recycled paper, petioles, alternative woods] and products of cellulosic origin [crafts or consumer goods industry]	Blocks, sheets, screens, products, granules	Seeds [Acai, Jupati, Buriti, Paxiuba and Tucumã], Fibers [Acai, Coconut, Jupati, Miriti and Banana], Woods [Jatobá, Angelin, Yellow Ipê, Cumaru, Masssaramduba, Timborana and Muiracatiara]	Biojewelry, Furniture, Clothing, Reinforcement for composite materials [new materials], Adornments, and Packaging
Textiles	Samples of natural textile fibers and synthetic fabrics	Fabrics, reels and textile artifacts	Jute Fabric, Tururi, Jute/Cotton [Hybrid], Raw Cotton, Calico, Felt[s], TNT[s], Cotton Viscose, Jute Yarn, Jute Fiber, Carded Jute and Cotton Yarn	Clothing, Accessories, Bags, Shoes, Ornaments, Wallets, Belts and Packaging

Source: Authors [2025]

Access to the space is via guided tours, conducted individually or in groups. This is the moment when visitors are encouraged to have sensory experiences with some samples from the collection, with the free handling of the material. Through a technical sheet placed next to each sample, it is possible to have access to information about the selected sample, such as production processes, environmental, cultural, and technical aspects.

By integrating traditional and scientific knowledge, the technical data sheets in the material library can become powerful tools of inspiration for design and fashion designers. In the field of traditional knowledge, the data sheets can detail the cultural origin of the material, the ancestral production and processing techniques, the associated symbolic meanings, the historical applications, and the communities that hold this knowledge. Including narratives that contextualize the use of the material within the local culture, its intrinsic properties empirically observed over generations, and the sustainable practices of natural resource management can awaken designers' sensitivity to the cultural richness and ancestral connection with the raw material.

In addition, the incorporation of scientific knowledge complements traditional understanding with objective and measurable data. Information such as chemical composition, physical properties [resistance, durability, flexibility], as well as studies that validate or deepen traditional knowledge, provide a solid basis for innovation. This fusion of perspectives allows Amazon designers to explore the potential of materials more consciously, combining aesthetics and cultural meaning with technical performance and sustainability, resulting in creations that transcend functionality and carry a rich and relevant history.

The methodology for approaching the content of the Material Library follows the method outlined by [Manzini and Vezzoli \[2016\]](#), based on the life cycle of a product, comprising all its stages and processes, from birth to death, in relation to the environment and the actors in the production chain. It is understood that during all phases of this cycle, the product undergoes transformations and affects the environment, requiring material, energy and releasing its emissions throughout the process. The approach chosen to present the information voluntarily initiates awareness aimed at responsible production and consumption, since information about the processes and materials is made available and evaluated.

In the Material Selection process for Fashion and Design projects, the role of the UEPA Material Library is linked to supporting decision-making, so that the professional can assess the possible impacts and consequences of a product, as well as choose the message that the project aims to convey. As a way of exposing sustainability issues, information linked to traditional Amazonian knowledge was also attributed, through a confluence of indigenous, members of a quilombo community, riverside, and technical-scientific knowledge. [Figure 3](#) illustrates how the samples and technical data sheets of the materials are presented.

Figure 3. Presentation of samples and sheets with specific information



Source: Authors [2025]

The acquisition and obtaining of the samples that make up the collection are done in different ways, whether by purchasing at craft fairs, contacting manufacturers to request them, or voluntary donations through scientific expeditions and technical visits to traditional communities located in the state of Pará. In addition, samples developed in scientific initiation research, or that are the result of research in the area of materials and processes, also go through a curation process and can be part of the collection/exhibition.

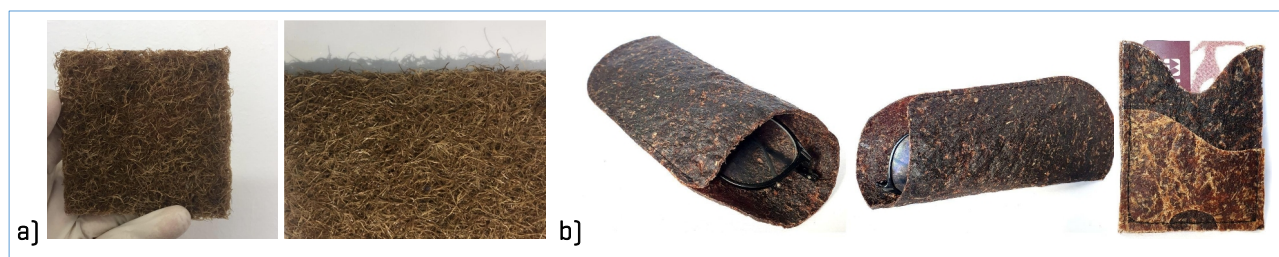
The organization that prioritizes the appreciation of raw materials, such as the display of samples in their raw form or at different stages of processing, allows visitors to have a deep visual and sensory connection with the origin and essence of natural materials and textiles. The playful and summarized presentation of technical sheets, using visual resources, infographics and even interactive installations, facilitates the understanding of the properties, applications, and stories behind each material, making learning intuitive and memorable.

In addition, providing tactile contact with raw materials is a crucial element in awakening creativity. The sensory experience of touching different textures, feeling the weight, malleability and shape of materials stimulates the imagination and evokes new possibilities of application and combination. This direct physical interaction, combined with accessible and visually appealing information, nurtures curiosity and encourages mental experimentation, paving the way for the generation of innovative ideas in design and fashion, where materiality is a central element of creative expression.

The space offers a museum-like ambiance in the act of offering to design students non-answers, but opportunities to make connections such as design and environment, design and craftsmanship, design, and biodiversity, among others. Thus, the Materioteca project contributes to the formation of this essential human capital, essential for the promotion of sustainable use of biodiversity, design being the strategic tool that will enable this transformation.

In the context of Research & Development, there are local alternatives for the use of fibers from residues from consolidated production chains in the region, as shown in Figure 4. For example, the use of Açaí fibers to produce a non-woven textile and the development of a material similar to leather, with fibers from the crown of the pineapple, for making cases, wallets, and accessories.

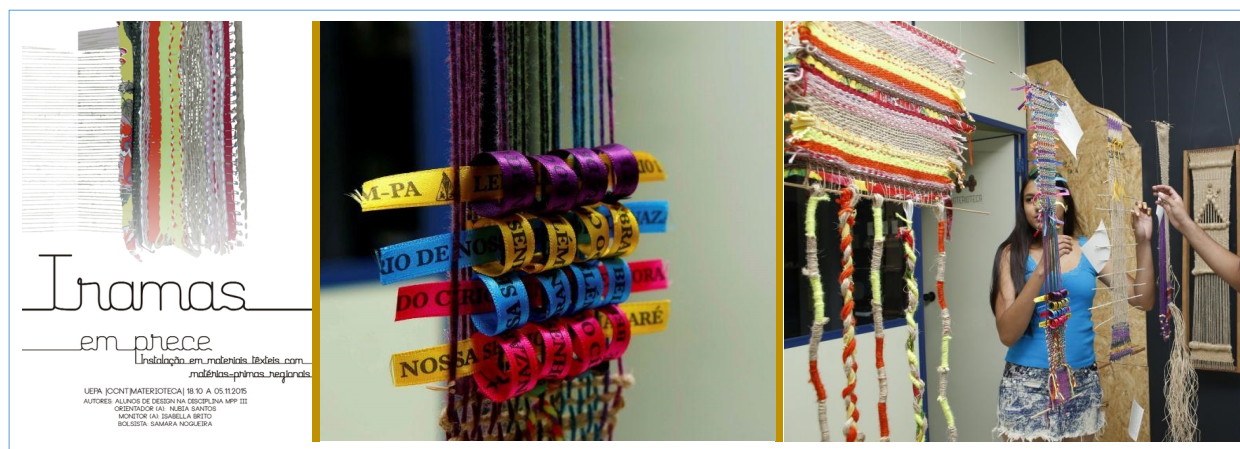
Figure 4. Materials Samples a) Non-woven with Açaí Fiber; b) Biomaterial with Pineapple Crown Fiber



Source: a) Cohen & Santos [2022a]; b) Cotta [2023]

As a cultural facility linked to artistic production and teaching, the UEPA Materials Library offers a space for exhibitions of Final Course Works (TCC) or prototypes from the Materials and Production Processes disciplines of the Design course. In October 2015, the exhibition *Tramas em Prece* [Figure 5] had as its theme the *Círio de Nossa Senhora de Nazaré*. The procession and the promises of the faithful were interpreted in pieces produced by hand, using jute threads, calico fabric, açaí seeds and miriti splints. As an attraction, visitors were invited to feel and touch the texture of the materials/art installation.

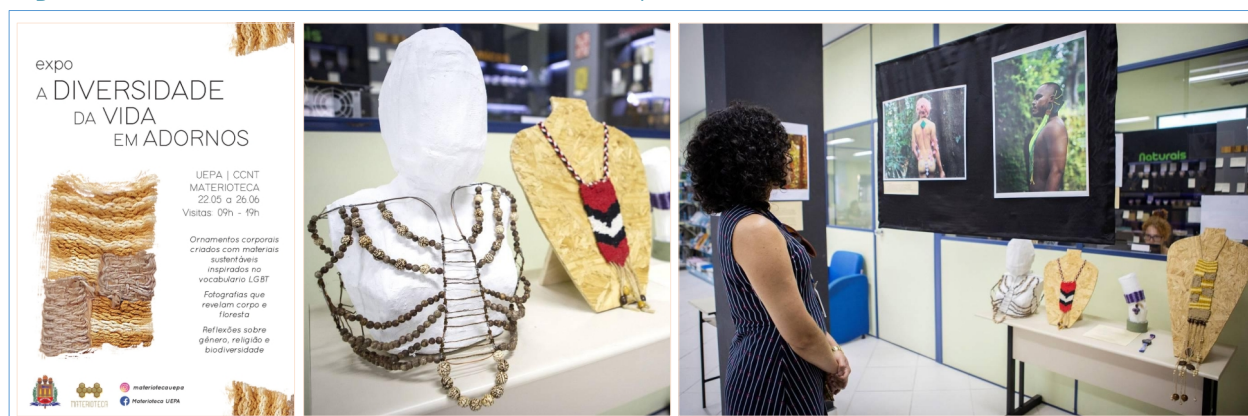
Figure 5. Records of the Exhibition “Plots in Prayer”



Source: Authors [2025]

In 2018, the exhibition *The Diversity of Life in Adornments* [Figure 6] presented two TCC results with similar themes, and conceptual projects made by the students of the discipline “Materials and Production Process I” as shown in Figure 7. The first TCC results brought together body ornaments [developed with recycled polymers] inspired by Pajubá – a dialect used by the LGBTQIAPN+ community. The second theme presented photographs that provoked reflections on the body and the forest, through African-based religiosity. Therefore, ornaments produced using hand-woven techniques, Tururi fiber, wool and natural seeds were developed and exhibited. Using alternative materials, the productions had in common the goal of providing visitors with reflections on fashion from the perspective of gender, religion, and biodiversity.

Figure 6. Records of the Exhibition “The diversity of life in adornments”



Source: Authors [2025]

While distinct in their thematic universes, both exhibitions establish a multifaceted technical-scientific dialogue on environmental, political, and biodiversity issues. They invite reflection on the context of materials, highlighting craftsmanship and repurposing practices as sustainable approaches. A notable point of convergence lies in the centrality of religiosity as a source of creative inspiration in the Northern region.

On one hand, the African matrix of Candomblé and, on the other, Catholicism, a legacy of colonization, coexist and intertwine. This intersection not only illustrates the cultural plurality of the Amazonian people but also offers a lens to analyze how cosmovisions and ritualistic practices influence artistic production and engagement with contemporary issues.

The Material Library UEPa emerges as an essential practical space for student education, going beyond mere participation in the cultural production of exhibitions. Under the supervision of the project coordinator, students are immersed in the complete exhibition design process, from the conception and creation of display units to the implementation of communication strategies, logistical organization of pieces, and the stages of assembly and disassembly. This integrated approach not only solidifies theoretical understanding by connecting it to hands-on practice but also enhances crucial skills such as critical thinking, problem-solving, project management, and effective communication, preparing future professionals for the multifaceted challenges of the job market.

For materials, inter-institutional collaboration is crucial. These partnerships optimize resources, expand reach, diversify collections, and strengthen educational programs, solidifying the subject matter as centers of learning and innovation [Akin; Pedgley, 2016]. Strategic partnerships not only optimize resources and infrastructure, but also enhance the dissemination of knowledge, the conduct of innovative research, and community engagement. They allow subject matter institutions to expand their reach, diversify their collections, and offer more robust educational programs, solidifying their role as unique centers of learning and innovation.

The institutional partnership between the Material Library UEPa and the Sector Library of the Natural Sciences and Technology Campus (CCNT) in the State University of Pará (UEPA) is a classic example of mutualistic symbiosis, where both entities (in this case, the spaces) benefit and strengthen each other. The library lends its permanent facilities to house the material library's collection, allowing the latter to have a dedicated space for organizing and

displaying its materials. This transfer is not limited to the physical infrastructure; it extends to traveling thematic exhibitions, such as those that address the life cycle of materials or innovations in biomaterials, which find a captive and engaged audience in the library. In addition, the collaboration manifests itself in the joint organization of lectures and workshops, such as the events, focusing on the relationship between sustainability and materials. All these joint practices have the primary objective of strengthening education and learning, providing students and the academic community with an enriched environment for research, innovation, and awareness about the universe of materials.

Since the space was established, the educational and recreational potential of the project and the collection has been observed among elementary school students. As a result of this experience, in 2015, the opportunity arose for a systematic itinerary, seeking to reach students from the public elementary school system [Figure 7]. Environmental education is like a process that provides people with a global understanding of the environment, which seeks to build values and develop attitudes that make them take a conscious position in relation to environmental issues.

Figure 7. Images of the Itinerant Material Library action



Source: Authors [2025]

The activities of the Itinerant Material Library project allow knowledge developed in an academic environment to go beyond the university barriers, while also being a way of giving back to the community and spreading the Amazonian sense of belonging. For high school and elementary school students, contact with samples and design/fashion products made from biodiversity materializes relationships that are often not perceived in everyday life.

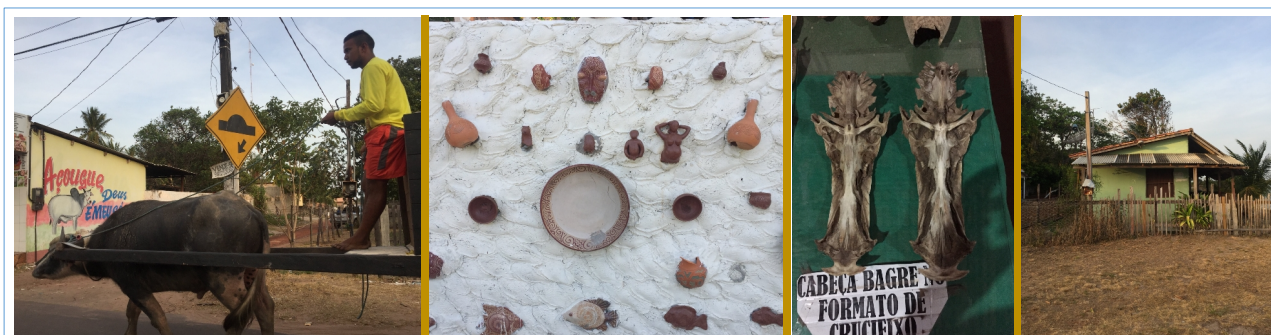
In the North of Brazil, younger students show interest in biodiversity and its conservation compared to other regions of the country, especially in relation to local animals and plants. However, educational materials distributed in Brazilian schools do not adequately address these topics [Santorelli Junior, 2023]. The curation process of the Itinerant Material Library actions is guided by a rigorous technical and scientific approach, prioritizing pedagogical contextualization in relation to the school environment, the target audience's age group, and the intersections with the participants' reality. This process aims to establish an intrinsic connection between the exhibition content and the individuals' sociocultural universe, optimizing the initiative's impact.

A central objective is to foster conscious consumption and the valorization of local resources, utilizing design as a catalyst for added value and fashion as a mirror of individuality, personal taste, and intrinsic values. This multidisciplinary approach, by integrating didactic, environmental, and socioeconomic aspects, contributes to the development of a critical perception of production processes and the role of materials in building identity and sustainability.

In an educational way and through tactile contact, it allows them to understand that, in addition to synthetic and industrialized materials, there is value in natural/forest resources. Over the years, itinerant actions have taken place in more than seven public schools and four educational events in the state of Pará, in the cities of Belém, Castanhal, Ananindeua, Paragominas, and on Marajó Island.

For higher education students, the project's context offers a unique immersion in Amazonian experiences, contrasting with the education often restricted to urban and undiversified environments found in many Design and Fashion institutions. This alternative pedagogical approach promotes "hands-on" learning, including technical visits and scientific expeditions directly within Amazon biome, illustrated in [Figure 8](#).

Figure 8. Architecture, compositions and materials found in technical visits and expeditions in Marajó Island






Source: Authors [2025]

Direct contact with nature and local communities not only enriches the understanding of bioinspired materials and processes, but also develops a critical perception of sustainability and socio biodiversity. During this process, creatives in training can observe the experiences, architecture, logistic, and aspects of daily life that make the amazonian community unique and diverse. This experience is crucial for the training of professionals capable of innovating with environmental and social responsibility, overcoming traditional paradigms and valuing ancestral knowledge and contextual solutions from the Amazon.

Putting Amazonian biodiversity on the fashion and design agenda is already being done by some local designers, however this doing as a conscious choice must be based on formal/academic knowledge, as it is provided by the undergraduate design course at the state university of Pará. Amazonian biodiversity can sometimes be seen in a generic way by the media, not reflecting on the necessary empowerment of this immense natural heritage by the citizens to whom it belongs. It is understood that the need to appropriate this biodiversity is an action that promotes understanding of the importance of its preservation and sustainable use, because you cannot preserve what you do not know.

Adherence to the Sustainable Development Goals and the commitments established in the 2030 Agenda are not completely binding on the actions of a material collection. However, it is essential that this relationship be internalized, since it is in the local context that policies and actions aimed at sustainable development are implemented. Thus, based on the initiatives indicated throughout the text, a parallel was drawn between the work of the Materioteca and the SDG agendas ([Table 2](#)).

Table 2. Relationships between the SDGs and the actions of the Material Library UEPA

SDGs	Goals set by the 2030 Agenda, related to Fashion and Design [UN, 2015]	Material Library's activities based on the SDGs/planned goals
 <p>SDG 4 [Quality Education]</p>	<p>4.1 - Ensure that all girls and boys complete free, equitable and quality primary and secondary education that leads to relevant and effective learning outcomes;</p> <p>4.2 - Ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, the promotion of a culture of peace and non-violence, global citizenship and the appreciation of cultural diversity and the contribution of culture to sustainable development;</p> <p>4.3 - Substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent work and entrepreneurship.</p>	<ul style="list-style-type: none"> - Communication of technical knowledge to a general and/or academic audience; - Support in the organization of cultural events [exhibitions and lectures]; - Participation in technical and scientific events on education; - Support the formation of critical thinking among residents of the Pará Amazon.
 <p>SDG 12 [Sustainable Consumption and Production]</p>	<p>12.1 - Promote sustainable management and efficient use of natural resources;</p> <p>12.2 - Substantially reduce waste generation through prevention, reduction, recycling and reuse;</p> <p>12.3 - Ensure that people everywhere have relevant information and awareness for sustainable development and lifestyles in harmony with nature;</p> <p>12.4 - Support and strengthen scientific and technological capabilities to encourage more sustainable patterns of production and consumption.</p>	<ul style="list-style-type: none"> - Curation of sustainable materials and products; - Support for research projects using agro-industrial waste from the Amazon; - Support for the use of renewable resources and/or clean processes in the development of academic projects and products.
 <p>SDG 15 [Life on Land]</p>	<p>15.1 - Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests;</p> <p>15.2 - Provide ways to conserve ecosystems, including their biodiversity, to enhance their capacity to provide benefits that are essential for sustainable development;</p> <p>15.3 - Integrate ecosystem and biodiversity values into national, local planning and development processes.</p>	<ul style="list-style-type: none"> - Guidance for the use of materials with low impact on terrestrial life; - Inclusion of local stakeholders in the feasibility of sustainable production processes in product and projects; - Integration of traditional knowledge with scientific research in research centers and universities

Source: Authors [2025]

By showcasing samples of natural materials from the Amazon and sustainably produced textiles, the initiative directs designers on environmentally friendly alternatives that are directly related to SDG 15. By highlighting materials from responsible forest management and recycling, the material library demonstrates the viability of using land resources in a way that protects ecosystems and prevents degradation.

The appreciation of alternative processes reinforces the importance of responsible forest management and combating deforestation, which are key elements for protecting and restoring Amazon forests and maintaining biodiversity. This perspective, which places the sustainable aspects of Life on earth at the center of the possibilities for design and fashion projects, transforms the classic perspective in which economic benefits and consumer trends are initial design premises, predominantly related to SDS 12.

As shown in the [Table 1](#), the representation of the SDGs helps to understand the commitment to placing climate change and the fight against inequalities at the center of economic policies, with the biosphere being the focus of the discussion, without which nothing else exists, and which is the basis for sustaining social and economic life. Subsequently, society is understood – which in addition to basic premises of human dignity also encompasses political, cultural, and institutional objectives – and the economy as an integral part of the other areas [[Abramovay, 2019](#)].

Although SDG 4 does not directly address possible contributions by designers to 2023 Agenda, Materioteca's work has a strong contribution to the Goal, by promoting educational initiatives for designers and non-designers, with its itinerant work being a specific example of this contribution. The articulation between the actions and the SDG guidelines allows the project to act as an academic instrument for people to think about sustainability, from the connection and preservation of Life on earth to more educational issues. Through the panorama presented in this article, it is indicated that the project has interrelations with other SDGs, such as 9, 11, and 17.

This issue reinforces a thought found in the literature, in which to achieve sustainability parameters in Fashion and Design, it is necessary for solutions to present alternatives based on broad and systemic issues in the production chain [[Thakker; Sun, 2023](#)]. Making Fashion and Design in the Amazon is much more than dressing, footwear or adorning with renewable resources from the forest.

It also means raising questions about how sustainable practices can happen and how they can be used as an instrument of empowerment for the Amazon population, in addition to realizing the importance of preserving the forest and its people for climate balance in Brazil and the world. As a way of supporting this movement, the UEPA Material Library presents itself as a facilitating link for the connections between sustainability and biodiversity.

Final Considerations

The relationship between Fashion, Design and Materials brings important reflections on sustainable development, social, environmental, and cultural responsibility. For discussions on sustainable Amazonian production, knowledge and recognition of materials, inputs, and renewable resources with potential to be used in projects are fundamental to the process. Within this context, it is also essential to acknowledge the actors involved, who possess knowledge of sustainable forest-use processes.

This text is based on a proposal to demonstrate connections related to sustainability, through a collection of Amazonian materials. By presenting the actions and the case study in relation to the 2030 Agenda, the article demonstrates different contributions of the project to investigations and activities with approaches as a tool for different educational and exhibition processes, as an academic institution for people to think about the SDGs. Bringing sustainability perspectives, concepts, and applications to the community [such as designers, students, professors, and others].

The developments of the analysis are relevant to the project in a way that offers an overview of its performance, in addition to serving as an example for other Material Library projects or similar initiatives. In addition, it reinforces the relationships between the SDGs and the performance in Fashion or Design projects. As suggestions for future work, we highlight the possibilities of analyzing the results as a teaching resource, sample organization strategies and information on the physical space linked to other sustainability indicators.

References

ABRAMOVAY, R. **Amazônia**: por uma economia do conhecimento da natureza. São Paulo: Editora Elefante, 2019.

AKIN, F.; PEDGLEY, O. Sample libraries to expedite materials experience for design: a survey of global provision. **Materials and Design**, v. 90, p. 1207-1217, 2016. DOI: <https://doi.org/10.1016/j.matdes.2015.04.045>. Available at: <https://www.sciencedirect.com/science/article/pii/S0261306915002277>. Accessed: 7 Jan. 2026.

ASHBY, M.; JOHNSON, K. **Materiais e Design**: arte e ciência na seleção de materiais no design de produto. Rio de Janeiro: Elsevier, 2011.

BAK-ANDERSEN, M. **Reintroducing materials for Sustainable Design**: Design Process and Educational Practice. New York: Routledge, 2021.

BERLIM, L. **Moda e sustentabilidade**: uma reflexão necessária. São Paulo: Estação das Letras e Cores, 2016.

CALLISTER, W. D.; RETHWISCH, R. **Ciência e Engenharia de Materiais**: uma introdução. Rio de Janeiro: Editora LTC, 2016.

COHEN, L. A. F. P.; SANTOS, N. S. S. Estudo da utilização de fibras de açaí [*Euterpe oleracea* Mart.] como material têxtil. **Mix Sustentável**, v. 8, n. 1, 2022a.

COHEN, L. A. F. P.; SANTOS, N. S. S. Materioteca: iniciativas de um museu universitário para preservação e educação da biodiversidade na Amazônia. **Muiraquitã: Revista de Letras e Humanidades**, v. 12, n. 2, p. 172-185, 2024. DOI: <https://doi.org/10.29327/210932.12.2-12>. Available at: <https://periodicos.ufac.br/index.php/mui/article/view/7878>. Accessed: 7 Jan. 2026.

COHEN, L. A. F. P.; SANTOS, N. S. S. Materioteca nas Redes Sociais: oportunidades de aprendizado em ambiente virtual na Amazônia. In: MARINHO, C. T.; BARROS, C. B. F.; NASCIMENTO, B. R. [org.]. **Pesquisa e Design**: Defuturando o Design. Fortaleza: Editora Nadifúndio, 2022b. p. 470- 486.

COTTA, M. G. C. **A utilização de resíduos da cadeia produtiva do Abacaxi para produção de um material têxtil sustentável**. 2023. Trabalho de Conclusão de Curso [Graduação em Desenho Industrial] – Universidade do Estado do Pará, Belém, 2023.

DEL CURTO, B.; BERTOLDI, C. A. Materiotecas: instrumentos para inovação. //n. DANTAS, D.; DEL CURTO, B.; BERTOLDI, C. A.; MIRA, M. R. C. **Materiais para a economia criativa: pesquisa em design**. São Paulo: FAUUSP, 2018.

GIL, A. C. **Como elaborar projetos de pesquisa**. São Paulo: Editora Atlas, 2016.

GRANSKOG, A.; LAIZET, F.; LOBIS, M.; SAWERS, C. **Biodiversity: The next frontier in sustainable fashion**. [S. l.]: McKinsey & Company, 2020.

MANZINI, E.; VEZZOLI, C. **O Desenvolvimento de Produtos Sustentáveis: os requisitos ambientais dos produtos industriais**. São Paulo: Editora da Universidade de São Paulo, 2016.

SANTORELLI JUNIOR, S. Promovendo a Conservação da Biodiversidade Amazônica através de Livros Educativos Bilíngues [Português E Tupi-Kagwahiva]. **Revista Ensino de Ciências e Humanidades-Cidadania, Diversidade e Bem Estar-RECH**, v. 7, n. 2, p. 112-125, jul./dez. 2023. Available at: <https://periodicos.ufam.edu.br/index.php/rech/article/view/12889>. Accessed: 7 Jan. 2026.

SANTOS, N.; MENDES, J.; OLIVEIRA, S.; ROCHA, R.; GOUVÊA, R. Implementação de uma Materioteca no Centro de Ciências Naturais e Tecnologia da UEPA: a busca do conhecimento para inovação e sustentabilidade. //n. CONGRESSO BRASILEIRO DE PESQUISA E DESENVOLVIMENTO EM DESIGN, 10., 2012, São Luís. **Anais [...]**. São Luís: EDUFMA, 2012.

SILVA-NETO, S. L.; LEITE, B. S. Design Thinking aplicado como metodologia para a solução de problemas no ensino de Química: um estudo de caso a partir de uma problemática ambiental. **Ciência & Educação**, Bauru, v. 29, e23043, 2023. DOI: <https://doi.org/10.1590/1516-731320230043>. Available at: <https://www.scielo.br/j/ciedu/a/t7X76FWV8TDL5JLVyBLnR4h/>. Accessed: 7 Jan. 2026.

THAKKER, A. M.; SUN, D. Sustainable Development Goals for Textiles and Fashion. **Environmental Science and Pollution Research**, v. 30, pp. 101989-102009, 2023. DOI: <https://doi.org/10.1007/s11356-023-29453-1>. Available at: <https://link.springer.com/article/10.1007/s11356-023-29453-1>. Accessed: 7 Jan. 2026.

UN. United Nations Organization. **United Nations General Assembly, Transforming our world: The 2030 Agenda for Sustainable Development**. Rio de Janeiro, 2015.

WDO. World Design Organization. **United Nations Sustainable Development Goals**. Montreal, Quebec: WDO, 2020. Available at: <https://wdo.org/about/vision-mission/un-sdgs/>. Accessed: 2 Feb. 2025.

ADDITIONAL INFORMATION

HOW TO CITE THIS ARTICLE ACCORDING TO THE JOURNAL'S GUIDELINES

ABNT: COHEN, L. A. F. P.; SANTOS, N. S. S. Sustainable futures, the role of material library in fashion & design education. *Revista Vértices*, v. 27, n. 3, p. e27323546, 2025. DOI: <https://doi.org/10.19180/1809-2667.v27n32025.23546>. Disponível em: <https://editoraessentia.iff.edu.br/index.php/vertices/article/view/23546>.

APA: Cohen, L. A. F. P., & Santos, N. S. S. [2025]. Sustainable futures, the role of material library in fashion & design education. *Revista Vértices*, 27(3), e27323546. <https://doi.org/10.19180/1809-2667.v27n32025.23546>

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FUNDING SOURCE

The authors declare no funding source.

ETHICS COMMITTEE DECLARATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare no conflict of interests.

DATA AVAILABILITY DECLARATION

Not applicable.

DECLARATION OF AI USE

The authors declare that the paper was written without the use of any generative artificial intelligence tools.

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PUBLISHER'S NOTES

Essentia Editora, Publisher subordinate to PROPPIE of the Fluminense Federal Institute of Education, Science and Technology. The content and opinions expressed in the manuscript are the sole responsibility of the author [s].

NOTES

 This text is the result of a research work originally presented by the authors at ENSUS 2025 - XIII Encontro de Sustentabilidade em Projeto - UFSC - Florianópolis - July 30th to August 1st, 2025. The article was selected by the Scientific Committee of the Event to compose special editions of scientific journals and was approved to compose a Thematic Dossier of Revista Vértices.