Article

Design Archives: Sustainable Solutions for Young Designers in Valencia, Spain

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Abstract: Design education is practical and theoretical; however, it does not usually include the study of cultural heritage. Nonetheless, relations with academia have been strong since the 18th century, when the need to educate designers spread across the continent to improve design and make it competitive in the market. In this paper, we recover that spirit and act as mediators between heritage and young people to create links and preserve cultural heritage. A case study was conducted at the Public Valencian Design School with 31 product design students. The methodology applied was based on iterative processes that allowed students to discover design and silk heritage when they proposed innovative ways of approaching it. A qualitative survey was used to evaluate the case study. The results showed that students increased their appreciation for cultural heritage (by more than 90%) as well as their willingness to preserve it and reuse it in their future creations. Collaboration between cultural heritage and design might foster sustainable conservation and mark the future steps of ongoing collaboration.

Keywords: design; creative culture; innovation; cultural heritage; sustainable heritage

1. Introduction

In recent decades, there has been an increase in teaching heritage practices, mostly at primary and secondary levels. Traditionally, this has focused, in the best-case scenario, on its elements, typologies, or styles, rather than on its context, processes, dynamics, and importance not only for the past, but also for the present and the future. On the other hand, heritage education models seek to adapt to the current demands for Information and communication technology (ICT) resources. For instance, computer-generated graphics can be used to explain the evolution of archaeological and cultural landscapes through augmented reality [1], the georeference of cultural heritage assets [2], and ICT applied to archaeology [3]. In this regard, cultural heritage education has traditionally been the subject of methods that have evolved from Recommendation R (98) 5 to the Member States on Heritage Education [4], which calls for heritage education to be based on cross-cutting approaches, as well as a partnership between the fields of education and culture that employs the widest variety of modes of communication and expression. In Article 13, the FARO Convention [5] states that countries should facilitate the inclusion of cultural heritage in education, not necessarily as a subject of study in its own right, but as a source for other subjects. Recently, the European Commission has demanded the integration of cultural heritage in the New European Bauhaus as a means of connecting creative industries with their past.

Research has contributed to establishing a participatory vision of cultural heritage and heritage education as the basis for building identities, critical citizens, and social cohesion [6]. In this regard, Santacana and Martínez Gil [7] have emphasized the importance of the emotional factor and its relationship with cultural heritage, simultaneously establishing that this factor is primordial and decisive concerning didactics and the dissemination of

heritage elements. According to these authors, emotional factors are widely present in the learning process based on the use of cultural heritage. In this learning process, empathy and surprise play a fundamental role in the generation of knowledge capable of interconnecting people from different social and cultural realities, but at the same time do so from the experience of the persona. Participatory frameworks can be traced from workshops to exhibitions, creating a variety of practices in an already-complex domain.

On the other hand, sustainable design is gaining strength at a time when sustainable development is of the utmost urgency to mitigate the damage of climate change, reduce the gender gap, and provide families with fair housing—in short, to share resources equitably, as the Sustainable Development Goals (SDGs) remind us. Designers such as Bonsiepe [8], Papanek [9], and Roman [10] have formulated theories and practices around them. Papanek's approach emphasizes the importance of designing products and systems that are socially and environmentally responsible and meet the needs of all people, including those who are often marginalized. Papanek [11] in his book *Designing for the Real World*, wrote that "the designer must be aware of his moral and social responsibility. For design is the most powerful weapon man has been given to shape what he produces, his environment, and by extension, himself; with it, he must analyse the consequences of his actions, both in the past and in the foreseeable future [. . .]design must be an innovative, highly creative and inter-disciplinary tool that responds to the real needs of man. It must be research-oriented, and we must stop dishonouring the earth itself with poorly designed objects and fabrications". Indeed, recent studies show that design education can be re-contextualized to generate social change at the same time it stimulates collective production [12]. In this regard, higher education plays a vital role in supporting the implementation of sustainability initiatives in design practices such as fashion, product design, and jewelry design.

Currently, Donald A. Norman's *Emotional Design* [13] determines the importance of cultural transmission in product design through three values: visceral, behavioral, and reflexive; that is, the form and its attractiveness, the function and interaction with the user, and the closely related culture that a product transmits. The personal memories it evokes, the meaning it conveys, and its beauty, provided by conscious reflection and experience, are influenced by knowledge, education, and culture. Finally, prestige is perceived as out of the ordinary and exclusive. These are all values that form part of the material culture of silk and that we develop in the projects we conduct.

Teaching cultural heritage to design students is essential because it helps them develop a deeper understanding and appreciation of the historical and cultural contexts in which they work. For designers, studying cultural heritage can provide a rich source of inspiration and creativity, as well as help them to develop designs that are more meaningful, relevant, and responsive to the needs and desires of diverse communities. By learning about the cultural heritage of different groups, designers can develop a more nuanced and empathetic understanding of their perspectives and experiences, which can inform their design decisions and help them create products and environments that are inclusive and respectful. Additionally, teaching cultural heritage to design students can also help promote the preservation and conservation of cultural resources. By learning about the importance of cultural heritage and its significance to different communities, designers can become advocates for the protection and promotion of cultural resources, and work to develop designs that support and celebrate cultural diversity.

Literature shows some examples and projects that incorporate the teaching of cultural heritage into design education. Such is the case of Indigenous Cultural Heritage and Design, a course offered at the University of Alberta [14] that focuses on the intersection of indigenous cultural heritage and design. Through case studies, guest speakers, and hands-on design projects, students learn about the importance of indigenous cultural heritage and how it can inform and inspire contemporary design practices. This course covers topics such as indigenous identity, community-based design, and cultural appropriation. Another example is the course Designing for Cultural Sustainability at the Rhode Island School of Design [15], where students are tasked with designing a product or system that promotes

cultural sustainability in a particular region or community. The project requires students to research the cultural heritage and environmental context of their chosen community and develop designs that reflected those values and needs. The resulting designs have included a sustainable fishing system that incorporated traditional fishing practices and materials, and a textile production system that supported local artisans and traditional weaving techniques. The Design for the Third Age, at the Glasgow School of Art in Scotland [16], involves students designing products that support the health and well-being of elderly people. The project focuses on traditional Scottish crafts and incorporates cultural heritage elements such as tartan and tweed in the product designs. The Craft and Design for Social and Economic Inclusion, based at the Estonian Academy of Arts in Tallinn [17], promotes social and economic inclusion through the design and production of traditional Estonian crafts. Students work with local artisans and craftspeople to learn traditional techniques and create products that reflect the Estonian cultural heritage. These projects and initiatives demonstrate the diverse ways in which cultural heritage can be incorporated into design education in Europe, from product design to urban interventions to social and economic inclusion.

For this paper, we will focus on the relationship of three elements: design education, cultural heritage, and technology. Few studies have combined these elements. To fill this gap, two projects led by the Universitat de València have joined forces to preserve this heritage. The European SILKNOW project (funded by H2020) that conserves and promotes silk European heritage [18], and the Arxiu Valencià del Disseny [19], a local Valencian project that conserves and disseminates Valencian designers' archives. Both have at their core the ability to preserve cultural heritage, acting as mediators between archives and museums in creative industries.

This research aimed to break the dichotomy between the real world and the educational world by involving cultural heritage in educational design courses to act as inspiration for tomorrow's designers and find concrete applications in the field of design, industry, and technology. In short, this paper aims: (1) To demonstrate that cultural heritage (CH) can be a source of innovation; (2) To describe a case study from Valencia with designers, technological tools, and cultural heritage, following Papanek's theories; and (3) To present the results of such a case study. Although we report conclusions from a small group, our findings revealed interesting outcomes. First, we prove that students can play a significant role in solving real-life problems; Second, we demonstrate the potential that cultural heritage has as a source of inspiration to young generations of designers; Third, how the interaction between sustainable design and cultural heritage can improve local communities and how these experiences can be further exploited.

This paper is organized as follows: first, we introduce the current state of the art on how silk heritage has been part of design schools and how cultural heritage is part of sustainable development. This section is followed by the presentation of our case study at the Design Ideas Lab, where we explain the methodology followed by this course and its liaison with two projects, especially with SILKNOW and its tools. Next, we showcase the results obtained, including a brief questionnaire about how the students received this experience. The last section includes the discussion, suggestions for future research, and conclusions.

2. State of the Art: Sustainability from Silk Heritage to Design Schools

2.1. From Silk Heritage to Design Schools

Textile conservation has produced small- and medium-sized museums with few possibilities and resources for transferring the importance of the heritage they treasure to society. Nevertheless, silk remains a living heritage that is part of the craft traditions of major Mediterranean cities that participated in the cultural and technological innovations communicated through the Silk Road. Far from being a heritage that only belongs to history and serves the museum to relate to the artistic and aesthetic tastes of our ancestors, silk is still alive in small family businesses that survive with difficulty. They are linked to this

heritage as they are custodians of significant know-how and innovation applied to textile design, which sometimes refers to the aesthetic formulas of the past [20].

Silk heritage can be considered both tangible (fabrics, textiles, tools, looms, etc.) and intangible (knowledge, techniques), but above all, it has had continuity over time and still maintains connections with the community that created it [21] and responds to what is currently called "living heritage". This theoretical approach makes continuity the main factor, specifically, continuity within each culture and society [22]. Within this process, the community allows such continuity; it is those who develop connections to their heritage. Cultural values enable innovation, development, solidarity, and the participation of citizens in making important decisions, such as the protection and preservation of tangible and intangible cultural heritage. Such decisions might also be made thanks to the impulse of small- and medium-sized cultural industries. As stated in the OECD report on the role of culture and creative industries in the economy [23], culture and creativity also have an enormous impact on social cohesion and development, especially as drivers of creative ideas for future generations.

As shown in the following sections, we intend to follow this approach. To connect with young people as a part of the community, we showed them their heritage. In reality, most museums are small. Because of their reduced resources, they are affected much more than big museums by the current global economic crisis. In some European countries, most museums are financially dependent on local governments (which sometimes results in less autonomy in the production of digital content). Digital technologies, however, offer new solutions at affordable costs [24].

Since the 18th century, when the question of "a good designer" was at the heart of the concerns of the silk market, designers had a fundamental role in the creation of fashion trends. Consequently, this issue created schools for the artistic training of designers in industrial arts, including those from Paris, Marseille, and Lyon, where the economic and commercial conditions were combined with the desire to renew artistic creation [25]. L'école Gratuite de Dessin was founded in Lyon in 1756, where academic teaching was intended not only for painters and sculptors but also for craftspeople who were educated in geometry, architecture, figures and animals, flowers, and ornaments, contributing to the emergence of a new generation of artists, some of whom would work for the textile industry [26]. In this school, freehand design and the subsequent transfer to technical drawings were taught. In some cases, even the threads that were supposed to be used and the colors that would be used in silk fabrics were noted.

The need to educate designers has spread across the continent to improve it and make it competitive in the market. In fact, one of the most outstanding inheritances of Lyon was the system itself, which was spread across Europe. In the case of England, in 1754, the English Society of Arts was founded to compete with goods coming from France; this society became the Royal Academy in 1768, focusing on the arts of design [27]. Nevertheless, many designers were trained in non-official schools leading to the publication of several manuals for didactic purposes including *Youth's Guide to drawing of foliage* (1740), *A New Drawing Book of Ornaments, Shields* (1746), both by Matthias Lock, or *A New Book of Ornaments for the Instruction of those Unacquainted with that Useful Part of Drawing by Copland and Others* (c.1758). In Spain, the Real Academia de San Carlos de Valencia was founded in 1768, and two years later, the Sala de Flores, which was involved in the study of designs applied to silk fabrics, and later became by royal order the Escuela de Flores y Ornatos, directed by Benito Espinos, who maintained relations with other academies and, in particular, with their floral studies, including those of Madrid, Murcia, Valladolid, Zaragoza, and Barcelona [28]. The teaching system involved copying directly from nature during the months of Spring and Summer, while the rest of the year, students copied archaeological models from antiquity: Acanthus, rocailles, festoons, etc., or specifically grotesques or the Renaissance lodges of Rafael de Urbino. In Spain, it was also common to be inspired by the archaeological remains of Pompeii and Herculaneum through the copy

of the models recorded at *Le Pitture antiche d'Ercolano e contorni: Incise con qualche spiegazione* (Napoli, 1757) of Ottavio Antonio Baiardi under the patronage of Carlos III himself.

It was in the 19th century when textile design studies were permanently separated from academies and became schools of arts and craft and later, just design schools. In England, in 1837, Government Schools of Design were founded with the aim of improving the education of designers on the assumption that if it improved, the British industry would improve [27]. The arts and crafts movement which aimed to recapture the pre-industrial spirit of medieval English society insisted on the idea that a designer must be an artist and craftsperson, returning to the manual elaboration of the arts [29] and seeking inspiration from English sources, often consulting the collection of the Victoria and Albert Museum, which was founded as a repository of art objects intended to serve as inspiration for the design community. From that moment, the models used came from different sources; among them, it is worth mentioning the one from Désiré Guilmard, entitled *Les Maitres Ornemantistes. Dessinateurs, Peintres, Architectes, Sculpteurs et Graveurs. Ecoles Francaise, Itallienne, Allemande et des Pays-Bas* (Flamande & Hollandaise), published in Paris in 1880. From that moment on, a multitude of teaching methods and ornamental designs emerged, such as the *Colección de modelos para la enseñanza del dibujo. Aplicable las Artes, Oficios e Industrias* (c. 1869) of Jaume Serra i Gilbert, which taught about floral motifs.

In short, museums, industries, fine arts academies, and other cultural heritage institutions, are guardians of these important tangible heritage sites but are also linked to the continuous teaching and evolution of design. In this regard, one of the most important factors to be taken into account is education, the transmission and dissemination of the knowledge we have to contribute to the creation of cultural identity, since having an awareness of origins means that when the individual is an adult, he or she will be able to share values, customs, and ideas with other cultures in a way that guarantees an understanding of what is different [30]. If we go a little deeper, and following Pérez and Alagarda's text, through heritage education we are democratizing the cultural assets themselves, making them available to society as an instrument for developing its knowledge, and turning them into the main tool for protecting our heritage [31].

2.2. Design Schools and Sustainability

Considering design industries as part of the current trade market, it is necessary to understand the cultural heritage linked to today's societies. These experiences can be traced to the beginning of the first museums, from which the Victoria and Albert stands out [32]. Their collection is based on the importance of historical design for developing in the present, and economic, social, and cultural innovations that open new horizons for the future. In this sense, museums, as permanent laboratories, are one of the main sites of research activities worldwide, especially in collections dedicated to design or crafts such as ceramics. Recently, there have been excellent initiatives in the field of industrial heritage. This objective was first mentioned in the European Route of Industrial Heritage [33]. This route emerged in 1999 owing to the need to connect European industrial locations and create a network of thematic routes from different sectors, such as textiles, iron/steel, and mining. This itinerary was generated under the precept that, from its beginning, industrialization was a transnational process, which was not limited to specific countries or regions, and transformed the cities and landscape of many European territories, forming an international, closely intertwined network of European industrial regions.

In this sense, our perspective is broader and embraces the values defended by the Council of Europe for cultural itineraries, understanding design as an integral history of the industrial age, its forms of life, and its associated values [34].

This approach to the value of industrial heritage for developing current societies is interesting: "Industrial Heritage is more than just industrial buildings and machinery, that is, the "tangible" tangible remnants of industry. It also includes the complex knowledge of running and maintaining machines of numerous techniques and skills as well as of sector-specific social routines and intangible heritage" [35]. Therefore, at its 2020 Annual

Conference in Oberhausen, the main theme was "Keeping the wheels turning. Making industrial heritage fit for generational change". The interest of the experience did not consist of the presentation of broad theoretical frameworks, but in practical examples of preserving and passing on the knowledge of first-generation employees from different countries [36]. This logic is the one proposed by many museums that escaped the traditional conception of museums. This is especially significant in contemporary art museums, but also in museums whose main objective is to safeguard a living and intangible heritage linked to design or craft processes in their different dimensions. As creative spaces appear in museums [37] like a small laboratory, the concept of the MuseLab emerges. As a laboratory created around the principles of design thinking and proposals for emergence and opening, the MuseLab is truly a space for experimentation and practice, and breaks the rules for the sake of learning, innovation, and discovery. Although this logic escapes the conventional museums, museums such as the Prado Museum (Spain) have generated content in this sense, such as the MediaLab (today in Matadero, Madrid), which was conceived as a citizen laboratory for the production, research, and dissemination of social and cultural projects that explore the forms of experimentation and collaborative learning that have emerged from digital networks [38].

On the other hand, design schools in general, and the Escola d'Art i Superior de Disseny (EASD) in particular, are currently applying methodologies in which they involve their students in sustainable development. For example, following their methodologies on social design and on self-produced furniture, open codes, and social innovation, students of Product Design at the EASD have developed various proposals to respond, through design, to the needs of groups at risk of social exclusion, such as the ECO design container [39]. The bases of the project are the reuse of materials, sustainability, low production costs, and adaptation to minimum space. Education for sustainability aims to develop "competencies that enable individuals to participate in socio-political processes and hence to move their society toward sustainable development" [40].

Teaching sustainable design is the key to creating better societies. It was not until the end of the last century that sustainable considerations began to appear in design practices. These practices include sustainable products and service design, including environmental, economic, and social criteria [41]. Training students in sustainability means making them responsible for creating a better world. To achieve this, design education must provide students with tools and skills that activate their critical thinking as well as their role as agents of sustainable development [42].

Students should acquire skills in the three pillars of sustainability (social, economic, and environmental), know how those skills are interconnected, and how they will apply their eco-design strategies to address current issues [43]. Education for sustainability seeks to train students not only in product development but also in how to reduce their impact while producing them, that is, to be sustainable from product conception, its materiality, durability, recycling, reuse, etc. [44]. In short, it means to be sustainable from a project's inception while considering how it will have an economic and environmental impact on society. To this end, sustainable practices must be integrated into design education curricula.

In this sense, design schools, specifically the Escola d'Art i Superior de Disseny de València, work on the basis of craftsmanship, whose processes and materials are sustainable by nature, reviewing new functionalities and forms that allow them to adapt to the current needs of the habitat and other environments. Richard Sennet [45] determines that craftsmanship is defined by a series of capacities: 1. Ability by the development of dexterity; 2. Motivation, wanting to do things well, to evolve; 3. Talent: The ability to learn and develop an activity well. Understanding the technique and material allows students to design new technologies while maintaining the essence of the product and transmitting a story from the ancestral knowledge of craftspeople.

The methodologies used in the classroom for product development inherently include sustainability and social responsibility in their processes. The Bauhaus School of Design (Germany, 1919–1933), in its discipline of the design process, proposed a renewal of the for-

mal and social potential of design, maintaining a utopian idealism in which design should reach social housing through furniture and refined objects produced with new technologies. Hans Meyer, the architect who directed the Bauhaus school in Germany between 1928 and 1930, proclaimed a social definition of architecture and design: "the designer, as a planner and creator, must satisfy the needs of society with coherent, convenient, and appropriate products" [46].

After the Second World War, the ULM design school (1954–1968) continued with Meyer's principles of prefabricated construction, systematic reflection on problems, analytical and synthetic methods, foundations, and choice of design alternatives. In this context, Gui Bonsiepe (who trained at the ULM school and ended up teaching there) states in his book *The Design of the Periphery* [47] that "industrial design is an instrument of action and even of social transformation, directly benefiting the majority of the population according to an equitable, less dualistic model".

On the other hand, helping students face real challenges helps them get in touch with the world they live in. Curricular interaction with society is a methodology that is not alien to design [48]. In this sense, unifying this methodology with sustainability education will result in designers of the future taking into consideration various factors to make the world a more equal place.

All this is to say that to succeed with measures and policies applied to the conservation of design heritage, we must depend on education and training. New experts, artisans, and producers who conserve the silk industry, but also society in general, emphasize efforts on the young public since as they grow up, they will be new transmitters of knowledge; therefore, the impact that we seek to have on society can be achieved by working with them [30]. By engaging with cultural heritage in their design practices, students can develop a deeper understanding and appreciation of the cultural values and traditions of diverse communities and create designs that are more inclusive, sustainable, and socially responsible.

Hence, designing for sustainability means acquiring holistic approaches at different stages of product or service development. Modern and sustainable design education must understand that creation and implementation should work together to make it an iterative process. We strived to implement this in teaching practices, and it was only possible thanks to the interdisciplinarity of the team formed by art historians, designers, and technologists, as shown in the following section.

3. Design Ideas Lab: Learning Sustainability Models in Design Schools

3.1. Design Ideas Laboratory

For the purpose of this paper, we will present the work carried out during the 2020–2021 course at the Design Ideas Laboratory. This course allows students to manage real projects through direct collaboration with companies and institutions. These projects are managed in the same way as in a real design studio; therefore, students experience designing for clients in the real world. The students who participated came from any of the six specialties of the EASD Valencia: Product Design, Interior Design, Graphic Design, Fashion Design, Photography and Audiovisual Media, and Jewelry and Objects.

Acquired knowledge helps students set guidelines for their professional futures. The Design Ideas Laboratory provides a global vision of the designer's role today in an interdisciplinary studio, the most common working methods, how teamwork is managed and distributed, the distribution of responsibilities among its members, the research and development of new concepts, and the communication of projects.

Through educational experiences, we contextualize the use of silk in the social and cultural environment of the community and present it from the current perspective, considering the need to maintain this cultural heritage. When it comes to design education, it must be taken into account that it is both a practice and an academic discipline [49] with multiple parameters, and changes according to society.

Designers must take part in global challenges as they can shape our world. In this regard, we must recall the 17 Sustainable Development Goals (SDG) proposed by the UN in 2015, which are an urgent call for action by all countries to tackle issues such as climate change, access to education, elimination of the gender gap, and access to food, among others. Educational institutions are not unrelated. In fact, they should implement them in their curricula to make the younger generations aware of the problems we face. Hence, designers must acquire knowledge from community know-how. In this sense, we need these didactic methodologies to re-contextualize a traditional craft in the moment in which we live. It is at present that we choose to continue our tradition, out of social will, and not out of nostalgia. This is the sense in which we will work throughout our educational experiences, giving the activity a present and not a past character [31].

3.2. Methodology

The working methodology adopted by the Design Ideas Laboratory is based on creative research in phases that progress in the style of a vortex, circling around the problem posed and moving from an open approach, in successive phases, toward concrete and closed final proposal. Design thinking requires iterative experimentation [50], especially for companies that cannot afford to lose resources while innovating. Design thinking is a problem-solving approach that involves understanding users' needs, exploring possible solutions, and creating prototypes to test and refine ideas. Iterative experimentation is a core aspect of design thinking, which means that the process of designing and testing ideas is repeated repeatedly until a satisfactory solution is found.

Iterative experimentation involves creating a prototype, testing it with users or stakeholders, gathering feedback and data, and using that feedback to refine the design. This cycle is repeated multiple times, with each iteration building on the insights and knowledge gained from the previous one. The aim is to identify and solve problems, refine ideas, and improve the final design based on user feedback.

By embracing iterative experimentation, designers can avoid the pitfalls of making assumptions and assumptions about what users need, which can lead to solutions that do not meet the actual needs of the users. Instead, the iterative process allows designers to refine their solutions based on feedback from users and stakeholders, leading to designs that are more user-centered and effective.

In this regard, our methodology is based on iterative processes to allow students to commit failures and react to challenges. By embracing experimentation, designers can create solutions that are more innovative, user-centered, and effective. This methodology was applied during the entire study conducted with SILKNOW and the Arxiu Valencià del Disseny. These phases were:

(1) Initial Phase—Research on the topic
Background research.
Analysis of the sectors of relevant contests, products, and brands.
Analysis of trends in sectors.
Briefing outline.
(2) Conceptual Phase—From briefing to idea
Application of tools for planning, research and assessment (Gantt chart, data collection techniques, background studies, morphological tables, market research, etc.).
Elaboration of the briefing.
Establishment of the design plan (planning of times and tasks).
(3) Ideation Phase—From the idea to the proposal.
The application of tools for ideation (sketches, concept maps, etc.) for data analysis (comparative tables, market studies, etc.) for evaluating ideas for improvement (flow chart, SWOT, function tree, etc.).
The application of tools for improvement and strategy in eco-design).

The application of creative tools (creativity techniques, representation techniques, etc.), visualization, and verification tools (physical and virtual modelling, mock-ups, and design support software).

The application of tools for communication of proposal.

(4) Development Phase—From proposal to object/product.

Tools for the formalization of solutions, visualization, verification, evaluation, and representation (planimetry and rendering).

(5) Communication Phase—Communication of each phase

Application of tools for project communication and presentation

During Phase 1, the University of Valencia (UV, representing both projects) acted as a "client" and asked students to improve their tools and/or to create dissemination strategies. Researchers also took advantage of Valencia as Design Capital, a year-long program that occurred in Valencia, Spain, in 2022. The program was part of a larger initiative by the World Design Organization (WDO) to designate a city as the "World Design Capital" every two years, with the aim of promoting design as a tool for social, cultural, and economic development. As the designated Design Capital of 2022, Valencia hosted a series of events, exhibitions, and activities throughout the year, showcasing the city's design talent and promoting the use of design as a means of addressing social, environmental, and economic challenges. Valencia Design Capital promoted Valencia as a global hub for design, attracting visitors, businesses, and investors in the city's design talent and expertise. The program also aimed to promote collaboration and knowledge sharing among designers, businesses, and other stakeholders, with the goal of advancing design as a tool for positive change. In this regard, UV researchers used silk and its various applications in design as a starting point to explain its connections with heritage sites.

First, UV researchers explained to design students how silk designs have evolved according to the fashion and traditions of each country. However, the history of European silk is closely intertwined, and designs have been copied and reinterpreted in different areas and periods, making it difficult to identify dates and places of production. From the *menaux* style in the 15th century to *chinoiseries* or art deco textiles, silk designs have evolved according to the fashions, technology, and tradition of each era. Furthermore, the tradition of silk design, as well as the study of silk design applied to design in general, has been maintained for the last three centuries. SILKNOW and the Arxiu Valencia del Disseny (AVD) maintain this tradition by bringing silk back to design schools with the aim of, on the one hand, recovering this spirit and, on the other hand, acting as a mediator between heritage and young people in order to create links and thus preserve this important European heritage.

To do so, UV researchers explained on the one hand the digital tools provided by the SILKNOW project and, on the other hand, the archives related to silk held in the Arxiu. Related to the digital tools, we showed them the following: (1) A virtual loom [51] that acts as a digital memory of silk heritage as it preserves historical weaving techniques, most of which are known only by artisans who have kept this ancestral know-how alive. It conserves and documents several weaving techniques owing to its 3D visualization, which allows us to understand the interlacement between wefts and warps by applying the necessary restrictions for each technique. Therefore, VL shows these techniques in real life. (2) ADASilk [52] (Advanced Data Analysis for Silk Heritage), which integrates an exploratory search engine and a spatio-temporal map, is built on top of SILKNOW's knowledge graph that contains nearly 40,000 fabric entries with images and other relevant information describing them (e.g., production place, production timespan, material, technique, etc.). (3) A Silk Heritage Thesaurus [53], a tool that enables either those interested in fabrics or researchers who should contrast those local terms found in the archives and items they study, to understand the international significance of silk. Furthermore, it constitutes a relevant resource for museums and collections when working with catalogues and fabric goods, with the aim of standardizing these inventories. (4) STMaps [54], which browses silk-related objects, discovers interesting relationships between different objects, and shows the versatility and

power of the different visualization tools. (5) Educational Materials [55]—the Silk Route, which has been specially designed for learning Spanish through different aspects related to silk in Europe. The aim of its publication in the SILKNOW portal is to disseminate our cultural heritage and highlight the cultural exchanges involved in the production and trade of silk.

As per the collection of the Arxiu Valencia del Disseny (Figure 1a,b), we showed them the collections of the college of interior designers (Valencian area), whose collection holds archives from designers such as José Arrufat, José Martínez Peris, Rafael Tamarit, Armando Munuera, or Pepe Blanquer, to mention a few. However, we also included archives that range from the 19th century in art deco styles on luxury furniture and silk tapestry. The AVD holds a collection from the 19th century, passing through Nordic styles of furniture and the Californian style that fused European rationalism and American organicism, to the 1980s urban and casual aesthetic and the 90s small-scale interior spaces and ephemeral architecture, which had been practically abandoned due to the large number of new public works constructions.

(**a**) (**b**)
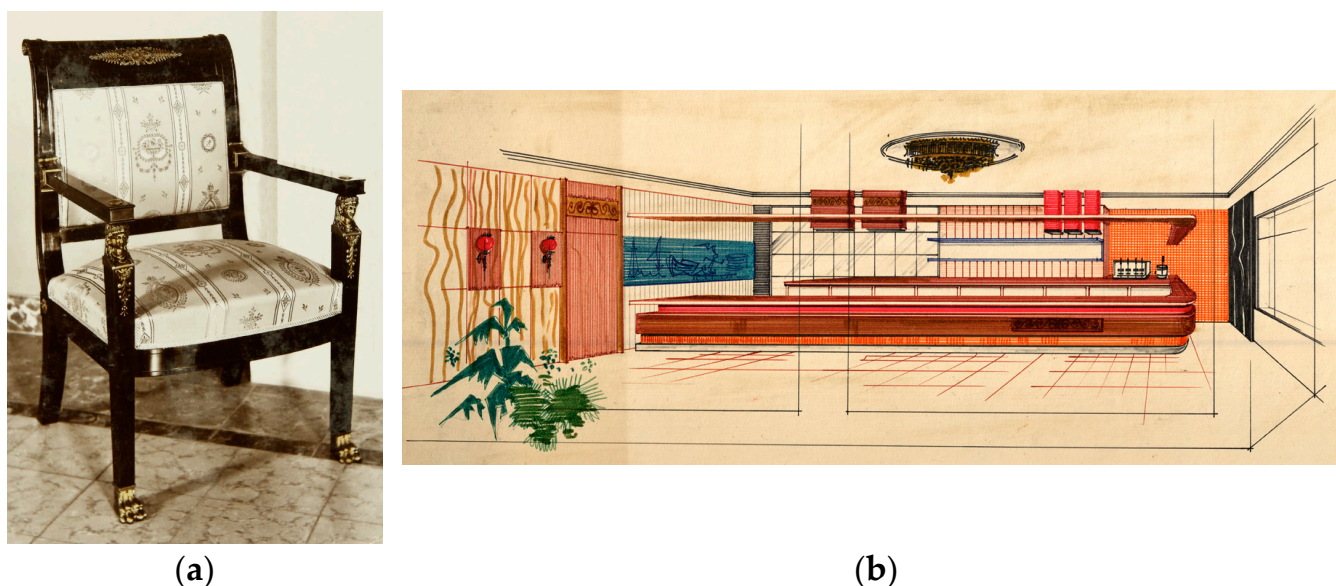
Figure 1. (**a**) Louis XV style armchair. Armchair with legs slightly in cabriolet cut wood with backrest and seat upholstered with floral patterned fabric. Mariner, 1939–1950. (**b**) *Cafeteria 'Gran vía', Elche.* Armando Munuera (ca. 1975), ink on cardboard.

In short, we talked to students about silk history, focusing on its motifs, techniques, and importance in Europe. Here, we had a particular focus on Valencia to connect them with their local heritage sites. We sought to disseminate knowledge to lay the foundation for the interpretation of this activity in its current context, as education helps lay these foundations. Through interpretation comes understanding and knowledge, through knowledge comes identification, and through identification comes appreciation, and cultural assets can be preserved.

At the end of this phase, the students shared their initial ideas and sketches with the team. We gave them feedback, the proposed changes, and made improvements to the project proposals.

Phases 2–4 were directed by professors of EASD. During this period, the students developed two brief assignments. The first briefing or assignment was "Designing strategies or objects to enhance the value of silk heritage". Teachers and students decide how to enhance their heritage value. These were (a) relations with other materials; (b) techniques; (c) typologies of objects; (d) motifs or drawings for application to silk; (e) applications of traditional motifs and drawings; (f) developing proposals for the Valencia Fine Arts Museum (Museu de Belles Arts de València) that articulates the idea of Museum–Silk

World Design Capital; (g) collaborating with visualization (data, space-time maps, semantic relations, and other information management tools), improving its legibility, facilitating accessibility, and making its use more attractive; and (h) any others that might arise.

We must highlight the fact that the Valencia Fine Arts Museum's collection makes it the most important cultural touchstone in the Valencian Community in terms of Gothic, Renaissance, Baroque and 19th century painting. Founded in 1837, its holdings comprise a large selection of paintings and an extensive collection of drawings and prints, sculptures, archaeological pieces, architectural elements, and sumptuary arts. The bulk of the museum's collection of early paintings comes from Valencian convents and monasteries disentailed in the early 19th century. Other major sources include the San Carlos Royal Academy of Fine Arts, particularly works by academics and students, and the Government of Valencia, notably the donation made by Pere Mª Orts-Bosch in 2004. Highlights include a significant group of Gothic altarpieces and works by Joan de Joanes, Francisco Ribalta, Ribera, Velázquez, Goya, Vicente López, Sorolla, Pinazo, and Benlliure, among others. In this regard, the reflection of silk fabrics in paintings or altarpieces is important for design because it provides a valuable visual record of the fabrics and designs that were used during different periods. These paintings and altarpieces often feature detailed depictions of luxurious silk fabrics that were popular among the wealthy and influential members of society. By studying these depictions, designers can gain insights into the materials, patterns, and colors that were favored during each period and use this knowledge to inform their own design work. For example, designers creating garments or textiles today may draw inspiration from the intricate floral patterns and rich colors of medieval silk fabrics or incorporate the delicate draping and folds depicted in medieval paintings into their own designs. Additionally, the reflection of silk fabrics in paintings and altarpieces can provide an important historical context for contemporary designs. By understanding the role that silk fabrics play in society, designers can gain a deeper appreciation of the cultural and social significance of textiles and create designs that reflect this broader context. Examples can be found in Figure 2, where we show the Annunciation of Jaume Baçó (ca. 1450), where the archangel Gabriel is shown kneeling, dressed in a brocade raincoat and holding a staff of lilies, or the work of José Burgos, *Muestra de estampado. Ramo de flores* (1796), designed to be used in a silk textile.

(**a**)

(**b**)

Figure 2. (**a**,) *Annunciation*, Juame Bacó, called Jacomart (ca. 1450), tempera, oil, and gold on panel; (**b**) *Muestra de estampado. Ramo de flores*, José Burgos (1796), tempera in blue and purple with graph paper.

The second briefing or assignment was aimed at designing strategies to develop new uses or applications of silk heritage. These actions were (a) new relations with other materials; (b) new techniques; (c) new typologies of objects; (d) new motifs or drawings to be applied to silk; (e) new applications of traditional motifs and drawings in other fields of use or other materials; and (f) developing proposals for the Valencia Fine Arts Museum.

Afterwards, the students had to present a proposal of ideas for the two proposed assignments, which necessarily involved planning time and tasks. In this phase, they also had to analyze the chosen field of action, conduct background research, search for similar experiences in other areas that could help us approach the problem, draw up comparative analysis tables, etc. This exercise helped them to create a more concrete briefing based on the assignments received. In this sense, the aim was to move from the general and open-ended nature of the assignment to an effective work proposal based on the research carried out, which should allow us to understand the scope of the problem posed and the philosophy of the values of the client who commissioned it. For example, the student Carlos Real made three proposals: first, to design a "Digital Jacquard Loom"; second, to develop a series of digital maps that would show the importance of silk and allow the research carried out to be disseminated to a wider public; and third, "to redesign the existing Thesaurus to improve its usability and legibility". Of these three proposals presented to the UV, it was agreed to develop the third proposal.

Finally, Phase 5 consisted of the presentation of the students' results, and a dialogue was established on the actors involved, lessons learned, and the importance of heritage, and so on. Simultaneously, the UV proposed several ways to showcase their results, and events were scheduled to disseminate them. During this discussion, researchers could contextualize silk heritage through their creation. In this regard, contextualizing through educational processes is one of the most important purposes for cultural agents to offer and disseminate knowledge to society; at the same time, it is a tool for heritage conservation. In particular, nowadays, silk heritage is stripped of context. In other words, the new generations do not fully understand the processes, techniques, materials, etc. in the same way as their ancestors did.

When we talk about contextualizing and giving current meaning to cultural heritage, it is of great importance to know how to convey the meaning of objects through their implicit immateriality and go beyond the common historical and formal data that we are accustomed to. Silk material is a link between tangible and intangible culturally well-defined heritage, whose knowledge is being lost, and this is what we strived for in our case study.

4. Results

During 2020–2021, 31 students attended the Design Ideas Laboratory. Because they had several different backgrounds, we grouped their results according to the following typologies: SILKNOW technological tools, publishing, exhibitions, outdoor events, games, and new products. Figure 3 shows the percentage of these projects.

(1) Publishing. As Figure 4 shows, some students proposed converting the SILKNOW thesaurus allocated in the SKOSMOS format, into a printed book. This student transformed an online thesaurus into an illustrated dictionary. Another student (Figure 5) proposed writing a book focusing on the relationship between silk and Valencian territory, highlighting lessons learnt about the intangible silk heritage. This last result was quite interesting, including interviews with local citizens and thus understanding silk as a living heritage.

(2) Exhibition. Some students pointed out that showcasing silk through museum exhibitions would be the ideal way to disseminate this heritage to citizens. These shows were related to silk history, related to modern silk applications, and related to silk designs in paintings (Figures 6–9). We also included here students who suggested creating an installation as an artistic way to disseminate silk heritage (Figure 10).
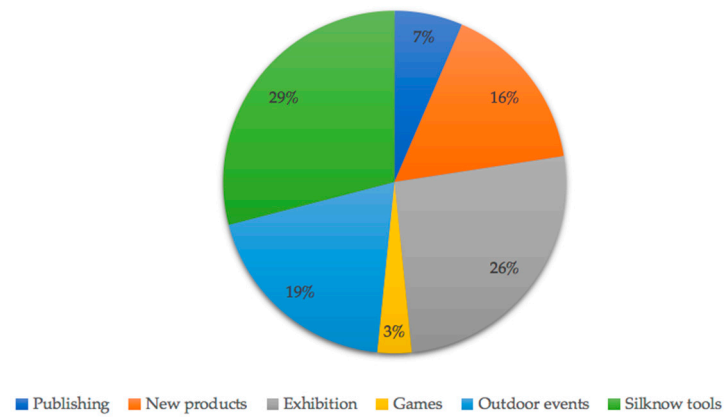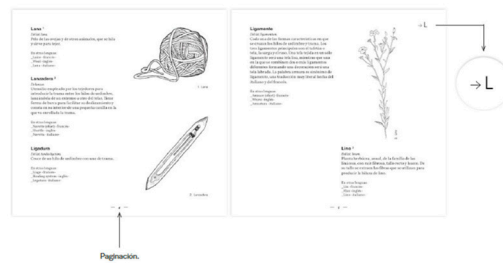
Figure 3. Graphic showing students' proposals.

Figure 4. SILKNOW Thesaurus turned into a printed book.

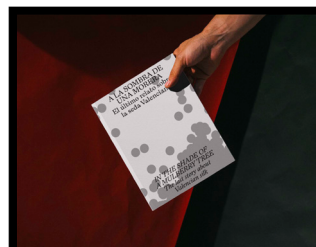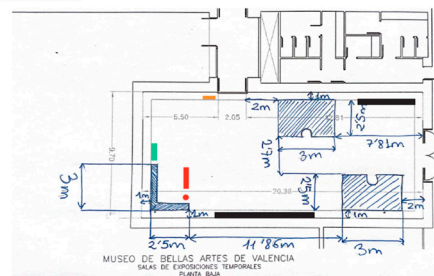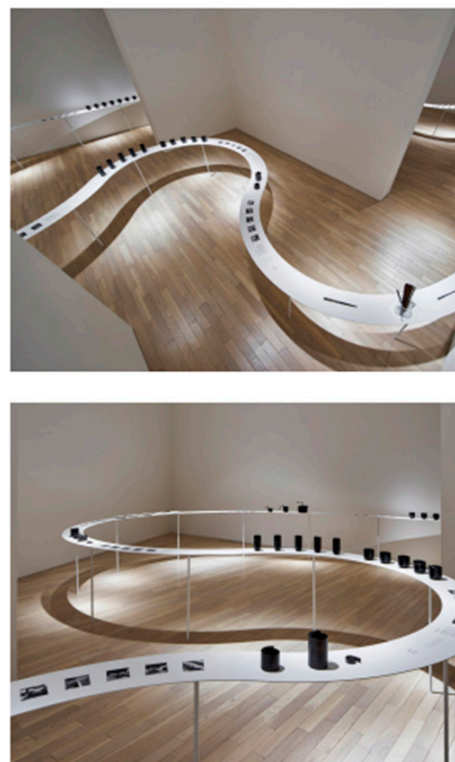**Figure 5.** Mulberrry tradition.

Figure 6. Exhibition based on silk history using QR codes that will connect with SILKNOW tools.

(a)

(b)

(c)

Figure 7. Exhibition by Antoni Sanegre: (**a**) 40 paintings from the Valencia Fine Arts Museum where silk appear in the paintings; (**b**,**c**) Panels proposal.

Figure 8. Temporary exhibition about the modern use of silk.

Figure 9. Exhibition about Valencian silk history.

Figure 10. Geraldine Marin proposed an installation based on the virtual loom techniques. This installation was meant to be placed at the Valencia Fine Arts Museum.

(3) Games. Figure 11 illustrates the game as suggested by the student. She was inspired by Monopoly and Roll Games. Her game is thought to be collaborative, and her cards were inspired by Valencian silk history, although she proposed that this game can be transformed into a European silk history board game. In this section, we present an example of heritage gamification.

Figure 11. Silk—Monopoly game.

(4) Outdoor Events. Some students proposed different types of events that had a direct impact on city urbanism, from cultural routes to urban interventions (Figures 12 and 13) and street theatres (Figure 14). These students connected with their own cities and rediscovered hidden secrets related to silk heritage. Every student said that these interventions could be implemented in any city in the EU.
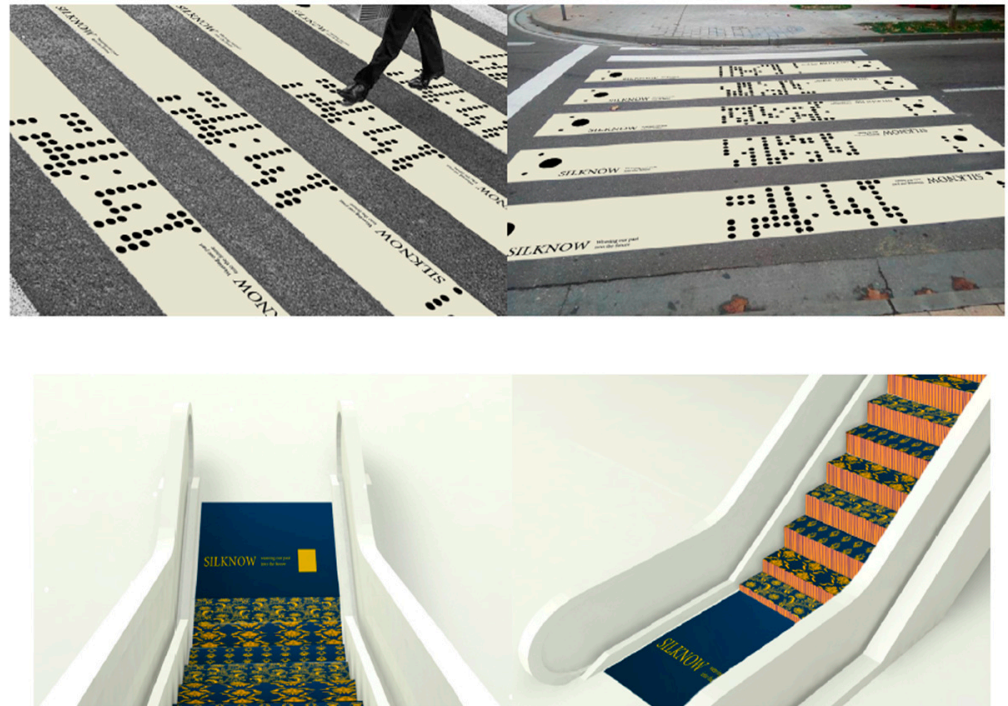
Figure 12. Urban interventions at a pedestrian crossing and on an escalator.
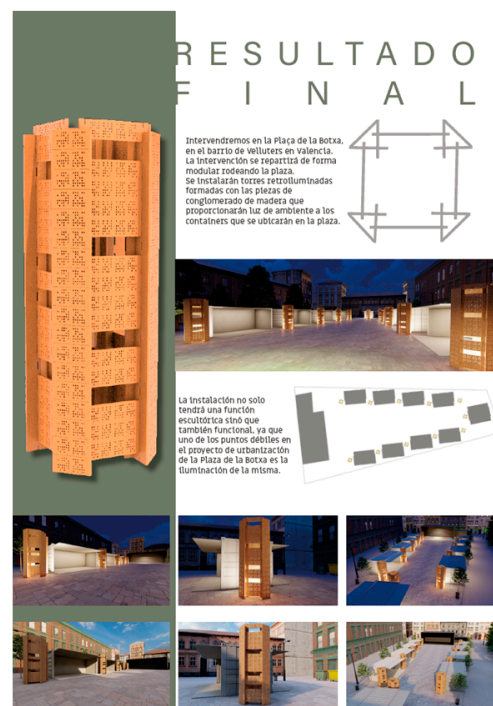
Figure 13. Urban interventions at a the velluters (silk velvet weavers) neighborhood.

Figure 14. Urban theatre.

(5) New products. Some students used the silk heritage as inspiration to create new products. By experimenting with different fabrics, techniques, and cultural influences, they created designs that are both innovative and rooted in tradition as shown in Figures 15–17.
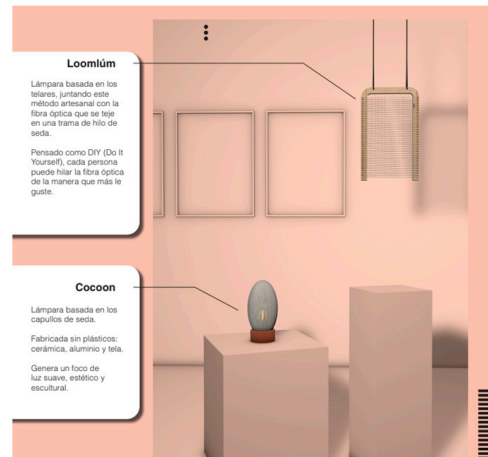
Figure 15. Luminaires inspired by silk. The so-called Loomium is inspired by Jacquard looms while the Cocoon is inspired by silk cocoons.

Figure 16. Roller with which the user can apply any paint and use it either on a wall, on a T-shirt or on a poster to hang in a frame on the wall. This roller tries to send out a message by using the silk printing technique, the *indianas*. This roller was created to be sold as a souvenir in a museum.

Figure 17. Creation of a souvenir to be sold in a museum. The souvenir is a silk scarf on which the buyer can print a motif used in textiles, the pomegranate.

(6) Improvements to SILKNOW. The improvements offered by the students were related to tools such as ADASilk or the Thesaurus (Figure 18a,b); an augmented reality (Figure 19); improving the project's website (Figure 20; rebranding the entire brand (Figure 21); and advertising campaigns for the entire project (Figure 22).
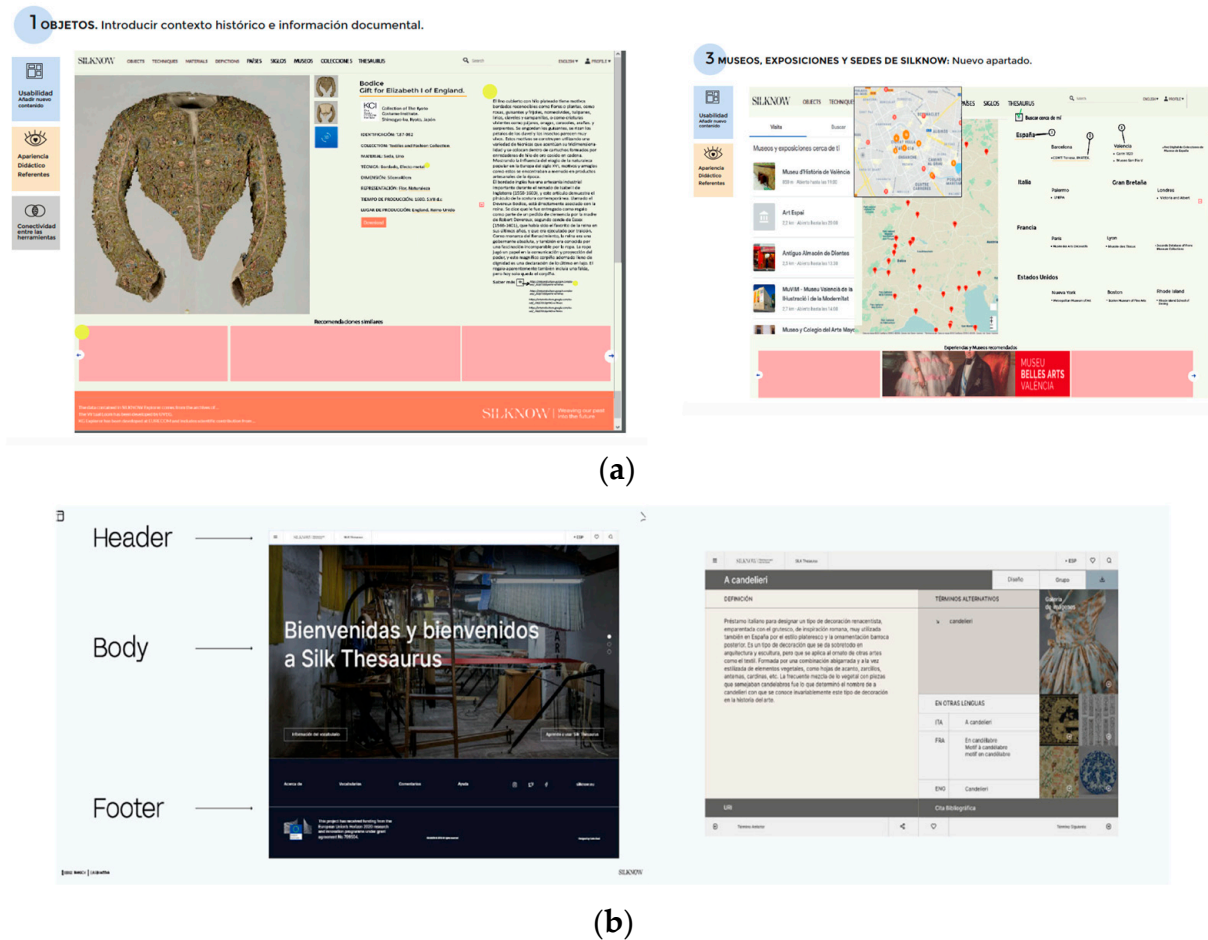

(**a**)

(**b**)

Figure 18. (**a**) New user interface including museum's location. (**b**) Thesaurus new user interface.
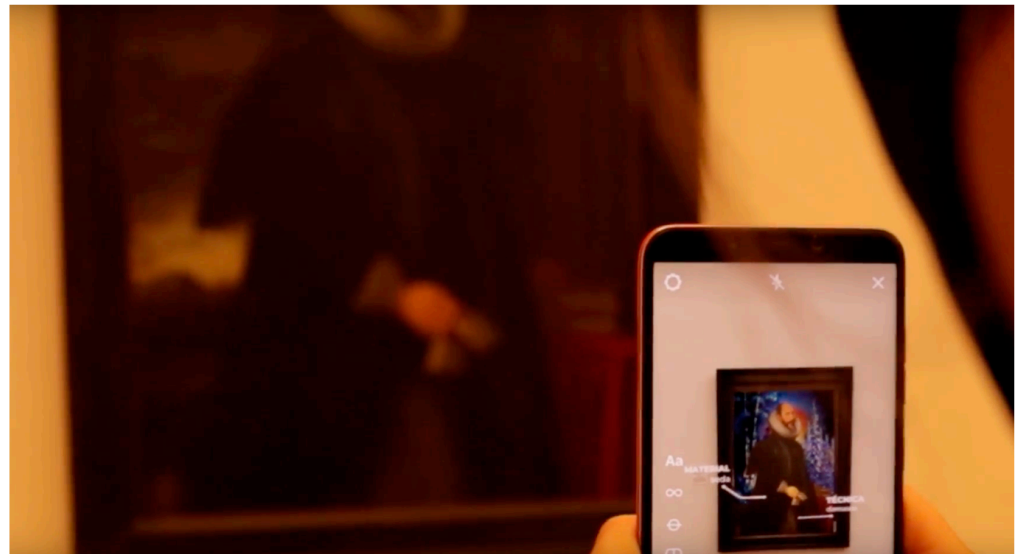
Figure 19. Augmented reality to be used in the Valencia Fine Arts Museum.
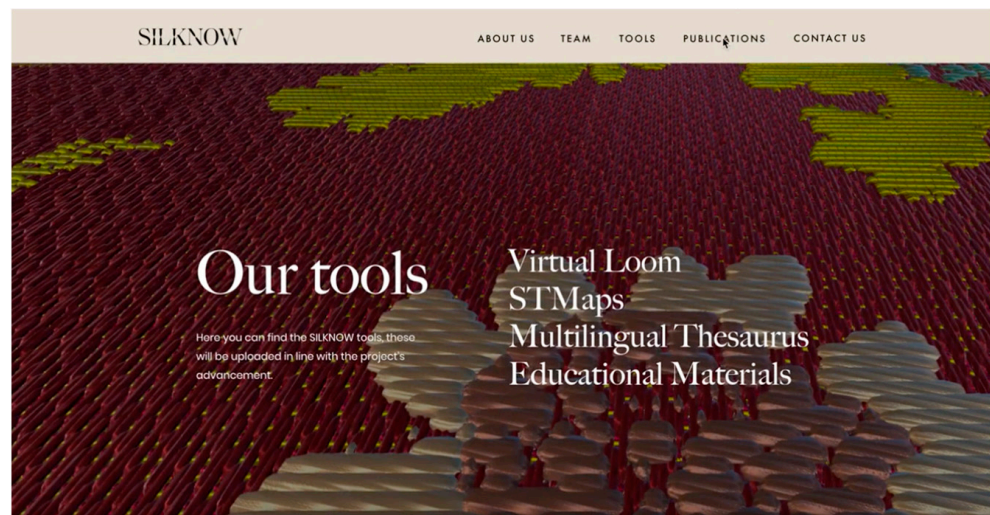
Figure 20. Improved SILKNOW website.

Figure 21. Redesign of SILKNOW tools' logos.

Figure 22. Commercial campaign to disseminate the SILKNOW project in the city of Valencia, Spain. This campaign was designed to be replicated in other EU cities.

Statistical Analysis

Our evaluation consisted of a qualitative questionnaire that included both open- and closed-ended questions. The instrument used was a self-supplied survey created using Google Forms and distributed by the teachers. The study included 19 students (those who answered the questionnaires), both female and male, aged 18–30 years. To be included in the study, students had to be capable of answering the questionnaire by themselves, and they were previously informed about data protection. Once we applied the qualitative survey, we performed data analysis using SPSS v. 12.3 software package.

Of the 19 respondents, 78.9% agreed that they found the application of cultural heritage to their curricula useful, while 10.5% agreed considerably. This is a very positive answer for the project and every museum collection that wants to work with Design Schools.

Next, we wanted to determine if the project's tools acted as mediators between heritage and young creatives. We did this in two ways: from projects to creatives, and from creatives to cultural heritage. To this end, we asked if they had learnt about silk heritage. The results are shown in Figure 23. As can be noted, we coded the answers by grouping them according to similar responses into each code, following the so-called "closing open-ended questions" process, which responds to an inductive coding. We manually coded the responses in a flat frame, meaning that all codes had the same level of specificity and importance [56]. As can be seen, we differentiated between students who answered that silk is part of their heritage, students who said it is part of European heritage, and those who located this heritage in Valencia, their own territory. This was done to highlight differences between "that heritage" (far from me), "our heritage" (related to me), and "my heritage" (related and close to me). In any case, if we put these answers together, they summed up to 52% of the students who learnt that silk was part of their heritage. Other students answered that, thanks to this experience, they learnt on the one hand the weaving art (techniques,

difficulty, etc.) involved in the process of silk fabric production, while 16% recognized silk as an artisanal heritage. It is worth noting that only 13% of the respondents believed that this heritage should be preserved. Finally, 6% of participants expressed that silk was beautiful or had aesthetic value.
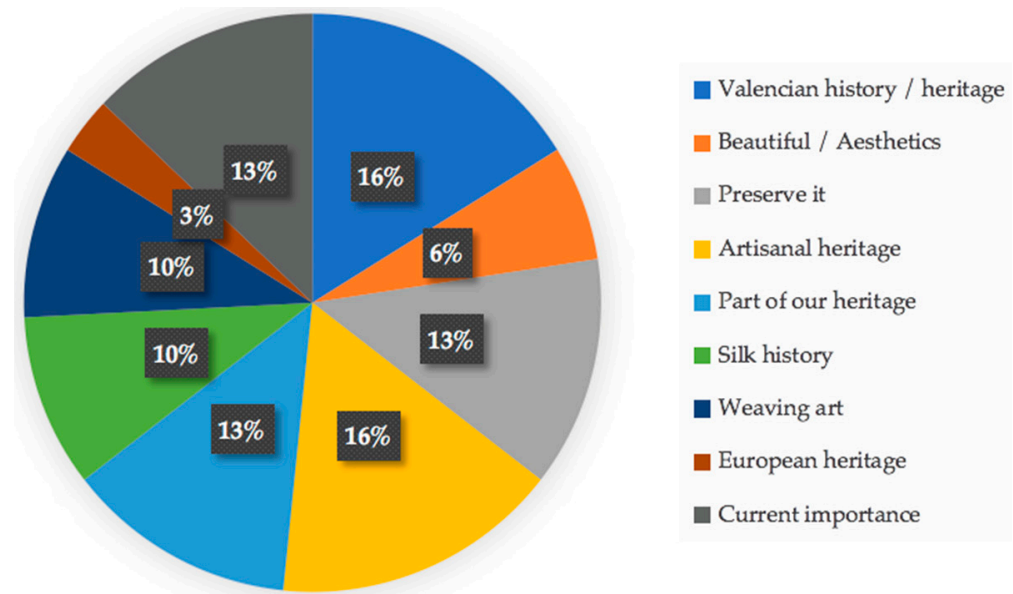
Figure 23. What have you learnt about silk heritage?

As mentioned, we wanted to know if they feel that their future work as part of the creative industry can preserve design heritage. Of these, 89.5% answered positively to the questionnaire. For those who answered yes, we wanted to know how they could contribute to cultural heritage preservation. As with the previous question, we coded the answers into three groups: dissemination/communication and new products through the reuse of silk heritage and technology. It is not surprising that almost half of the respondents specified the creation of new products and reuse of this heritage, as they were young European creatives. In this regard, some stated that they would keep combining jewelry with silk, while others said that using traditional silk knowledge can be used to create new products. We want to highlight the following statements: "Using the virtual loom and inspiration from historical silk dresses to preserve heritage and use silk motifs in nowadays. As a new designer, it is in my hand to renew this material with my creations and adapt its manufacturing process to modern methods. Adapting its importance in the representation of tradition and culture, such as the Silk Road and the heritage it represents for the Valencian Community. A material representing a whole culture, ours, by itself".

Other respondents said that they could help preserve silk heritage through its dissemination and communication, while only 17.6% answered that they could do so through technology, as one respondent said by combining design, creativity, and history, as Figure 24 shows.

Finally, we asked them about their experience of working with cultural heritage through this experience; 42% found this project interesting and satisfactory, while 10% found it a good experience related to collaboration among domain experts and young creatives, especially since they found that collaborative work with various opinions is always better. Related to learning experiences, this sums up to 38%, taking into account every answer related to learning and taking into account those who answered that they appreciated/learned to work with clients for the first time. In this sense, we split learning into four categories: those who already mentioned working with clients (15.8%—"I had never worked with a client before."); Those who learnt about silk and design heritage, especially techniques and motifs that can be reused in their future creations (15.8%—"It has been very interesting, learning about silk helps a lot when designing new elements using

this heritage, its patterns and its history.") Those who learned that project tools can be used for other things, such as the Virtual Loom that provides patterns that can be used to create textures applicable to interiors or graphic projects, and those who learned more about tools that are specifically related to their courses, such as 3D. Finally, we must mention those who said that we provided too much information, and that it was not appealing. The results are shown in Figure 25.
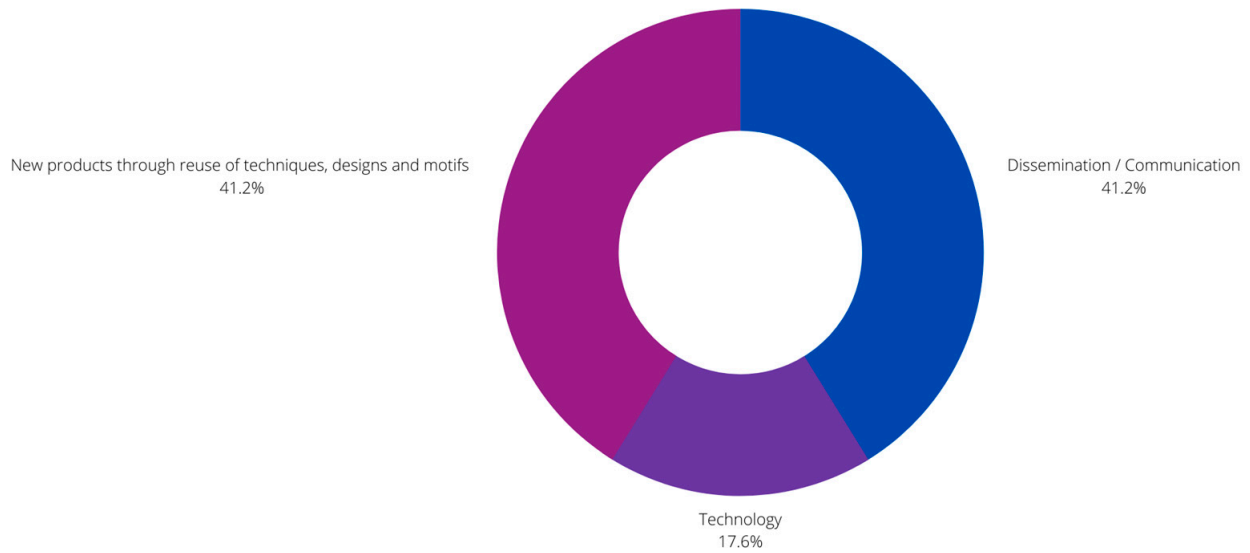

Figure 24. How can your work contribute to the preservation of cultural heritage?
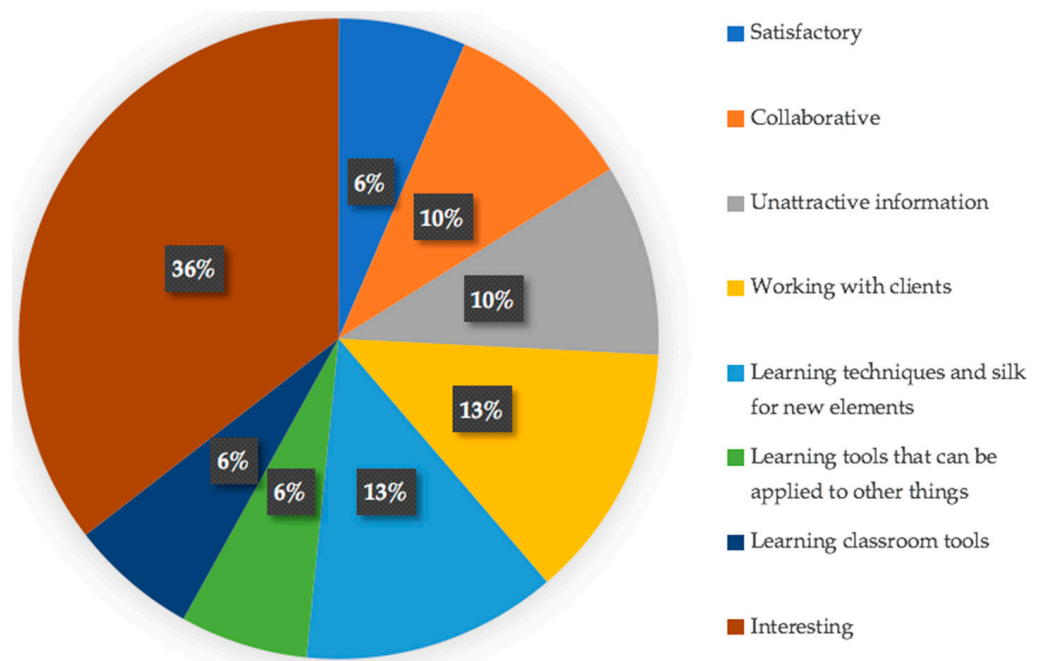
Figure 25. Please, give your general opinion on this experience.

5. Discussion

During the course, the students were highly participative and interested in their heritage. The results of the surveys showed that the students were keen to learn about their heritage. Moreover, they showed true appreciation for their heritage and willingness to preserve it and reuse it in their future creations.

Almost 80% of the students were in favor of including cultural heritage in their curriculum. Additionally, almost half of the respondents answered that they would be

inspired by it, whereas the other half answered that they could be useful to heritage through its dissemination. This responds to the sense of appropriation of heritage as an element to be considered and conserved. A similar example is found in projects that incorporate intangible heritage elements that were not discussed in class but which the students thought on their own, as in the case of the mulberry tradition or the cultural routes and dramatized representations that made the students investigate in depth the relationship that silk has with the territory. Even playful experiences, such as a monopoly game, encouraged pupils to research the historical past of silk. On the other hand, the communicative and inspirational intentions of pupils can be found in elements such as exhibitions, urban interventions, and improvements to the interface itself.

This responds to participatory experiences in cultural heritage that, although not entirely new, what is interesting is the inclusion of cultural heritage in a field such as design, in which the tendency is towards the future rather than the past. In this regard, we argue that design studies can use cultural heritage as an inspiration for creative and innovative design solutions. Cultural heritage can provide a rich source of inspiration for designers as it reflects the history, traditions, and values of a particular culture or community. By exploring cultural heritage, designers can gain insights into the unique perspectives and experiences of different groups of people and use this knowledge to create culturally sensitive and relevant designs. This experience was interesting not only because of the positive results of the survey, but also because of the projects carried out. Of particular interest were those in which the students had to do cultural research, such as going to the museum and investigating not only the motifs, but also the techniques that appear in the paintings. Of special interest are those proposals that intended to create new products, given that they have really used cultural heritage to develop something new.

On the other hand, we have proven how Victor Josef Papanek's "sustainable" design approaches can be used in cultural heritage and design teaching. Papanek's approach emphasizes the importance of designing products and systems that are socially and environmentally responsible and meet the needs of all people, including those who are often marginalized.

In the context of teaching cultural heritage, this approach can be used to encourage students to think critically about how cultural heritage is preserved and presented. For example, students could be challenged to consider how the design of museum exhibits and interpretive materials can be made more sustainable and socially responsible. They could also be asked to consider how cultural heritage preservation can be made more inclusive and accessible to a wider range of people.

Additionally, Papanek's approach can be used to encourage students to think about how cultural heritage can be used to promote sustainability and social justice. For example, students could be asked to consider how traditional ecological knowledge and sustainable practices from indigenous cultures could be incorporated into contemporary design practices. They could also be challenged to think about how cultural heritage can be used to address pressing social issues such as climate change, environmental justice, and cultural identity.

Overall, by applying Papanek's "sustainable" design approaches to cultural heritage teaching, students can develop a deeper understanding of the complex social, cultural, and environmental issues that shape our world and learn how to apply design thinking to address these challenges in creative and meaningful ways.

6. Future Research

This study highlights some potential areas for exploration. First, the next steps should focus on design for accessibility and inclusivity, which means understanding how design can be used to make cultural heritage more accessible and inclusive to a wider audience, including people with disabilities or from different cultural backgrounds.

The positive results of this experience suggest that it should be repeated in other courses. In particular, there are plans to replicate the experience with students from to

2023–2024 and with other design schools. This confirmed the replicability of the project. In this sense, a larger sample size could shed light on how sustainable design can be used for cultural heritage. For example, research could explore how sustainable design approaches can be used to preserve cultural heritage sites and artefacts while minimizing their environmental impact. To explore the potential of co-design and participatory design approaches for working with communities to preserve cultural heritage, empowering local people to play an active role in preserving and celebrating their cultural heritage, as well as creating new forms of expression that respect and honor traditional practices. In general, there is a wealth of opportunities for research in the fields of design, cultural heritage, and technology, and new technologies and innovative design practices can help preserve and celebrate cultural heritage for future generations.

Furthermore, cultural heritage can inspire sustainable and socially responsible design practices. For example, designers can draw on traditional ecological knowledge and sustainable practices of indigenous cultures to create designs that are environmentally responsible and socially just. They can also use cultural heritage to promote diversity, equity, and inclusion in designs by celebrating the cultural diversity of different communities and creating designs accessible to people from different backgrounds and perspectives. Cultural heritage can provide a rich and diverse source of inspiration for designers and help create designs that are both beautiful and meaningful. By incorporating cultural heritage into their work, designers can help create a diverse, inclusive, and sustainable design industry. These are some areas that the authors of this paper will continue researching in similar workshops that are already planned for the 2023–2024 courses.

On the other hand, ICT and design can interact in various ways, as we have shown in this paper through the use of SILKNOW digital tools. ICT can be used as a tool to support and enhance the design process, and design can be used to create innovative and user-friendly solutions. Young designers use their expertise in user-centered design to create interfaces and experiences that are intuitive, user-friendly, and aesthetically pleasing. Future research should specifically focus on how ICT can be used to support design research and collaboration. For example, designers can use online platforms and tools to conduct user research, share design concepts, and collaborate with team members located in different parts of the world. This can facilitate a more efficient and effective design process and can help ensure that the final design solution meets the needs of users and stakeholders. This can be particularly important in the development of software applications, websites, and other digital products. The authors of this paper have planned another workshop with interactive tools being developed for the Arxiu project, in which designers use design thinking and human-centered design approaches to create ICT solutions that promote sustainability, social justice, and access to information and resources.

7. Conclusions

The conservation of cultural heritage, particularly the appreciation of its creative qualities, forges an interrelationship between society and cultural heritage. It is capable of intervening in the cognitive articulation of the process of contemplation using cultural objects as mediators. The outcomes of these educational projects for future creatives and designers are very useful. In particular, it has been indicative of the enormous potential of stewardship and the understanding of cultural heritage for the development and innovation of creative industries and the promotion of young talent.

Including sustainability in design curricula is of utmost importance, as design is not only about materiality, technology, art, or mental processes. It has shaped the world in which we live, and it has improved our lives in ways that we cannot even begin to imagine. Young students should develop their interest within a sustainable system that will transform the world. SDGs provide learning opportunities to include best design practices. These might become, in turn, building blocks for future law-making initiatives about shaping a greener and fairer way of life in creative and inclusive societies, at any level of reach and enforcement.

From a teaching perspective, it is essential that future designers are aware of the SDGs and how they can contribute to them through their daily work. Incorporating these practices into design curricula will provide a foundation for economic, societal, and ecological growth, which can be translated into an improvement in the quality of life of its inhabitants.

Incorporating heritage education mixed with SDGs is fundamental, as documenting our history will help us better understand our present and fight for a better future. Sharing our common past allows students to develop their personal or collective memories (such as the case of a student who interviewed local people and their relationship with silk) at the same time as they discover new connections between what they can create and their identity (such as the case of gamification or acting in public space). As shown, cultural heritage can be used as inspiration in design studies. For example, designers can draw on traditional design motifs, patterns, and materials from different cultures to create new and innovative designs that reflect contemporary sensibilities. They can also incorporate traditional design techniques and processes, such as weaving, embroidery, or woodworking, into their work to create designs that are both visually stunning and culturally significant.

Cultural heritage in general, and silk in particular, presented itself as a source of inspiration for future designers, guaranteeing a return not only to traditional techniques, but also to the safeguard of silk heritage. Collaboration between design schools and silk heritage is not new. SILKNOW and the Arxiu Valencià del Disseny recover this tradition and act as mediator, and young creatives recontextualize their heritage and weave it from the past to the future.

Finally, the interaction between ICT and design can create innovative, user-centered, and socially responsible products and solutions that benefit individuals, communities, and society as a whole.

We can conclude that the use of cultural heritage, technology, and design education is an interesting approach as it helps students to become more thoughtful, culturally aware, and socially responsible designers, who are better equipped to create designs that are aesthetically pleasing, socially meaningful, and sustainable.

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