3D infographic for the dissemination and protection of Tenango as cultural heritage of the State of Hidalgo

Infografía 3D para la difusión y protección del Tenango como patrimonio cultural del Estado de Hidalgo

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Abstract

Cultural heritage deals with the traditions, beliefs and achievements of a community; thus, it is the creative expression of its existence and of everything inherited from generation to generation. However, on many occasions these goods or manifestations are not as well-known because they are part of small towns, as is the case of Tenango in the state of Hidalgo. Therefore, various global companies have profited from these works of art and have made them their own, generating large economic income, without giving recognition and royalties to the people who originally created these pieces. For this reason, the present text is oriented to the creation of a mobile application based on a 3D infographic with various 3D models of garments and accessories that contain Tenangos, this with the purpose that people know them, as well as their history, way of manufacturing, among many other details, in order to become aware of the importance of these handicrafts in Mexican culture and prevent outsiders from obtaining benefits from their illegal reproduction. This encourages the use of innovative means for the dissemination of cultural heritage through mobile applications and social networks.

3D infographic, Cultural heritage, Tenango

Resumen

El patrimonio cultural habla de las tradiciones, las creencias y los logros de un pueblo, por lo que es la expresión creativa de su existencia y de todo lo heredado de generación en generación. Sin embargo, en muchas ocasiones esos bienes o manifestaciones no son tan conocidos debido a que forman parte de poblaciones pequeñas, como es el caso del Tenango en el estado de Hidalgo. Por lo que diversas empresas globales han lucrado con estas obras de arte y las han hecho propias, generando grandes ingresos económicos, sin dar el reconocimiento y regalías a las personas que crearon estas piezas originalmente. Por tal motivo, el presente texto está orientado a la creación de una aplicación móvil basada en una infografía 3D con diversos modelos 3D de prendas y accesorios que contienen Tenangos, esto con el propósito de que las personas los conozcan, al igual que su historia, forma de fabricación, entre muchos otros detalles, para así tomar conciencia de la importancia de estas artesanías en la cultura mexicana y evitar que personas ajenas lucren con su reproducción ilegal. Con ello se fomenta el uso de medios innovadores para la difusión del patrimonio cultural mediante aplicaciones móviles y redes sociales.

Infografía 3D, Patrimonio cultural, Tenango

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Introduction

During the present millennium, the artisans working in the region of Tenango de Doria, in the state of Hidalgo, have turned the trade they initially practiced surviving into a handicraft industry. The Tenango, as this embroidered piece is called, has evolved to become an authentic work of art with an infinite number of details. In fact, they are no longer only purchased by people locally, but are also sought after nationally and even internationally thanks to the use of technology to promote and obtain them.

However, there are also some unwanted admirers who have set their eyes on these pieces. Recently, some international fashion brands have published products with ornaments belonging to the characteristic iconography of the Otomi, but without mentioning that they come from Tenango de Doria or that they have an origin in this culture. For example, the Benetton company used an image similar to that of the Tenangos on a swimsuit, the company claimed that the design "came from an internet search" and that its product department "did not know about the traditional work of this community". Alma Yuridia Santos Modesto, a member of a collective of artisans in the village, commented that the visibility given by global brands using Otomí designs "gives our work a lot more exposure". But she added: "It would be nice if they would take us into account. Maybe giving us a little more work. A few years ago, her collective made embroidered bags for the Carolina Herrera brand. But more recently, the same fashion house used the iconography of the Tenangos in its 2020 collections without giving them any credit (Malkin, 2019).

In the face of public outcry following countless accusations of cultural appropriation, the fashion industry is undergoing a profound transformation. Around the world, fashion designers are being urged to take into account elements taken from other cultures and to offer products that respect their traditions. While there is still no consensus on the meaning of the term Cultural Appropriation, Intellectual Property is certainly called to be part of the solutions to curb this harmful practice (Vézina, 2019).

Although many alternatives have been developed to try to please both sides of this problem, with the rise of social networks, the use of technology to assist in the generation of so-called Virtual Heritage has gained relevance. Through the use of virtual content, cultural heritage can take a step forward and embark on an equal footing in the new era of information and communication technologies. With 3D virtual content, more and better dissemination and marketing can be achieved. The fact that it can be linked to a web page also makes it possible to achieve greater dissemination among the new generations, who are more inclined to acquire information through this channel (Gómez, Jiménez and Benavent, 2015). In the field of Cultural Heritage, the importance of 3D recording and documentation through digital techniques is an innovative practice that is undergoing exponential development. In this sense, in the fields of various areas such as architecture, paleontology, archeology or sculpture, the taking of 3D data is an established working method, given that these are non-destructive and highly graphic methodologies that, in turn, allow real-time monitoring, visualization without manipulation, virtual intervention and dissemination of collections through virtual spaces (Niquet and Barberá, 2018).

For such reason, the present work is oriented to the creation of a 3D infographic that collaborates to disseminate and protect the cultural heritage of Tenango at a national and international level. The 3D infographic is visualized within a mobile application, which helps to reach many people in a short period of time through social networks. With this, it is intended to give the recognition it deserves to the creations of the people who live in Tenango de Doria, since it is important to know the cultural heritage of the country and protect it from people who try to take advantage of it without proper permission.

Tenango

According to Roa Gómez (2020), Tenango de Doria is one of the 84 municipalities of the state of Hidalgo, and is located in the region known as the Otomí-Tepehua mountain range. The word Tenango is of Nahuatl origin (Tenanco) and means "in the place of the walls". And the municipal seat of the municipality bears the same name. It is a town with an indigenous population of Otomi origin, which has its foundations in ancient times. In a timely manner, it is very important to describe the methodologies, procedures and equipment used in the production work of their handmade crafts, since it is in this municipality, and in neighboring localities, where embroidered textiles popularly called Tenango are produced.

Negrete (2014) mentions that Tenangos are drawings that reflect the cosmogony and cosmovision of indigenous women from the Otomí-Tepehua region, in the state of Hidalgo, mainly embodied in unique and unrepeatable multicolored embroidery. Additionally, for Monterrubio, Hernández and Medina (2019), in the traditional Otomi embroideries one can find the meaning of Tenango, in terms of the representation not only of their own cosmovision, but also of their ceremonies, festivals and traditions. For example, sequences of birds and deer alternating with plants and flowers are common.

Among the Nahua and Otomi, birds are sacred animals and are related to the souls of the dead. The deer is the king of the animals and is considered the protector of the hills and milpas, it is the bearer of riches and participates in the lunar symbolism, with its golden hooves and horns as a crown. Plants and flowers are used in all moments of a person's life and in various festivities, representing protection, respect, gratitude and happiness (Galinier, 1990). Likewise, the Otomi cosmovision is still full of rites and ceremonies related to the fertility of the earth and protection by supernatural beings. In the ancient Otomi ideology there were animal spirits called Rogi that lived in the forests, they were known as Toná if they were protectors of an entire village. The Toná of San Pablito was a four-headed eagle that can be seen in some embroideries (Vergara, 2004).

As for the motifs represented in the Tenangos, the universe inhabited by animals, real or imaginary, is the most recurrent. There is also a great diversity of animals such as deer, rabbits, foxes, armadillos, birds, rodents, insects and worms, which live in plants, flowers and tree branches. Since their origin, the Tenangos contain images of fantastic beings, some with human forms and others associated with mythical and imaginary beings, first drawn and then embroidered on cotton cloth.

In the words of Nemuda (2020), within the Tenango artisan community there are several norms to be able to guarantee that the Tenango made is an original and completely handmade piece. These norms indicate that it depends on the size of the piece if it should be made by the same person from start to finish. If the demand for the Tenango at that moment is sufficient, then it can be made by several people at the same time, in order to create a collaborative piece and thus be able to supply the demand. To make the embroidery, it must be made with cotton threads and embroidered on a natural fiber textile such as silk, cotton, linen, wool or other (commonly on a blanket). Due to its complexity, it can take from a couple of weeks to a year to be finished.

The embroidery process consists of drawing a series of patterns inspired by some event, or as it is commonly done, inspired by the flora and fauna of the region. Subsequently, the embroidery begins. To do this, it must first be ensured that the embroidery has the precise distance from one thread to another so that the background fabric is not perceived, or open at any time, the fabric must be properly stretched to avoid possible folds. The embroidery technique consists of two thread stitches in a straight line, the outline of the figure is not marked, it is only filled in straight stitch, one thread next to the other, so this must be accurate in distance to mark the outline of the figure in this way, taking care not to lose the sense or separate the stitch too much. The embroidery and the shape of the figure must be marked with the thread carefully and progressively. The result of this whole process can be seen in Figure 1 (Bertuzzi, 2020).

Figure 1 Example of Tenango
Source: Own elaboration

Crafts as cultural heritage

At the international level, the United Nations Educational, Scientific and Cultural Organization UNESCO (1997), defines handicrafts as follows: "Handicraft products are those produced by craftsmen, either entirely by hand, or with the aid of hand tools or even mechanical means, provided that the direct manual contribution of the craftsman remains the most important component of the finished product. They are produced without limitation in terms of quantity and using raw materials from sustainable resources. The special nature of handicraft products is based on their distinctive characteristics, which may be utilitarian, aesthetic, artistic, creative, culturally linked, decorative, functional, traditional, symbolic, and religiously and socially significant."

For Rivas (2018), crafts can be placed as cultural heritage because through it people can identify themselves, transfer the technique from generation to generation, and feel represented by seeing their product in other places outside their land of origin. Craftsmanship as cultural heritage allows the craftsman to be very careful to inherit his knowledge and to polish the skill in his heirs. In ancient times, it was the artisans who were responsible for providing their family and community with the indispensable elements for daily life. Today, this is known as popular culture.

For UNESCO, cultural heritage is the cultural heritage of a community's past, maintained to the present day and transmitted to present generations. From a scientific point of view, cultural heritage is identified with the overall cultural heritage of the species and, therefore, with the formalized knowledge that can be preserved and transmitted about it, without any distinction based on extra-cultural legitimacy or other symbolic attributions (Prats, 2000).

At first glance, it seems easy to define the concept of cultural heritage, but this is not the case. Olaia Fontal (2003) has analyzed the different meanings of heritage: as inherited property, as historical selection, as a sediment of the cultural plot and as a shaper of social identity, to which we can also add its role as a reference model. For his part, González-Varas (2000) has limited the categorization of artistic monument only to those objects that are granted an articular and distinctive value and meaning, which differentiate them from other types of objects. Coinciding with this evaluable dimension, Josep Ballart (1997) has defined the types of values that can be granted to cultural property, dividing them into three major categories: use value, formal value and symbolic-significant value. Finally, public institutions at both the regional and international levels have proposed successive classifications and denominations, contained in laws that do not always coincide, for the elements that are considered part of cultural heritage (Peñalva, 2005).

Like the term culture, heritage is a term that has evolved over time and has gone from being a concept related to the monumental and artistic (basically painting and sculpture), to the intangible, such as customs and traditions. The goods that make up cultural heritage exist from the very moment that man left material evidence of his presence and activities, giving rise to objects of all kinds, from works of art to objects of a utilitarian nature (González Varas, 2000). Nowadays, heritage is defined as a collective wealth of crucial importance for cultural democracy. It requires the ethical commitment and cooperation of the entire population to ensure both its conservation and its proper exploitation.

The development of a territory presupposes a vision that involves collective action, involving local and regional governments, the private sector and the population in general. This collective action involves numerous activities that can be based on cultural aspects, such as identity and heritage. Identity implies recognition and appropriation of historical memory, a past that can be reconstructed or reinvented, but which is known and appropriated by all. Valuing, restoring and protecting cultural heritage is a clear indicator of the recovery, reinvention and appropriation of a cultural identity (Molano, 2007).

Cultural appropriation

Cultural Appropriation is considered to be the phenomenon of taking elements from a minority culture and using them without their original meanings in a foreign context, almost always for commercial purposes. This terminology has been so little explored by experts in the field that it does not even exist in the dictionary of the Royal Academy of the Spanish Language (RAE). It has been understood then that cultural appropriation is actually a phenomenon that has so far generated a recent and in many cases effervescent interest (Tostado, 2020).

Cultural appropriation brings together various aspects of a complex phenomenon. Concepts such as plagiarism, intellectual property, heritage and creativity are in dispute and demand validity from different disciplinary fields. Substantively, however, the phenomenon refers to the denial or concealment of an original idea that belongs to another in order to attribute it as one's own. In addition, a social inequality is generally recognized between a dominant culture that usufruct cultural manifestations of another marginalized culture, as a form of oppression of minority cultures (Ziff and Rao, 1997; Young, 2010).

From the arts world, cultural appropriation is understood as the adoption or use of cultural elements by members of another culture. It is also known as cultural misappropriation, often described as harmful and considered a violation of intellectual property rights against the culture of origin (Ziff and Rao, 1997), even though in the legal world there are no international and legally binding regulations governing this type of practice (Sádaba, LaFata and Torres, 2020).

However, indigenous communities not only demand the recognition of authorship in a legal framework; they also demand the recognition of their identities at a cultural level, through the creation of a social link between those involved, which allows them to establish meeting points to legitimately relate to each other. This is what happens in the case of the accusations against the Spanish brand Mango and the French designer Isabel Marant, where the claim is not only the authorial attribution and appropriation of iconographic elements of a Latin American ethnic group, but the omission and lack of interaction with the people who have originally developed these techniques in Mexico, in the Mixe communities of Tlahuitoltepec and Otomí of Tenango de Doria (Ramírez, 2021).

More recently, in the Resort 2020 collection of the U.S. brand Carolina Herrera, recognized textile and embroidery techniques were used in Mexican artisan communities of Coahuila, Tehuantepec and Tenango de Doria. The Mexican Minister of Culture, Alejandra Frausto, denounced cultural appropriation and plagiarism, and demanded that the brand respond to the allegations. Through a press release, the brand stated that the designs were a "tribute to the richness of Mexican culture and its artisanal techniques" without acknowledging the act of misappropriation in its designs (Friedman, 2019).

It would seem that Mexico's cultural identity is for sale, but it is not the people who are left with the profits. Sculptures, paintings, but mainly textiles that imitate the aesthetics of native peoples of Latin America and Mexico, are marketed through the Internet. The embroideries of Tenango de Doria (Hidalgo), huipiles that imitate the elaborations of Oaxaca or T-shirts printed with the stone of the Sun (the Aztec calendar), are sold through Internet pages that constantly change their address and place of origin. The visual appeal of Mexico's embroidery, sculptures, paintings and other handicrafts has caused dozens of companies to appropriate the cultural heritage, without the creators seeing a single peso for their work, effort and creativity.

In this regard, the National Human Rights Commission issued a recommendation in which it warned that "Mexico does not have an adequate legal framework that addresses the specificities and characteristics of indigenous peoples and communities, the same that makes effective their right to protection" of their cultural heritage" (Rodríguez, 2021).

3D infographics

Infographics is a graphic piece that was born in the journalistic medium, having as a characteristic that it incorporates textual and visual elements, in an indissoluble relationship. Villaplana (2019) adds a third characteristic by understanding it as a means of information transmission. As an object of information design, infographics is one of the most used resources for the visualization of complex data in understandable and aesthetic informative pieces, which break visual fatigue by transmitting descriptive messages in an attractive way and generating learning.

However, although documentation based on two-dimensional graphic images for paper-type physical formats is essential, there are documentation systems capable of improving the quality of the information (Irujo-Ruíz and Prieto-Martínez, 2006). 3D computer graphics can be defined as the generation of images by computer. More specifically, it usually refers to the creation of images that try to imitate the three-dimensional world by calculating the behavior of light, volumes, atmosphere, shadows, textures, camera, movement, etc. 3D models digitally reproduce the real world, obviously without reaching the quality of detail existing in reality. By means of thousands of points and meshes, terrain and objects are imitated by means of simplified structures (Fraile, 2007). 3D modeling is presented as a system that can improve both field documentation and the dissemination of scientific results obtained through research.

The elements that make up a 3D infographic are: information, audiovisual language, video, 3D, text structure, typefaces, illustrations, maps, graphics, audio, video duration, visual and sound effects, as well as virtual environments. These conforming elements are not hierarchical, therefore, as they have the same level of importance, none of them can be omitted, since all of them together generate a 3D infographic.

In addition to entertainment, 3D technology goes hand in hand with current fashion and is at the forefront in the use of digital tools. The inclusion of the third dimension in this tool, responds to give the user another alternative to receive information that allows, according to the objectives of the project, to understand, understand, analyze, etc., any type of information that is intended to disseminate through this tool. The use of 3D in infographics, allows to give a greater breadth of the subject to be exposed. Thanks to its characteristics to move in three dimensions and give that feeling of depth, the way objects, environments or any graphic that is presented are visualized, give the user greater reference of volume, size, distance and shape that can be similar to things they know. From their experiences, they can compare or take as a reference to better contextualize the subject matter presented and not have to refer to the imagination.

3D modeling of tenangos

The idea of creating 3D infographics through a mobile application arises from the goal of finding new methods of dissemination or disclosure for what represents the cultural heritage of Tenango in Hidalgo and throughout Mexico, covering the origin, history, meaning, and process. To achieve these goals we contacted an artisan who lives in Tenango de Doria to present the project and get permission to reproduce his handicrafts digitally. The artisan, Clemente Reyes Jiménez, agreed to listen to the proposal and explained important points about Tenangos and his experience, in addition to agreeing to have his designs appear in the 3D computer graphics, providing several photographs of his works of art, among which the ones shown in Figure 2 stand out.

Figure 2 Tenangos made by artisan Clemente Reyes Jiménez
Source: Own elaboration

3D design refers to the three-dimensional creation of parts, objects or structures, generally used in engineering and architecture, or to the creation of 3D images related to the multimedia world and 3D animation. The basic steps to achieve a 3D object are: modeling, UV mapping, texturing, lighting and rendering. Modeling consists of shaping individual objects based on a reference image. UV mapping represents the texture coordinates on the model, which in 3D view coincide with the position of the vertices, but have an independent movement in their unfolded form. Texturing is performed to increase the detail and realism of the models by incorporating textures, it is an image that is placed on the faces of the polygon. Lighting or shading defines how the faces of a polygon will behave when illuminated by a strong light. Rendering generates an image from a model, i.e. it is the complex calculation developed by a computer to generate a 3D image.

The Marvelous Designer software is used for the modeling of the garment, this design program allows to capture digitally the manufacturing process of a garment. It is a very useful tool for the detail and quality of the textures. Obviously, the construction of each garment is made based on the artisan's designs to capture the iconography.

Once the garments are planned, the digitalization of the Tenangos begins, for which two programs were used. Illustrator is a program that allows to digitally capture drawings, the artisan's drawing is captured to make a digital representation as faithful as possible to the design. Having digitized each drawing, we chose to use a specialized program for embroidery, Drawings 4, which allows the texture of the embroidery to be precise and with a very high level of detail.

To capture the textures in each garment, the specialized software Substance Painter is used, this program contains a large number of default textures and allows you to create your own. For the texture of the fabric it is decided to use a predetermined texture of the program that adapts to the conditions of detail that is required. In order to import the created textures it is necessary to make use of another image editing software such as Photoshop, since it allows to create alphas or alpha channels, these are the ones that define the opacity of a pixel in an image. The alpha channel acts as a transparency mask that allows, in a virtual way, to compose opaque images or backgrounds with images with a certain degree of transparency. For the animation of the garments, each model is rotated through 360 degrees to show every detail of the clothing. This is done in Autodesk Maya, since it is compatible with Substance Painter, and exporting the textures to this program is more efficient. The animation is made at 24 frames per second, having a duration of 70 frames. This whole process is shown in Figure 3, and is repeated for each Tenango.
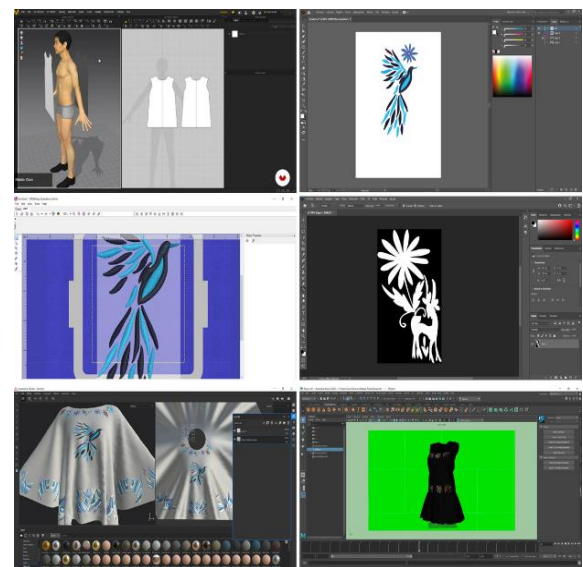

Figure 3 Process to create the 3D modeling of the Tenangos
Source: Own elaboration

For rendering, Autodesk Maya is also used in conjunction with the Arnold render engine, since it is one of the most compatible and intuitive. We chose to render with an image quality of Full-HD 1080 by 1920, since with that image resolution the implemented textures can be appreciated. Figure 4 shows some of the finished 3D models where you can see the detail of the textures, trying to match the original piece.

Figure 4 3D models of the Tenangos
Source: Own elaboration

Presentation of the infographic

Currently, social networks and mobile applications have become a great communication tool within society, with which it has been possible to project, inform and share information with various groups of people. For this reason we chose to create a mobile application that contains 3D infographics and where the user can interact a little more with the content, in addition to creating a video and broadcast it on social networks such as Instagram, Facebook and YouTube. Part of the operation of the mobile application is shown in Figure 5.
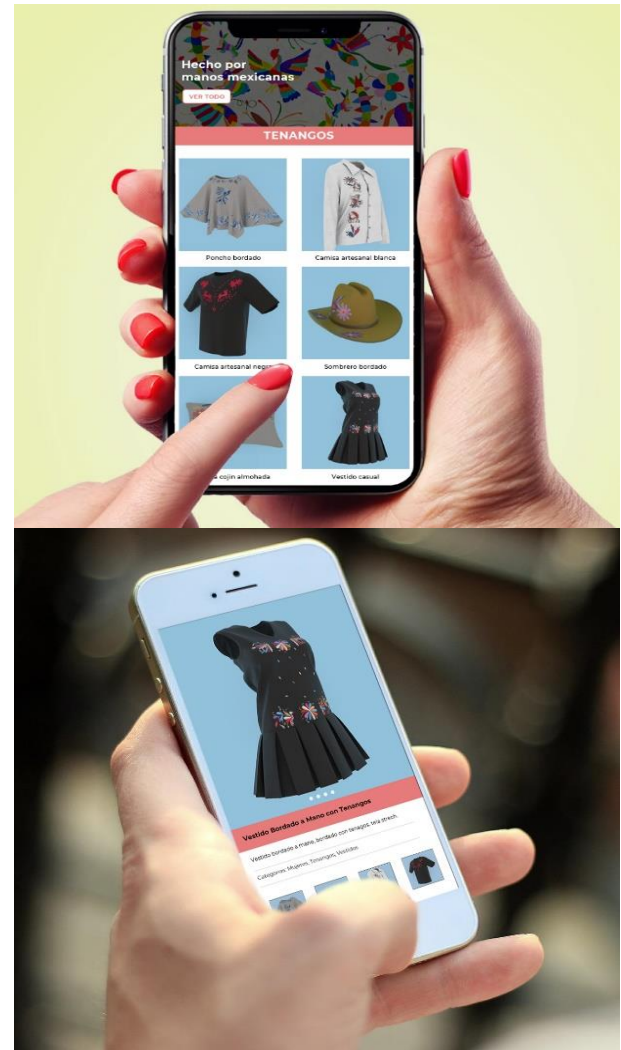

Figure 5 Mobile application with 3D infographics
Source: Own elaboration

In addition to the 3D models and animations, the application contains texts and audios that talk about the background of the Tenango, as well as the embroidery process that is carried out for its creation, and a bit of the history behind each of its forms. This is intended to allow users to interact with the Tenango and get to know it in detail.

To test the effectiveness of the application, a brief questionnaire was applied to 100 people in order to know their opinion. The results were positive, mainly among young people, since they accepted with pleasure and interest the use of new technologies to promote and make known Mexico's cultural heritage, as is the case of Tenango. They considered important the use of new media and technological tools even to promote tourism in these places, since some people had no knowledge of the municipality of Tenango de Doria. Currently there is more openness to the media and online dissemination, so they would reach more people in a short time.

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It is evident that each person has different tastes and interests, but they are all consumers of digital technologies. Therefore, the main utility of the application is to disseminate and protect the cultural heritage of Tenango by increasing people's knowledge about its characteristics. Table I presents the main questions and results of the survey applied.

Ask	Yes	No
Does the app provide you with the necessary information about the Tenango creation process?	85	15
Does the app help to spread the cultural value of Tenango, mainly among teenagers?	96	4
Do the 3D models presented have the necessary quality to visualize the details of the Tenango?	92	8
Did you find the handling and interaction in the app adequate?	80	20
Do you agree with global brands using Tenango on their garments, with or without permission?	29	71
Comments: Very nice dresses and accessories, they look very realistic. They should also promote the place and not only Tenango. More tools like this are needed for everyone to know what is made in the country. A simple application, but with very valuable information about this work of art.		

Table 1 Survey of app users
Source: Own elaboration

According to Tostado (2020), the phenomenon of cultural appropriation has focused on the study of popular art as a commercial commodity, analyzing and contrasting the historical and social implications that this implies. The debate on the ownership of art is a deeply complex issue, as it currently encompasses many spaces, from the social to the economic. Since decades ago, an international legal scaffolding has been sought to determine the ownership of the cultural elements of each country (music, crafts, dance), so there are international legal guidelines that do not allow the registration of utilitarian products and intangible heritage such as Mexican cuisine and Mariachi. Some exceptional cases have become anecdotal, such as the patent of the Taco in 1979 registering this dish as an element of cultural penetration by the artist Maris Bustamante, or as, according to BBC investigations, the Chinese businessman Wu You Lin who appropriated the image of the Virgin of Guadalupe in 2002 until 2012 or finally Harry Henneman in 1996 with the Mexican National Anthem.

None of these examples had real practical repercussions in the use of iconographic elements, being the result of existing legal holes in the regulations of national and international patent laws and remaining in the imaginary of recent Mexican historical curiosities.

As proven in this analysis, and citing Ramírez (2021), there is a demand beyond the terms of authorship and ownership, related to the visibility, or lack thereof, that indigenous communities have vis-à-vis other socially privileged groups, such as fashion brands. Cultural appropriation is seen not only as theft, but also as a device that favors the absence of the other, that allows avoiding the relationship with others, that materializes a silencing of their voice and an invisibility that leaves them at the margin of a possible space of relationship. Likewise, when cultural demands cling to the concept of cultural appropriation, they seek something more than a legal obligation, they also expect recognition and participation in authorial terms. Recognition in order to stop the denial and invisibilization they experience, as happens when fashion brands evade the concretion of a link with those communities that are used to their advantage.

Despite their commercial purpose and the attempts of big industry to appropriate them, these embroideries continue to reflect ancient traditions and ways of conceiving and interpreting the natural and supernatural world, the real and the mythical, the past and the present. The communities of Tenango de Doria and its surroundings have not lost their own vision of the world and their immediate environment. Their ideas, feelings and concerns are still alive, which they express in drawings and embroidery. It is the duty of each person to recognize their roots, value the tangible and intangible heritage, rescue the knowledge of indigenous groups, respect nature, and preserve the historical memory through the Tenangos (Monterrubio, Hernández and Medina, 2019).

Acknowledgements

Conclusions

Tenango is a craft that identifies not only the region of Tenango de Doria, but also the entire state of Hidalgo, due to the recognition it has acquired nationally and even internationally. As in any artisan process, the finished object is not only the result of a mixture of raw materials, techniques and methods, but also the inherited knowledge, the daily work, the ways of perceiving the world and the feeling and creativity of the artisan. Each embroidery is then characterized by being unique and unrepeatable. Once the motifs are drawn on cotton fabric, the embroiderers fill them with threads of different colors, which give great originality and identity to this craft.

Since the Tenangos have a unique beauty, several companies have tried to plagiarize them to commercialize them on their own and obtain economic profits, sometimes with the permission of the artisans, but most of the time without their consent and without giving them the credit and royalties they deserve. These events have motivated these communities to promote the designation of origin and the designation as cultural heritage.

Although they already have these designations, new tools and means are always needed to disseminate these crafts, as well as the process followed for their embroidery. Since that is where much of its value lies, in the time and dedication that artisans dedicate to its design and creation. So potential customers should pay the right price for one of these pieces, and not be tempted to buy them with pirate brands or brands that have no rights over their marketing and steal other people's ideas for their own benefit.

The mobile application presented in this document, contains various models and 3D animations with extremely realistic textures of various dresses and accessories with embroidered Tenangos. The purpose is not only for people to know them in detail, but also to know their history and the process followed to create each one of them. As it is a technological innovation, it is mainly focused on the new generations, those who are immersed in the fashion world and spend a lot of time in front of a computer looking for clothes and more accessories to buy. It is important for everyone to know that big brands cannot take over the ideas and work of small communities far from the big cities.

And if this is the case, they should not buy these illegal products, but rather buy them with 100 percent Mexican handicrafts. The application also aims to raise awareness among users about this problem, so that they raise their voices and defend products made in Mexico.

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