Effect of Digital Age on the Transmission of Cultural Values in Product Design

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Abstract: In today’s world, contemporary trends and changes that emerged from technological developments transform the ways of cultural transmissions. New abilities gained from the digital technologies are changing cultural values and their formation process. Cultural and traditional values mostly took form through craft in the history but now they are produced by new modern techniques like rapid prototyping and reforming. In this study, the ways of transmitting cultural elements to digital age is handled by analyzing the sample products that contain cultural signs and produced or designed by post-industrial techniques and affected by digital age trends. The research is conducted by; firstly, summarizing the data that is gathered from literature review, then evaluating the findings that are gained from product analysis and observation. Consequently, the methods for transferring culture to the future in scope of product design and the interactive relation between cultural object design and technology are presented and discussed.

Keywords: Cultural transmission, Product design, Digital age, Technology

1. Introduction

In today’s world, contemporary trends and changes that emerged from technological developments generate a web like platform. This platform contains social relations, cultural transmissions, individual and peripheral data. Current trends and new abilities gained from the digital technologies are changing the tangible and intangible layers that surround us. This change also occurs in cultural and traditional values, which have a long history, and in their formation process. Oswell (2006) implied that the culture is not only a category or an idea but also something substantive, something material. The nonmaterial cultural contents are also carried by different forms and means of materials. According to Oswell, culture in all its flexibility is not just the stuff transferred but it is also all that happen during this transfer (Oswell, 2006). In this context, cultural elements and signs in design are influenced by the developments during transportation and they are transformed. In the other words, evolution of design is still going on, like the evolution of nature. Cultural and traditional values usually took form through craft in the history but now they are produced by new modern techniques like rapid prototyping and digital manufacture and they are reforming according to the current conditions. These values are also affected by many trends in terms of visuality. For example, a redesign of traditional handmade carpet motives via generating a pattern that consists of pixels.
Therefore, in this study, similar examples and the ways of transferring culture into the future via using these values in product design are analyzed and how technology affects the cultural product design is investigated.

2. Culture and Design

2.1 Relation Between Culture and Design

Culture, which is very difficult to define, is an inclusive concept of life and everything that exists. Culture; when it is approached from an anthropological standpoint, can be defined in a very general sense as everything about human form or life style. Like design, culture has roots related to the idea of development and nourishment (Sparke, 2013). From past to present, there have been constant changes in the meaning of culture. Before the 19th century, culture was regarded more as 'tendencies of natural growth', but later this concept started to have a meaning of its own. Firstly, this concept referred to 'the general state or habit of the mind' and secondly it meant 'the whole level of intellectual development of a society'. Thirdly, culture has gained the meaning of 'general structure of art' and finally 'whole life style in material, intellectual and spiritual sense' (Williams, 1983).

Many researchers had aimed to define culture, and it has been considered as a structure composed of multiple layers. For example, Leong and Clark (2003) developed a framework for studying cultural objects that is distinguished by three special levels: The outer “tangible” level, the mid “behavioral” level, and the inner “intangible” level. If we consider the concepts expressed as 'outer level' or 'tangible' here as physical or material assets, objects and tools used in everyday life can be included in this category. 'Behavioral level' refers to human rituals and traditions; 'inner' or 'intangible level' expresses emotional art, beliefs and religions (Leong & Clark, 2003). This structure concretizes the fluid structure of culture and it provides a basis for dealing with culture's building blocks.

![Figure 1. The “spatial perspective” of culture. (Leong, D., & Clark, H., 2003)](image-url)

On the basis of these works and classifications, cultural objects, as designed objects, may become visible and understandable by building bridges between design characteristics and layers of culture. To accomplish this, these layers were matched with various design qualities to create new working frameworks that were anticipated to be used for the design of cultural products.
Although culture is commonly handled holistically, there are some subcategories to culture such as; popular culture, traditional culture, material culture... etc. However, these structures never exist completely apart from each other and they constantly interact with each other and construct each other. The most important domain for design discipline is material culture. According to Prown (1996), material culture is the study of any raw or processed material that has been transformed into a manifestation of cultures after human actions. Prown's method of studying material culture is to examine the reality of the product in all its forms, constructions and articulations. He treats the information as a structure that is not only inclusive but also productive simultaneously (Prown, 1966). According to Sparke (2013), design is both an influencer and a reflector of change. In addition to visual and material expression, it can convey messages with its ideological value, and for this reason, it has a shaping role in society and culture. In this sense, design is not only a reflection of culture but it is also a part of the on-going process in which culture is created.

### 2.2. Cultural Objects as Culture Transmitters

Throughout the history of mankind, from the very first moment we started to produce artificial objects; human, as a creative person, had not performed an independent design action from his thoughts and experiences. There have always been internal and external influences affecting design. Actually, we can call all these influences, which include our past and present experiences and lifestyles affecting our way of thinking, as culture. Therefore, since the time of man's existence, the mental processes that triggered production and products have always been in interaction with culture. While culture influenced design, design influenced culture and they both transformed each other. Hence, product designs are much more than they are and contain many information and values about culture and life. In this context, designers, past and present, convey cultural values to the future with their designs, with or without being aware of it.

Cultural indicators in product design can be conveyed through various strategies such as morphological application, topographic application, formal interpretation, allegorical interpretation and conceptual inspiration. Morphological practice is the placement of the form of a cultural, historical or a popular object on to design object as an ornament. Topographic application is the provision of a third dimension and usage for a historical, ethnographic or an architectural pattern. Formal interpretation is the redesign of an existing product, as the working principle remains the same.
same. Allegorical interpretation can be defined as providing a new use for an old object. Conceptual inspiration, which is one of the forms used in cultural product design, is a method in which cultural norms and beliefs constitute the infrastructure of social behavior patterns rather than a specific product or form based on culture (Balcıoğlu, 1999).

Cultural objects carry signs of cultural identity and refer to the traditional one. There is a vivid relationship between culture, society and tradition. They are changing within themselves and are constantly affecting each other. Cultural objects; especially in the past, were hand-made, they have functions and appearances known to society, and have meanings attributed by the society. They represent some of the practices of daily life conveyed from the past. Cultural objects, as being the transportation medium of historical ethnic data, have become a kind of memory for the society. This relation resembles the one between memory and the individual. Material culture is “the common mechanism to collect data” (Posner, 2001).

3. Design in the Digital Age

Today, science and technology are progressing rapidly. With this progress, creative disciplines are undergoing an evolutionary process similar to the evolution in nature. Especially the development of digital technologies has been very influential on the concept of design and design action. Design and the whole design process inclusive of design philosophy, design thinking, methodology and production methods are transforming.

In the information age that we are in, our competences in the field of design and production have increased and differentiated. This new digital design has brought its own theoretical and practical structure, transforming the last century in almost a revolutionary way. With all these developments and changes, a culture that can be defined as digital culture has been formed, which reflects in our life style and therefore reflects in each of the design products that are in interaction with this life style.

Post-industrial production methods such as CAD, CAM systems, 3D printing, 4D printing and laser cutting have played an active role in production and design. Along with new possibilities in design, came new functions that can respond to emerging needs, rapid production methods and organic and generative forms that were difficult to realize with the previous possibilities. In product design, architecture and other design areas, this visual innovation was quickly recognized by experimental design practices, consequently becoming a driving force in the spread of digital design cultures. Digitalization and its growing influence on design and production has led to a need to redefine the methodology of design together with concepts of the design discipline such as representation, generation and interaction (Oxman, 2006).

Digital design has become a form of culture, living and thinking that is effective not only in the transfer of designs through digital interfaces, but also in the stage of cognitive and intellectual activities that are involved in the entire design process of designers. The digital design has differentiated itself from conventional design through various components. Digital technologies affect the basic elements of design such as presentation, generation, evolution and production while transforming the design process. Products are now designed, documented, produced, assembled and presented through digital media. Together with new technologies, the concept of time, also known as the fourth dimension, has become a more effective parameter with increased applicability. Designed products have become more complex but more responsive and flexible. These qualities arise not only from the forms that the design develops into, but also because they contain more information and are made with knowledge. Furthermore, related to these developments are changes
in the general culture of design including the introduction of new design concepts, and the recognition of new contingent relationships with philosophy and science related to these concepts (Oxman, 2006).

According to Mitchell (2000), if the new design is in any sense revolutionary, it is so not due to its forms, but due to its ability to propose meaningful alternatives to the logic of repetition in the comprehensive historical sense. Emerging design theory has transformed the concept of form into the concept of formation. Traditional models of design processes were based on implied, rather than explicit, knowledge. Both generative and evaluative knowledge were not formalized and very often this lack of formalization was associated with intuition and creativity (Oxman, 2006).

When considered in terms of product design, digital design evolves from the mental process of the designer through stages of representation, formation, presentation, interaction and production, that is, an entire design process. Digital tools are used at every stage of the design. In the designed products—even if they are not digitally produced—effects of some of the trends are visible as an outcome of digital age occupying mental and social space and becoming a way of life.

4. Effect of Digital Age on the Transmission of Cultural Values in Product Design

In the digital era that we are in, the cultural values from the past meet and interact with today's digital culture, transforming the way of transferring cultural values through products. While a cultural value is being represented in product design or creating design thinking, it can no longer be independent of the digital world; it is transferred with digital media, using digital media.

The selected designs in this study will be considered in terms of which strategies the cultural indicators are transferred to design and how the generation and thinking methods of the digital age are influential in the identification and implementation of these strategies. In this context, examples were selected from different categories such as furniture, ceramics, accessories, toys and kitchen utensils.

The first of these selected examples is Ela Cindoruk’s design "Five in one" (Figure 4). ‘Five in One’ is a type of accessory that is used in some regions of Anatolia, particularly in rural areas. This object is traditionally given as a gift to women at celebrations such as weddings and circumcision festivities. It comes in two different forms: one where five whole gold coins are tied to a red ribbon, and the other one where five gold coins are compounded as one and tied, again, to a red ribbon (Cindoruk, 2012).
Here the designer has introduced a formal interpretation of the cultural object, while conveying a cultural value over an object with traditional use. Along with this formal interpretation, a function has been added to the product in which gold can be removed and presented as a gift. The design, which proposes a new form and use, has been produced by laser cutting method among the modern production techniques.

Another example based on a cultural object with a long history in its formation is the "Mosaic" carpet design of Kunter Şekercioğlu (Figure 6). The product refers to the hand-woven carpets produced by traditional methods and the traditional motifs seen on them. However, this design is machine-made using modern methods and it presents an image made up of pixels. The designer's strategy here is to refer both to the past by introducing a formal interpretation of the traditional carpet motifs and to integrate the new values with the past values using the digital age’s visual codes.
A product design made with a similar concept is Elisa Strozyk's "Colored Wooden Rug" design (Figure 7). While the colors and geometry used in this design also give references to traditional carpets, the product stands at a point very close to today's design concept and trend. Contrary to the traditional, a more dynamic and flexible structure has been created and the product has been reproduced by repeating certain components with a method similar to parametric design methods. The time parameter that we have seen in the methodologies applied in the digital age is also included in the design. Material and technical innovations that have not been used before in this cultural artifact have been applied here.

The vase, as being one of the objects that has been produced since the earliest times conveying clues about the past forms of daily life, has been seen throughout history in various functions and forms. In traditional methods, ceramics or glass materials were often used and the vases were hand-produced. Today, with advancing technology, different approaches have been developed besides traditional methods. Especially 3D printing technology has provided new possibilities for designers. As examples of new approaches, Olivier van Herpt's "Functional 3D Printed Ceramics" (Figure 9) and MIT's "Printing transparent glass in 3-D" (Figure 10) studies can be given.

In his project, Olivier van Herpt pulled the ceramics material out of the traditional methods and produced ceramic vases in various forms by using the layering technique of overlaying with the 3D printing system he developed. This method is actually a working principle of 3D print, which makes it a digital revolution. The new method is aimed at solving the problems of production size and heat resistance of existing 3D printers. The designs, although produced with a new technology, continue to convey the value of the traditional ceramic vases, as each piece is unique with its material and exclusive forms.
Another example that can be given for this transformation is the "Printing transparent glass in 3-D" system developed by a research team from MIT, including Neri Oxman (Figure 10). Here, too, glass as a hand-shaped material that is carrying traditional and cultural values acquires new potentials, by an innovative system, emerge especially in form research.

The digital age transforms cultural products not only by means of production methods, but also by the emerging innovative materials and the characteristics of these materials. Designers are trying out new materials as they are redesigning cultural objects. An example of this is Gamze Güven's "Loqum Tray" design (Figure 12). In this design, Corian is used as a new material. A contemporary proposal has been made for the presentation of "lokum", a traditional food which has an important place in the Anatolian culture. It is observed that this cultural product design also has a formal interpretation. However, the most effective parameter for producing the form here is the structural property of the material itself.
Handcrafted lace, as one of the cultural objects, was also subjected to the interpretations of the designers with the influence of the digital age. An example of the use of a cultural object in product design in a contemporary manner is Büke Çangal’s coffee table design called "Mukaddes" (Figure 14). Here, the traditional lace pattern and the gaps in it are represented by removing pieces from the metal plates. The lace, which is used less and less nowadays, has a spiritual existence and the designer had aimed to maintain this spirituality using different methods. Hence, it has taken its place in the design as a cultural sign.
Finally, within cultural objects, we can give an example of the transformation of toy design, which has its place among significant products in our lives. Pinwheel, with its long history, has been redesigned by JungHoon Lee and Dongkyu DK Lee as "Completing Incomplete" (Figure 16). Here, it is observed that the design has a simpler look, away from the traditional structure of wood and hand production. But the main form and function have not changed. While the cultural value is transferred in the design, it is seen that structures representing the cities are also symbolized. All these transfers are done again by 3D printing method. In the design process, using the same methods, rapid prototyping is done and feedback is collected.

Figure 15. Traditional Pinwheel (Stephan Karlisch, 2007)

Figure 16. Completing Incomplete (Lee, J., 2016)

Figure 17. Completing Incomplete Prototypes (Lee, J., 2016)
5. Analysis and Discussion

In contemporary digital age, cultural values from the past interact with the digital culture of today, transforming the ways of transfer of cultural values through products. Just as the design concept and the entire design process can be influenced by the cultural values of the past, it is also influenced by today's culture and way of life. Design actions can no longer be independent of the digital universe, new production methods, new materials and design methods.

In this study, the selected designs have been analyzed due to their cultural roots and being products that convey cultural values with contemporary methods. By considering these designs, the aim is to generate an idea about what kind of transformations digitalization can cause on cultural objects, and what strategies can be applied by the designers while transferring cultural values in this age. As seen in the sample products examined in this context, while the cultural objects are redesigned, the physical, social and non-physical characteristics of a cultural object can be made use of, depending on the strategy applied by the designer. In the analyzed examples, mostly the physical properties and then non-physical properties of cultural objects were put into use. Strategies such as formal interpretation and abstraction have been followed.

Today, besides these strategies, the changing design methods and design language are also influential in the design of cultural objects. Sometimes through the methodology of formation, and sometimes in terms of form and function, the products are referring to digitalization. It has been determined that in the products analyzed in the study, new production methods and materials were mainly used. Following that, generative formation strategies and appearances such as pixilation, which became digital culture codes, were utilized (In which aspects the sample products are influenced the digital age presented in Table 1.).

Table 1. Analysis of the Product Samples

| Product Designs          | Digital Age Effects                      |
|-------------------------|-----------------------------------------|
|                         | Appearance (form, pattern, color, material etc.) | Function (usage, mobility, flexibility etc.) | Production (post-industrial techniques, rapid prototyping etc.) |
| Five in One             | x                                       |                               | x |
| Mosaic Carpet           | x                                       |                               |   |
| Colored Wooden Rug      | x                                       | x                               | x |
| Functional 3D Printing  | x                                       |                               |   |
| Ceramics                | x                                       |                               |   |
| Transparent Glass in 3D | x                                       |                               | x |
| Printing                |                                         |                               |   |
| Loqum Tray              | x                                       |                               | x |
| Mukaddes                | x                                       | x                               | x |
| Completing Incomplete   | x                                       |                               | x |
In the given table, the products which have tangible and intangible cultural values are marked in which aspects they were influenced dominantly by the digital world and new production methods during this transmission of cultural values. It is, of course, difficult to embody and precisely categorize these digital age effects. Hence, these interpretations are based on the products’ dominant characteristics. For instance, some of the sample products have considerably organic or generative forms thanks to new digital methods. So, they are marked as affected in terms of appearance in the table. Some products have additional functions or have changed their functions due to new digital possibilities. These are indicated in the function column. Lastly, as seen as in the table, the products examined are most influenced by digitalization in terms of production. All these effects also change the way of thinking and designing of designers. So, while they use cultural values in their designs, they set strategies under the influence of the digital age.

Finally, from a prospective point of view, it can be envisaged that the cultural product design will continue to exist without the disappearance of the cultural indicator but will become more and more abstract. Moreover, the effects of the digital world will increase as the transformative character of the designs will vary, and geometric and structural form of the designs will become more complex with a lot of potential but more sensitive to time and environment.

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Acknowledgements: The author would like to thank the Review Committee for their constructive comments. Special thanks to Asst. Prof. Dilek Hocaoglu for her guidance and encouragement.