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Current Approaches to Textile Design Education

**Basak Ozkendirci
Assistant Professor
Altinbas University
Turkey**

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Athens Institute for Education and Research
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Tel: + 30 210 3634210 Fax: + 30 210 3634209 Email: info@atiner.gr URL:
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Current Approaches to Textile Design Education

Basak Ozkendirci
Assistant Professor
Altinbas University
Turkey

Abstract

Textile Design; It is a wide design area that includes fabric production areas such as weaving, knitting, warp knitting, nonwoven and surface design. The textile design that has existed since the industrial revolution has been the subject of a great change in the last century. Recently it took months to design a single pattern on paper, but nowadays, digital equipment can be done in digital media in a few minutes. The rapid change in technology is not limited to facilitating and accelerating the processes. The emergence of new areas of use, the development of new production technologies, the development of new generation textiles with superior qualities, affect every aspect of life. This change, which increases the habits and expectations of consumers, reshapes the textile sector. The boundaries of textile design are changing. While textile design has been limited to fabric construction or pattern design in the past, today it has become an interdisciplinary field where more than one field expertise is required. The study examined the technological developments since the beginning of the adoption of textile as a design field in the historical process and explained how these developments are reflected in the design processes. The research conveyed the new working areas and tools of today's textile designers and questioned how these innovations would affect textile designers. Within the scope of the research, a vision has been formed on how to position the textile design field in the future, and in line with this vision, the qualities that the textile designer should have in the future have been determined. This study also evaluates the concept of classical textile design in line with current developments and gives some suggestions for modernizing design education.

Keywords: Textile Design, Fabric Design, Textile Design Education, Textile Designer, Modernization in Design.

Introduction

Since the development of the first steam-powered weaving machine, textile has become a major field of production and employment. The individual productions that the home people made to meet their own needs and the small-scale productions realized by the shopkeepers in the workshops were moved to the factory area with the development of machines that provided faster and better quality production (Soner, ST2007,p.8). As a result of the move to the production area, the distance between the consumer and the producer has expanded. In order for the factories to work efficiently, the production areas had categorized. Manufacturing techniques have developed to improve product quality. Production measurements standardized by determining the average size of individuals and goods. The aesthetics of industrial design has reinterpreted with the concept of fashion because the aesthetics of design will be presented to the taste of the society instead of the taste of the individual.

There was an uncertainty about who will assume the design action in factories in this period. The design act that craftsmen had previously done was met by engineers, artisans, and artists in the industrial setting. It is known that painters who produce designs for factories in the period when the textile started to industrialize positioned as the managers of artisans who produce patterns (Raizman,D.,2003.p.19). Pattern offices as Turnbull & Stockdale established by the end of the 19th century and artists as Edouart Collona, Alphonse Mucha, Otto Eckman who specialize in pattern design, have contributed to the development of the textile design concept (Jackson, L.2002,p.27-30).

It can be said that the Bauhaus School, which was founded in 1919 by Walter Gropius in Germany, created the identity of the designer. Textile designers who graduated this school met the expectations of the industry of the era with their aesthetic skills and technical knowledge. Many academies established after the Bauhaus study adopted the Bauhaus school and designed the education system to suit this school.

The designs needed for the mass productions of the first weaving factories had performed by artists. Those drafts had to be rearranged to be accord to the report repetitions by craftsmen. Careful and painstaking studies of pattern designs were driving months. After the draft operation on the technical papers, hundreds of jacquard pattern cards had to be punched, sequencing of and sewed according to the original pattern so that the pattern could be transferred to the weaving loom which has a jacquard mechanism (Bell,T.F.,1895,p.96). From drawing to card punching, every step of the weaving design continued to be handcrafted until computers began to be used in the textile field. From the first industrial weaving looms to the present day, weaving technologies have shown significant improvements in terms of production speed, production quality, and pattern capacity. The most important development affecting the design stages in the weaving area was the increase of the design capacities of jacquard mechanisms. Another important development affecting the design was the development of weft insertion mechanisms that allowed the use of multiple colors. Thanks to the new weft insertion systems, multi-colored fabrics have been produced quickly. The adaptation of computer hardware and software to textile has brought textile design to the new century. In this way, the design processes were shortened and the transfer of the patterns to the weaving machine became easier.

In the production of printed fabrics, motifs in designs had to be carved into wooden molds or copper strips according to the number of colors to be printed. It is known that at the beginning of the 19th century a printing production plant established in Germany could mechanically print with wooden plates and hollow copper cylinders (Yilmaz, G.2015, p.16). In order to print the

designs of the artists to the fabric, color separations and pattern repetitions had to be done by artisans. A pattern was preparing by carving wood or copper mold separate for each color to use. The developments in printing technology are mostly focused on; increasing the variables such as the clarity of the pattern details, the quality of the colors used in printing, the number of colors used, and the amount of production. Different printing methods, such as gravure printing, transfer printing, flock printing, etc., which have been performed by hand in the past, have been mechanized. Until design software began to be used in textiles at 1980's it became the only mechanization copier in the production of print design designs.

The mechanization of knitting is started with the invention of the circular knitting machine by British priest William Lee in the mid-16th century. During the industrial revolution, single yarn fed plain knitting machines, single yarn fed round knitting machines, double needle bed knitting machines, and warp knitting machines have been developed (Bahriyeli,B.,Ozkendirci,B, 2009, p.4). With the fashion designers began to use knitted clothes in their collections in the 20th-century, the popularity of knitting has increased. Knitting technologies and fashion have entered a loop that feeds each other in terms of developing new products and new machines. In 1921, the adaptation of jacquard mechanisms to knitting machines increased the pattern variety, and the need for textile designers to provide design services in the field of knitting also increased (Matković,V.M.P.,2011,p.16). With the development of software that works in coordination with knitting machines, knitted fabric, and product design has been moved to the digital field. Since there were no experts in design in this field, knitted designs were made by textile engineers and technicians for many years. Some organizations that offer academic education in fashion and textiles add knitting design courses to their curricula in the last thirty years.

With the software developed specifically for textile designs, it is possible to draw patterns, create repeats, create structural patterns, make color separations and create color variants in the digital environment. Variant studies can be done, fabric, print and embroidery designs can be made simulations. Completed fabric designs can be simulated in a three-dimensional image on a seat image or a visual image (Kumar, A.L., Kumar, M.S., 2018, p.392).

The industrialization of clothing production began in 1824 when Pierre Parissot opened a store in Paris where ready-to-wear was sold. Women who do not have the time to produce their own clothes as they started to live and work in cities showed great interest in ready-made clothing products. Ready-to-wear stores grew rapidly in a short period of time and became popular all over the world. Thus, ready-made clothing turned into a major industry (Condra, J.2008.p53). With the clothing industry, the fashion sense gained momentum. The designers of the fabric producing companies for the clothing industry had to follow the latest trends and produce more designs in parallel with this fast market.

Since the period of the industry, changes in textile production have led to the development of different subdisciplines according to production methods and/or product types under textile discipline. The academic institutions have been restructured in accordance with these sub-disciplines. Recent innovations in science and technology have led to radical changes in the textile industry. This radical change affects the expectations of the industry from the textile designer. In order to prevent design education from lagging behind the age, it is necessary to question the status of the textile design area, to establish the future position of the textile and to redefine the textile design education with a future perspective. It is necessary of revise the textile design undergraduate education to be able to educate the textile designer in accordance with the qualities to be expected from them.

Literature Review

For the preparation of the manuscript, resources such as books, articles, papers and web pages related directly or indirectly related to the subject have been investigated. Sources about the developments in weaving technologies (Soner, ST2007), (Bell, TF, 1895), sources on the design of the patterning (Raizman, D., 2003), (Jackson, L.2002) sources of printing technologies (Yilmaz, G.2015), and the sources of knitting technologies are examined (Bahriyeli, B., Ozkendirci, B, 2009), (Matković, VMP, 2011) in order to convey how the textile design field is shaped in the historical process. In order to determine the status of textile design education, curriculums of the related departments of twenty universities from different countries were examined and the internet addresses of these institutions were added to the referances. In order to create a vision of which textile industry will work in the future with the disciplines, articles related to scientific research such as textile-adapted technologies, nanotechnology and new generation textile materials are investigated (Cherenack, K.Pieterston, L., 2012), (Labbare, S. (2016) (Inan N., Yildirim T., 2009) (Barfield, W. & Caudell, T.2001), (Brownell, L.2017), (Chan, J., Shyamnath, G.2017 (Francioso, L, Siciliano, P., Pasca, M. 2013), (Phillips, N. 2014), (Hall, JS 2009), (Mongillo, JF 2007).

Studies on the adaptation of new generation technologies and new production technologies to education have been examined as directly related sources (Studd: R., 2002, p.35), (Ballie, J., 2012), p. (Ujiie, H., 2002, s.254). Environmental factors such as global warming, reduction of natural resources, reduction of energy resources, sustainability, global economic interactions have been examined as indirect sources, which are considered to be effective in determining the future status of the textile industry (Fankhauser,S.,1994), (Abernathy,F.,Volpe,H.) , (A.,Weil,D.,2006), (Shedroff, N, 2009).

Methodology

Scientific and technological developments related to textile have examined and the information in published researches evaluated. A descriptive analysis was carried out in which the disciplines will cooperate with the textile field in the future.

Social, economic and environmental conditions that will affect future design areas have examined. With reference to these conditions, a hypothetical approach has developed for the future status of textile design. By examined the new generation of design tools and production technologies, a vision has developed on how the design action will be implemented in the future. The subject of how to be positioned in the future of the discipline of textile design and related subdisciplines has opened to discussion. The possible qualifications of the textile designer in the future in accordance with the position and expectations of the textile sector have defined and this definition has been put on the agenda as a topic of discussion.

The curricula of twenty universities from different countries with textile design education programs have examined. Among these programs, the existence of the courses required for the modernization of textile design education has questioned. The current state of textile design education has evaluated and determined.

Findings

Thanks to the competition in the world of technology to produce electronic equipment in smaller sizes, it has become possible to adapt sensors, power-generating transistors, data-transmitting cables, and LED lighting materials to fabrics (Cherenack, K.Pierson, L., 2012). Many scientific studies are carried out on fabrics that can identify the variables of the user or the environment, respond to the effect that can transfer data or store data. Fabrics equipped with technology to facilitate daily life of users are seen as textile products of the future. Advances in nanotechnology have enabled to integrate different nanoscale materials into fabrics. Nano-fabrics exhibit superior qualities without losing their natural castings and touches. There are many researches in the field of biomaterials that are completely soluble in nature, which are considered to be useful to reduce environmental pollution. Biotextiles obtained by reproduction of the tissue sample taken from the cow in the laboratory or by the development of different types of mushrooms are thought that will be rival the leather and fabric industry.

In the coming years, as a profession, design will continue to evolve into a hybrid industry that also is as technically accepted as much as being creative (Labbare,S.,2016). Textile, one of the industrial field where scientific developments can be quickly adapted and sold to consumers, is at the center of multidisciplinary studies. In order for a multidisciplinary study to be productive, the experts participating in the study should be able to recognize each other's fields and use a common language to communicate in a healthy way. The knowledge of textile designers about other disciplines related to their field will allow them to take part in multidisciplinary projects and develop new multidisciplinary projects.

Computers are used in almost every discipline. The software specially developed for professions are converts verbal data, numerical values or designs into a visual language that can be understood by everyone. Nowadays, experts from different disciplines can work simultaneously on the same project without having to come together with new generation software (Inan, N.,Yıldırım, T., 2009, s.583-585). The software that interacts on the net with each other, digitally visualized data, combines all designers, scientists, and artists in common visual language. The increase in multidisciplinary studies that related textile shows that designers will be involved in such projects in the future. When considered in this context, the necessity and importance of computer-aided design courses are remarkable.

As mentioned in the introduction section, weaving, knitting, warp knitting, and embroidery machines are managed with digital software. Instead of the sample fabrics produced at the marketing of fabrics, fabric simulations are presented. The adaptation of digital printing technologies to the textile sector has led to drastic changes in the textile printing industry and indirectly in the printed fabric market. The flexible production conditions provided by digital printing facilities that can be installed at low cost have reduced costs such as inventory, transportation, minimum production quantities. For these machines, which can print in short and in series, designers need to prepare more patterns in less time.

The industrial production dependent on fossil fuels and the rapid consumption concept, which has become a disease of developed societies, cause the rapid depletion of natural resources. In order to reduce the excessive carbon emission, which is seen as the biggest cause of global warming and environmental pollution, designers who design industrial products need to be conscious. The concept of industrial design that serves fast consumption has to be transformed radically to the concept of sustainable product design. The textile industry is a production area where many toxic substances such as pesticides and finishing chemicals used in

natural fiber production contaminate natural resources. Compared to high production figures, a very low proportion of textile products can be recycled. Because of aggressive marketing strategies, clothing products have increased to the category of fast moving consumer goods in recent years. This situation brought the textile industry to the second rank of the environmental pollutants' blacklist (Muthu, S., 2015). Such an industry does not have sustainability. Whereas, promising studies questioned by the slow fashion insight suggest that the environmental awareness of the fashion industry is increasing (Mangir, F., A., 2016). For the textile industry to be removed from the black list and to be sustainable, it is necessary to design products that can be produced with less energy. New products developed must be produced with recyclable materials which are soluble in nature. The longer the usage time of the products, the lower the carbon footprint of the consumer. Therefore, it is important that new products are designed in a quality that can be used for a long time and they are innovative products with more than one function. Qualified innovative products contribute to slow consumption and slow fashion understanding as they have high added value compared to low market circulation. Innovation and sustainability will become the keywords of design in the future. In order for textile designers to gain environmental awareness, it is necessary to give environmental-oriented design courses in the curricula of design education institutions. There are many educational models that will enable design students to gain an understanding of innovative design (Shavinina, L.V., 2013). In this context, in the curricula of twenty universities that examined, words such as innovation, sustainability, and environmental-centered design have been searched. In only two of the twenty universities studied, courses about sustainability in fashion design were identified.

Nowadays, companies are looking for a lot of features besides their professional knowledge and skills at resumes. At the job applications, graduates with advanced creativity, social intelligence and empathy skills come forward. Identifying problems and producing creative solutions are the abilities which seen as a requirement. Skills such as effective communication and persuasion make it easy for graduates to find jobs. In order to be successful in their professional lives, graduates need to acquire these skills as well as vocational training. The courses organized in order to develop creative thinking, solution-oriented thinking, and human and environment-oriented thinking skills take place at different levels of education (Albrecht, K., Miller, G. 2004, p.5-7). Designer Robert Girling notes that creativity will not be monopolized by designers, and it is in this competitive environment that more and more designers will need additional knowledge and expertise to contribute to multidisciplinary contexts (Girling, R., 2017). This finding suggests that innovation courses that improve creativity are not enough alone. It's suggesting that innovative design courses should be conducted in conjunction with studies that will prepare the ground for multidisciplinary studies.

Thanks to the Internet, the circulation of information and images reached an infinite level. Textile designers now following street fashion and fashion trends through social media. They are sharing their designs with the world on their web pages. They are marketing their designs on the internet without the need for large investments to establish a company. This rich sharing environment, in which designers also benefit from the development of new ideas, on the other hand, makes the protection of design rights difficult. In this context, it is recommended that the positive and negative effects of social media on textile design should be considered as a research topic. The sharing and protection of the rights of designers in accordance with the rules of professional ethics on the internet is seen as another research topic that will be of concern to lawyers in the near future.

The environmental conditions, scientific and technological developments, and the effects of these on the textile industry show that it is necessary to make innovative arrangements in textile design education. At this point, it would be useful to redefine the identity of the textile designer, to set the attributes expected from the textile designer with a realistic approach, to debate the textile designer's job descriptions.

Textile designers are working in different positions such as trend consultant, drawing, color specialist, repeat artist, cad-cam designer, research and development specialist in accordance with sub-disciplines. While a designer working at the integrated production facility only hand-drawing, another person can make a color variant throughout the day in a computer. In a small business, a designer can undertake a variety of tasks from drawing a pattern to marketing a product. Textile designers are expected to use design software effectively, design products that meet consumer demands and manage all variables in the production process.

According to Wilson; a textile designer has to design and produce, to an agreed timetable, an agreed number of commercially viable fabric designs (Wilson,J.,2001,p.10). Steed and Stevenson, on the other hand, state that the traditional role of the textile designer, limited by color, pattern and fabric aesthetics, has become increasingly complex and exciting with the development of new technologies and social media (Steed,J., Stevenson,F.,2012p.15). Professor Robert Young states that future designers will need to develop their core design skills as well as their creativity, analysis, synthesis and representation skills. Professor Young adds that; the designers will operate at the more strategic level in companies and organizations as interpolators who will guide the interdisciplinary cross-connections (Designtransitions.2012). Findings of the study are consistent with the opinions of Young, Steed, and Stevenson. In the direction of the findings obtained, textile designer of the future could be defined as; having the basic design knowledge and skills related to the field of discipline and, expertise as well as being able to use innovative design skills, have environmental and human-centered design consciousness, have high social intelligence, have multidisciplinary working skills and effective use of design software. This definition is open to developments in the direction of variables affecting expectations from textile designers.

Another issue that needs to be discussed is the position of textile design subdisciplines in the future. New production technologies and scientific inventions may add new branches such as bio-textile design and three-dimensionally printed fabric design to existing branches. In addition to this, thanks to the developing design software, the difficulties of learning craft will be reduced and the productivity of the designers will increase significantly (Girling,R.,2017). This may be able to a designer to develop designs that are tailored to each subdiscipline of textile design without having to specialize in a particular branch. In this case, a specialization in sub-disciplines in design education in the future may become unnecessary.

In six of the twenty universities studied within the scope of the research, textile design education is carried out as an independent program without merging with fashion or similar field. In other universities, textile and fashion design education are carried out together. In the article, twenty universities, whose numerical information is used, provide education within the faculties of art and design. However, during the research, it was seen that there were also textile design programs providing education in engineering faculties too. During the research, it was seen that education was not divided into disciplines in the art and design faculties of many international universities and the courses were organized with a holistic approach. Students who have taken basic art and design courses in this education model can choose courses from different disciplines according to their interests. The graduates of these faculties have the title of artist-

designer as their specialty in their diplomas. It will be useful to develop an innovative perspective on how the design discipline and sub-disciplines should be positioned in line with the findings.

Conclusions

The increase in the fields of hybrid research development resulting from the collaboration of different disciplines and the adaptation of scientific and technological developments to the textile field show that the textile design field is going to gain an important place in terms of multidisciplinary studies. Therefore, it is important that textile designers of the future are prone to multidisciplinary studies and to communicate effectively with different disciplines.

Increasing environmental pollution due to the decrease in natural resources and energy resources leads to question the sustainability of textile production. The intergovernmental agreements aimed at protecting the future of the world, such as the Kyoto Protocol, reveal significant sanctions on clean production. These sanctions will also change the consumption-centered design concept. The new design approach is structuring around sustainability and innovation values. Sanctions lead the textile industry to a sustainable and environmentally oriented structure. The textile designer will play an important role in this process of change. For this reason, design students should gain environmental awareness and develop environment-oriented designs in their vocational education.

In terms of the modernization of textile design education, the inclusion of innovative design courses based on problem-solving, which will provide human and environment-oriented design awareness in basic education programs, will be an important development.

Research shows that the success of future textile designers is directly related to the three-dimensional computer-aided design skills. Therefore, it is considered necessary to take computer-aided design courses as a compulsory course in textile design programs.

Based on the study indicating that interdisciplinary studies will increase It is thought that creating fields that support interdisciplinary studies will be beneficial for the development of design education institutions. In order to increase students' sensitivity to multidisciplinary studies, it is recommended to prepare multidisciplinary courses that combine different disciplines in textile design education.

Within the scope of the research, textile design curricula of universities from various countries have been examined by taking into consideration the lessons which are required for modernization. It has been seen that ten of these twenty programs did not include relevant courses. The courses related to computer-aided textile design, interdisciplinary studies and sustainability, which are included in the curricula of the other ten universities, are important for an awareness of the modernization of textile design. However, it is not possible to reach the speed and competence required by modernization effort with the few courses mentioned.

Designers should be in front of the time not at the back. The revision and modernization of the academic education of textile design according to the changing conditions should be evaluated as the key to the success of the future textile designers.

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