Exploration and Practice on the Teaching of Electronic System Design Based on Integration of Technology and Fashion

Hao LIUa, Tian-Yu XUEb, Qing-Chang MENGc and Hao MAD
Beijing Institute of Fashion Technology, Beijing, china 100029
agxyliuh@bift.edu.cn, bgxyxty@bift.edu.cn, cgxymengqch@bift.edu.cn, dgxymh@bift.edu.cn

Keywords: Integration of Arts and Technology, Electronic System Design, Teaching Research.

Abstract. With the advantages of the integration of the arts and technology of BIFT, this paper discussed the method of application-oriented talents in Arts and Engineering. Based on reform of teaching about electronic system design, the new knowledge and new technology of interdisciplinary was introduced in the teaching practice. The curriculum reform has manifested the concept of Arts and Science, and put more emphasis on the organic integration of theory teaching and practice teaching. Combined with the academic competition and various extracurricular activities in science and technology, the reform of course realized the mutual complement between the inside and outside of the class practice teaching and cultivation principles of "high efficiency, continue to strengthen, step by step" in teaching processes was embodied. Through the above methods, our students had some abilities in Engineering design and practical, fashion and art design and team management and cooperation, etc. Thus their employment competitiveness and self-employment’s ability was enhanced.

Introduction

Ministry of Education, Higher Education Steering Committee on the "how to train applied talents," pointed out the need for culture and social development of high-quality composite applications personnel must be combined with the own actual situation, giving full play to their own advantages, to accurately predict the needs of society, in order to adapt to the social development in the information age [1].

Today, modern world is in the era of rapid development and changes. The rapid development of knowledge economy, the process of globalization, science and technology innovation and progress had been changing with each passing day, and talent competition was becoming increasingly fierce [2]. The opportunities and challenges brought by the trend of social development have highlighted the importance and urgency of engineering education reform and the cultivation of innovative talents, and therefore universities put forward new requirements in terms of structure, quantity and quality in the training mode of applied talents. This is mainly manifested in two aspects: On the one hand, with the development of electronic information, computer and other fields of science and technology, study of matter itself became more and more deeply, and engineering activities are the origin of team composed of members of different engineering background. This change to promote the engineering education from a single direction toward the comprehensive and systematic transformation; On the other hand, with the people pay more and more attention to art design and fashion industry, project development, design and implementation of gradually completed by a cross knowledge background of project teams work together, thus to the overall project design implementation put forward higher requirements [3].

The Necessity of Cross-Integration of Science, Technology and Fashion

Science and technology research and fashion design both belong to the high-end field of human intelligence activities, and its development of the update is extremely rapid, strong timeliness characteristics. Thus, "innovation" is the common soul of fashion and technology. Because of the
nature of science and technology and fashion homology, the feasibility of cross-border integration of the two areas is provided. "Fashion" and "science and technology" has been like two parallel lines in the field of development, and now slowly began to produce the intersection and slowly closer to each other. Although the "science and technology is the first productivity", "Science and Technology" by means of "fashion" coat to wrap cores, its injection of fresh blood, so technology products become more diverse and avant-garde, and more accepted by the public, so as to create greater social value [4]. At the same time, integration of new technologies and new materials will inevitably produce more fashion connotation positive impact on the fashion industry has brought a huge impact. With the progress of society and the gradual elimination of barriers between the industries, the integration of technology and fashion trends have become clearer direction for the development of technology and fashion a key role in the development of their industry plays will also be further highlighted [5]. "Fashion" and "technology" in the collision, mutual support will be distributed under a greater charm, complement each other and full of surprises.

In this new situation, electronic system (product) design teaching was facing the challenge. According to the relevant professional teaching system status and role, rational planning of teaching content, introduction of new knowledge and new technologies interdisciplinary, reflecting the concept of integration of technology and fashion elements in practical teaching, focusing on the organic integration of theoretical teaching and practical teaching, paying attention to the complementation between curricular and extra-curricular practice teaching, and realized the training principles of "high efficiency, continue to strengthen, step by step" in teaching processes was embodied. Finally to enhance their employment competitiveness and self-employment’s ability was enhanced.

**Concrete Methods in Teaching Reform and Practice**

**Enhance the artistic quality, outstanding engineering and the art of cross-integration, and explore scientific and technological cooperation model systematic fashion design.**

Science and technology talent to get innovations should have a sense of innovation, the spirit of innovation, creative thinking and creative ability, and these should be on the basis that scientific literacy, artistic accomplishment, health and well working conditions are closely linked. Scientific literacy and artistic literacy are the key factors in scientific and technological personnel scientific innovation. They are “two wings of a bird, and cooperative development are advanced on both wings”, and to obtain sublimation in scientific research activities at the same time.

In electronic information and arts or industrial design’s teaching, exploring the interdisciplinary subject "fusion of art and engineering" integrated mode of education, using of “workshop” and other means to carry out cooperation projects to enhance the fashion culture, science and technology frontier culture effect on the overall quality of college students applied. Teachers come from different professional backgrounds in teaching team, and together to complete the task of teaching and research.

- Make full use of co-teaching faculty resources, the establishment of high-tech fashion product design, research workshops, students of fashion design vision and sensitivity to the forefront of design, technological development, innovation and collaborative design capability in the design environment and cross-integration team.
- The "combination of art and engineering" always carry out the science fashion design every aspect, ordering to designers, manufacturers and users are satisfied with the products as the ultimate goal.
- Combined graduation designs or URTP projects, with "Science. Art. Fashion" Festival and Open Day of BIFT, and other means of art exhibition platform, the relevant works of design were completed
together from two professions in electronic information engineering and industrial design (product design).

- With the workshop and other forms, thematic discussions and project cooperation, to enhance the overall design of the project team to implement capacity.
- Encourage and support students to set up an interdisciplinary product development project group or team, from the high-tech fashion product business concepts, creative ideas, design implementation, prototype production and other multiple perspectives, the whole process of development cooperation.

With combination of the new technologies and new concept form technology and fashion industry was introduced in teaching, the concept of product design of technology and fashion intersect integration was outstanding.

- From product design, structural design, functional design, multiple perspectives coordination, putting more emphasis on both fashion-oriented technology and art.

Previous product design work is mainly dominated by art and design personnel, more emphasis on product appearance and artistic creativity, scientific and technological development into less, and function realization is very restricted. However, engineering and technical personnel tend to focus on the function of system implementation. Although it has strong internal system function, product design has always been to stay at relatively elementary stage. Not to mention high-tech fashion product, because of neglect appearance, art and fashion and other factors. In such cases, the teaching team plans teaching practice consists of two types of teachers to professors. One class teacher modeling ability outstanding, is mainly responsible for the modelling aspects of teaching, teaching students the basic theory and design of aesthetic, another class teacher has expertise in the technical aspects, another class teacher has expertise in the technical aspects, teaching mainly responsible for the technical aspects of the teaching team to guide students from product design standpoint analysis of the problem, according to the need for prototyping product features, so that teaching to achieve both aesthetic and design, skills and methods of hand effects.

On this basis, high-tech fashion product design is no longer the simple sum of the original engineering system design+ the style design of products, but from the user and consumer’s point to analysis demand of product, functional division on the basis of and task decomposition, then for the design task decomposition by the team who coordinated different expertise is completed. Further, in teaching practice not only focus on product design, manufacturing and focus on product realization and use 3D prototyping technology will focus on the art of fashion and technology integration prototyping product realization.

- Science and technology engineering teaching is concerned with the development of modern technology, and the introduction of new technology and new concept.

With the rapid development of modern electronic technology, the method of electronic system design has been changed greatly. Integrate micro controller with the programmable device in a single chip and form a system on chip, which become the development direction of modern electronic system design.

The technology of programmable system on chip and mixed signal chip can be introduced into teaching, reflecting three major changes in electronic system design and application: guide students from functional circuit design to system design, from hardware design to high degree of cooperation design between hardware and software, shift from the application of the traditional integrated circuit to the application of programmable logic device, so as to improve the students' ability of complex electronic system design.

During the course, we should strengthen the use of computer, then made design, analysis, simulation, and manufacturing, the electronic system design and development and electronic design automation (EDA) technology integrated closely. In the practice teaching process, the use of electronic circuit simulation tools (Multisim, Pspice), circuit board level design tools (Altium Designer),
electronic system level simulation tools (Matlab, Simulink), microprocessor system simulation tools (Proteus) and other industry popular design tools can be introduced.

**Conclusion**

Based Training System of Beijing Institute of Fashion innovative art and engineering integration, uphold and improve the "art and engineering integration" educational philosophy, and actively promote the development strategy "Undergraduate Teaching Quality Project", teaching team offered to engineering quality and innovative ability as the target, outstanding product design "technology" and "fashion" for the integration of cross-cutting features, reform and practice on Teaching about the electronic system design direction. During the process of building engineering design practice teaching team, on the one hand to strengthen the construction of the multi-disciplinary faculty teaching staff had strengthened; on the other hand, in line with a strengthening students' art and engineering integration "concept Engineering design and practice, fashion art and design, team management and collaboration and other aspects of comprehensive ability to enhance their employability and competitiveness and the ability to start their own businesses.

From the last three years, our college of electronic information engineering and automation major's employment statistics may show, stressed that "the fusion of art and engineering" engineering practice ability, students with strong employability and competitiveness.

**Acknowledgement**

This research was financially supported by Beijing Institute of Fashion Technology under Grant NHFZ2016011 and NHFZ2016059/001.

**References**


