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The Role of Philosophy of Science and Technology in the Teaching Reform of Design Majors in Universities

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Abstract: In order to adapt to social changes, the current curriculum teaching reform of college education has become the main reform trend, which can make colleges and universities more efficient and successful in cultivating high-tech talents in line with the trend of social development. However, the road to reform has not been smooth, and universities are still in the exploration stage. It is at this stage that the philosophy of science and technology can play a more guiding role, making the road of exploration less bumpy. These include encouraging and cultivating students' exploration of innovative thinking and creative ability, encouraging students to supplement the courses through innovative methods, cultivating students' self-innovation awareness and enthusiasm in active participation of courses. Through the guidance of science and technology philosophy, the reform of college curriculum can proceed more efficiently and correctly.

1. Introduction

The reform of college teaching is an attempt to reform the traditional teaching by changing the past cramming teaching methods, in which students turn passive into active in the learning process. Design courses especially need such teaching reform, because design courses are mostly practical and the proportion of students' actual operation time is higher than other majors. In order to complete the course teaching objectives and requirements of the corresponding courses, students need to master the design methodology, apply the knowledge learned in practice through practical operation and specific design. In short, design courses are not theoretical courses, but courses that combine theory and practice very closely. Therefore, design courses need to be more involved in curriculum reform, reduce the time for teachers' classroom teaching, give students more opportunities to do actual design cases. Only when they carry out a real design, can they master the knowledge, skills and abilities of the corresponding courses. When they have acquired the ability to complete the corresponding design, they can be needed and accepted by related positions and society.

However, it is the top priority in this reform as to how to effectively enable students to learn actively and how to improve the learning methodology. The effective support of these theoretical reforms is the philosophy of science and technology, which plays a very important guiding role in the reform of university teaching.

The predecessor of philosophy of science and technology is the Dialectics of Nature, which mainly studies some basic laws of scientific and technological activities, as well as some philosophical

problems contained in them. [1]

From the perspective of philosophy, the reform of college teaching can be divided into the following three aspects: First, it is necessary to change the teaching methods of teachers, the class should be interactive teaching activities between students and teachers rather than teachers' speaking alone. Second, the students should change their way of thinking, turn passive into active, take the initiative to absorb knowledge and master the ability, and actively express themselves. Third, the relationship between teaching and learning should be balanced.

On the basis of analyzing and solving these three problems, we can try to effectively carry out teaching reform through the guidance of philosophical ideas of science and technology.

What we need to do in the process of reform is to break the past teaching mode, break the fixed relationship between teachers and students in the past, make analysis and summary according to the new problems and new situations that have emerged in the process of our in-depth teaching reform from the viewpoints and methodologies of philosophy of science and technology, and try to find solutions, pushing the education of college design courses to a new height.

2. Teaching Reform of Design Majors from the Perspective of Philosophy of Science and Technology

The innovation of science and technology has changed people's lifestyles and the outlook of the whole society. As people enter the digital age, they become more dependent on technology. However, the development of science and technology is a double-edged sword [2], and the integration of scientific and technological means into college teaching reveals that traditional teaching methods and teaching models are more unsuitable for the development of modern education, and even restrict the development of education.

2.1. Problems

The development of design majors has the following problems.

2.1.1. Emphasizing Theory over Practice

Education focuses the mastery of theoretical knowledge, while practical and operational skills and abilities are not valued. Because of the restrictions on the investment and the teaching environment in universities, as well as the lack of communication between universities and enterprises, students can only learn theoretical knowledge in the teaching environment of universities, and have no opportunity to do real design cases. After entering the society, students generally find that much of theoretical knowledge they have learned on campus cannot be used in practical work directly, and they have to learn new knowledge and skills that are really needed in the work environment. This situation is very common in design majors, because both design skills and professional design knowledge are updating at a rapid pace. Once the teaching process of universities is detached from the actual situation of society without effective connection with the design business, the students cannot master the real status of design business and development trend, and cannot meet the requirements of society and enterprises for design students.

2.1.2. Not Paying Attention to the Cultivation of Thinking

Universities do not pay due attention to the cultivation of students' design literacy, design thinking, innovation and creative ability. Even if they have abundant knowledge and skills, the design majors will not be able to stand out in related in real jobs without innovative thinking and creative ability. In China, it has always been a serious social problem that design is equivalent to plagiarism, which has

already existed in the education of universities. It is the deviation in the education of design majors in universities and the lack of emphasizing the cultivation of design thinking and innovation ability that result in this social problem.

2.1.3. Underestimating the Design Profession

Social cognition underestimates and ignores design majors, resulting in universities not paying attention to design majors and not supporting their development. The current emphasis on science and engineering and the prejudice against the design majors have placed limitations to its development. In contrast, in 2010 the American education community suggested that the STEM education framework based on engineering technology be expand into a multifaceted STEAM framework, of which the extra A refers to the art [3]. Only with the development of new liberal arts and philosophy, including art studies, design majors can gain its academic status and show its importance in professional skills.

2.2. The Driving Role of Philosophy of Science and Technology

From the perspective of philosophy of science and technology, it has the following unique role in promoting the teaching development of design majors.

2.2.1. Emphasis on Innovation

The philosophy of science and technology encourages the cultivation of innovative spirit. The philosophy of science and technology pursues the essence and general laws in science and technology and perceive the essence through phenomena, which can guide students to establish a correct scientific outlook on development and discover the more profound essential part as well as the phenomenal things. It can also cultivate their interest and hobby in science and technology and the nature behind, and stimulate them to pay more attention to and discover the development trend and essence of things. In this process, students are guided to contact more cases that reveal the essence, and their innovative thinking that is more in line with the scientific outlook on development will be cultivated through their understanding and mastery of the essence.

After having gained innovative thinking through training, students will no longer mechanically accept the teachers' cramming and will think independently. They can also remove the truth from the false, learn to take the essence and remove the waste, and focus on mastering the knowledge and skills they need. In this process, students will naturally learn the use of innovative methods through the guidance of philosophy of science and technology in fields such as scientific methodology.

Not only that, as mentioned above, the cultivation of innovative thinking is very important for design majors. Students in this major need to have creative thinking ability, innovative vision and skills, so they can innovatively improve design based on the works completed by predecessors or independently complete innovative design. Design students need to prove to society that design is not plagiarism, and that China is not only superior in manufacturing, but also in Chinese-style creation.

2.2.2 Interdisciplinary Cooperation

Philosophy of science and technology can guide students to look at problems from multiple perspectives and solve problems across disciplines. From the perspective of design development, the present design disciplines are becoming more and more detailed, and related disciplines are getting independent, which does not mean that the research field of design will also become narrow. On the contrary, present research attaches great importance to multidisciplinary development, mutual promotion and collaborative progress, which is also true of the prospective future of design majors

[4]. Students majoring in design should not only cooperate with other majors in the same discipline, but also with majors in other disciplines. For instance, design majors need to cooperate with teachers and students of mechanical majors to apply the design to physical objects with specific data; design students can cooperate with automotive majors and aviation majors to jointly develop new energy vehicles; design students can also work with computer programming students to build and produce the Internet work. And the list goes on.

What students need to know is that it is difficult to turn a design work from idea to reality only with knowledge of their area of expertise, and it needs the assistance of many other professions in this process. Although design students need to prove to society that we are not just good at art, it is not realistic to complete the design of a large-scale product all on their own. And even the consumer group research we need to complete before designing a new product requires the assistance of psychology, ergonomics and physiology related skills.

2.2.3 The Importance of Ethics

In the researches related to product design, the solution of scientific and technological problems always gets more attention, while the lack of guidance of ethical thought is common. In this link, the guidance of the philosophy of science and technology is indispensable. In the hot topic of artificial intelligence, for instance, more people focus on the thinking design of artificial intelligence, the de-programming of language logic ability, the collision of perceptual thinking and mechanical thinking, but few people take the initiative to pay attention to issues such as the ethics of artificial intelligence, the legal responsibility of artificial intelligence products during services, and the supervision of the artificial intelligence market. In 2018, Google's driverless car completed all the laboratory links and was ready to be put on the market. But on the night before entering the market, the upcoming product was also urgently removed from shelves because it hit a female pedestrian on a bicycle and the whole promotion completely went bankrupt, which was a huge blow for both the company and the society [5]. It is precisely because of this traffic accident that people have begun to realize the fact that the humanization of driverless cars is not as perfect as imagination, and rights protection is even more difficult.

The philosophy of science and technology needs to show people scientific and technology, but also clearly demonstrate the moral and ethical issues involved. This is also a question that designers need to consider, and this is why modern design has always called for "human-oriented" design.

3. The Reform of Higher Education under the Guidance of Philosophy of Science and Technology

3.1. The Current Situation of Philosophy of Science and Technology

It is undeniable that the entire discipline of philosophy is in decline in higher education, and attention paid to the liberal arts and philosophy is on the decrease. This is mainly due to the following reasons.

3.1.1. The Lack of Integration with Reality

The lack of integration with reality makes philosophy empty and boring, which leads to a certain deviation in students' cognition of philosophy, and they find that philosophy research is empty and unrealistic, which seriously affects students' enthusiasm and interest in philosophy and innovative thinking. Philosophical reflection in combination with reality is a distinctive feature of philosophy of science and technology. Because of the rapid progress of science and technology in modern society, we keep up with the trend or we are replaced soon. Especially emerging professions such as design

must always be in line with the times, which requires that design students need to always pay attention to reality and stay in contact with the development of society under the guidance of the philosophy of science and technology.

3.1.2. The lack of Self-Innovation

Philosophy has always been summarizing the experience of predecessors in the process of development, but it lacks self-innovation, the so-called originality. The philosophical trends that are prevalent in China are summarized from Western philosophical circles, and these philosophical ideas and research directions are not completely suitable for our basic national conditions, nor are they in line with people's lives and academic realities. Universities have not found the research value of modern philosophy, and students have misunderstood the unoriginal knowledge brought by philosophy, which will inevitably affect the direction and development of the entire higher education. Therefore, it is imperative to establish our own philosophy of science and technology, give full play to its original spirit, develop new philosophy from our own standpoint, and set a correct example of innovation for students.

3.1.3. The Derailment of Ideological and Political Courses

Ideological and political courses are seriously derailed from the major, which makes universities pay less attention to educational reform. In other words, universities are advocating ideological and political courses go deep into the classroom in combination with design profession, but the support for implementation is not adequate and go in depth. Students feel that the ideological and political course is a formal work, and philosophy has nothing to do with their majors. The preoccupied wrong cognition will affect students' cognition of philosophy of science and technology, and develop wrong philosophical views, outlook on life and values.

3.2. The Guiding Role of Philosophy of Science and Technology

We should use the guiding role of the philosophy of science and technology, combine the current situation of higher education and our fundamental realities, and find a way to reform higher education to meets the requirements of modern society. We need to do the following explorations.

3.2.1. Repositioning the Disciplinary Status

Reposition the disciplinary status, research direction and content of philosophy of science and technology, find a foothold that fits the status quo of design majors, and connect the new liberal arts with science and engineering on the basis of philosophy of science and technology.

With the guidance of philosophy of science and technology, we should introduce the scientific outlook on development and philosophical thinking into design majors in line with the general direction of quality-oriented education. While helping students establish a correct philosophical view, we should improve the cultivation of innovative ability, innovative thinking and innovative methods, so that students can think independently, dialectically accept the knowledge from teachers, and make progress together.

3.2.2. New Technological Development Direction

The development of science and technology has pushed the study of philosophy of science and technology to a new direction, and people have begun to contact more new technologies, such as artificial intelligence, information technology, new energy technology, nanotechnology, etc. [6] In this process, with the guidance of the philosophy of science and technology, people turn to the new direction of research and development from traditional science and technology, and the philosophy of science and technology must ensure that social development and scientific and technological

development are synchronized, which means that social and cultural development will move forward together with scientific and technological development. We cannot deify scientific and technological progress, and we cannot neglect its development, either. If people's thinking development and cultural level fail to keep up with the pace in the process, social disconnection occurs. The philosophy of science and technology clearly shows that scientific and technological progress does not mean the progress of society as a whole.

In higher education, scientific and technological progress also shows significant influence. While encouraging students to learn knowledge, we must also pay attention to the progress of students' philosophical thoughts, outlook on life and values. We should guide students to be friends with science and technology, and look at the progress of science and technology in a more diversified and rational way.

3.2.3. Adaption of Science and Technology to Realities of China

The philosophy of science and technology should be developed down-to-earth in line with China's realities, so that Chinese students can understand it more correctly and deeply. Philosophy of science and technology should also strive to meet the development requirements of Chinese students and cultivate their correct values in the process of development.

On this basis, the philosophy of science and technology is needed to guide universities to effectively improve the quality of courses. In the process of teaching and learning, the relationship between teaching and learning should be balanced. The traditional teaching that is not suitable for modern education should be reformed, and more practical teaching methods should be applied. We should not only focus on reform, but also keep in mind the essence of teaching, enabling students to learn more knowledge and skills.

4. Conclusion

College teachers try to present a deeper meaning for the role of teacher from the perspective of natural dialectics, in which they are not just narrators of knowledge, but also the persons encouraging students to break away from their passive learning roles and take the initiative to acquire knowledge and master abilities. This is a long and arduous process, and it is clear that the reform of university teaching is still in the first step, that is, the stage of repositioning its role. The university is encouraging students to innovate more effectively and change their thinking, but obviously they dare not take too big a step. Because once the reform is too hard, students and teachers will get lost and forget their original intention. And a reform of high intensity is not in line with the actual situation in China. In China, it is still necessary to be more in line with China's national conditions and China's scientific and technological level to cultivate students who meet the requirements of the Chinese market.

From the perspective of design majors, this study focuses on problems faced in the first step of reform and how to proceed. The article mainly emphasizes the research results within the scope of the university, which is slightly one-sided, and the next step is to expand the scope of the research and carry out targeted systematic research in the design majors of other universities.

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