Research on Practical Teaching of Design Major Based on Artificial Intelligence and Traditional Craftsmanship in Southern Fujian

Dongdong He, Yaping Zhang

Quanzhou University of Information Engineering, Quanzhou, China

37877907@qq.com

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Abstract: Southern Fujian culture has profound historical and cultural value. Southern Fujian traditional crafts have high artistic value and craft value, such as Xiamen lacquer thread carving, bead embroidery, Minnan Zhangpu paper-cutting, Dehua pottery, and Hui'an shadow carving in Chinese intangible heritage and traditional art Unique in China. However, these products are out of touch with market demand, are facing serious talent gaps, outdated production methods, lack of product innovation, and lack of people to inherit intangible heritage craftsmanship. Through the modern apprenticeship system, we deepen the integration of industry and education, school enterprise cooperation and collaborative education, take artificial intelligence technology as the carrier, realize the integration of intangible cultural heritage traditional technology and art design specialty, innovate the training mode of skilled talents, optimize teaching means and expand teaching channels for basic design courses in colleges and universities. It is beneficial to enhance students' innovative practice ability, form a systematic "artificial intelligence + design" thinking, build a solid professional foundation and form a complete knowledge accumulation.

1. Introduction

With the process of globalization, industrialization and urbanization, the social environment and ecological environment on which the traditional crafts in Southern Fujian depend have changed dramatically. Its protection and inheritance will face the severe challenge of no successor. Artificial intelligence technology will be one of the important ways to improve the education quality of higher vocational colleges. For students majoring in design in the new era, artificial intelligence has increasingly become a necessary thinking path, knowledge and skills to cope with the increasingly intelligent environment and the requirements of discovering and solving design pain points. Combining the production and innovation of traditional technology with artificial intelligence and infiltrating our characteristic traditional culture into artificial intelligence not only enriches the school's teaching resources, but also enhances the school's ability to serve the local economic and social development, creating opportunities for the further development of the school. The traditional process design not only improves the work efficiency, but also improves the quality of process products.

In addition, a lot of practical activities should be interspersed in teaching, which not only trains students' practical ability, but also relates to creativity, expression, skill inheritance, public welfare influence and so on. Give full play to the resource advantages of traditional folk art, integrate traditional folk arts and crafts into basic design teaching, and improve the basic design teaching concept. The combination of traditional processes with artificial intelligence, robots, cloud computing and big data will give new vitality to traditional processes. It can be seen from this that the integration of artificial intelligence and intangible cultural heritage Southern Fujian traditional crafts can effectively solve the problems existing in the inheritance of intangible cultural heritage Southern Fujian traditional crafts. Only by constructing a teaching framework of cutting-edge technology theory suitable for design students can we meet the Boche needs of innovative society for the cultivation of new design talents.

If the modeling features, aesthetic thoughts and spiritual connotations of traditional art are integrated into the basic teaching of artificial intelligence, it will not only be beneficial to the inheritance and development of traditional folk arts and crafts, but also help students to enhance their interest in learning and enhance their artistic creative thinking. However, the design education for students also lacks cultural education. It infiltrates "curriculum practice", "creative practice", "project practice", "cultural practice" and "artificial intelligence" into all links of professional teaching, and establishes a professional system of people-oriented talent training mode. Cultural practical teaching is our weakness, which is a long-term practical teaching process, It can not be achieved through standardized classroom and standardized training. This paper discusses the combination of traditional technology and "artificial intelligence".

2. Significance of Combining Traditional Craftsmanship and Artificial Intelligence in Southern Fujian

2.1 The Severe Situation Faced by the Traditional Crafts in Southern Fujian

As a unique symbol of Minnan culture, Minnan traditional crafts embodies the history and culture of Minnan people for thousands of years. Minnan traditional folk crafts have a wide variety, rich history and culture, and distinctive national and regional characteristics. It was once unique in the regional economy. Under the current situation, it is a major feature of the design to be based on the native land. However, most of the traditional crafts are faced with the situation that the products are out of touch with the market products and a large number of talents are lost, which leads to the serious backwardness of modern traditional crafts, and the traditional crafts will be eliminated face to face. At present, the most serious problem of traditional crafts in Southern Fujian is that the market share of cultural industry in Southern Fujian is low, the overall scale is small, and there is a lack of leading backbone enterprises; Single process structure and limited economic benefits; The reason is that the transformation of traditional craft works in Southern Fujian is weak and the market development is insufficient. We need to combine modern technology with traditional crafts, absorb local, national and folk styles and various cultural traces left by the history of the region, and expand the team of traditional crafts.

2.2 The Benefits of Combining Artificial Intelligence with Traditional Craftsmanship in Southern Fujian

The new generation of information technology represented by artificial intelligence is profoundly changing all fields of social life and constantly challenging the product design practice facing complex problems in life and design work. The development of artificial intelligence is faster than the renewal of traditional majors, and the traditional technology in Southern Fujian is far from keeping up with the modern rhythm, so it has caused major problems for the construction of professional talent training system. Computer courses and classes are not like regular problem-solving steps in mathematics, nor do they want to fill in the answers of ancient Chinese poetry to be fixed, or the mechanical production process is traditional. It is difficult to grasp the implementation process of talent training, and the training is not diversified enough. It is necessary to combine artificial intelligence technology with traditional practice teaching in southern Fujian, so as to achieve lifelong, fair and personalized education, and further improve the personnel training system and optimize the teaching process. For example, the artificial intelligence technology which combines design and traditional art closely can help students understand the combination of technology and design (instead of the underlying principles and algorithms that computer majors need to master) in a simple way, and strengthen the basic training of using scientific and technological means to realize design ideas. This model can stimulate students' innovative thinking, create a relaxed and efficient technology development environment, and avoid their ideas divorced from reality. Giving full play to the advantages of artificial intelligence and actively promoting the deep integration of artificial

intelligence and education has become an important driving force for the reform and innovation of contemporary education.

The combination of artificial intelligence and traditional Minnan crafts can promote the cultivation of talents, better inherit the combination of traditional art and contemporary art, and increase the market share of Minnan traditional cultural enterprises. Art education should adopt new teaching methods, sum up new teaching methods, introduce traditional project teaching and task-based teaching into the classroom, and achieve good teaching results, so that more students can participate in the "Artificial Intelligence+Minnan Traditional Craft" project for college students and cultivate innovative talents in batches. The enterprise's sense of smell for artificial intelligence is always sensitive. This project not only recruits more talents for the enterprise, but also updates the demand standard of the enterprise, avoiding the phenomenon that the enterprise develops too fast and the school can't follow all the way.

The traditional folk crafts in Southern Fujian are dominated by practical operation in both production steps and production technology. Applying its practical teaching value to the teaching of three-dimensional composition can greatly promote the development of art design in local colleges and universities. Therefore, the participation of artificial intelligence technology in traditional technology promotes the enrichment of teaching resources, cutting-edge technology and diversification of courses. The explanation process is easy to learn and the answers to exercises are fixed. The basic teaching of relevant parts can be awarded to artificial intelligence. This process is relatively easy for our students to better accept traditional technology and inherit culture and art. This not only effectively realizes the integration of "teaching and doing", but also realizes the innovative mode of deepening the integration of production and education, promoting the reform of vocational education, school-enterprise cooperation and dual education. The introduction of artificial intelligence technology into the teaching process and the formulation of students' diversified learning are currently large class teaching in most schools, which is difficult to really suit each student's personality development. Realize the connection between specialty setting and industrial demand, curriculum content and professional standards, teaching process and production process, graduation certificate and vocational qualification certificate, vocational education and lifelong learning, so as to solve the problem of in-depth training of school enterprise cooperative talents. Artificial intelligence technology can also integrate and analyze the data that is always sorted out and entered, and then formulate the learning plan of individual students, adjust students' learning behavior, create personalized education that is really suitable for different individual learning needs, and deepen the educational development of traditional culture. It can make artificial intelligence innovate the development direction and face the society in a diversified way.

3. Strengthen the Practical Teaching of Artificial Intelligence and Traditional Crafts in Southern Fujian

3.1 Advantages of the Integration of Artificial Intelligence and Traditional Craftsmanship in Southern Fujian

The traditional crafts in Southern Fujian, such as porcelain carving, bamboo lacquerware and PU paper cutting, form various forms rich in formal beauty through the artistic techniques of IP arrangement, combination and change. They are constructed according to the original appearance characteristics of objective things, reflect the specific realistic form of things, contain the unique implication and aesthetics in Southern Fujian, and have a unique modeling style. Its production method, process, conception and the function of the work can also bring innovative points of thinking to the study of three-dimensional composition.

3.1.1 Process Design Task Model Formula

Task element: atomic activity unit in process design activities. The machining process design activity of a part is a task element. Since a task element cannot be executed by multiple process

personnel, task element is the smallest independent activity unit in process design activities. It can be represented by the following triples:

$$At^{\bullet\bullet} = (P, t, sta), \quad (1)$$

Sub-task: the processing technology design task of a part subset completed by a technician, which can be represented by the following quintuple:

$$St^{\bullet\bullet} = (StID, R, D, H, A), \quad (2)$$

Product process design task: process design task for all machined parts in the target product, which can be expressed as:

$$PT^{\bullet\bullet} = (R, D, Sat), \quad (3)$$

Where: R has the same meaning as the subtask, and D is the completion time limit of the task; Sat is the complete set of task elements.

3.1.2 Process Design Level

The process design task is divided into three levels: product process design task layer (general task), sub task layer and task element layer. The product process design task consists of several subtasks, which contain several task elements. The task meta layer is the leaf node of the task tree. Any subtask must complete all task elements before it can be completed, and the premise of completing the total task is that all subtasks must be completed.The task hierarchy is shown in Figure 1.
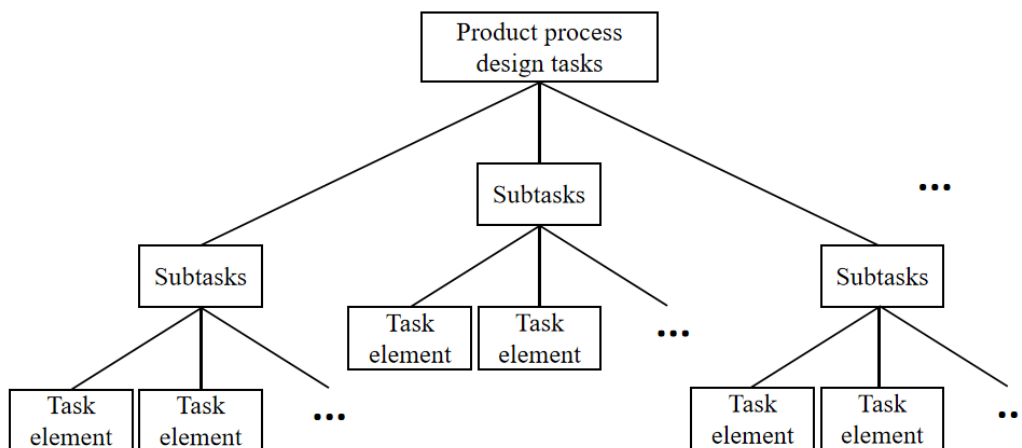

Fig.1 Task Hierarchy

We can transform these traditional craft forms abstractly, and integrate artificial intelligence technology with traditional design concepts to better meet the development needs of modern society, and promote the inheritance and development of the traditional craft of cutting porcelain carving. This course will combine our modern practical courses, tap the resources of traditional arts and crafts in southern Fujian, and combine modern innovative thinking with traditional crafts, which can improve students' artistic accomplishment, cultivate aesthetic consciousness, let students create and design their own traditional crafts by themselves, and stimulate students' learning enthusiasm and love for traditional crafts. At the same time, we should give full play to the strong atmosphere of school culture, sublimate the products of traditional culture, actively rely on artificial intelligence or change the decoration style, which should be improved in the long-term practice.

3.2 Artificial Intelligence and Traditional Craft Practice

Artificial intelligence can also display our traditional crafts through the platform through the realization of different colors, three-dimensional composition and form display, and see the

presentation of our traditional crafts more intuitively, making it easier for students to explore our traditions in many ways. Craft. For example, Zhangpu paper-cutting, Zhangpu paper-cutting composition is full, well-proportioned and symmetrical, both express the theme. In the process of re-creation, the expression technique can be concrete, or it can be expressed in abstract form through deformation and exaggeration. Zhangpu paper-cut lines are coherent, concise, delicate and elegant, and the aesthetic interest is integrated into the teaching of three-dimensional composition. For another example, cutting porcelain carvings, using colored porcelain as materials to paste and carve biological and plant forms, is to reproduce the specific physical characteristics of external things vividly and realistically. We can use artificial intelligence technology to abstract and transform this traditional process form, integrate it with contemporary design ideas, and gradually evolve natural things from concrete shapes to simplified In the process of abstract form, the modeling shown is a subjective re creation of things. It can not only show the new idea of artificial intelligence, but also convey the inner vitality of cutting porcelain carving, thus promoting the inheritance and development of this traditional craft of cutting porcelain carving and better meeting the development needs of modern society. The feature recognition function is shown in Figure 2.
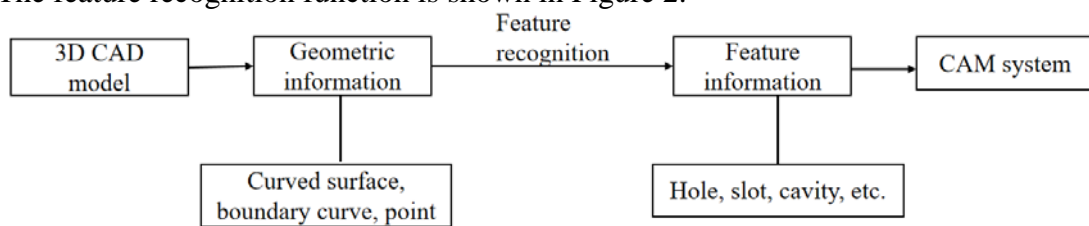

Fig.2 Simplified Diagram of Feature Recognition Function

At present, our colleges and universities are carrying out the reform of teaching methods and teaching means, fully integrating the talent training scheme into modern industrial robot technology and traditional process, adding new courses such as traditional process practice, robot kinematics, machine vision and artificial neural network, and integrating industrial robot programming and operation and industrial robot system integration technology, The teaching content is formally incorporated into the talent training plan in the form of curriculum. The practical teaching curriculum system is shown in Figure 3.
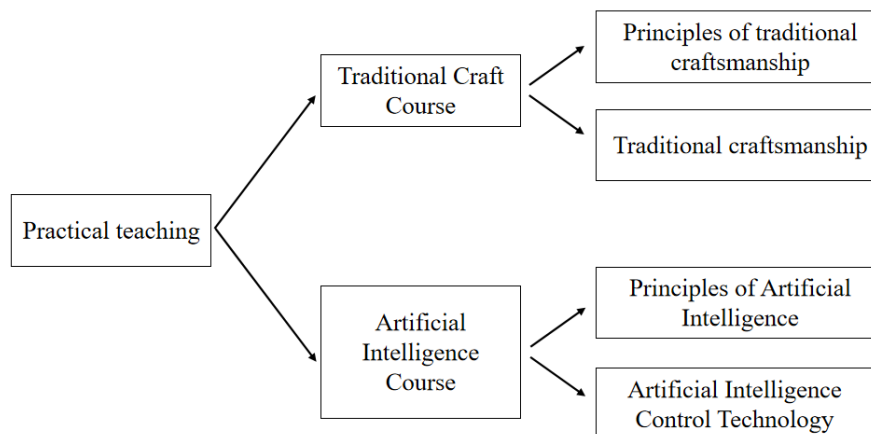

Fig.3 Practice Teaching Curriculum System

The reform mainly focuses on the two teaching levels of professional skill training and comprehensive innovation training. At these two teaching levels, a large number of teaching courses with the technical characteristics of the new era have been implanted, while retaining the main core courses of traditional culture. Traditional arts and crafts learning is mostly experiential teaching by example, with more emphasis on manual knowledge. With the progress of the times and the rapid development of modern manufacturing industry, the traditional manual workshop model is difficult to fully adapt to social production. Now, we design ideas through reasonable artificial intelligence

technology and methods to enhance product creativity. It is helpful for students to expand their innovative thinking of solving practical problems and further improve their innovative design literacy. In the traditional practice teaching, the professional ability innovation training firmly grasps the product of the era of artificial intelligence, and always focuses on the related technologies needed by the intelligent manufacturing industry, from simple design to site configuration design, to integrated design of complex large-scale flexible manufacturing production lines, which is linked with each other, and gradually helps students master the application skills of industrial secondary development posts. Make use of certain scientific and technological strength to improve old technology and increase production efficiency. Science and technology dig deep into traditional craft resources, spread excellent regional culture and produce social effects. Stimulate students' learning enthusiasm and improve students' practical ability. At the same time, paying attention to the combination of traditional craft inheritance and artificial intelligence in teaching not only has practical significance for teaching, but also has an important impact on promoting the inheritance of traditional culture with regional characteristics and the development of cultural industry. It not only solves the serious disconnection between College Teachers' teaching and engineering practice for a long time, but also widens the channels for students' employment. In particular, colleges and universities aiming at cultivating advanced applied talents need to rely on the resources of enterprises to cooperate and win-win with enterprises.

4. Conclusions

The combination of design field and information technology such as artificial intelligence is getting closer and closer, and the application of interdisciplinary is becoming more and more obvious. Traditional process design education is not only to cultivate students' skilled skills and form scientific ideas, but also to be a professional study of students, which is not only the expression of skills and creativity. More importantly, it is combined with the development of society and has the ability to raise and solve problems in design practice. The deep integration of artificial intelligence and traditional crafts in southern Fujian will make great changes in traditional teaching methods and closed teaching in time and space in traditional school education, form flexible educational forms, and provide more possibilities for the inheritance and extension of traditional crafts. It not only has practical significance for arts and crafts teaching in Colleges and universities, but also has an important impact on promoting the inheritance of traditional culture with regional characteristics and the development of cultural industry. Only by continuous learning and closely combining with the needs of national strategic development can we find a breakthrough in specialty construction and curriculum construction, so as to cultivate more senior application-oriented talents that meet the needs of the industry for the country and the society. Southern Fujian traditional crafts are our precious material and spiritual wealth and the treasure in our cultural treasure house. Integrating Southern Fujian traditional crafts into artificial intelligence can achieve a win-win situation.

5. Acknowledgment

References

[1] Du Yifei, Huang Shuman. Artificial Intelligence and Traditional Techniques. Reading for Middle School Students: High School Entrance Examination Edition, no. 7, pp. 1, 2019

[2] Zhu Zhaohong. Research on the innovation and entrepreneurship model of AI artificial intelligence + Tibetan handicrafts. Modern Vocational Education, no. 20, pp. 2, 2020

[3] Xu Jianping. Artisan Robots: Technology Makes Traditional Crafts More Colorful . Robot Industry, no. 2, pp. 5, 2019

[4] Li Shike, Liang Dongni. With the advent of artificial intelligence, will Xingtao die out. Literary Life·Theories of Literature and Art, vol. 000, no. 005, pp. 20-21 , 2018

[5] Fan Chuanguo, Sun Ziping. Intangible cultural heritage dissemination of traditional handicrafts empowered by artificial intelligence. Media Observation, no. 8, pp. 6, 2021

[6] Zhang Yanping, Zhu Zhiming, Xu Chaoyi. Labor education in the era of artificial intelligence. Teaching Monthly: Middle School Edition (Politics Teaching), no. 12, pp. 4, 2019

[7] Gao Wei. Research on the application of artificial intelligence technology in computer network technology. Journal of Liaoning Institute of Science and Technology, vol. 20, no. 2, pp. 4, 2018

[8] Gao Wei. Design and implementation of intelligent systems in colleges and universities based on WEB technology and artificial intelligence algorithms . Journal of Heihe University, vol. 009, no. 003, pp. 213-214. , 2018

[9] Zhang Jianhua. Research on the practice of non-inherited inheritance of traditional crafts in southern Fujian . Fujian Computer, vol. 36, no. 4, pp. 3, 2020

[10] Chen Zhenyu. The government's role in promoting the development of traditional arts and crafts souvenirs--Taking Minnan folk arts and crafts souvenirs as an example. Art Technology, vol. 29, no. 4, pp. 2, 2016