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Issues and Path Selection of Artificial Intelligence Design Talents Training in applied Undergraduate Universities in Smart City

(Full Paper)

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ABSTRACT

The widespread popularity and application of artificial intelligence technology requires technological innovation, of which talent training is an important content. The lack of professional talents has greatly restricted the development of the artificial intelligence industry to some extent. How to train industrial design talents with comprehensive qualities of "artificial intelligence design talents" in universities has now become the most important topic. Carry out university teacher training based on the industrial design profession, carry out the "collaborative education" innovation model based on "university-enterprise-government", innovative ability and awareness training curriculum system, and use artificial intelligence talent training goals and curriculum system for the construction and practice of goals. Analyze the current plight of artificial intelligence design talent training in applied general universities, clarify the current types and status quo of artificial intelligence design talents, and propose specific ways to solve the current artificial intelligence design talent training. There are few relevant talents for artificial intelligence design professionals who can combine their ideas and technology in actual production. The lack of design talents has greatly limited the development of their industries to some extent. The current application-oriented undergraduates Colleges and universities should explore specific paths for the training of artificial intelligence design talents, and the construction and practice of related curriculum systems should also be gradually revised during practical exploration, so as to realize innovative education through educational innovation.

Keywords: Artificial intelligence technology, design talent training, curriculum system, teacher training

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INTRODUCTION

In recent years, the Ministry of Industry and Information Technology has emphasized that the in-depth integration of artificial intelligence with the real economy and manufacturing, the development of smart products and smart equipment, and the promotion of the overall upgrade of our country's manufactured products and equipment to the "smart generation" is the implementation of "Made in China 2025" One of the keys. In the context of artificial intelligence, research on the cultivation of industrial design talents based on artificial intelligence technology is of great significance for the further development of intelligent design, industrial design transformation, humanized design, interactive design, and design service industries.

The term "artificial intelligence" was first proposed at the Dartmouth Society in 1956. Artificial Intelligence (AI) is a branch of computer science that explores the essence of intelligence, creating human intelligence that can respond in a way similar to the purpose of an intelligent machine (Pu, 2018). Artificial intelligence is the closest relationship between scientific and philosophical topics. Its research results bring together cognitions from psychology, linguistics, neuroscience, logic, mathematics, computer science, robotics, economics, sociology and other disciplines (Chen, 2017a; Chen, 2017b). The research of artificial intelligence is not only to make machines have the ability to solve problems, but also to pay attention to the research of machines with self-learning ability, so that machines can accumulate life experience and wisdom like intelligent creatures, constantly sum up lessons, correct mistakes, improve performance, and adapt.

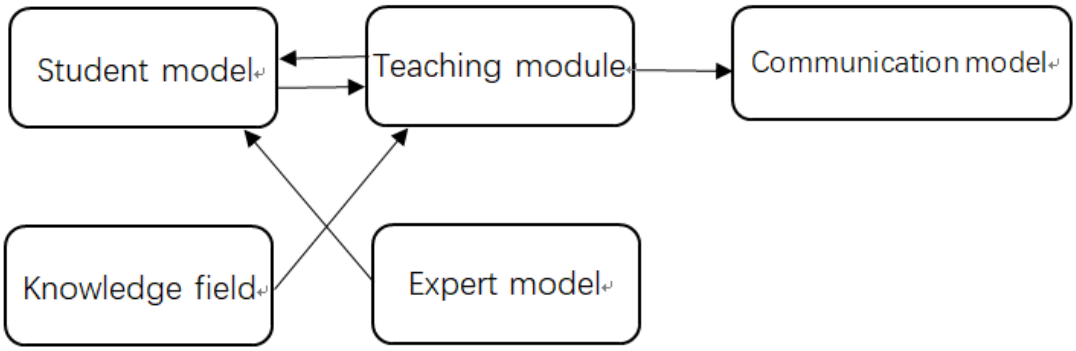
Among them, training of personnel is an important content. Although artificial intelligence technology has been emerging in our country for some time, there is still a certain gap compared with some foreign developed countries. Among them, the shortage of professional design talents has greatly restricted the development of this industry to some extent. Among them, there are very few relevant talents who can combine ideas and technologies in actual production. Currently, applied undergraduate colleges and universities are actively exploring training programs for artificial intelligence design talents. In addition, our country's artificial intelligence technology also lacks some problems in terms of policies. Among them, the training and support of professional talents greatly restrict the development and progress of the industry. According to statistics

from relevant agencies, at this stage, our country has an urgent need for talents in the artificial intelligence industry. The smart manufacturing industry and IT communication industry have the greatest demand for talents in the application of artificial intelligence technology. Among them, the biggest demand for artificial intelligence design and application talents is the industry of industrial design and intelligent design, and this number is constantly increasing every year. Therefore, it is the goal of this research to clarify the types and status quo of the current artificial intelligence design talents, analyze the current application-oriented colleges and universities of artificial intelligence talent training, and propose a specific path to solve the current artificial intelligence technology talent training.

Intelligent tutoring systems may outwardly appear to be monolithic systems, but for the purposes of conceptualization and design, it is often easier to think about them as consisting of several interdependent components. Previous research by Woolf (Woolf, B. 1992) has identified four major components: the student model, the pedagogical module, the domain knowledge module, and the communication module. We have identified a fifth component, the expert model. Woolf includes this component as part of the domain knowledge, but we feel that it is a separate entity.

DEMAND TYPES OF ARTIFICIAL INTELLIGENCE DESIGN TALENTS

In the past two years, the artificial intelligence industry has developed rapidly. Technically, from the application of single-point technology such as speech control and face recognition, to the multi-modal computing design interaction industry that integrates vision, voice, and semantics; in the application, the historical transformation power of artificial intelligence is accelerating its penetration into all walks of life. From product services, to production, operation, and decision-making, it plays an effective role in reducing costs and risks, shortening processes, bringing value-added income, and improving the production efficiency of enterprises. In terms of policies, artificial intelligence has also risen to the country's strategic position. Relevant policies have appeared frequently to encourage industrial development from the national level (Yang, Ma & Sun, 2017). The troika of technological development, application landing, and policy support jointly drives the rapid development of artificial intelligence. Artificial intelligence changes the way we interact with machines, affects our lives, and redefines our relationship with machines. In the era of artificial intelligence, the transformation of the industrial design industry is not an evolution, but a reconstruction. It will reconstruct the tools, productivity, life and even machine aesthetics around us (Shan, 2017).



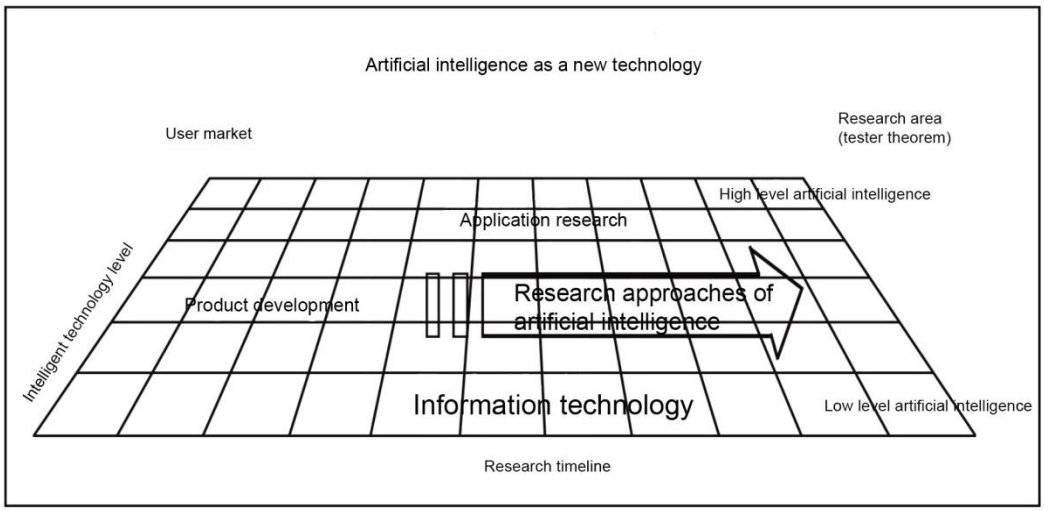
Source: This study.

Figure 1: Component interaction in intelligent teaching system

Within education curricula, Information Technology has made a great impact expedited by the advent of the World-Wide-Web and the consequent cultural information explosion. IT is a generic expression that can include any form of technology (equipment and technique) used by people to collect, store, control, generate and communicate information. It is clear that the advance of AI technology has been assisted by developments in Information. Chen (2017) Technology and many parallels can be drawn between these sciences. 'Smart Technology' is an unfortunate term that has been used in a somewhat cavalier manner, mainly due to media hype and commercial exploitation. In the mid-Eighties the development of shape memory alloys led to the tag 'Smart Materials' (Weiss, 2000). This was followed by 'Smart Cards' a simple memory device on a piece of plastic the size of a credit card which contained user profiles to operate user dependent machinery such as bank teller machines. Since then a whole manner of devices and products have been designed and marketed bearing the label 'smart', or even more misleading, 'intelligent'. There are examples where IT has been merged with common domestic products, for instance by allowing Internet access via an LCD screen in the door of a microwave, or by installing a bar code reader and Internet access in a fridge, whereupon these humble kitchen appliances are apparently rendered 'intelligent'. A common misconception is that AI and Smart technology is one and the same thing. The understanding and appreciation of AI as a philosophical science and an engineering discipline should, however, refute this, e.g., Figure 1 provides a view of the interactions between the modules. The proposed model illustrated in Figure 1 aims to create a more usable definition for distinguishing AI and Smart Technologies

from an application based engineering perspective. Beal (2013) If we consider Tesler's theorem then legitimate AI areas, in both high and low level techniques, are shown as future research goals. Advances in AI research are disseminated through to applications research. Finally, proven techniques are integrated into commercially viable designs at the product development stage. Referring back to Tesler's Theorem, at the point of accomplishing the technique it can no longer be considered legitimate AI. What remains are tried, but possibly not thoroughly tested, techniques that could be considered to be within the realm of Smart Technologies.

For the purpose of the model e.g., Figure 2: Artificial intelligence in the new era, only those products resulting from the direct consequence of AI research and its applications are considered. The model, however, is considered valid for such areas as wearable technology where IT and programmability is integrated into textiles and garments (Lu, 2019).



Source: This study.

Figure 2: Artificial intelligence in the new era

At this stage, in dealing with artificial intelligence application talents, it is necessary not only to increase the training of talents and technologies, but also to keep pace with the times, but also to have detailed plans and clear goals to ensure that this professional talent can be supplemented. In addition, artificial intelligence is also a highly applied professional subject. The main framework should be constructed based on market conditions and school-enterprise integration. The ideological line must be correct, and the requirements of social enterprises for this talent must not be ignored. Do not follow the trend blindly and radically. We must deal with it based on the facts and analyze specific issues. Reasonably arranging the school-enterprise training of design talents for production, study and research also plays a big factor, and its effect cannot be ignored. The current international classification of demand for artificial intelligence talents mainly includes the following types: AI design theory application talents, AI technology application talents, AI technology management talents, AI education and teaching talents, AI design and development talents. Each type has certain roles and skills, which are classified in the following table.

WHY DO DESIGNERS NEED TO KNOW ABOUT AI AND SMART TECHNOLOGY?

The commercial implications of using AI technology to create a unique selling feature is a familiar theme in product design, but, the important factors on how best to include AI techniques in products to improve usability (Xie et al., 2019), are ill-defined. Factors including the potential users' perception and understanding of the technology alongside their confidence in depending upon such products are presently rarely considered. Gaining the confidence of users' needs to be a task of principle in ensuring successful design of interactive products. It can be seen within present consumer products that simple automation features can cause the user frustration and annoyance. Auto-focusing cameras, auto text formatting within software packages, voice-activated (Tan, 2017) controls and speech generating alarms are examples of where the intended added functionality can ultimately result in user aggravation.

In terms of usability, AI can be viewed as a method for supporting a working dialogue with a product. Establishing the dialogue need not, therefore, be just an ergonomic relationship, effective interface design and degrees of controlled automation, it can also encompass the complex manipulation of information and the interaction with embedded knowledge. There is no inherent intelligence within a machine and it is left to the designer, of both hardware and software, to artificially create this attribute. It is, however, extremely rare for product designers to become involved with this level of technical engineering detail. But the combination of hardware, software and AI techniques is what endows smart products with functionality. Knowledge of the capabilities and limitations of the technology will enable product designers to be more creative and innovative and ensure the design of more successful interactive products.

Huang (2016) AI researchers have acknowledged that there is a noticeable lack in communication between AI developers and designers wishing to apply the technology. At a recent international workshop to discuss the acceptability of specific state of the art AI techniques in industry, it was noted that the development of usable systems was significantly hindered by failures in recognizing the importance of human interaction issues. The interaction issues are not the sole responsibility of ergonomists and designers, and it is also a necessary consideration for computer scientists, and AI developers. Furthermore, to ensure the success of smart products, it will be an ever-increasing responsibility of designers to be able to find common ground with software engineers, computer scientists and electronics engineers, e.g., Table1: Demand of International Classification of Artificial Intelligence Talent.

Table1: Demand of International Classification of Artificial Intelligence Talent

Talent type	**Technical**	**Applied**	**Managerial**	**Educational**
Role play	AI theory, technology, software, programming innovation	AI design, data, technology application and improvement	Innovation and practice of AI business model	AI education concept, all kinds of personnel training, professional construction, competition and competition
Skills	Proficient in AI theory, technology, programming, software, equipment, communication and other knowledge, with original consciousness and ability.	Master the technology of product design, software programming, material preparation and testing, data processing, equipment operation and transformation, and have strong innovation and practice ability.	Familiar with the basic knowledge of AI technology, familiar with the operation system and basic mode of industrial chain, have the basic skills of market and business management, and have the awareness of business innovation.	Familiar with the basic knowledge of AI technology, familiar with the basic theory and method of education and teaching, master the professional construction, curriculum, teaching organization and management methods, and have the ability of textbook compilation, teaching implementation, training management.

THE TRAINING DILEMMA OF ARTIFICIAL INTELLIGENCE DESIGN TALENTS

Artificial intelligence technology has developed rapidly in recent years, but it belongs to an emerging field after all, with a relatively short development time and many technical problems. For a long time, artificial intelligence design and machine learning capabilities have been a "bottleneck" in the field of artificial intelligence. On the one hand, the ability of machine learning is limiting the development of artificial intelligence and machine learning; on the other hand, given the close relationship with other fields, this requires researchers to train machine learning while the development of other talent fields can be used in new learning algorithms. And other areas of learning institutions have discovered, thereby promoting new development in the field of talent cultivation intelligence.

The target positioning of artificial intelligence design talent training is not accurate.

Through a series of popular science surveys, for related industries in our country, our country’s artificial intelligence industry is still in the initial stage of development, although the field of artificial intelligence technology is in all walks of life in our country All are involved and applied very quickly, but there is still a certain distance from the relatively mature AI technology abroad. In addition, our country currently has no clear standards for the formulation of artificial intelligence industry standards. It is still in an embryonic state and needs further development. The promotion of the cultivation of artificial intelligence design talents in colleges and universities has a profound and indelible impact. At this stage, the artificial intelligence technology in various universities in our country is also in a state of crossing the river by feeling the stones. A considerable number of colleges and universities are still in a blank state in the application and cognition of this technology. The most important thing is that they have not formulated training plans for design talents in this area. In addition, there is a lack of resources for talent training. The resulting series of problems also brought embarrassment to the recruitment of related AI companies: On the one hand, the design talents trained by the school lack a certain amount of practical training in the design and development of smart

products, and also lack long-term effective training programs; on the other hand, the popularity of our country's domestic artificial intelligence industry is still far Not enough, the technology is relatively immature, and there are not many jobs compared to other mature majors. The requirements for design talents are very high, so the prospects are not optimistic. From an economic point of view, schools spend millions to establish artificial intelligence technology laboratories, artificial intelligence research institutes, etc. However, there are few applications that can truly integrate teaching, and the quality of student sources cannot keep up. Restrictions on industry development, our country also does not pay enough attention to artificial intelligence design and application talents, and it is far from enough in the training and promotion of related artificial intelligence technology. There is a big gap in the design and development of artificial intelligence related software, programming and other courses, the design and development of intelligent products, and the application and practice of foreign cutting-edge artificial intelligence technology. There is also a gap between the artificial intelligence professional education of engineering majors in universities and the application needs of enterprises, and there is a lack of clear and reasonable positioning in the training of talents. Therefore, the school's senior management will also consider whether the training of artificial intelligence design talents in the school is feasible and effective.

The dilemma of artificial intelligence teaching and research faculty

At present, the application of artificial intelligence in our country is still immature. Most domestic colleges and universities are unable to introduce relevant artificial intelligence equipment due to the backwardness of experimental equipment and the high cost of professional equipment. Artificial intelligence is an emerging industry, and the design colleges of domestic universities do not have a clear division of disciplines. The resources for the training of artificial intelligence design talents are relatively scarce, and most colleges and universities are mostly teachers in engineering, computer science, communications and other professional teachers, and lack certain AI-related companies' market experience and educated students. It is difficult to connect with the emerging AI industry in the future. They also have teaching blind spots in intelligent design products and other reasons, and cannot guarantee the better development and application of artificial intelligence technology in intelligent products. In addition, the lack of multidisciplinary collaborative innovation among universities and the lack of interdisciplinary scientific research topics restrict the emergence of artificial intelligence compound design talents. After investigation and research, the current domestic correlated artificial intelligence design teachers are mostly group scientific research teachers. They lack a certain amount of practical experience in AI companies. In addition, traditional design companies also lack a certain degree of knowledge and understanding of artificial intelligence, and even less Practical application, it is unable to provide effective practical innovation guidance. Lu (2015) As artificial intelligence is a new type of industry and is more closely integrated with computer majors, design students have insufficient awareness of this, and only know that it is a new and fashionable "synonym" of computer programming. Fewer; the lack of resources for smart designers has led to an embarrassing state of unmanned application implementation even if universities have the ability to introduce various artificial intelligence facilities and technologies. The final result is that the design majors of various colleges and universities pay more attention to this than "hot pursuit". The students who are educated to do artificial intelligence-related design have a conceptual framework for the design, and there is no feasibility of implementing technical solutions. It is difficult to connect with AI companies in society.

The mechanism for training artificial intelligence design talents is unsound

According to relevant statistics, our country's shortage of artificial intelligence design talents is as high as one million, among which artificial intelligence application design talents are the most prominent. As a new industry that is emerging, its coverage is very wide and the lack of relevant design talents is beyond our imagination. For example, the artificial intelligence industry needs to continuously develop some intelligent software, digital technology, machine learning, etc. to meet the needs of today's society. At this stage, our country has some shortcomings in the training of application-oriented artificial intelligence design talents. Most domestic colleges and universities have little understanding of artificial intelligence intelligent design, and there are no training programs for related design talents. The talent mechanism is quite lacking. In addition, most colleges and universities follow the traditional school-running philosophy and focus on the cultivation of academic talents. The current shortage of intelligent design talents can also be confirmed and understood.

Providing appropriate information and guidance for fast-developing and commercially competitive fields may become a major obstacle for educators. Due to the conflicting agendas of intellectual property and research and dissemination, the transfer of technology from industry to education (and even from education to industry) often lacks the momentum needed to support this initiative. However, in the field of higher education in industrial design, because design solutions are often encouraged to incorporate more "close to market" attributes, institutions are often in a good position to take advantage of industrial cooperation. Some research groups in the field of artificial intelligence believe that exposing students to cutting-edge technology, its foundation, use, and development can stimulate and produce innovative and technologically advanced design solutions for practical problems. In addition, some research institutions acknowledge that education plays an important role in defining and advancing certain technologies used in the industry, because today's students may be the final users and

developers of future technology. It is envisaged that the development of design talents can be accelerated by introducing artificial intelligence in the early stages of student education.

THE TRAINING PATH OF ARTIFICIAL INTELLIGENCE DESIGN TALENTS

With the development of emerging technologies in the "Industry 4.0" era, the development and wide application of artificial intelligence technology, as the closest relationship between scientific and philosophical themes, its research results are gathered from psychology, linguistics, neuroscience, logic, mathematics, Computer science, robotics, economics, art and other disciplines. In the field of industrial design in the future, the greatest convenience that artificial intelligence brings to designers is that it can replace tedious and inefficient repetitive work, as well as some fixed and conventional artistic expression methods. From the perspective of most people's definition of art, the important thing that distinguishes designers from computers is that computers do not have "imagination", so artificial intelligence cannot replace designers at present, but works in collaboration with designers (Liu, Yan & Chen, 2016).

"Collaborative innovation" in the intelligent age leads the cultivation of artificial intelligence design talents

Construct application-oriented undergraduate colleges with an innovative model of "collaborative education" of "university-enterprise-government". The "collaborative education" innovation model of "university-enterprise-government" is an extension of the current university-industry-research combination. "Industry" cannot be separated from specialized artificial intelligence design talents who master knowledge; "research" also needs to rely on professionals who master artificial intelligence technology and technical knowledge. University topics come from production and life practice; "learning" must be linked to artificial intelligence. The practical application of the design requires attention to the research results of the latest artificial intelligence technology. Linking "university-enterprise-government" and taking the road of "industry-university-research" in the new intelligent era will inevitably improve the quality of talent training in applied undergraduate colleges. However, the three organizations of "industry", "learning" and "research" have their own tasks. Clarifying the interests of all stakeholders is the starting point for deepening the "collaborative education" innovation model of "university-enterprise-government". Enterprises need to combine their related interests in the innovation of artificial intelligence technology, the upgrading of artificial intelligence products, and the provision of artificial intelligence design talents and employee training that are closely related to enterprise production; the fundamental interest of applied undergraduate colleges lies in the training of artificial intelligence-related students Become an applied design talent welcomed by enterprises and society. Based on this, in the era of intelligence, applied undergraduate colleges and universities must deepen the "collaborative education" innovation model of "university-enterprise-government" and must cooperate closely with enterprises and governments to get out of the original plight of industry-university-research cooperation.

Teacher training of artificial intelligence technology in the field of college design

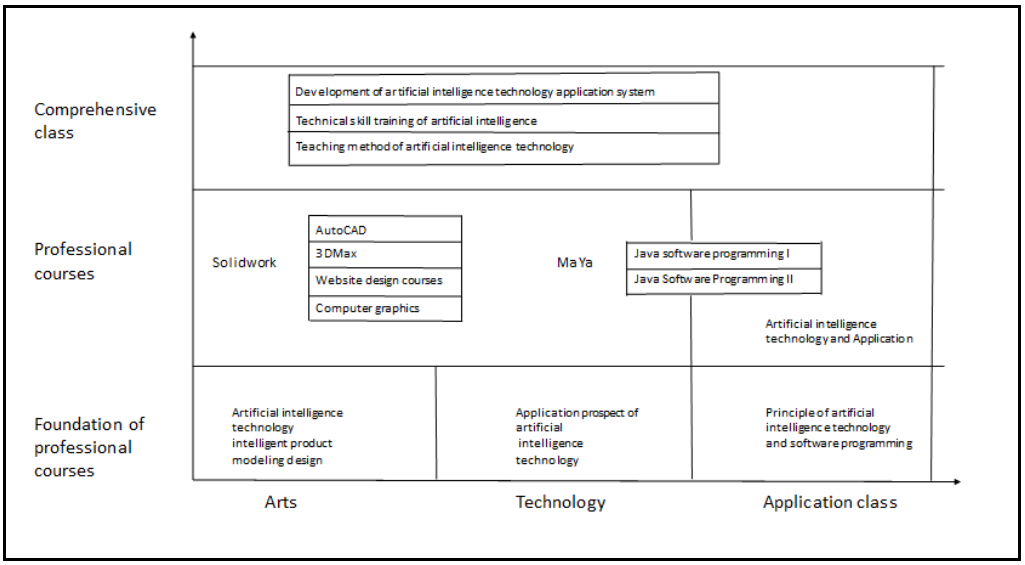
In order to support the construction of the faculty for the training of artificial intelligence design talents in colleges and universities, relevant enterprises that carry out collaborative education innovation models with colleges and universities need to hold regular seminars for teachers of artificial intelligence teaching and research and enterprise technical personnel. Relevant universities need to hold high-level seminars and research classes related to artificial intelligence from time to time, invite university teachers and experts in artificial intelligence technology to participate, exchange and learn with each other, research and discuss the curriculum and target positioning of artificial intelligence design talent training. So as to meet the social needs of adapting to talent training.

College education is the main method of educating talents, and most students are trained in this way. Therefore, the physical and intellectual education of educating talents should be developed at the same time. Research on learning science and neuroscience provides basic insights into the complexity of learning and the processes behind learning, and provides clues for further improving individual teaching. For example, when students learn to motivate and challenge group projects in a team, they learn more; when they immediately apply what they have learned, they retain more; when they get from a quick-reacting mentor, they will learn more when they help, and these methods reflect a deep understanding of the learner's background, strengths and weaknesses.

Applying this new insight about human learning in the digital learning environment of teacher training requires a deeper understanding of teachers' cognition, including more effective constructivism and active teaching strategies. Artificial intelligence technology is essential for developing representations and reasoning about these new cognitive insights, providing a richer appreciation for how teachers lead students in learning, and measuring collaborative activities. Tan (2017) Artificial intelligence will also become a game changer in education. In fact, education and artificial intelligence can be regarded as the same two-sided coin: Education helps students learn and expand the knowledge accumulated by society. Artificial intelligence provides technology to better understand the mechanisms of thought, knowledge and intelligent behavior.

Establish a talent training goal and curriculum system designed with artificial intelligence

According to the specifications of talent training, application-oriented general undergraduate colleges need to train artificial intelligence application design talents, that is, to transform scientific principles into the design of artificial intelligence products; from the development trend of modern vocational and technical education in developed countries and regions, artificial intelligence The training of design talents can be at the undergraduate level and level, and it is necessary to train students to have the ability to comprehensively apply to solve the development and application of artificial intelligence products, and to design and innovate artificial intelligence technology. This target positioning is to solve the overall requirement of the current application-oriented undergraduate colleges with a poor target positioning of artificial intelligence design talents. From the perspective of the formulation of the curriculum system, we need to get rid of the skill training-centered curriculum system with higher education institutions, and at the same time change the curriculum system for academic talent training based on theoretical knowledge innovation, so as to build an artificial intelligence technology application (Yin, Ren & He, 2008). The curriculum system of applied general undergraduate colleges with design ability as the core, construct a curriculum system diagram as follows, Figure 3: Knowledge structure diagram of the "trinity" artificial intelligence curriculum system:



Source: This study.

Figure 3: Knowledge structure diagram of the "trinity" artificial intelligence curriculum system

CONCLUSION

Intelligent tutoring systems have been shown to be highly effective in increasing student motivation and learning. In designing these systems, it is useful to view them as being composed of five components: the student model, the pedagogical module, the domain knowledge, the communications module, and the expert model. Research has been done on each of these modules, but only a few are very well understood. Specifically, incorporating multiple teaching strategies in the pedagogical module is a large open research question.

In higher education, encourage the introduction of new cutting-edge technologies. If more and more attention is paid to the design of functional products in the education of design academies, then design students must obtain a solid foundation in the basic elements of intelligent technology. The research of artificial intelligence needs to pay attention to an eclectic knowledge system. There are few relevant talents for artificial intelligence technology professionals who can combine their ideas and intelligent design in actual production. The lack of talents to some extent has greatly limits the development of the artificial intelligence industry. At present, applied undergraduate colleges and universities should explore specific paths for the cultivation of artificial intelligence design talents, and the construction and practice of related curriculum systems should also be gradually revised during practical exploration, so as to realize innovative education through educational innovation.

Taking industrial design as the carrier, launching the "collaborative education" innovation model based on "university-enterprise-government", and "collaborative innovation" leading the training of artificial intelligence talents; developing innovation ability and awareness training curriculum system, and conducting university teacher training; Practice with the goal of artificial intelligence design talent training and curriculum system. Clarify the current types and status quo of artificial intelligence design talents, analyze the current application-oriented colleges and universities of artificial intelligence talent training, and propose specific ways to solve the current artificial intelligence design talent training.

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