The Application of "Artificial Intelligence +" in the Construction of Architectural Majors in Higher Vocational Colleges

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Abstract: To adapt to the rapid development of artificial intelligence(AI) era, it is necessary to strengthen the construction of AI technology in professional talents. The major of architecture in higher vocational colleges is mainly to train application-oriented talents with professional skills. Meanwhile, students majoring in architecture also need to master AI technology. Integrating AI into professional courses can not only improve students' professional skills, but also change their learning environment, promote education reform in the era of AI, and help students' employment. In the era of AI, education is not only limited to traditional classrooms, but also the construction of online learning space is one of the current upsurge. Architectural AI is an important application scenario of AI, which improves the efficiency and quality of architectural services, and will also bring about the transformation of architectural productivity and the subversion and optimization of the construction industry chain. In this paper, combined with the AI development background and literature review method, building engineering construction in higher vocational colleges, analyzes some problems existing in the method through the experiment set controlled trials, from the curriculum structure system update teaching in combining false and true, spatial control experiment is made in aspects of online learning, and puts forward some countermeasures for the construction of professional innovation, to provide the reference for the people who pay attention to the subject, to promote the sustainable development of construction industry.

1. Introduction

AI technology has injected new vitality into education, pension, energy, medical treatment and other fields [1]. Talent is the primary productive force, and education is the key to talent cultivation [2]. In the era of AI, how to deeply integrate education and AI, promote the reform of education from the aspects of education concept, teaching method and technology application, and cultivate qualified innovative talents with AI technology has become the research focus of the government, schools, experts and scholars [3]. In July 2017, the State Council issued the development plan reflects the country's high attention to AI technology at the strategic level [4]. The plan points out that AI is a strategic technology leading the future, and China must firmly grasp this new opportunity [5]. In 2018 in jiangsu province economic and information commission promulgated the development of a new generation of AI industry in jiangsu province implementation opinions, put forward the "AI and education", building intelligent education platform, promote the construction of AI in teaching, management, resource, whole process applications such as public policy of our country education related to AI has formed system [6]. It can be seen that the integration of AI technology and education has attracted the attention of the national and local governments.

AI research purpose is to enable computers to complete the intelligent work that only human beings could complete in the past [7]. AI has been widely applied in many fields such as manufacturing, medical treatment and military affairs, and other AI design systems have appeared in the field of design [8-9]. These systems provide audiences with more intelligent and convenient services by capturing data, modeling, calculation and evaluation in a way that traditional design platforms cannot achieve [10]. In the construction industry, where parameterized means can be used in a mature way, AI is also a highly anticipated upstart technology. There have been successful

application cases in the design, construction and management of buildings [11]. In the fields of landscape design, urban planning and real estate, AI technology has a broad application prospect. It can not only replace some manpower and improve work efficiency, but also bring new changes to the whole construction industry [12].

We mainly uses the method of literature review to deeply discuss and analyze the problems, and tries to find the entry point where the construction of higher vocational architecture majors is well combined with AI [13]. By setting the control experiment, from the curriculum structure system update, the actual online learning combined with teaching, the construction of the space three aspects to carry on the control experiment, find AI into the building engineering construction the best breakthrough point, to solve the problem of higher vocational problems existing in the construction engineering construction feasibility countermeasure, increase the depth of the AI and education, make students in the major of higher vocational construction beneficiaries[14-15].

2.Method

2.1 Research Highlights and Difficulties

The research is to summarize the existing problems of architecture majors in higher vocational colleges from domestic and foreign literatures. At the same time, how to effectively improve the construction difficulties of architecture majors in higher vocational colleges and promote the sustainable development of architecture majors in higher vocational colleges. The difficulty of this paper lies in how to set up the controlled experiment and what aspects to conduct the comparative analysis of the experimental results, and the results of comparative analysis should be of reference value to the construction of architectural majors in higher vocational colleges.

2.2 Research Ideas and Methods

This study takes "how to integrate AI into the construction of higher vocational architecture majors" as the core problem, which specifically involves two aspects: "the degree of integration of AI and education" and "the current situation and problems of the construction of higher vocational architecture majors". It is determined that AI, education and professional construction of higher vocational colleges will be the key keywords to be searched, so that the key journals studied in this paper are innovation education, science and technology economics guide, Chinese journal of multimedia and network teaching, and wireless Internet technology. Meanwhile, the search process is limited to original and review studies to ensure that the search results are peer-reviewed, high-level papers. Based on these search conditions, 36 papers were finally found on cnki as the object of this literature review and analysis.

The research method of this paper combines the control test method and typical cases of literature review method. In the application of literature review method, the clarity of search process and the repeatability of search results are emphasized. This method requires researchers to first identify the problem, search engine, search scope and keywords, then record the whole search process and results in detail, evaluate the relevance of search results based on unified screening criteria, and finally make critical comments on relevant literatures. This literature review method has been applied in many fields, and feasible reference results have been obtained.

Usually when you do a controlled experiment you have a control group and an experimental group. By using the randomized controlled experiment method, a research tool at the forefront of international academic research, the experiment was designed and implemented under the control conditions of updating the curriculum structure system, combining VR(VR) teaching and constructing online learning space, in order to investigate the influence of the integration of AI on the construction of architectural majors in higher vocational colleges. The study found that in terms of updating the curriculum structure system, students in the control group, the experimental group B and the experimental group A showed A significant increase in the professional level of architecture majors, among which the difference in the experimental group A was the most significant.

3. Experiment

First of all, in this paper, using the method of literature review on current situation and problems of higher vocational college construction class specialized analysis, clear that construction class specialized colleges and universities, such as insufficient attention of AI technology, the related resources construction is relatively slow, so how to effectively solve these problems, where is the entry point to solve these problems, of course, the answer is the fusion of AI and education.

Secondly, this paper carried out a controlled experiment from three aspects: updating the curriculum structure system, combining VR teaching, and constructing online learning space. In the first control experiment, the curriculum structure system was updated as a variable, and the control group and experimental group were set up. In the second control experiment, the combination of VR teaching was set as a variable, and the control group and experimental group were set up. In the third controlled experiment, online learning space was set as a variable, and control group and experimental group were set up. From these three experiments, it can be concluded whether the updating of course structure system. After repeated experiments to build complex control experiment, update control course structure system, set up the actual situation, combined with teaching in building online learning + building space, the actual teaching in three experimental groups online learning space, observe the student's acceptance, the final evaluation standard is the student's course experience, professional skills upgrading, AI and the classroom into the degrees.

4. Discuss

4.1 Experimental Results

The results of the three simple control groups are shown in table 1, table 2 and table 3. In table 1, 56% indicated that the students in the experimental group with the updated curriculum structure improved their professional skills by 56%, and 16% indicated that the students in the control group without the updated curriculum structure only improved their professional skills by 16%. From the three tables, we can see that the updating of course structure system,and the construction of online learning space all contribute to the improvement of the school's professional construction level.

Table1. Course structure system update control group

	Course structure system update	Course structure system don't update
Control group	-	16%
Test group	56%	-

Table2. Combination of VR teaching control group

	Combination of VR teaching	No combination of VR teaching
Control group	-	12%
Test group	61%	-

Table3. Building an online learning space control group

	Building an online learning space	No building an online learning space
Control group	-	9%
Test group	67.2%	-

The results of the last group of complex controlled experiments are shown in table 4. In this group of controlled experiments, the course structure system in both the control group and the experimental group has been updated. The only differences are whether the combination of VR teaching, the construction of online learning space, the combination of VR teaching and the construction of online learning space. 72% indicated that the students in the experimental group had improved their professional skills by 72%, 78% indicated that the students in the experimental

group had improved their professional skills by 78%, and the students in the experimental group had improved their professional skills by 80% when the combination of VR teaching and online learning space was carried out.

Table4. Complex control group

	Combination of VR teaching	Building an online learning space	C+B
Control group	-	-	-
Test group A	72%	-	80%
Test group B	-	78%	80%

After these experiments, the attitude of students was investigated and analyzed in combination with the experimental results, and the final results were shown in figure 1. Where X1 represents the update of course structure system, X2 represents the combination of VR teaching, and X3 represents the construction of online learning space map. Students believe that the update of course structure system, the combination of VR teaching, and the construction of online learning space all contribute to the improvement of their professional skills, and the corresponding improvement proportion is given. The bar chart shows the number of students who think it is useful to update the curriculum structure system, combine VR teaching and build online learning space. The line chart (i.e. percentage) shows the percentage of students' professional skills improved from the three aspects of curriculum structure system update, combine VR teaching and build online learning space.
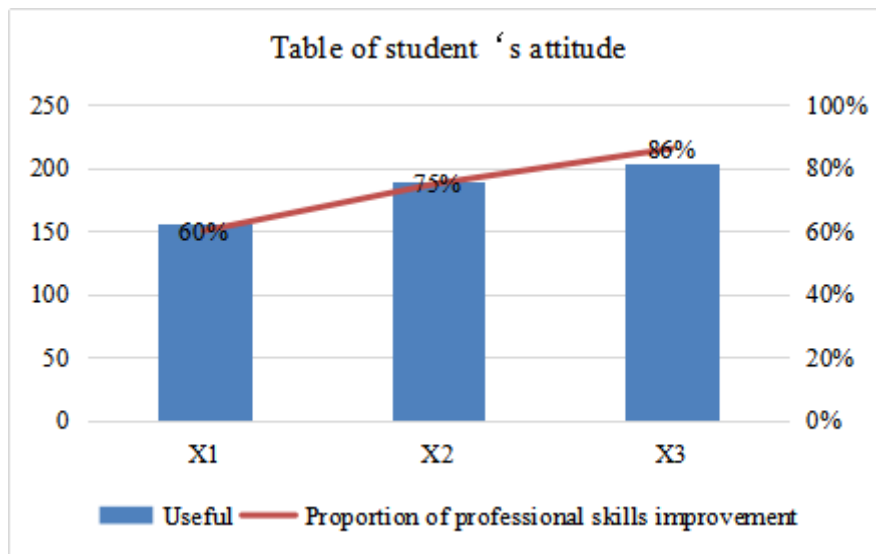

Figure1. Student 's attitude

4.2 Analysis of Influencing Factors and Countermeasures

Through the above results show that, from the curriculum structure system update, the actual online learning combined with teaching, the construction of the space of the fusion of these three aspects to carry out the AI and education have obvious results, construction in higher vocational colleges can effectively improve the professional construction situation.

4.2.1 Update of curriculum structure system

Combined with the new needs, it is also necessary to realize the renewal of the curriculum structure system of architectural design specialty, and introduce intelligent control courses in the traditional mechanical and electronic curriculum and other basic courses. Specifically, courses such as "intelligent manufacturing technology" and "AI technology" should be completed. Considering the limited teaching time of specialized courses, the selection of high-quality teaching content should be realized to ensure that students master the basic knowledge of architectural design and related technologies. Therefore, the basic courses of architectural design can be divided into several

parts, such as generation and development, architectural structure and architectural aesthetics. In terms of elective courses, it is necessary to complete multiple courses such as virtual architecture design, floor plan design and stereogram design. Students can combine their understanding and interest in the construction industry to choose courses and complete in-depth study of relevant knowledge and technology.

4.2.2 The combination of VR teaching

The combination of VR teaching can be understood as the combination of online and offline teaching. First of all, online employment environment can be simulated to make students feel like they are in it. In this environment, it is beneficial for students to adjust their own state, so as to encourage students to actively participate in the training, and thus achieve better teaching results. Secondly, the position can be simulated. Higher vocational colleges can let students simulate the positions in enterprises through information-based software, so that students can finish the work independently. Finally, the enterprise process can be simulated. Each enterprise has its own enterprise process. Higher vocational colleges can let students practice through information-based software. The application of this method is beneficial to students' future employment and the improvement of professional skills and qualities.

4.2.3 Build online learning space

Knowledge cannot be instilled unilaterally by educators, but by the entire learning environment, through interaction with teachers, learning partners, and learning systems. Combined with learner center theory, learner characteristics in modern education, and AI technology background, this AI space is composed of five modules: learner subject module, perception recognition module, AI housekeeper module, affective computing and communication module, and system resource module.

5. Conclusion

Speech recognition, image recognition, emotion computing, learning analysis and other technologies are the key technologies of AI. In today's era, people have gradually transferred their attention from AI technology itself to AI technology for education itself. Learners can enjoy "considerate" services through AI learning space. With the development of AI technology, its application in the field of education will be more and more in-depth. Under the background of "AI + education", the curriculum structure system, VR teaching and online learning education space will also be more perfect and the service will be more accurate.

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