The Practice of a New Maker Teaching Model in Vocational and Technical Education

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Abstract—Affected by the traditional teaching model, vocational education and teaching tend to emphasize theory but ignore practice, and students have a poor innovation ability, which can't satisfy the talent needs of the development of social market. In consideration of this, this paper introduces a maker teaching model supported by cyberspace, which divides the teaching process into six stages: knowledge learning, situational thinking, operational practice, research program, creative learning, sharing and communication. Combined with the characteristics of vocational education course, the maker teaching model is applied to this course, and the design is made from three aspects: maker spirit, maker ability and maker practice. At the same time, set pair analysis is adopted to set up a teacher-student two-way teaching effect evaluation model, with a view to improve the teaching effect of vocational education courses and enhance students' ability. The teaching practice results of this study indicate that students' learning initiative is effectively promoted under this teaching model, and the learning effect is relatively good. This education mode overmatches the traditional teaching method.

Keywords—cyberspace, vocational and technical education, set pair analysis, maker teaching

1 Introduction

Industrial technology is closely linked with national economy and social development, and the vocational education of engineering has cultivated professional technical and engineering talents needed by national economy and social development. In no small measure, the level of the vocational education of engineering is high, the technical human resources required by national industrialization and industrial development are abundant, and the level of national economy and social development is not low [1]. For this reason, the quality of the vocational education in engineering colleges has been brought to the forefront by the educational circle in recent years. With the blending of information technology in education, the basic conditions in teaching are optimized and create a variety of diversified teaching methods, which has become an inevitable trend in the current construction. It is relatively hard to understand knowledge points in vocational education course, an integral part of engineering. It is also important for us to give corresponding specialized practical training to make out professional theories in daily work. The previously used classroom-based teaching methods can no longer satisfy the current needs. In an effort to greatly improve students' vocational ability, we should create a corresponding teaching model, to improve learning efficiency and subjective initiative and raise high-quality interaction between teachers and students [2]. Compared with other professional courses of engineering, vocational education has its own advantages and responsibilities in accurate docking with the needs of industries and enterprises, for the purpose of providing badly-needed high-caliber technical and skilled talents for the development of national emerging engineering industries and the transformation and upgrading of traditional engineering industries. Concurrently, with the development of Internet information technology, traditional teaching methods of previous vocational education are monotonous and can hardly adapt to the new needs of information technology teaching. For instance, with the outbreak of COVID-19 in 2020, colleges and universities in China have imminently implemented the online teaching model, but it was hard to apply this model to vocational education and teaching [3]. Additionally, the existing teaching is more about training students' innovation and creativity, problem awareness, speculation and criticism, which are beyond the traditional teaching model [3]. To this end, to spur the development of the teaching of vocational education and cultivate more outstanding talents for the engineering field, it is requisite to improve the existing vocational education course. Hence, this paper introduces a maker teaching model supported by cyberspace.

Specifically, the innovation in this paper is evidenced in three aspects. Firstly, this paper briefs on the maker teaching model, reconstructs and designs the vocational education course in engineering colleges, explores the spirit of innovation and exploration and the concept of opening and sharing, enhances students' personal qualities and problem-solving skills through maker thinking. Concerning the maker teaching model, quite a few scholars have carried out study on it, but there are relatively few studies on the field of vocational education in engineering colleges. In practice, it is not commonplace to blend the maker model and educational information technology in the teaching of vocational education. The cultivation of talents with innovation ability and independent problem-solving skills is an important goal of existing teaching. Thus, it is necessary to introduce a new maker teaching model to the vocational education course. Secondly, based on the cyberspace-supported technologies, this paper also applies the teaching model of design thinking in vocational education course. This teaching model can remarkably improve students' creative thinking, self-efficacy of knowledge creation, and students' design thinking accomplishment, and further promote the effect of maker education. Thirdly, a teacher-student two-way teaching effect evaluation model is established, to find out drawbacks in vocational education and teaching, effectively improve the teaching effect, and train students with innovativeness and independent problem-solving skills.

2 State of the art

In the curriculum system of colleges and universities, engineering courses have been established for many years, and courses like fundamentals of mechanical manufacturing, mechanical drawing and mechanical principle tend to be diversified. In 2017, the Ministry of Education of China vigorously promoted the construction of new engineering, issued a series of notices on propelling the research of new engineering, printed and distributed the notice "Guidelines for the Construction of Future Technical Colleges (Trial)" (May 2020). With an in-depth exploration into the new model and new mechanism of new engineering education, the building of a powerful country in higher education has been further promoted [4]. Some renowned scholars around the world have set forth the connotation and actions of engineering construction precisely and also deeply investigated the mode and path of the training of engineering education talents. To be specific, with respect to the vocational education of engineering, Kamaludin et al. [5] set up a new learning system. This teaching reform aimed to enable students to develop their skills in accordance with the real world of work. To know the success of the implementation of industry practical program then held evaluation. The evaluation of the program in this study used the CIPP evaluation approach (Context, Input, Process, Product).

Practice has found that such kind of educational reform is conducive to the training of students' practical ability. Al-Ali [6] pointed out that technology transfer was very important in the teaching of vocational education. Technology transfer can indeed close the gap between what is being learned and practice in technical and vocational institutions and the world of work. In this paper, he presented some of the empirical results and observations which described the interactions between the supplier of technology (Electrical Engineering System) and the recipient of the technology (PAAEamp;T) in the field of technology transfer. Sibiya et al. [7] probed into Training (TVET) engineering students' understanding and found that the TVET's learning programmes should be repositioned to articulate as a poor response to poor schooling in relation to labour market, amongst others, to ease school leavers into jobs or self-employment under conditions of widespread youth unemployment. Liu et al. [8] advised that the teaching effect should be promoted by guiding students to take part in all kinds of vocational skill competitions. Practice has proved that through various skill competitions, on the one hand, students' skills are improved, and on the other hand, it makes the high-skilled talents trained by vocational education more fit into social needs. Xiao et al. [9] attempted to apply the teaching ecosystem of entrepreneurial education to the vocational teaching of engineering schools, launch teaching activities through technical practice and promote the mutual progress of teaching elements, such as teachers, technology and students. This teaching reform proposed that we may institute a "trinity" reform of the ecosystem of vocational education and teaching from three perspectives, i.e., teaching subject, teaching process and teaching method, etc., to facilitate this system to transform from the passive adaptation of "intelligent technology+ vocational education and teaching" to the active transcendence of "vocational education and teaching+ intelligent technology", so as to increase the efficiency of vocational education and teaching in the era of intelligence.

Concerning the study on the improvement of curriculum effect, the scholars, after investigating the application of design thinking in the practice of maker education, Danah et al. [10] believed that the cultivation of design thinking was conducive to the training of creativity and innovation ability. So this method was beneficial to the implementation of maker teaching model. The author also presented that in the actual teaching model, teachers should combine design thinking with maker education, as a means to stimulate the formation of students' creative thinking ability. Rebecca et al. [11] discussed the impact of maker teaching model based on design thinking on students' thinking and discovered that this model can dramatically increase the possibility that low-performing students chose to use effective strategies in an innovative learning environment, and enhance students' ability to solve problems independently. It was also reported that the maker teaching model under design thinking obviously overmatched project-based maker education. Chin et al. [12] believed that apart from improving students' innovation ability, the maker teaching model also needed to attach importance to the improvement of their design ability. Yang et al. [13] built a maker teaching model for primary and secondary schools supported by cyberspace. The authors examined the theories of maker education, design learning and project-based learning by using literature review, concluded that the maker thinking comprised of four links: creative idea, iterative design, production of works, release and sharing, and came up with seven steps to build maker teaching model accordingly. With an eye to further improve the maker teaching model, the author also established an effect evaluation system for the model, evaluated the teaching effect from four aspects: maker works, innovative thinking, innovation awareness and innovation skills, and made constant improvement on teaching model according to the evaluation results. Practice has proved that under the maker teaching model, students' innovativeness and hands-on ability have been significantly enhanced, and their understanding of learning content has also become deepened. Huang [14] gave an overview of the teaching mode of maker thinking, and through two years' teaching practice, built a course teaching mode aiming at cultivating knowledge integration ability, problem-solving skills, innovation ability and speculative and inquisitive abilities. Specifically, as described in the logic of the construction of knowledge theory, the establishment of learning environment, the launch of course practice and the summary of course assessment, the author built a teaching framework that integrated maker thinking into design courses in colleges and universities. The results of practical teaching indicated that this teaching model can effectively cultivate students' innovation and thinking ability.

From the aforesaid related studies, it can be seen that under the background of informationization, the teaching model of vocational education needs to combine more with information-based technical approaches, as a means to improve students' innovation ability and independent problem-solving skills. And the application of maker education, cyberspace support and design thinking, etc. in other teaching courses fully demonstrates the effectiveness of these teaching models in improving students' innovation, creativity and problem-solving skills. For this reason, it is necessary for vocational educators to refer to other courses and apply more teaching models according to their own circumstances.

3 Integrated teaching mode based on STEAM education concept in labor education course

3.1 Application of maker concept in teaching

The maker concept is a teaching concept based on design thinking that advocates interdisciplinary learning, whose core feature is the unity of knowledge, action, thinking and creation. This teaching concept principally creates and delivers a meaningful learning experience for makers through the process model of independent selection, investigation and research, creative idea, knowledge construction, design optimization, prototyping, test iteration, evaluation and sharing [14]. Specifically, the characteristic model of maker learning is shown in Figure 1:

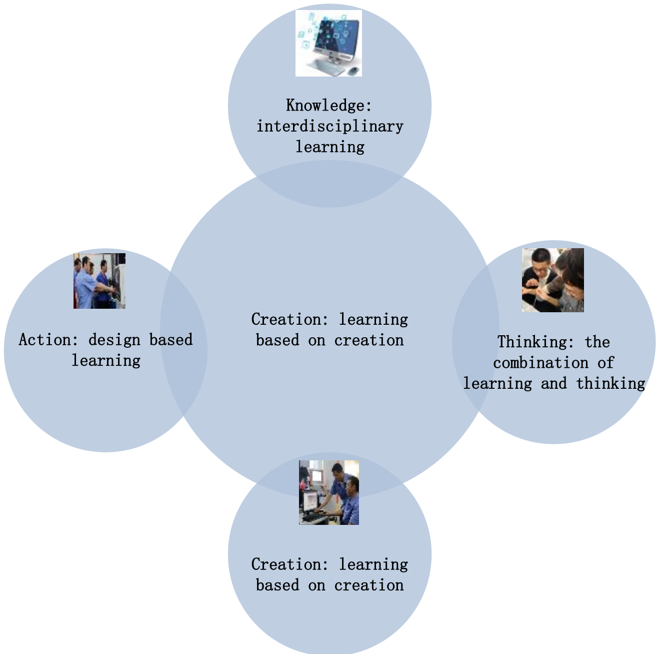

Fig. 1. Characteristics of maker learning

To be specific, first of all, the essence of maker learning is to constantly analyze existing problems, based on cutting-edge, systematic and comprehensive interdisciplinary knowledge. This problem-solving process is also a process about learning and creation. Secondly, maker learning lays emphasis on the combination of learning and thinking, believing that while learning relevant knowledge, students should not only accept passively, but more importantly, introspect, through which they can reinforce their understanding of knowledge. Thirdly, maker learning also lays stress on creation. In this concept, teachers are no longer disseminators of knowledge, but also designers and regulators of learning environment. By guiding students to think and apply, students become the users and creators of knowledge. Lastly, maker learning is also a kind of design-based learning, which means that students' design ability and problem-solving skills can be promoted in creative design activities.

Based on the connotation and essence of maker concept, this paper built a maker teaching model based on information technology and the details are shown in Figure 2:

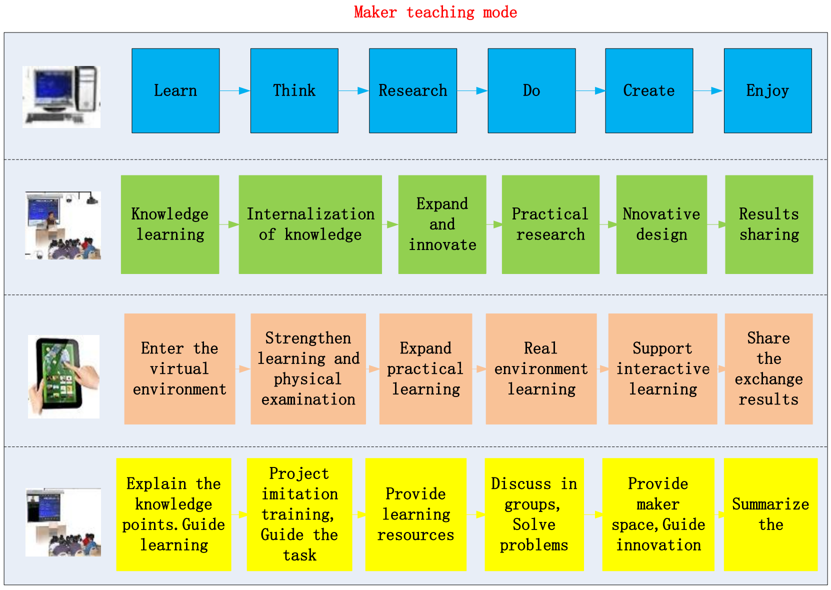

Fig. 2. Maker teaching model based on information technology

Under this teaching model, the teaching model can be divided into six stages: knowledge learning, situational thinking, operational practice, research program, creative learning, sharing and exchange. Among them, in the stage of knowledge learning, students should integrate knowledge points, understand basic operations, and then enter a virtual learning environment for knowledge learning. Teachers should also need to interpret relevant knowledge points. Situational thinking is a process whereby knowledge is reinforced. By completing tasks, students can have a deeper thinking and a more profound insight into relevant knowledge points in the stage of operational practice, teachers assign simulation projects, and students consolidate knowledge and understand the underlying mechanism through simulation exercise (see Figure 3). In the stage of research program, teachers fully delegate the subject responsibility of learning to students, and in this stage, students practice and exercise independently and sort out related knowledge in the form of group work. The stage of creative learning is the core of maker concept. In this stage, students completely become the subject of learning activities. They grow from simulation exercise to creative projects, and teachers also shift from imparting knowledge to motivating and guiding. Conclusively, in the stage of sharing and exchange, students exchange learning feelings and experiences through intra-group review and inter-group review, and build up self-confidence in innovation during the exchange. Teachers can also help students sort out knowledge points again through assessment.

Fig. 3. The stage of operational practice based on maker teaching model

3.2 Construction of an evaluation model for vocational and technical education mode based on set pair analysis

In order to verify the application effect of maker teaching model supported by cyberspace in vocational education course, constantly improve the teaching model and effectively promote the course effect of vocational education, this part adopted set pair analysis to set up an evaluation system for the curriculum model of vocational education.

Principle of set pair analysis. The core idea of set pair analysis was to analyze the uncertain correlation and certain correlation between objective things and analyze the whole as an uncertain system. Suppose that in an uncertain system, there were two correlation sets X and Y, which had N features respectively. According to the relationship of identity, discrepancy and contrary, the identity-discrepancy-contrary connection degree was:

$$\mu(X,Y)=\frac{S}{N}+\frac{F}{N}i+\frac{P}{N}i \tag{1}$$

Where S was the number of elements with identical features in two sets, P was the number of elements with contrary features in two sets, and F was the number of elements with discrepant features in two sets. The relationship among the three was:

$$N=S+F+P \tag{2}$$

If it was supposed that:

$$a = \frac{S}{N},\quad b = \frac{F}{N},\quad c = \frac{P}{N}$$

Then the k-element connection degree can be expressed as:

$$\mu(X,Y) = a + b_1 i_1 + b_2 i_2 + \cdots + b_k i_k + cj \tag{3}$$

Where b_k was the discrepancy component and i_k was the coefficient of discrepancy component.

Given the weight of each evaluation indicator, the connection degree can be expressed as:

$$\mu(X,Y) = a + bi + cj = \sum_{k=1}^{S} w_k + \sum_{k=S+1}^{S+F} w_k i + \sum_{k=S+F+1}^{N} w_k j \tag{4}$$

Where w_1 was the characteristic weight, which can be determined by analytic hierarchy process. The preceding Eq.(4) can also be expressed as: w_1

$$\mu = WRE = (w_1, w_2, \cdots, w_n)\begin{pmatrix} a_1 & b_1 & c_1 \\ \vdots & \vdots & \vdots \\ a_n & b_n & c_n \end{pmatrix}\begin{pmatrix} 1 \\ i \\ j \end{pmatrix} \tag{5}$$

Construction of evaluation model. With respect to the teaching effect of vocational education, it was hypothesized that $Q=[F,Z,W,H]$, where F was the scheme set, Z was the evaluation indicator set and W was the weight set. Thus, the specific numerical matrix of evaluation indicator can be expressed as:

$$H = \begin{pmatrix} u_{11} & \cdots & u_{1n} \\ \vdots & \vdots & \vdots \\ u_{m1} & \cdots & u_{mn} \end{pmatrix} \tag{6}$$

There was the best scheme U and the worst scheme V in the scheme set. For any k region, the connection degree of $[F_k, U]$ in the interval $[U,V]$ was:

$$\mu(F_k, U) = a_k + b_k i + c_k j \tag{7}$$

Where a_k was the identity degree under the set pair problem, b_k was the discrepancy degree under the set pair problem and c_k was the contrary degree under the set pair problem. To be specific, they satisfied:

$$a_k = \sum_{p=1}^{n} w_p a_{kp} \text{ , } b_k = \sum_{p=1}^{n} w_p b_{kp} \text{ , } c_k = \sum_{p=1}^{n} w_p c_{kp} \tag{8}$$

Therefore, the identity degree a_{kp} and contrary degree c_{kp} of the teaching effect evaluation matrix of vocational education and U,V can be calculated as follows:

$$a_{kp} = \frac{d_{kp}}{(u_p + v_p)} \tag{9}$$

$$c_{kp} = \frac{u_p v_p}{d_{kp}(u_p + v_p)} \tag{10}$$

Construction of a teaching effect evaluation model for vocational education course. Combined with teaching practice and extensive literature on teaching evaluation, this paper designed an evaluation indicator system from two perspectives: teaching and learning. The details are shown in Table 1:

Table 1. Evaluation indicator of the teaching effect of vocational and technical education course

Evaluation Angle	Evaluation Indicator
Teacher	Richness of teaching content T1
	Logic of teaching content T2
	Diversity of teaching form T3
	Classroom interaction T4
	Informatization degree of teaching methods T5
	Expressiveness in teaching language T6
	Comments on the completion degree T7
Student	Innovativeness S1
	Design ability S2
	Teamwork ability S3
	Organization and coordination abilities S4
	Learning interest S5
	Learning effect S6
	Classroom interaction S7
	Completion of assignment S8

The comprehensive evaluation model of the set pair H composed of T and S concerning teaching was as follows:

$$\mu = a + bi + cj = W_T \mu_T + W_S \mu_S \tag{11}$$

The connection degrees of all indicators were determined by questionnaire. To accurately express the recognition degree of teachers and students, the question content of each indicator was divided into such options as good, medium and poor.

Suppose that N teachers answered the questionnaire. When Q_1 teachers chose good, F_1 teachers chose medium and P_1 teachers chose poor, the connection degree can be expressed as:

$$\mu_{T_i} = \frac{Q_1}{N} + \frac{F_1}{N} i + \frac{P_1}{N} j = a_{T_i} + b_{T_i} i + c_{T_i} j \tag{12}$$

Likewise, when M students answered the questionnaire, Q_2 teachers chose good, F_2 teachers chose medium and P_2 teachers chose poor, the connection degree can be expressed as:

$$\mu_{S_i} = \frac{Q_2}{M} + \frac{F_2}{M} i + \frac{P_2}{M} j = a_{S_i} + b_{S_i} i + c_{S_i} j \tag{13}$$

3.3 Application of maker teaching model in vocational and technical education course

According to the characteristics of vocational education course, the application of maker teaching model in vocational and technical education course should be designed from three aspects: maker spirit, maker ability and maker practice. The details are shown in Figure 4:

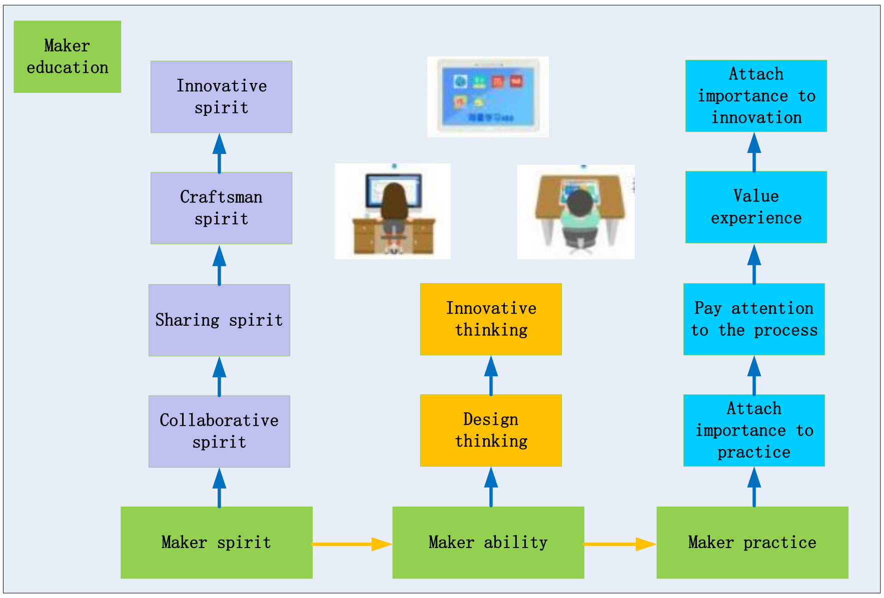

Fig. 4. The teaching concept of vocational and technical education course based on maker model

Therein, with respect to maker spirit, students' application of vocational technology and other knowledge not only requires a certain amount of creativity, but also necessitates the spirit of craftsmanship, collaboration and sharing, so as to achieve mutual progress. In terms of maker ability, in the vocational and technical education and teaching in engineering schools, we should attach importance to students' innovative thinking and design thinking, that is, when carrying out vocational and technical education and teaching, teachers should not only guide students to learn basic theories and relevant skills, but also encourage students to design a specific vocational practice program, in which relevant knowledge points can be put to good use for innovative design. As can be seen from Figure 5, in terms of maker practice, when the maker teaching model is applied to vocational and technical education and teaching, special attention should be paid to innovation, process, experience and manipulation. Specifically, these can be achieved by knowledge construction, the design of situational questions, the design of professional practice program, constant optimization, result sharing, expansion and innovation, etc.

Fig. 5. The practice link in maker education of vocational and technical education course

When the maker teaching model is applied to vocational and technical education course, we should focus on the theory of knowledge construction, and bond the learning process of sharing, argumentation, cooperation, creation and reflection with the maker education mode in an organic way. Specifically, by taking project-based learning as the main clue, and relying on the mode of "learning, thinking, researching, doing, creating and sharing", learners are enabled to have a preliminary understanding of the management of vocational education through thinking while learning, thinking while researching, doing while researching and creating while doing, etc., and then the practical knowledge of vocational education can be consolidated through evaluation, reflection, sharing, reengineering, iteration and improvement and the core of vocational knowledge of engineering is grasped. Ultimately, it is also required to adopt the combination of qualitative evaluation and quantitative evaluation, process evaluation and summative evaluation, self-evaluation and mutual evaluation, multiform evaluation and diversified evaluation. Specifically, the application of maker teaching model in the teaching of vocational education course can be designed as Figure 6:

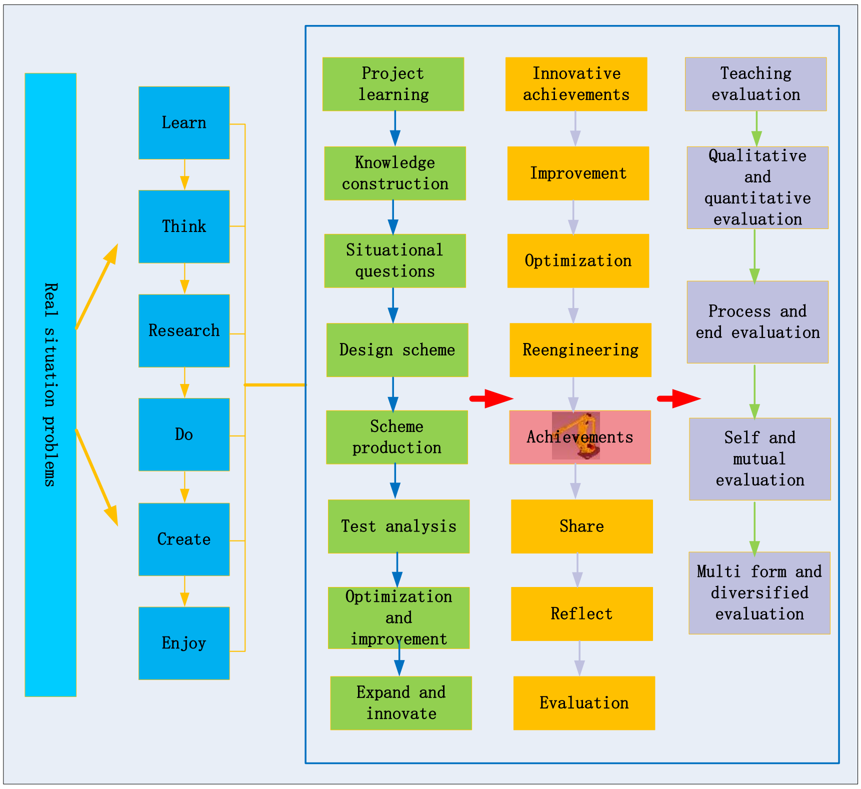

Fig. 6. Application of maker teaching model in vocational and technical education course

4 Teaching example and effect

4.1 Teaching example

In this part, a chapter about project planning in the lesson of Vocational and Technical Education, was taken as an example, to perform teaching based on the concept of maker education. Specifically, students' innovation ability was stimulated by guiding and encouraging thinking. This case mainly explained the writing of a sports tourism project proposal. First of all, the teacher explained a certain professional project proposal, then made clear key points about the writing of this vocational education project proposal around this professional project, and also illustrated the writing ideas of each key point. Subsequently, the teacher assigned a project for engineering majors, and required students to complete it in groups within limited time. During this period, the teacher may give some guidance and explanation, and encourage students to design the project innovatively, according to relevant experience.

4.2 Teaching effect

In this paper, students from Class 1 (43 in the experimental group) and Class 2 (45 in the control group) of Cohort 2020 of Engineering in a given college were randomly selected as the research objects. The teaching materials, teaching syllabus, teaching objectives, teaching hours and teachers of each chapter of the two groups were the same. here were no statistically significant differences between two groups in gender, age and entrance test score ($P>0.05$), indicating comparability. A total of 88 questionnaires were distributed in this group, and all of them were effectively recovered.

In this paper, the comprehensive practical skill assessment scores of two groups of students in vocational and technical education were compared. The results are shown in Table 2. Specifically, the final grade of vocational education course, sports management ability, organization and coordination abilities, teamwork ability and interpersonal communication skills were compared.

Table 2. Comparison of the comprehensive practical skill assessment scores between two groups

Item	Control Group (n=45)	Experimental Group (n=43)	t	P
Final Grade	72.34±2.35	88.19±1.36	5.129	0.001
Sports Management Ability	38.28±1.09	45.70±1.77	4.891	0.013
Organization and Coordination Abilities	24.47±1.33	32.18±2.08	9.080	0.000
Teamwork Ability	5.17±2.34	6.18±2.10	10.293	0.000
Interpersonal Communication Skills	7.82±1.74	8.44±1.65	2.099	0.125

As can be seen from the results in Table 2 above, the comprehensive practical skill assessment scores of the experimental group were significantly higher than those of the control group, whether in the final grade, sports management ability, organization and coordination abilities or teamwork ability, indicating that the maker teaching model supported by cyberspace had an excellent effect in vocational and technical education course. At the same time, this paper also found that the interpersonal communication skills were not significant between the control group and the experimental group and it was important to further improve the interpersonal communication in the maker teaching model. The results are shown in Table 3.

This paper further employed the aforesaid new curriculum model evaluation model based on set pair analysis, students in the experimental group were assessed, and the results are shown in Table 3. After the maker teaching model was applied to the vocational education course, the learning interest, learning application ability, vocational management ability, scheme design ability and innovation ability, etc. in the experimental group were significantly promoted. The reasons were mainly as follows: the maker teaching model integrating design thinking can significantly promote students' creativity and other high-level thinking abilities, the design thinking strategy can enhance learning and problem-solving skills, increase the possibility that low-performing students chose to use effective strategies in an innovative learning environment and improve learners' awareness of problem solving. Design thinking provided a strong support for the cultivation of learners' high-level thinking abilities, which had a remarkable advantage over ordinary blended education. At the same time, 6 teaching stages of this course, i.e., knowledge learning, situational thinking, operational practice, research program, creative learning, sharing and exchange in the form of group discussion, attempted to provide students with specific and operable creative design cases in different steps of the course. Teachers provided students with design cases and students generated more ideas through self-cognition and teamwork, inspired by case analysis, etc. This further improved their learning interest and learning initiative and tended to help students associate theoretical knowledge with practice, and enhance their learning application ability. Accordingly, through the maker teaching model push design thinking, students can master the correct law of knowledge thinking and be assisted to change their inherent learning thinking. By elevating innovative thinking and graphic thinking on the basis of original knowledge, students would unconsciously transform the original knowledge into thinking, for example, convert literal information into practical information, to deepen their memory and understanding, cultivate students' scheme design ability and increase their innovation ability, which was beneficial to the command of knowledge content of this subject.

Table 3. Evaluation of maker education-assisted teaching by students in the experimental group

Item	Absolutely Agree	Basically Agree	Uncertain	Disagree	Absolutely Disagree	Likert-scale Score
Improve Innovation Ability	73.28	20.89	5.83	0.93	0.91	4.32±0.29
Improve Professional Management Ability	75.14	21.33	3.53	0.87	0.20	4.42±0.38
Improve the Scheme Design Ability	77.29	21.00	1.71	0.39	0.32	4.71±0.41
Improve Teamwork Ability	70.18	22.25	7.57	0.89	0.87	4.18±0.32
Improve Learning Interest	69.13	23.28	5.26	2.33	0.72	4.23±0.44
Promote Active Learning	71.06	12.13	15.00	1.81	0.64	4.27±0.29
Improve the Learning Application Ability	72.27	22.73	3.25	1.75	1.07	4.31±0.34

5 Conclusions

In this study, the maker teaching model supported by cyberspace is applied to vocational and technical education. To begin with, the research status on vocational education and maker teaching model are briefly reviewed, then the maker concept is understood, a teaching model evaluation system is built based on set pair analysis, and then the application of maker concept in the course is illustrated in detail. What's more, this paper also verifies the teaching effect of the vocational and technical education course in college under the maker education model by using practical data. After research, this paper draws the following conclusions:

1. When the maker teaching model supported by cyberspace is applied to vocational and technical education, students' final grade, vocational management ability, organization and coordination abilities and teamwork ability have been significantly improved, but the improvement of interpersonal communication skills is insignificant.
2. After the maker teaching model is applied to the vocational and technical education course, students' learning interest has been significantly improved, and students are also willing to learn. Beyond that, students' scheme design ability and vocational management design ability have also been significantly improved, further indicating that the teaching effect of this course has been significantly enhanced after the application of the maker teaching model supported by cyberspace.
3. The practice results, however, show that the improvement of interpersonal communication skills is insignificant, which requires us to refine the design related to interpersonal communication, when applying the maker teaching model to various vocational and technical education courses.

In a nutshell, with the rapid development of information technology and increasing demand for industrialization, when a kind of maker teaching model supported by cyberspace is applied to the vocational and technical education course presented in this paper, it can effectively improve the teaching effect of vocational education and convey more outstanding industrial talents to the society.

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