Research and Practice on the Cultivation of Autonomous Learning Ability of Higher Vocational Students Based on Blended Teaching of Digital Learning-A Case Study of Analysis of Preparation in TCM

Yan Zhu[1], Jiao Feng[1], and Qingyang Liu[2(✉)]

[1] Liaoning Economic Management Cadre Institute College of Commerce, Shenyang, Liaoning, China
[2] Chinese Medicine Endocrinology Department, Affiliated Hospital of Liaoning University of Traditional, Shenyang, Liaoning, China
`qingyang-tcm@163.com`

Abstract. The cultivation of students' autonomous learning ability is the key of improving classroom efficiency. With the rapid development of information, in order to adapt to the new characteristics of the times, it is important for college students to adjust their learning style and method as soon as possible. Students in higher vocational colleges have poor awareness of active learning. It affects the comprehensive development of students' thinking. With the research and practice of blended teaching based on digital learning, we shared some practices and experiences of improving students' autonomous learning ability in blended teaching of higher vocational colleges and found a way to improve students' autonomous learning.

Keywords: digital resources · blended teaching · autonomous learning ability

1 Introduction

With the vigorous development of Internet plus education, online digital learning resources represented by MOOC and SPOC are becoming increasingly perfect, and a new online learning model emphasizing students' independent participation arises at the historic moment. This model effectively alleviates the lack of teaching resources in traditional classroom teaching, especially in terms of teachers and venues, and encourages students to extend their learning time independently and improve their learning enthusiasm. However, simple network learning is easy to lead to knowledge fragmentation, and it is difficult to build a complete knowledge framework. At the same time, distance education has obvious disadvantages in the cultivation of emotional attitude and values. The concept of blended teaching provides an innovative solution for teaching reform. Blended teaching emphasizes the combination of face-to-face teaching and online learning, and provides resources and activities consistent with teaching objectives with the

help of modern media technology, so as to optimize the teaching effect. In the process of teaching, we should not only highlight the dominant position of teachers in the guidance of activities, process control and achievement supervision, but also strengthen the initiative and creativity of educational objects. In achievement evaluation, it should be compatible with teacher evaluation [1], peer evaluation and subject self-evaluation, and social evaluation should be introduced appropriately. At the same time, offline learning activities such as PBL and task-driven group collaboration are combined with online data analysis such as testing and evaluation to strengthen process assessment. Blended teaching liberates teaching resources and introduces multi-evaluation, which is a beneficial supplement to the traditional teaching.

In view of the problem that students play mobile phones and have low interest in learning in traditional classes, this paper combines the teaching practice of pharmaceutical courses. On the basis of in-depth research and extensive investigation, we realized the introduction and application of digital curriculum resources, and we also designed the blended teaching mode in line with the characteristics of our college. This teaching model, which complements digital resources and traditional teaching, can effectively improve the autonomy of learning and emphasize the cultivation of higher-order thinking ability [2]. And it personalized development of students.

1.1 Current Situation of Autonomous Learning of Higher Vocational Students

Many vocational college students are supervised undered the parents and teachers. They have clear learning objectives in the middle school stage. When they went to higher vocational colleges, the students and their parents have a certain amount of relaxation in the mind. Whether the ideal goal is achieved or not. Many students have no motivation to learn, and they also lack of autonomous learning awareness.

1) Students have poor self-control ability
In China, the study status of students who enter vocational colleges in high school belongs to the middle and lower reaches. They are easy to be disturbed by the external environment. Their will to learn is not strong enough. They didn't impose constraints on themselves in study without parental supervision when they went to the college. Few vocational college students can make plans in advance and complete their study tasks according to the plan in the internet environment. Some students with poor self-control will be addicted to online games and cannot extricate themselves [3].

2) Students lack learning motivation
Many students have no choice but to enter vocational colleges. Some students fail to realize their dream of a bachelor's degree due to their failure in the college entrance examination. The gap between ideal and reality will have a negative impact on students. Thus it leads to lack of learning motivation.

3) Students fail to develop good study habits
Most students' learning methods and habits are still at the middle school level. They hope the teacher will emphasize and review it repeatedly when learn something new. University courses are rich in content, informative and fast-paced. Students study mainly

by independent learning after class. They can not adapt for teachers only play a guiding role in learning style. Nearly half of the students do not have the habit of self-study in their spare time.

4) Students have too high expectations for employment

Some students hope to find an easy, clean and well-paid job when they get employed. Many graduates majoring in science and technology in higher vocational colleges work in professional and technical positions and frontline production [4]. Many students are reluctant to take such jobs. Thus it leads to the loss of learning confidence and motivation.

1.2   Teaching Status of Higher Vocational Colleges

1) Vocational colleges take teachers as the center and ignore the main position of students

In the context of the "Internet Plus" era, varieties of online courses continue to emerge. However, many students, teachers and administrators believe that the learning style in the e-learning environment is only a supplement to the traditional learning style. The locations changed from students listening to the teachers sitting in the classroom, into students listening to the teachers on the network. In essence, the learning style has not changed, and students' learning initiative has not been brought into play. Because part of the higher vocational students self-control ability is poor, teachers worry that some students' learning attitude is not correct and the learning effect will be affected. Thus teachers excessive interfered in students' autonomous learning. Teachers are still the centre of teaching.

2) Vocational colleges focus on comprehensive development and ignore personalized development

Because of the influence of social attitudes and educational goals, teachers pay more attention to the overall learning situation of all students in classroom teaching. Teachers often neglect individual development [6]. Constructivist learning theory suggests that, we should respect students' subjectivity and develop their individuality in education. And we promote self-development of students. Education should be about individuality. Through the guidance of teachers, students' cognition can be transformed.

3) Research and practice of blended teaching in vocational colleges

Since the outbreak of COVID-19 in China in 2020, as a result of the epidemic, the epidemic has led to the norm of online and offline hybrid teaching with digital resources as the carrier due to repeated outbreaks over the years. Especially the first few weeks of each semester, online teaching based on digital resources has become a compulsory course for teachers and students. In the practice of blended teaching, the teacher tries to form a benign online teaching loop through live streaming platform, mobile teaching APP, video resources, PPT files, etc. But the students' learning enthusiasm and learning effect are not ideal. An important factor causing this phenomenon is that students have not formed a good habit of online self-directed learning. Whether it is self-study before class, deepening in class or consolidation after class, students lack online autonomous learning

ability. In order to achieve the ideal effect of online teaching. Only when students have high self-directed learning ability, they can learn at their own pace before class. Students can use learning resources effectively to carry out learning and find questions. They take the initiative to conduct in-depth discussion and collaborative learning in the subsequent teaching. Thus they could complete the internalization of knowledge and skills. Therefore, how to cultivate students' autonomous learning ability in blended teaching has become an urgent problem to be solved in the current teaching implementation process.

2   Materials and Methods

2.1   Materials

Students majoring in pharmaceutical operation and management of Grade 2019 which is study in college of commerce of Liaoning economic management cadre Institute were selected as the research object. One class was randomly identified as the experimental group (47 students), including 13 boys and 34 girls. The average age was 18–22 years. The other class was the control group (46 students), including 12 boys and 34 girls. The average age was 18–22 years. All students were informed and agreed to participate in this study, and the content, teaching hours and teachers of the lectures were the same for both groups.

2.2   Methods

72-teaching-hour Analysis of Preparation in TCM course has been arranged in the fourth semester of the second academic year. There are 40 theoretical hours and 32 experimental training hours. The course is arranged twice a week for a total of 4 teaching hours. The teaching materials and teachers between the control class and the experimental class are the same. The control class adopts traditional lecture-based teaching method. The experimental class adopts the hybrid teaching method of online digital resource learning and offline classroom teaching, as follows.

1) Prepaired online digital Resources
Teachers should collect and organize the basic online teaching materials for each chapter in advance. We choose online courses that are basically consistent with the teaching objectives and content of this course, and process and polish source course resources. Open online course resources to students with the learning platform. On the basis of the source course, we have added learning task sheets [5], handouts, electronic textbooks, set corresponding tests, assignments and discussions. In the study sheets and handouts, we use special colors to mark the key points. Students learn by themselves with a clear hierarchy on the basis of making full use of high-quality online course resources. Make the course have the individuality characteristic, and realize the course optimization design.

2) Self-study before class

Teachers will push learning task lists, related videos, handouts and electronic textbooks to students in advance through the platform. They also assign homework and organize online discussions. Let students have an overall understanding of the course. Students integrate more quickly into the classroom. Students watch videos, complete assignments and participate in discussions according to time points under the guidance of the study task list [7]. Make students' pre-class learning objectives clearer and learning forms richer.

3) The control class adopts traditional lecture-based teaching method

Teachers upload learning materials and assign preview tasks through the online teaching platform one week before class. Students should prepare for class according to their own needs. During teaching, teachers mainly explain in class, and students' questions are supplemented. After class, students can continue to consult the learning resources of the online teaching platform, continue to learn, and consolidate the teaching effect.

4) The experimental group adopted the blended teaching model

Before class, students formulate learning achievement goals and advocate independent learning outside class with the help of online teaching platform. Teacher carries out classroom activities in class. Teachers track and evaluate after class to continuously improve teaching quality. The specific implementation is as follows:

Teachers scientifically and carefully determine the expected learning outcomes of the curriculum according to the talent training objectives and students' understanding and learning expectations of the curriculum. Students set individual learning goals against overall goals. One week before the class, the teacher will upload the teaching related materials to the network teaching platform and formulate the learning process. The teacher guide students to learn the teaching content independently. Students study together in small groups. Students are required to participate in online topic discussions and complete chapter quizzes. If students have questions, they should first consult materials and literature in the group. If it is still difficult to understand, they can summarize the difficulties and doubts and upload them to the online teaching platform.

When teaching in a normal classroom, the classroom teaching is divided into three parts after self-learning with digital resources in the early stage. First, students report the learning effect: students report the online learning effect with PPT or oral presentation in groups, 2–3 groups of students report alternately each time. The second is the problem interaction discussion: fully discuss the students in the process of learning problems, understand the incorrect problems and difficult problems between students or between teachers and students. The third, teachers answer questions. Teachers add knowledge points ignored by students, summarize key knowledge, and guide students to solve difficult or difficult problems, so as to deepen students' understanding of the content of the lesson and promote the internalization of knowledge. Finally, several problems related to life and practical work are put forward for discussion, so as to expand students' thinking and make learning as a use. Through teachers' targeted explanation, group collaboration and teachers' comments, students are guided to complete the classroom teaching process of knowledge input, team interaction, skill application and comment and reflection. Students realize the trinity of knowledge, ability and quality.

Teachers assign review questions after class, guide students to consult materials, and share the answers on the online teaching platform. At the same time, communication and discussion between teachers and students and between students are carried out in the discussion area of the online teaching platform, so as to track students' learning situation and answer students' questions.

The knowledge learned has been further consolidate and expand. In addition, after each class, teachers evaluated students' online learning performance, autonomous learning ability, classroom activity performance and other effects. Reflect on teaching activities in a timely manner according to feedback results. The teaching design of follow-up courses were continuously adjusted. And the teaching quality was continuously improved.

5) Evaluation of teaching effect
A) Evaluation of basic knowledge mastery and ability to solve practical problems

At the end of the teaching semester, a consistent assessment method was used for the experimental group and the control group. The test questions were randomly selected from the test paper bank, with a total score of 100 points, including 40 points for basic knowledge, 30 points for knowledge understanding and 30 points for knowledge application.

b) Autonomous learning ability

The self-learning ability scale developed by Su-Fen Cheng in Taiwan is used, which is a self-rating scale, including four dimensions of learning motivation, planning and implementation, self-management, and interpersonal communication, with a total of 20 items. Each item adopts the 5-point Likert scoring method, with five options: strongly agree, agree, general/OK, disagree, and strongly disagree, which are scored successively. After the reliability and validity test, Cronbach's α coefficient of the total scale is 0.817.

c) Satisfaction evaluation of blended teaching

The self-made comprehensive evaluation form of teaching satisfaction includes five aspects: learning resources, teaching organization, teacher guidance, assessment methods and the love and recognition degree of blended teaching method. Students can choose one of the four options in each item: very satisfied, satisfied, average, and dissatisfied. Satisfaction is expressed as a percentage. The questionnaires were distributed to the students in the experimental group after the course. A total of 47 questionnaires were distributed and 46 valid questionnaires were collected, with an effective rate of 97.87%.

d) Data processing method

SPSS 22.0 was used for statistical analysis of the experimental data. Measurement data were expressed as ($\overline{X} \pm s$), t test was used for comparison between groups, and count data were expressed as percentage. The test level $\alpha = 0.05$, and $P < 0.05$ was considered statistically significant.

3   Results and Discussion

3.1   Results

1) Comparative analysis of general data
There was no significant difference in the overall evaluation scores of the three pilot courses of basic chemistry, Chinese medicine chemistry and Chinese medicine preparation between the two groups, which indicated that the learning ability and professional quality conditions of the students were basically the same. The comparative analysis of general data are shown in Table1.

2) Analysis of the influence of blended teaching method on the mastery of professional basic knowledge
The experimental group has higher scores in comprehension and application questions than the control group ($P < 0.05$), which indicates that blended teaching is helpful for students' understanding and application of knowledge, but there is no significant difference in basic knowledge questions between the two groups. The the influence of blended teaching method on student achievement are summarized in Table 2.

3) Analysis of the influence of blended teaching method on students' autonomous learning
The blended teaching method can affect students' autonomous learning ability. In the three dimensions of learning motivation, self-management and teamwork, the scores of the experimental group were significantly higher than those of the observation group ($P < 0.05$), the influence of blended teaching method on students' autonomous learning ability are summarized in Table 3.

4) The satisfaction evaluation of the experimental group to the blended teaching method
The students in the experimental group were generally satisfied with the blended teaching, and some students were not satisfied with the teaching organization and assessment methods. The experimental class was satisfied with the blended teaching method are summarized in Table 4.

Table 1. The ratings of the pilot courses of the subjects ($\overline{X} \pm s$) (Data from Educational administration system of Liaoning economic management cadre Institute)

Pilot courses	Group		Inspection result	
	Experimental group (n = 47)	*Control group (n = 46)*	*t-value*	*P-value*
Basic chemistry	75.45 ± 3.50	74.77 ± 4.01	0.879	0.381
Traditional Chinese medicine chemical	73.93 ± 3.89	72.67 ± 3.96	1.548	0.125
Traditional Chinese medicine preparation	76.08 ± 3.42	77.09 ± 3.47	-1.400	0.165

Table 2. The influence of blended teaching method on student achievement ($\overline{X} \pm$ s) (Data from Fanya learning platform of Liaoning economic management cadre Institute)

Question types	group		inspection result	
	Experimental group (n = 47)	*control group (n = 46)*	*t-value*	*P-value*
Basic knowledge questions	33.23 ± 1.59	32.02 ± 2.02	3.233	0.002
Knowledge comprehension questions	23.97 ± 1.26	22.78 ± 1.13	4.810	0.000
Knowledge application questions	22.85 ± 1.43	21.71 ± 1.16	4.184	0.000
Total score	80.06 ± 2.45	76.52 ± 2.59	6.775	0.000

Table 3. The influence of blended teaching method on students' autonomous learning ability ($\overline{X} \pm$ s) (Data from the self-directed learning ability scale was developed)

Dimensionality	Group		Inspection result	
	Experimental group (n = 47)	*Control group (n = 46)*	*t-value*	*P-value*
Learning motivation	26.46 ± 1.82	25.11 ± 2.35	3.118	0.002
Planning and Implementation	23.00 ± 2.16	20.65 ± 2.21	5.181	0.000
Self management	17.42 ± 1.39	16.02 ± 1.25	5.097	0.000
Interpersonal communication	18.32 ± 1.53	16.72 ± 1.57	4.972	0.000
Total score	85.21 ± 3.14	78.50 ± 3.67	9.477	0.000

3.2   Discussion

1) Blended teaching improves students' enthusiasm for autonomous learning
During online teaching, teacher requests the student to respond quickly when candidates, vies to answer first, many students can't score because of slowly typing, teachers can put forward to take pictures of class notes instead of typing as the answer, but mobile phone screenshots of web content are not be allowed. In this way, we can encourage students to self-study earnestly class notes. Many students showed their notes during the teaching process. This style of learning strongly promotes a positive learning atmosphere.

Table 4. The experimental class was satisfied with the blended teaching method (%) (Data from the self-made questionnaire)

Category	Option			
	Very satisfied	*Satisfied*	*Generally*	*Not satisfied*
Learning resources	68.8	28.4	2.8	0.0
Teaching organization	62.6	34.2	3.0	0.2
Teachers guide	59.8	37.4	2.8	0.0
The inspection way	53.9	39.8	6.1	0.2
Overall satisfaction	60.8	37.4	1.8	0.0

2) Blended teaching provides a new carrier for the development of ideological and political curriculum

During online teaching, teachers always lead students' thoughts and integrate ideological and political elements into professional teaching, so as to enhance students' patriotic feelings and guide them to establish correct career and life outlook. For the first time, I proposed to write "Hubei Go! Come on China!" Note and took a photo with the note in the form of a special check-in during the outbreak of COVID-19 in Hubei Province. Let the students pray for Hubei together! Pray for the motherland! Deeply practice patriotism education! In addition, a discussion on what professional qualities should be possessed by the practitioners of the industry was carried out, and the students were asked to discuss and analyze the qualities that should be possessed by a professional, so as to guide the students to establish a correct career outlook.

3) Blended teaching also needs to be kept fresh

When organizing teaching online, the author has tried two teaching methods. The first way is mainly to answer questions and interact with students. It adopts the methods of answering questions, selecting people and discussing. First of all, the teacher publishes the related questions about the advance learning content in the course group chat, and selects or rushes to answer them, so as to assess the effect of students' independent learning. After each point is answered, the teacher will summarize and expand it to further point out the key and difficult points. Students can also ask questions at any time, and teachers can answer them immediately. In terms of implementation, students are very excited about this online interaction as an alternative to traditional lectures. Students' enthusiasm is at an all-time high, and online responses can be described as explosive. Most of the students can answer the teacher's questions positively. The common feedback of students is that they are very nervous and excited when taking classes online. They feel that they are not so active when taking classes in the classroom. And the student feedback course is so much fun to teach! Many students who are usually silent in the classroom or even don't like learning in offline classes can actively participate. Students were highly involved in the competitive scoring activities. The advantages of this method are active classroom atmosphere, easy for teachers to control the whole classroom, easy to mobilize the enthusiasm of students, and diversified classroom forms. However, students

are dominated by self-study, so they may not have a clear grasp of the course context, and the mastery of individual knowledge points may not be in-depth enough. The blended teaching model is summarized in Fig. 1.

Another way of teaching is that teachers give priority to teaching and students interact with each other to answer questions with the help of synchronous classroom function of the learning platform. First of all, sign in to understand the situation of students to the class. After that, the course was taught, during which there was random interaction by naming and asking questions. After the lecture, students will return to the group chat to further impress students by answering the key questions mentioned in the course. At the same time test the effect of students. In this way, teachers are dominant in teaching, and many students' feedback is clear about the key and difficult points. However, the interaction with students in the teaching process is relatively simple, and it is difficult
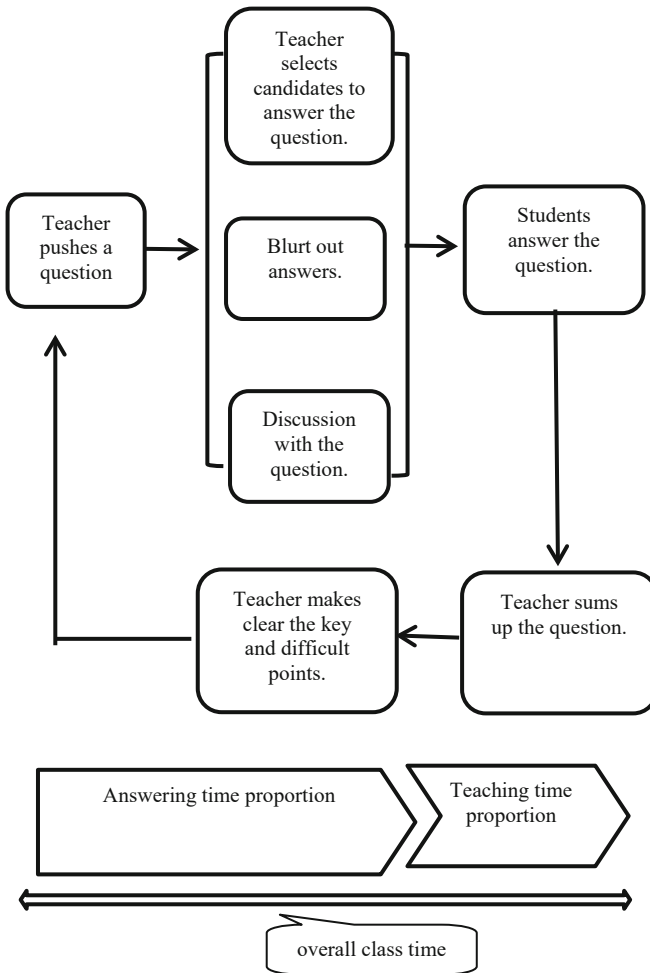
Fig. 1. A blended teaching model

for teachers to control the whole class. The teacher's situation is close to the teaching scene in the classroom.

In the many online lectures that have been conducted, the author believes that the key to attract students to actively participate in the class is to maintain the freshness, so timely adjustment of the teaching form is conducive to maintain the freshness, so as to stimulate the enthusiasm of most students to participate in the course [8].

4   Conclusions

Blended teaching method is helpful to improve students' understanding and application of curriculum knowledge. In the process of teaching implementation, students make full use of online and offline teaching resources to conduct independent inquiry learning. Their learning time can be extended, learning space can be transferred, and learning resources can be enriched. Teacher-student interaction, student-student interaction and information sharing are strengthened. It facilitates knowledge acquisition and translation. At the same time, intra-group and inter-group discussion, case analysis and teaching reflection increased in the process of teaching organization. Students' review, thinking and application frequency of knowledge also increased significantly. This further deepens the understanding and application of knowledge.

After the implementation of blended teaching reform, the experimental group is better than the control group in all aspects. Compared with traditional classroom teaching, blended teaching is more in line with the learning characteristics of contemporary students. It is also more likely to be accepted by students. At the same time, the use of blended teaching is also beneficial to improve students' awareness of autonomous learning. Therefore, in the process of teaching, teachers should first change the traditional teaching model concept of teacher-centered teaching. The teachers have changed from the traditional knowledge imparting to the learning leader and inspiration. Guided by the theory of information teaching innovation, the traditional teaching mode is reformed to guide students to study independently. Secondly, in the teaching process, teachers make full use of network information technology to build an information teaching environment. Teachers encourage students to study independently through the network and play the main role of students. Encourage students to change from "passive learning" to "active learning", and cultivate students' habits of independent learning, so that students become real learners.

References

1. Guo Y. (2020) How to Conduct teaching When Students "hide" screen [N]. Journal of Chinese Science, 007: 02-11.
2. Zhao L, Chen Y, Yu B. (2019) Research on online teaching model in colleges and universities from the perspective of intelligent education [J]. Computer Knowledge and Technology, 15: 164-165.
3. Jiao J, Zhou X, Chen Z. (2020) A case study of "no suspension" online teaching in the context of epidemic prevention and control [J]. China Audio-Visual Education, 3: 106-113.
4. Huang W, Zhang M, He Y. (2019) Pediatric nursing micro-course design based on autonomous learning ability training [J]. Guangdong Vocational and Technical Education and Research, 59: 21-24.
5. Chen K. (2019) Application of online and offline interactive teaching model in tourism management course [J]. Heilongjiang Education (Theory and Practice), 3: 66-67.
6. Fu B, Shen H. (2019) Research on the cultivation of autonomous learning ability of higher vocational nursing students based on MOOC blended teaching [J]. Health vocational education, 23: 74-75.
7. Posey L, Pintz C. (2017)Transitioning a bachelor of science in nursing program to blended learning: successes, challenges outcomes[J]. Nurse Educ Pracl, 26:126–133.
8. Chen Y. (2020) Strategies for cultivating college students' autonomous learning ability in the context of big data [J]. Education and teaching research, 2:105-106.