Design and Research of Curriculum Education Under Cluster Algorithm in English Hybrid Teaching Mode in Higher Vocational Education

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Abstract. Under the background of Internet, higher vocational English, as a general course, should be student-centered, make full use of the advantages of "Internet", integrate elements into the whole course teaching, and convey students' correct ideals and values. The concrete reform of Higher Vocational English can be considered from the perspective of blended teaching mode. Design and implement the development mode suitable for Higher Vocational English.

Keywords: Internet · Curriculum education · Higher Vocational English · Blended teaching mode

1 Introduction

With the development of educational philosophy and the advent of the "Internet plus" era, the application of multimedia and network technology in modern teaching is increasing [1]. However, at present, there are not many practical explorations on College English blended teaching, so there is a lack of deep experience and understanding of its positive role.

Under the background of the new era, the application of blended teaching mode in College English teaching can give full play to its positive role.

By means of questionnaire survey, the author finds that students' satisfaction with blended teaching is very high. The online learning content of blended teaching meets the needs of students, and the difficulty is moderate, which improves the learning interest. The mixed teaching mode makes most of the students' learning attitude more active than before, and the learning methods are more abundant and the effect is better. Through mixed teaching, students' abilities in all aspects are improved and learning methods are more diverse. 80% of the students think that the online learning effect is good or very good, and 90% of the students can basically or completely master the content. Mixed teaching mode is also conducive to improving teachers' teaching ability and information literacy [2–4]. The interviewed teachers believe that blended teaching has a certain role in promoting teaching reform and information-based teaching ability.

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2 Construction of Learning Community Between Teachers and Students Based on Blended Teaching Mode

The teacher-student learning community based on the blended teaching mode is centered on the exchange and transmission of curriculum knowledge, with the main purpose of online and offline mixed completion of teaching activities, and adhering to the learning goal as the guidance, to build a multi-level and multi-directional communication between teachers and students. The learning community between teachers and students can help teachers and students form a joint force, help each other and make progress together. A good learning community of teachers and students should have three elements, two levels and one core.

2.1 Elements of Teacher Student Learning Community Based on Blended Teaching Mode

There are three main elements in the learning community of teachers and students based on the blended teaching mode. First, students, who are the most important elements of the learning community and the originator of learning behavior, participate in the whole learning project and need to evaluate teaching through their mastery of knowledge. They are guides to guide students to understand and perceive the most fundamental law of the development of things, to discover and explore the mechanism contained in the discipline, and to use the knowledge to solve practical problems [5–7]. The third is the environment of students and teachers, which is the basis of learning and includes learning resources. The situation includes real situation and virtual situation. Real situation is the environment of interaction and actual communication between teachers and students, and it is a real learning environment. The virtual situation contains the emotional communication between teachers and students, which affects students' subjective initiative and potential way of thinking. Learning resources are used to support students' learning and provide necessary guarantee for the development of teaching activities.

2.2 The Level of Teacher Student Learning Community Based on Blended Teaching Mode

The teacher-student learning community based on the blended teaching mode mainly includes two levels, the first level is the low level, and the second level is the high level. The lower level is student student community and teacher teacher community, while the higher level is teacher-student learning network community.

2.2.1 Student Community and Teachers

Teachers' community and students' community is a low-level form of expression, which is a new mode of learning and discussion between students. Students communicate with each other, make progress together, share learning experience, new knowledge and new ideas in time. The novelty of it is that it is free from the constraints of time and space, and shares learning resources in real time with the help of information technology. Teacher teacher community is another form of low-level expression, which is based on

the knowledge research model between teachers and teachers [8]. The main body of this level is the coordinator and organizer of the learning community between teachers and students. Teachers spontaneously form professional teaching discussion groups, establish teaching circle culture, hold regular meetings to report teaching experience, share knowledge resources, build discipline construction system, and uphold the idea of "one game of chess". The discussion group should organize the division of roles, divide responsibilities and tasks, and realize real-time communication and multi-point linkage for education and teaching.

2.2.2 Network Community of Teacher Student Learning

The higher level of student learning community is teacher-student learning network community, which is characterized by teacher-student interaction, teacher teacher interaction and student student interaction. Each participant of learning community can communicate with every member of the organization, and they are equal, promote and grow together. This kind of high-level sharing resources will increase several times, and the ideas in the network structure collide with each other, which will inevitably stimulate new ideas and new knowledge. The participation of information technology will make ineffective learning scenarios happen at any time, make knowledge resources flow freely in multi-dimensional space, and improve the probability and speed of knowledge dissemination.

2.3 The Core of Teacher Student Learning Community Based on Blended Teaching Mode

The core of teacher-student learning community based on hybrid teaching mode is that teachers and students can establish teacher-student learning community online and offline with the help of information technology, and cooperate to complete various learning tasks in order to obtain good learning results [9–11]. The transformation and development of application-oriented universities pay more attention to the cultivation of practical ability and comprehensive ability, which requires teachers and students to fully communicate and interact in order to efficiently complete teaching activities. The establishment of learning community between teachers and students based on the mixed teaching mode can further deepen the communication and contact between teachers and students, and help students master important knowledge and methods. It can be seen that in the whole process, the dominant position of teachers is not highlighted, but the main focus is on the bridge built by the teacher-student community to help students acquire knowledge, solve problems and improve their comprehensive ability.

3 Blended Teaching and Academic Warning

3.1 Disadvantages of Traditional Teaching Mode

In the 1990s, the development of multimedia technology and network technology promoted the emergence of network teaching mode, breaking the traditional teaching mode that students passively accept teachers' knowledge. However, the network teaching mode

requires students to have strong self-learning ability and self-regulation ability, which has encountered great problems in practical application. Without effective monitoring means, students' learning effect cannot be guaranteed. In order to solve this problem, the concept of blended teaching came into being. Hybrid teaching was first proposed by foreign training institutions, aiming to make up for the lack of pure network teaching through the combination of online and offline, and has been gradually applied to the field of higher education [13]. At present, many domestic colleges and universities have accumulated a lot of teaching resources and teaching achievements in the hybrid teaching mode. Making full use of blended teaching can effectively enhance students' autonomous learning ability, increase students' opportunities for self practice, and reduce the situation of teachers' full house filling in traditional teaching mode.

3.2 Contrast Gap

In reality, the autonomy of online students still needs to be improved. In the process of offline teaching and guidance, teachers find that students' online learning effect is not good, so they repeat students' online learning content through offline teaching, which goes against the original intention of hybrid teaching design. Therefore, in order to better promote students to complete autonomous learning, under the background of blended teaching, colleges and universities need more comprehensive and effective monitoring means to monitor students' learning. Early warning means that colleges and universities use information technology means to establish a set of special programmed prediction, evaluation and processing mechanism in students' academic management, Ensure that the students whose evaluation results are in the early warning range can graduate smoothly in the future [14, 15]. Since the implementation of academic early warning system in China's universities in 2006, the academic early warning standards and early warning levels of various universities are similar, mainly through the completion of credits to grade early warning for students. However, in the information age, with the change of teaching mode and access to information, university teaching management should keep pace with the times, using more scientific and technological means to obtain more comprehensive data and information. By optimizing the academic early warning system, enriching the early warning content and improving the supporting measures, a set of academic monitoring management system is established to adapt to the mixed teaching mode and the needs of contemporary college students.

4 The Necessity of Optimizing the Academic Early Warning System in China's Colleges and Universities

4.1 Online Teaching Lacks Effective Monitoring Means, so It Is Difficult to Improve Learning Autonomy

The characteristic of blended teaching is the combination of online teaching and offline teaching. Online teaching mainly studies the course content through students' self-help, which requires higher autonomous learning ability of students. In practice, there will be the phenomenon that students hang up or do not participate in online learning. Therefore,

in the absence of strong monitoring means, it is difficult to ensure the effect of students' online learning [16]. In view of this situation, colleges and universities need to rely on technical means to monitor students' online learning, timely remind students of their personal learning status, so as to enhance students' learning autonomy and give full play to the advantages of hybrid teaching.

4.2 The Content of Academic Warning Is Single, and the Problem Is Not Clear

China's colleges and universities mainly through the way of grading early warning to the students with poor academic performance. The early warning standard is mainly based on the completion of credits or academic performance, and the evaluation standard is relatively single. Students' credit completion or academic performance can only reflect the overall academic progress or level of students. Some students who get early warning are not clear about their graduation requirements and the school's talent training objectives. They cannot be aware of the purpose of setting early warning standards in time, let alone how to make up for the existing problems. Compared with the hierarchical early warning, the classified early warning can more clearly point out the problems that students need to pay attention to, and also help schools to provide help measures for students.

5 Analysis of Basic Learning Model

5.1 Interactive Internet Education Courseware

Internet education, as its name implies, is to teach and impart knowledge with the help of the Internet [17, 18]. Because of the convenience of the Internet, people can choose their own courses to study, and at the same time, it also avoids learning problems caused by time conflicts or explanation of important knowledge points due to distraction. It is this characteristic that makes it convenient for people to study anytime and anywhere. The Internet plays an important role in the education industry, which has a major feature - the sharing of resources. China has always attached great importance to the balanced development of various regions. At present, most of the work is to help the poor out of poverty. The popularization of Internet technology is the embodiment of poverty alleviation. The application of this technology solves the problem that students in backward areas cannot accept the same education as students in better developed areas due to lack of conditions, and saves teachers.

Internet education technology is characterized by convenience. Students only need to choose one course and reach a certain learning time to complete the final examination. They will be awarded a certificate of completion or certificate of completion. As shown in Fig. 1, the course of Internet distance education is generally composed of anti fake learning and anti substitution module, courseware learning timing system, final automatic evaluation system and courseware. The modules of anti fake learning and anti substitution learning mainly play the role of supervising learning, which are not included in the evaluation system of user standards. For the learning process, the determination of reaching the standard is given by the timing system. When the time of

learning courseware reaches the target time and reaches the opening period of the final examination, the user can participate in the assessment, and the corresponding certificate or certificate will be granted after the assessment is completed.

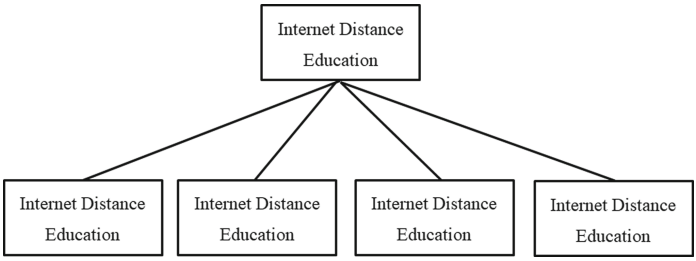

Fig. 1. Interactive network education course mode

5.2 Prior Probability Analysis

A priori probability refers to the probability of science and mathematics obtained from the previous experience of various experiments and the calculation and analysis of experimental data. The prior probability can represent most of the problems encountered in life. Taking the formula of total probability as an example, in all the problems of causality, the formula calculates the probability of "cause" in the problems encountered.

The pass rate of courseware refers to the pass probability of a certain courseware, which is the proportion of the total number of times (pass) of learning the courseware to the total number of learning the courseware. The total number of times that users who fail to pass the assessment of the courseware will increase each time they participate in the courseware learning [19, 20]. If and only if the user has not passed the assessment of the courseware and passed the assessment after learning, the total number of times of learning the courseware will be recorded. The courseware pass rate CP can be formalized as follows:

$$CPR = \frac{pass}{total} \tag{1}$$

Car (course accelerating rate) refers to the conditional probability of passing the Ci of another courseware after passing the examination of any courseware CJ. It is the ratio of the total number of times CP (condition pass) that passes the CJ and passes Ci to the total number of CI learning after passing CJ (condition total). When a user passes a certain courseware, all CP and CT based on the last passed courseware will increase; when the user fails to pass a certain courseware, only CT based on the last passed courseware will be increased. The car can be formalized as follows:

$$CAR(C_i \backslash C_j) = \frac{CP}{CT} \tag{2}$$

CMR (course master rate) refers to the probability of a certain courseware passing before learning. The comprehensive evaluation before the first learning course and the

pre-school quiz before learning a courseware for the first time will record the user's assessment between the courseware before learning for the first time, The user whose score of pre-school assessment is greater than 85% is defined as the learned user who has mastered the knowledge of the courseware before participating in the courseware. Therefore, CMR is the proportion of the total number of times FP (first pass9 accounts for the total number of times of learning the courseware for the first time). The CMR of courseware early learning rate can be formalized as follows:

$$CMR = \frac{FP}{FT} \tag{3}$$

6 Design of Blended Teaching Mode Under the Background of Internet Plus

The focus of the mode design is the four core elements of information-based curriculum, namely platform, content, activities and evaluation methods. According to the teaching situation of Vocational English course in our college, this paper designs the information-based hybrid teaching mode suitable for the course [21]. The course design mainly includes three aspects: the design of learning environment, the design of learning activities and the design of learning content.

(1) Learning environment design

There are many understandings about the learning environment. Combined with the characteristics of Higher Vocational English curriculum, the author believes that the learning environment mainly includes classroom teaching environment, network learning environment and learning resources. According to the nature of the course, teachers of Higher Vocational English courses can use courseware such as computers, networks and projectors to teach in the multimedia classroom; according to the learning situation of the teaching objects, they can provide network and text learning resources, such as MOOC links of related topics, teachers' micro lectures, references, etc. [22]. The rich online resource library classifies the content, so that students can learn selectively according to their own level, and then assess according to the difficulty and quantity of the learning content selected by students.

(2) Design of learning activities

The learning activities of Higher Vocational English course include classroom learning, online learning, practical activities and collaborative learning. The combination of language learning and practical skills; the combination of group counseling and individual counseling; the combination of network resources and text teaching materials, so that students can set their own pace, choose their own time, work consciously and communicate freely. Online learning courseware, watching the video of micro class/Timothy class, completing the homework, participating in the test, strengthening the practical activities and collaborative learning of language skills in the classroom. On this basis, we can ensure the learning effect of students.

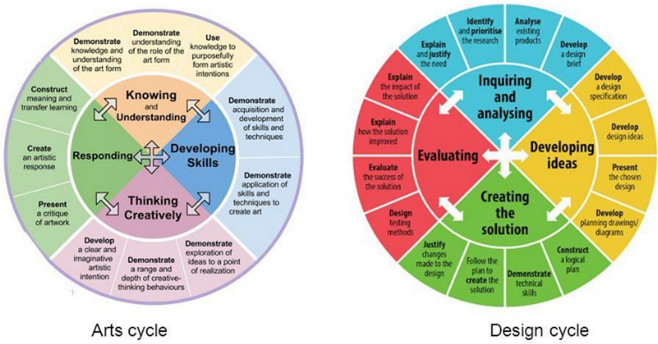

Fig. 2. Learning content design

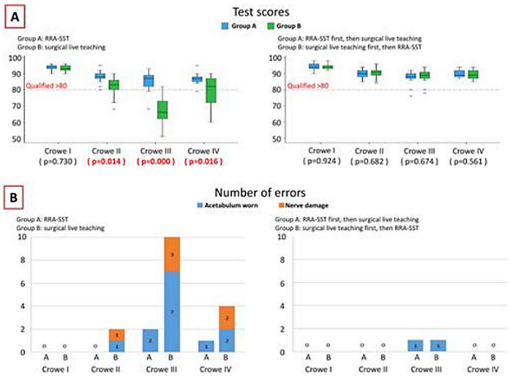

Fig. 3. Verification of test effect

(3) Learning content design

According to the needs and levels of students, the teaching contents with different levels are set up to give students more choices. The success of blended teaching largely depends on the construction of online content and resources. As shown in Fig. 2. Improve the proportion of online learning in assessment and evaluation. First of all, we should ensure that the assessment proportion of online learning is not different or consistent with that of online learning. Secondly, the proportion of online learning content in the examination content should be increased [23, 24]. Only by increasing the proportion of online learning content in the examination and strengthening the assessment, can the students pay attention to the online learning process and improve the learning effect.

7 Simulation Analysis

We verify the effectiveness of the proposed method from test scores and error rates. Because from all the teaching results, we can see that the test score is the most important, followed by the number of errors. As shown in Fig. 3

As can be seen from Fig. 3, after statistical analysis, the teaching effect of group A is not as good as that of group B. As can be seen in Figure B, the number of errors in group B is significantly less than that in group A. This shows that the proposed algorithm is effective.

8 Conclusion

In the process of teaching implementation, there are still some areas that need to be improved, such as the design of some teaching links is not detailed and reasonable, and the communication needs of individual students cannot be fully met. The information age of education has greatly impacted the concept, mode and evaluation system of traditional classroom teaching for English majors. Making full use of modern information technology and constructing the information-based hybrid teaching mode of English Curriculum in higher vocational colleges, its coverage effect and radiation effect will have positive guidance for other English major courses.

References

1. He, K.: Looking at the new development of educational technology theory from blending learning. Inf. Technol. Educ. Prim. Secondary Schools (3), 21 (2004)
2. Liu, D., Zhang, J.: Investigation and reform ideas of Public English Teaching in Higher Vocational Colleges. China Foreign Lang. **6**(6), 77–83 (2009)
3. Lin, X.: The practice of curriculum ideology and politics in English language teaching in Higher Vocational Colleges. Sci. Educ. Guide **12**, 144–145 (2018)
4. Zhao, Y.: Research on the multiple evaluation system of College English teaching quality – a case study of Chongqing University of science and technology. Foreign Lang. **28**(6), 169–173 (2012)
5. Fu, J., Sun, L., Zhao, X., Liu, W., Wang, X.: Exploration and practice of experimental teaching mode of data structure and algorithm based on ability training. Comput. Educ. (03), 99–103 (2021)
6. Liu, S., Xu, L., Zhang, Q., Cao, Z., Wang, Y., Hou, Y.: Hybrid teaching organization mode of computer composition principle based on engineering education professional certification. Comput. Educ. (03), 104–107 (2021)
7. Fang, L., Qin, D., Jing, B., Liang, Z.: Construction and implementation of hybrid experimental teaching mode of network interconnection technology. Comput. Educ. (03), 165–170 (2021)
8. Kang, M., Ling, W.: Implementation and summary of online teaching of BIM Technology Application Course. Shanxi Archit. **47**(06), 189–191 (2021)
9. Xiao, H., Zhu, Z., Xiao, H., Yu, F.: Research on online and offline hybrid teaching mode of radar principle and technology. Sci. Technol. Wind (07), 41–43 (2021)
10. He, W., Shi, X.: Research on mixed teaching innovation of self built resources of "road and Bridge Aesthetics" based on flipped classroom. Sci. Technol. Wind (07), 46–47 (2021)
11. Yu, J., Chen, X., Li, J., Liu, J., Liu, Z., Liu, M.: Research on online and offline hybrid teaching and practice of modern testing technology under the background of "new engineering". Southern Agric. Mach. **52**(05), 126–127 (2021)
12. Sheng, J., Ni, X.: The construction and application of SPOC Hybrid Teaching Mode under the background of "Internet plus" – taking the application project management course of the undergraduate course as an example. China Training (03), 78–79 (2021)

13. Li, S., Chen, S.: Exploration of online and offline mixed teaching mode of port logistics. Logistics Sci. Technol. **44**(03), 167–168 (2021)
14. Li, Z.: Research on online and offline integrated Internet plus teaching mode. Logistics Technol. **44**(03), 184–185 (2021)
15. Chen, W.: Research on online and offline hybrid teaching mode of electrical engineering. Hebei Agric. Mach. (03), 66–67 (2021)
16. Xian, X., Chang, H., Ding, P., Cao, Y., Zhang, Z., Li, J.: Discussion on the teaching of "hearing seeing testing thinking understanding" intelligent classroom in internal medicine of integrated traditional Chinese and Western medicine under the OBE + mixed teaching mode. Mod. Distance Educ. Chin. Tradit. Med. **19**(05), 9–13 (2021)
17. Shen, Q., Wang, S., Liu, H., Gu, Y.: Analysis of factors influencing the learning effect of online open courses in medical colleges and countermeasures. Mod. Distance Educ. Chin. Med. **19**(05), 19–21 (2021)
18. Cai, D., Jian, R., Zeng, D.: Application of flipped classroom mixed teaching mode in the course of X-ray of imaging equipment. Mod. Distance Educ. Chin. Med. **19**(05), 37–39 (2021)
19. Jun, L.: Research on Hybrid Teaching of mathematical modeling course in Higher Vocational Colleges Based on TPACK framework. J. Educ. (03), 68–73 (2021)
20. Fu, S., Zhu, S.: Research on the influencing factors of teachers' blended teaching based on TTF and UTAUT – taking X University as an example. China Educ. Inform. (06), 21–27 (2021)
21. Nan, D.: Operation demonstration skills training of computer normal students based on Hybrid Teaching. China Educ. Inform. (06), 68–71 (2021)
22. Jiang, S., Li, L., Ding, S., Yu, C.: Research on the cultivation of students' autonomous learning ability under the online teaching mode in Colleges and universities. Theor. Res. Pract. Innov. Entrepreneurship **4**(05), 63–65 (2021)
23. Ma, Z., Yong, W., Chang, P., Gao, C., Bian, H.: Design and practice of hybrid teaching mode based on the platform – taking College Physics Course as an example. J. Lanzhou Univ. Arts Sci. (Nat. Sci. Ed.) **35** (02), 113–120 (2021)
24. Zou, X.: Research and practice of Online + offline hybrid teaching mode. Educ. Inf. Forum (03), 7–8 (2021)