Research on the Application Mode of Online Course Construction Based on the "Five Optimized Integration"

Yani Zhang[1], Linbo Su[1(✉)], Mengxi Wang[2], Jingke Wan[1], Lei Qin[1], and Jiaoke Lv[3]

[1] College of Information and Communication, National University of Defense Technology, Xi'an, China
slb7912@163.com
[2] Xi'an Vocational and Technical College, Xi'an, China
[3] Northwest Institute of Mechanical and Electrical Engineering, Xianyang, China

Abstract. Based on the characteristics of online courses, combined with the experience of course construction, integrated into the systematic teaching development model, focusing on the practical problems in the construction and practice of online courses, the application mode of online courses construction based on the "Five Optimized Integration" is proposed, which includes the accurate method of curriculum analysis, the optimization path of curriculum design, the standardized process of curriculum development, the diversified strategy of curriculum implementation, and the whole process system of curriculum evaluation, so as to provide reference ideas for building high-quality online courses.

Keywords: online courses · model construction · curriculum requirements

1 Introduction

In 2015, the Ministry of Education issued "the Opinions on Strengthening the Construction, Application and Management of Online Open Courses in Colleges and Universities", proposing to build an opening online course system with Chinese characteristics, which strongly promoted the construction and application of online open courses [1]. After years of continuous efforts and development, online course construction in colleges and universities has made important achievements, promote and realize the curriculum construction in colleges and universities for the long-term development and comprehensive development. Meanwhile there are still some problems, such as the lack of normative guidance paradigm in curriculum construction, the low quality standard of curriculum, and the low benefit of curriculum application, which directly affect the learning efficiency and enthusiasm of learners. Therefore, the construction of online courses is not only the development of teaching resources and the guarantee of teaching platform, but also the comprehensive exploration and reform of course analysis method, course design path, course development process, course implementation support and course evaluation should be carried out by standardizing the construction process, strict quality standards and focusing on teaching benefits.

V. Balakrishnan et al. (Eds.): ICMEIM 2022, AHSSEH 6, pp. 302–309, 2022.
https://doi.org/10.2991/978-94-6463-044-2_40

2 Build the Application Mode of Online Course Construction With "Five Optimized Integration"

Thoroughly carry out the teaching concepts of learning as the center, unity of knowledge and practice, and high-level cultivation, according to the course construction model, the construction process of online courses is divided into five stages: analysis, design, development, implementation and evaluation [2]. Combined with the construction experience of national first-class online courses, a systematic model of "Five Optimized Integration" online courses is explored. In the analysis stage, based on the job demand and long-term career development, combined with multi-layer quantitative analysis method, the precision method of course analysis is put forward. In the design stage, following the "Two features and One challenge" standard, focusing on the presentation effect of online courses, learning from high-quality online resources, and integrating the principles of multimedia design, the optimal design path is innovatively proposed. In the development stage, the engineering quality control cycle is integrated, and the development tasks of curriculum elements are decomposed, so as to establish the standardized process of online curriculum development. In the implementation stage, centering on the three major services of autonomous learning, interactive communication and data mining, the diversified support of curriculum implementation is constructed. In the evaluation stage, formative evaluation and summative evaluation should be adopted simultaneously, and the principle of revising the direction of curriculum construction and ensuring the quality of curriculum construction should be kept in step, so as to form a whole process evaluation system of curriculum construction (Fig. 1).

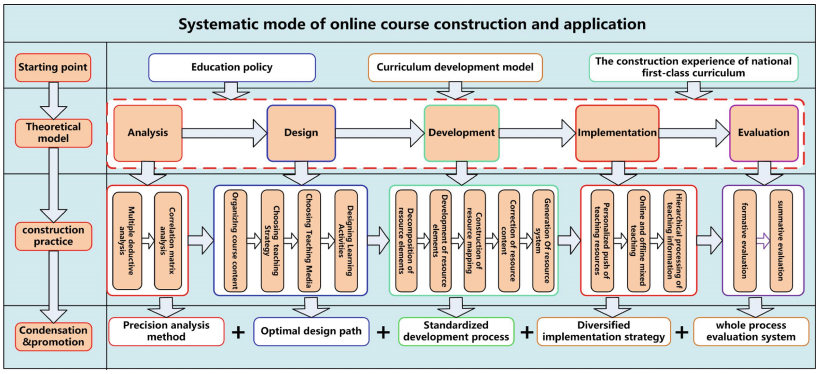

Fig. 1. Systematic mode of online course construction of "Five Optimized Integration" [Owner-draw]

3 Explore the Path and Method of Online Course Construction Based on the "Five Optimized Integration"

3.1 Using Two-Level Quantitative Analysis, Put Forward an Accurate Curriculum Analysis Method

Based on the accurate understanding of the learning characteristics of online courses, it accurately analyzes the job performance ability and the long-term development needs of students, and accurately generates the course content according to the differences in the level of post objects. First, the construction team determines the specific positions oriented by the course, and reasonably decomposes and generates the two-level capability demand targets according to the hierarchical differences of the post objects. Second, the relevant parties of the course (the representatives of the course learners, the representatives of the employer and the course construction team) respectively quantify the importance of each ability demand, comprehensively analyze the relative importance of each specific demand, so as to refine the target of the ability demand. Third, the course construction team decomposed the knowledge points from the perspective of professional courses, constructed the correlation matrix between the knowledge points and various ability needs, analyzed the comprehensive contribution of each knowledge point to the ability needs, redesigned the content covered by each knowledge point, and realized the precise transformation from the curriculum needs to the content composition (Fig. 2).

3.2 Follow the Standard of "Two Features and One Challenge", Innovate and Optimize the Course Design Path

According to the curriculum standard of "Two features and One challenge ", the path of online curriculum design can be divided into four steps: organizing curriculum content, choosing teaching strategy, matching teaching media, and designing learning activities [3]. First, guided by the idea of "high order", we should organize the course content and solve the problem of what to teach. Based on the teaching objective of cultivating students' comprehensive ability and thinking to solve complex problems, combined with the list of knowledge units obtained in the analysis stage, the content of the textbook is appropriately increased or decreased, and the key and difficult points are divided, noted and reorganized. Second, with the connotation of "innovation" as the requirement, we

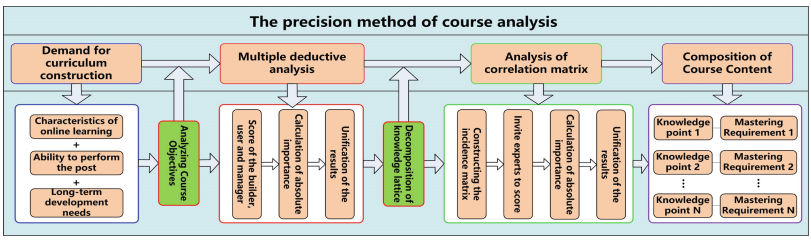

Fig. 2. Precision method of online course analysis [Owner-draw]

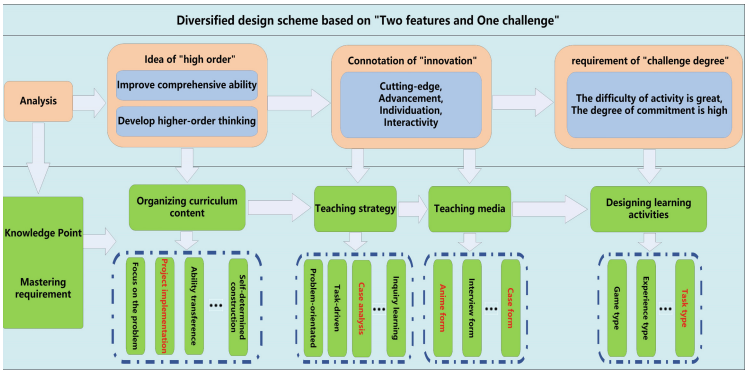

Fig. 3. Diversified design scheme based on "Two features and One challenge" [Owner-draw]

should choose the teaching strategy, match the teaching media, and solve the problem of how to teach. Through the selection of teaching strategies in line with the learning situation and teaching content, the advanced, interactive and personalized teaching forms of online courses are highlighted. The third is to objectively evaluate the learning effect by designing learning activities based on the requirement of "challenge degree". The main purpose is to improve the participation of students in learning activities through the design of rich content, rich form and demanding learning seminars (Fig. 3).

3.3 Adopt Quality Control Cycle and Establish Standardized Resource Development Process

According to the objective of online course ability training, starting from the course content system and course design scheme, the quality control cycle of "planning, execution, checking and processing" is adopted to construct a standardized course resource development method. Through the steps of resource module elements decomposition, elements development, mapping construction, content correction and system generation, an effective collaboration mechanism among course construction team, demand unit and video production team is established and a standardized course development process is constructed. Finally, a course resource system integrating explanation video, test question bank and reference materials will be formed (Fig. 4).

In the planning steps, the course team decomposed the elements of the resource module according to the objectives of curriculum ability training, and deconstructed the elements of the resource module from four aspects: ability filling, ability generation, ability expansion and ability testing. In the implementation steps, development is carried out one by one according to the decomposition of previous elements. In the aspect of ability filling, relevant knowledge materials in the front of the course are collected; in the aspect of ability generation, video scripts are written and explanation videos are shot; in the aspect of ability expansion, content development materials are collected; in the aspect of ability testing, test question types are designed and test questions are compiled. In the inspection step, the mapping relationship between each resource element and the course content is constructed, the module connection of resource elements is formed,

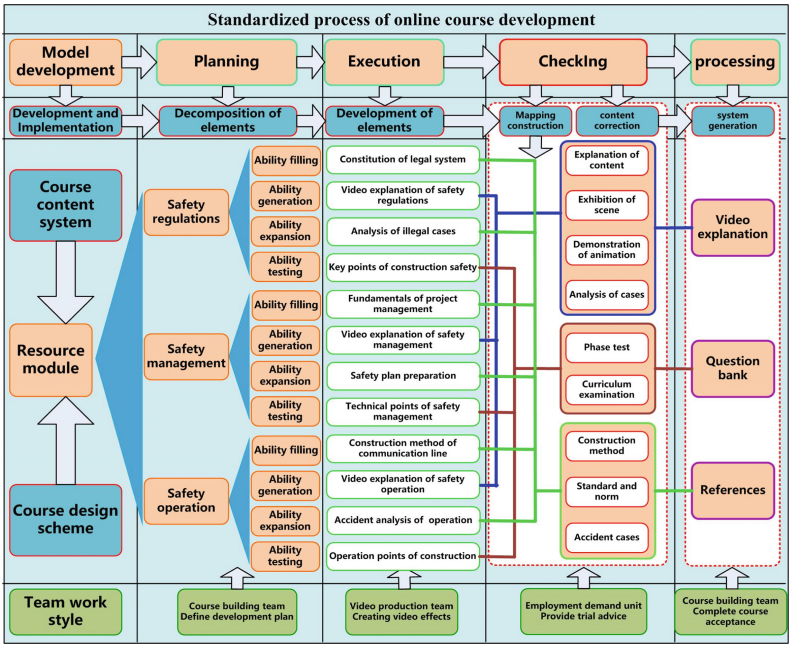

Fig. 4. Standardized process of online course development [Owner-draw]

the problems and mapping relationship in each resource module element are checked and corrected, and the demand unit carries out the trial study and provides suggestions. In the process of processing, the course team revises the course content, constructs the course resource system, completes the course self-inspection and acceptance, and forms the "trinity" course resource system including explanation video, test question bank and reference materials according to the checked problems and the opinions of the demand unit.

3.4 Distinguish the Teaching Organization Form, Construct the Diversified Curriculum Implementation Strategy

Centering on the personalized learning concept of online courses, and aiming at the learning organization mode of online courses, this paper explores innovative and composite course application methods, constructs three teaching implementation methods, including personalized push of teaching resources, online and offline mixed teaching, and hierarchical processing of teaching information, and forms diversified course teaching implementation strategies [4]. Firstly, the learning style of the course object should be determined, and the application implementation method of personalized push of teaching resources should be constructed for the students of individual autonomous learning. Through learning situation initialization analysis and WEB data mining, the learning activity sequence of the collected objects is analyzed, and the learning behavior and cognitive level are analyzed by big data, so as to optimize the learning plan and realize personalized resource push. For the object of centralized learning in the unit, a mixed

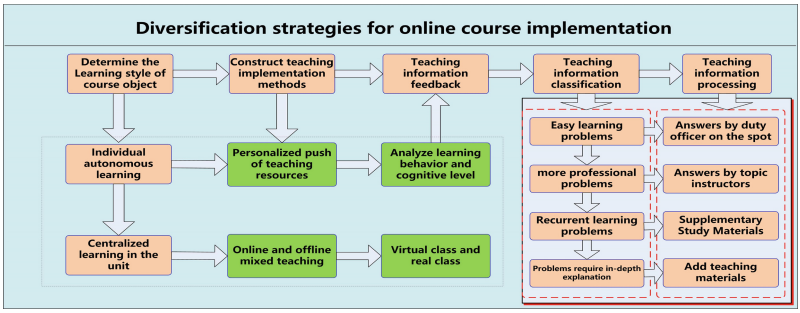

Fig. 5. Diversification strategies for online course implementation [Owner-draw]

application and implementation method of online and offline is constructed, and learning is carried out by on-site teaching of the course team or teaching organization of the corresponding unit. Before class, the online method is adopted to complete the preliminary knowledge learning through the virtual classroom. In the course, we used offline methods, combined with cases, to explain the key and difficult points in depth, and used interactive communication to deepen the understanding of content. After class, we will complete the exercises online and provide expanded resources for consolidation and improvement.

In the process of implementation, a person on duty is set up, information feedback is formed based on the platform data, and a hierarchical processing mechanism of teaching information is constructed. The platform operation and maintenance problems shall be handled by the platform operation and maintenance center and the processing results shall be tracked. In view of the easier problems to be answered by the on-duty staff; For the more difficult and professional questions, the duty officer will determine the topic of the question and transfer it to the topic teacher to answer it. For the learning questions with a large number of questions, the topic teachers will timely supplement the learning materials; For the problems with depth and value of explanation, the course team will discuss and study the problems, and a new topic will be added for video explanation. The diversified course teaching implementation strategies adapt to different learning organization forms of online courses, ensure timely response to problems in the implementation of teaching, ensure the implementation effect of teaching, and collect demand data for real-time optimization of course content (Fig. 5).

3.5 Accurately Grasp the Direction and Quality of Curriculum Construction, and Create the Whole Process Evaluation System of Curriculum Construction

Aiming at the direction of curriculum construction, ensure the quality of curriculum construction. It has opened multiple channels, organized multiple subjects and based on multi-dimensional perspectives to carry out curriculum construction evaluation, explored the whole process evaluation system of "layer upon layer → dynamic cycle → ladder rising", and scientifically set construction standards and evaluation index system [5]. Formative evaluation permeates each stage of online course construction and revises the

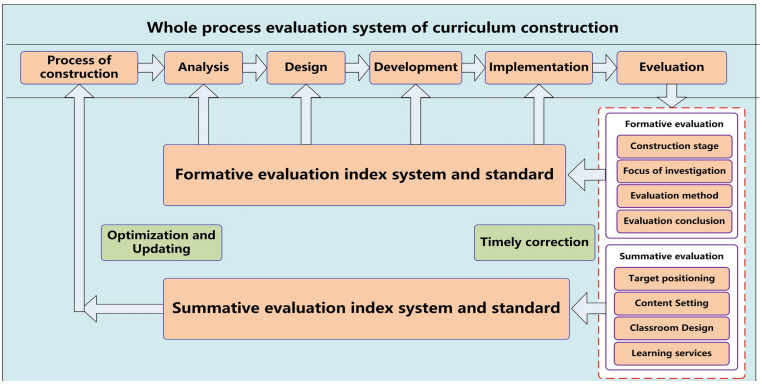

Fig. 6. Whole process evaluation system of curriculum construction [Owner-draw]

direction of online course construction in time. The summative evaluation is independent of the construction process, which ensures the objectivity and justice of the online course construction quality evaluation, and forms countermeasures and suggestions for the optimization and renewal of the course construction. It has three main characteristics: ① The evaluation system shall implement national standards. The construction evaluation is based on "the Standards for Online Courses in Information Technology Learning, Education and Training" (GB/T36642-2018) and other national standards and norms. ② Formative evaluation permeates the whole process. It will focus on the task process of each stage, carry out continuous observation and reflection of the whole process, timely adjust the construction plan and correct the construction track. ③ Summative evaluation is accurate and efficient. It will establish the curriculum construction index requirements, accurately evaluate the quality of curriculum construction, and form the optimization strategy (Fig. 6).

4 Conclusion

In short, the construction of online courses is a systematic project, and also an important means to improve the teaching level and quality. Nowadays, the construction of high-quality online courses has become a subject that university teachers must study. Only by paying attention to the essential system of online curriculum development and recognizing the significance of curriculum construction can we push forward the teaching reform and improve the teaching effect and the quality of personnel training.

References

1. Ministry of education, Implementation opinions of ministry of education on the construction of high-quality open courses, no. 8, 2011.
2. Y. Qi, Online course design guided by ADDIE model: A case study of "introduction to education", journal of Lanzhou petrochemical technical college, vol.20, 2020, pp.61-63.
3. J. X. Cui, L. Li, M. Bai. Design of media presentation form of online course ontent, journal of Tianjin television university, vol. 7, 2003, pp. 22-23.

4. R. G. Li, S. C. Zhang. Development and practical application of micro-curriculum resources, China educational technology and equipment, vol. 17, 2018, pp. 59-60.
5. Y. H. Cao, Q. H. Cao, W. X. Deng. Design model and development strategy of online courses in vocational education, journal of Guangdong technical normal university, vol. 5, 2020, pp. 24-25.