MOOC-Based Mixed Teaching Research on Microcomputer Principle Courses in Colleges and Universities

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Abstract. With the rise of MOOC teaching mode, the hybrid teaching mode which combines online teaching and traditional teaching has drawn extensive attention. Based on the analysis of MOOC teaching mode, this paper synthetically compares the advantages and disadvantages of MOOC teaching mode with traditional teaching mode. Taking the microcomputer principle course set up by our electronic information engineering specialty as an example, this paper constructs a teaching platform based on MOOC and solves the problems of traditional teaching Middle school students lack of learning initiative, learning resources can not be fully utilized and other issues, have some referencet to reform of mixed teaching in colleges and universities.

Keywords: MOOC · Microcomputer principle teaching · Mixed teaching reform

1 Preface

The rise of the Massive Open Online Course (MOOC) in 2012 set off a digital tsunami in education that provides new teaching methods through platforms such as the Internet and WeChat, including micro classes, short videos, online work, Online testing and other content, with large-scale and open features promote the reform of the traditional teaching mode.

Microcomputer Principle is a professional basic course for electronic information engineering in our school. Through this course, students can understand the basic principle, basic composition, interface technology, hardware connection and assembly language programming method from the application point of view, and establish the microcomputer work the overall concept of training students with the software and hardware design and development of the basic ability to develop students' ability to think independently, analyze and solve problems. Due to the limitation of course hours combined with the difficulty of course learning, students generally have low interest in learning and can not make full use of learning resources. Through the construction of MOOC teaching platform, the hybrid teaching mode is used to solve the above problems while providing mixed teaching reform for other courses Some ideas and methods.

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2 Elements of MOOC and Classification

According to Kop et al., The MOOC consists of five main elements: teachers, learners, topics, learning materials, and situations. Li Qing et al. (2012) observed and analyzed ten MOOC courses and summarized the general operation mode of MOOC, extracting elements of MOOC from the following: elements of things (platform and tools, course information, learning activities) and human factors (Teacher, learner, course coordinator).

MOOC includes both CMOOC, a large-scale open online course of communicative education, and xMOOC, which was developed by behavioral schools in well-known American universities. Both of them have great differences in teaching philosophy and are commonly known as xMOOC in the general media. The differences include: The cMOOC model emphasizes creativity, creativity, autonomy and social network learning; the xMOOC model emphasizes traditional learning methods such as video presentations, quizzes, and tests. In other words, cMOOC focuses on knowledge creation and generation, while xMOOC focuses on knowledge duplication. Specifically, from a practical point of view, cMOOC is a single course, which is organized and implemented by individual teachers and does not participate in the official institutions of the university. The xMOOC mode open course basically runs as an open course project website, with tens to several Hundreds of courses. In terms of organizational structure, xMOOC takes the form of corporatization of operations, with external funding, commercialization potential and cooperation with many well-known universities. These larger MOOC course websites provide more learners with open learning resources and learning tools that are well organized and process disciplined, far beyond cMOOC, regardless of size, benefit or social impact.

3 Advantages and Disadvantages of MOOC and Traditional Teaching Model

3.1 The Advantages and Disadvantages of MOOC

(1) The advantages of MOOC

Large-scale, online, open is a notable feature of MOOC. As a new learning and teaching method, MOOC is easy to use; it is low in cost; most MOOCs are free; it covers a large population; learns independently; and learning resources are abundant. As a new form of remote on-line teaching, MOOC is a characteristic of time and space separation. MOOC is conducive to individualized learning at low cost, coupled with its rich and open learning resources, as learners will undoubtedly be willing to embrace Join them.

(2) The disadvantage of MOOC

MOOC learning is done online, in the network environment, a lot of temptation, students are not easy to focus attention, learning efficiency is easy to lower, which is MOOC course completion rate and the main reason is not high adoption rate.

In addition, there are problems with MOOC in terms of integrity, course quality assurance, evaluation mechanisms and standards.

3.2 The Advantages and Disadvantages of the Traditional Teaching Model

(1) The advantages of the traditional teaching model

Compared with the MOOC, the school, as a special organization, has its own unique cultural characteristics in addition to having the characteristics of a general organizational structure and is manifested in a material, institutional and spiritual form. Campus culture can imperceptibly give students cultural infiltration, culture, which is unmatched by MOOC.

(2) Disadvantages of traditional teaching methods

The traditional teaching model is mainly teacher-centered, textbook-centered, and teachers' main functions are to teach courses and to convey the learning materials as ready-made conclusive knowledge, without repeating the process of human discovery and formation of relevant knowledge. The main function of students is "passive learning", that is, memory recitation plus mechanical repetitive training. This traditional teaching model greatly suppresses students 'learning initiative, initiative, enthusiasm and independence, and restrains students' reading and thinking, making students lack of innovative ability.

4 MOOC-Based Hybrid Instructional Design

Through the above analysis, MOOC teaching mode and the traditional teaching mode are relationship of mutual support and mutual supplement, rather than mutually exclusive, mutually incompatible relationship. According to the respective advantages of the two, combined with the characteristics of our microcomputer theory course, a MOOC-based hybrid teaching mode is constructed and an MOOC-based teaching interactive platform is set up to improve the actual teaching quality.

4.1 Design Ideas and Frameworks

In the stage of higher education, students not only master the discipline, the basic theory and basic knowledge of the discipline, but also master the basic skills, methods and relevant knowledge necessary for the major and have the initial ability to engage in practical and research work of the major. So design top-level from the knowledge and ability of two dimensions MOOC-based hybrid teaching model, the specific framework is shown in Fig. 1.

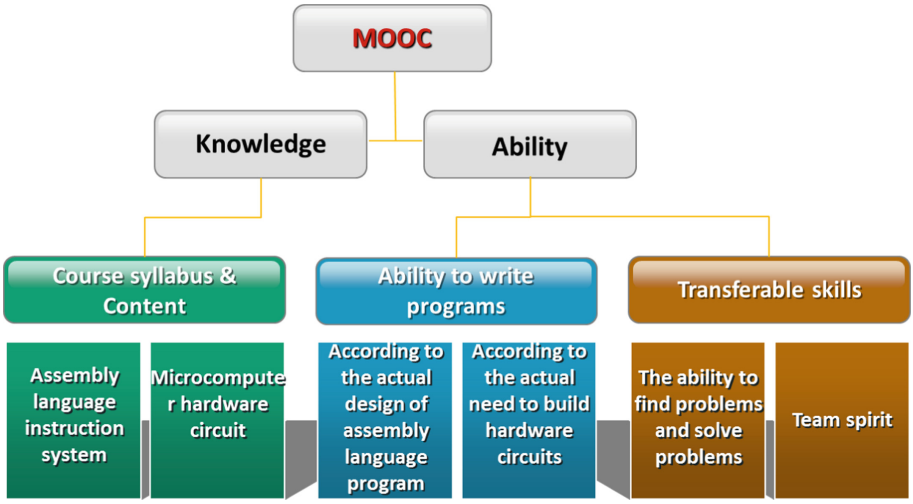

Fig. 1. Top-level design framework

4.2 MOOC-Based Hybrid Teaching Process Implementation

Organize students to carry out teaching based on the open teaching content in MOOC platform. The teaching process mainly includes online learning and offline learning. Specific teaching processes are shown in Fig. 2.

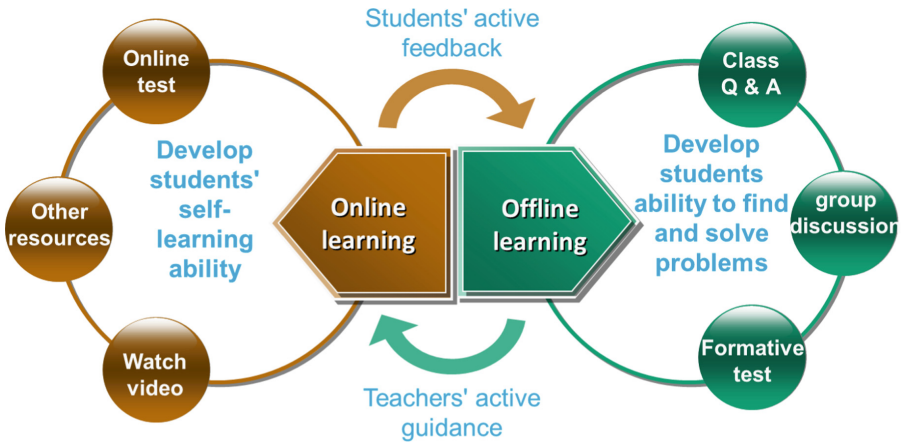

Fig. 2. Teaching process diagram

It can be seen from the figure above that the MOOC-based hybrid teaching mainly includes two parts: online learning and offline learning, which can be divided into five parts: teaching preparation, teaching process, teaching feedback, teaching replenishment and teaching improvement. The following sections address the way in computer theory courses as an example to illustrate the implementation of hybrid teaching on the MOOC platform.

(1) Teaching preparation

Teaching preparation phase includes teaching objectives and teaching plan. When setting teaching objectives, teachers should fully consider the diversity of audiences and set a multi-level goal so that students with different curriculum learning plans can enjoy a relatively complete learning experience.

Teachers should have a clear plan for the structure and development of the course and develop a detailed syllabus. Syllabus does not contain specific teaching content, but it is an important teaching tool from beginning to end. A science-based, clear, detailed syllabus will be a guide and contract for teachers and students throughout the course.

Teachers emphasize the teaching tasks, knowledge structure, schedule and assessment scope of this chapter so that students can clarify the contents of the next week in order to establish a learning plan.

(2) Teaching process

Online video, PPT and other teaching resources should try to be specific to each problem, short, in order to allow students to understand their principles within a limited time to master the part of knowledge. Such as the addressing mode should be immediately addressing, register addressing, direct addressing, register indirect addressing, indexing addressing, base address addressing, base address indexing addressing, etc. which way to facilitate the students to understand a short time grasp.

Learn online can add embedded tests to test your knowledge of what you have learned. For students, this function can be found in time to learn the doubts and difficulties in order to more smoothly the next chapter of learning. For teachers, this feature can significantly increase the interaction between teachers and students to improve the quality of teaching, you can also analyze the test results to assess this chapter teaching..

(3) Teaching feedback

The actual teaching can use verbal feedback, written feedback, body posture feedback, activity feedback, group feedback, personal feedback, collective feedback and other feedback. Oral feedback is an efficient and effective way of feedback in MOOC's blended instructional model. For example, what are the differences between immediate addressing and direct addressing that can be raised by asking students questions, what is the connection? The statu of the students grasp of knowledge can be known according to the student's verbal response.

(4) Teaching supplement

Teaching supplements mainly for some of the extension of knowledge points. For example, the address mode mainly explains assembly language operation registers and memory address method, as an extension of reading and according to the actual use of the process can explain the use of C language registers and memory address related instructions and differences, pay attention to the distinction between the two languages And contact to expand students' knowledge.

(5) Teaching improvement

Teaching improvement mainly aims at some problems found in the teaching process, summarizes, analyzes the causes and finds ways to improve. For example, most students are prone to confusion between direct addressing and immediate addressing. These two addressing modes are easily confused in testing and practical use. After careful analysis of the reason, the concept of student immediate versus immediate is not fully understood. The next phase of improvement requires the addition of the concept of immediate data.

5 Course Evaluation

In traditional teaching, general teachers are the main subjects of evaluation and students are the objects of evaluation. The evaluation methods usually adopt a single paper test and the final evaluation is the main one. The scores are the only criterion for evaluating students. Different from traditional teaching, MOOC shows its diversity with the support of big data technology.

(1) Multiple evaluation subjects

MOOC learning platform, through the analysis and processing of big data in the background, combined with the evaluation of learners by different subjects, helps teachers learn about students' learning from different channels in order to further improve teaching. At the same time, students can also recognize the advantages and disadvantages of their own existence and contribute to the overall development of students.

(2) Multiple evaluation targets

The diversified evaluation subject of MOOC determines its diversified evaluation objects and can evaluate hybrid teaching from multiple perspectives. MOOC through the background of big data to understand the specific circumstances of students in the learning process. Teachers can also be inspected from the aspects of the organization of teaching activities, the provision of learning resources and the guidance of the students' learning process.

(3) Multiple evaluation methods

MOOC provides a variety of evaluation methods, such as peer evaluation, student self-assessment, mutual peer review, machine evaluation, alumni evaluation, teaching evaluation. According to different disciplines, different courses choose different evaluation methods. Computer-based courses such as computer-based assessment of the main online learning evaluation, offline learning using paper-based assessment and the combination of mutual assessment. The use of a variety of evaluation methods can complement each other, help teachers improve teaching quality, improve the quality of students.

6 End

In view of the difficulty of computer theory course leading to students 'lack of initiative in learning and students' comprehensive utilization of learning resources effectively, this paper proposes a hybrid teaching reform mode based on MOOC, which combines the advantages of MOOC and traditional teaching mode, Strengthen the student's dominant position, improve the students' learning initiative, integrate rich teaching resources, expand students' knowledge and improve students' migratory learning ability. In this mode, it is conducive to cultivating students' autonomous learning ability, improving the ability of combining theory with practice, and finally achieving the purpose of using computer to control in practical work.

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References

1. Eberlein, E., Keller, U.: Hyperbolic distributions in finance. Bernoulli **1**(3), 281–299 (1995)
2. Hao, D.: Literature analysis of the current MOOC research. China Distance Educ. (21), 42–50 (2013)
3. Watted, A., Barak, M.: Motivating factors of MOOC completers: Comparing between university-affiliated students and general participants. Internet Higher Educ. **37**, 11–20 (2018)
4. Chen, X., Wang, D.M.: MOOC development history and main characteristics analysis. Modern Educ. Technol. **23**(11), 5–10 (2013)
5. Zhang, Y.Y.: The impact of MOOCs on higher education in China and countermeasures. J. Hebei Normal Univ. (Educ. Sci. Ed.) (2), 116–121 (2014)
6. Hu, J.H., Wu, Z.J.: MOOC-based college English flip classroom teaching model. Foreign Lang. Teach. (6), 40–45 (2014
7. Sneddon, J., Barlow, G., Bradley, S., et al.: Development and impact of a massive open online course (MOOC) for antimicrobial stewardship. J. Antimicrob. Chemother. **73**(4), 1091 (2018)
8. Deng, H.Z., Li, M.G.: Discussion on the problems in the development of mu'mu. Sci. Technol. Innov. Herald (19), 212–213 (2013). Application. Open Education Research, 11 (b08), 46–49 (2005)
9. Xu, Y., Jia, Y.Z.: MOOC to SPOC - an academic dialogue based on MOOC practice at UC berkeley and tsinghua university. Modern Distance Educ. Res. (4), 13–21 (2014)
10. Fu, T.Z., Zheng, J.P.: Strategies of university libraries in coping with MOOC challenges. Acad. Libr. Trib. **32**(1), 20–24 (2014)
11. Zhou, J.X., Zhou, Y.R.: Mixed teaching model in MOOC era. Educ. Sci. China (15), 71–74 (2017)
12. Wang, R., Yu, H.M.: MOOC based C programming language teaching ideas. Softw. Eng. (3), 60–61 (2015)
13. Nagano, Y., Yamaguchi, S., Fujita, Y., et al.: A differentiable gaussian-like distribution on hyperbolic space for gradient-based learning (2019)

14. Volkovicha, V.A., Griffiths, T.R., Thied, R.C., et al.: Behavior of molybdenum in pyrochemical reprocessing: a spectroscopic study of the chlorination of molybdenum and its oxides in chloride melts. J. Nucl. Mater. **323**(1), 93–100 (2003)
15. Schweizer, B.: Confessions of an unreconstructed MOOC(h)er. Thought Action, 29 (2013)
16. Brita-Paja, J.L., Gregorio, C., Llana, L., et al.: Introducing MOOC-like methodologies in a face-to-face undergraduate course: a detailed case study. Interact. Learn. Environ. (8), 1–18 (2018)
17. Davis, D., Kizilcec, R.F., Hauff, C., et al.: The half-life of MOOC knowledge: a randomized trial evaluating knowledge retention and retrieval practice in MOOCs. In: The 8th International Conference (2018)
18. Shapiro, H.B., Lee, C.H., Roth, N.E.W., et al.: Understanding the massive open online course (MOOC) student experience: an examination of attitudes, motivations, and barriers. Comput. Educ. **110**(C), 35–50 (2017)
19. Swinnerton, B.J., Morris, N.P., Hotchkiss, S., et al.: The integration of an anatomy massive open online course (MOOC) into a medical anatomy curriculum. Anat. Sci. Educ. **10**(1), 53–67 (2017)
20. Zhao, Y., Davis, D., Chen, G., et al.: Certificate achievement unlocked: how does MOOC learners' behaviour change? In: Adjunct Publication of the Conference (2017)