



The Innovative Application and Research of Mixed-Halving Class Based on the Mobile Information Technology and WeChat Public Platform in Automotive Major Courses

Xiaoxuan Zhu, Dong Zhao^(✉), Yue Yang, Shengfeng Reng, Yantao An, Yihua Zhang^(✉), and Hailong Liu

School of Mechanical Engineering, University of Jinan, Jinan 250022, China
{me_zhuxx, me_zhangd, me_yangye, me_rensf, me_anyt, me_zhangyh, me_liuhl}@ujn.edu.cn

Abstract. With the promulgation of the National Outline of Medium and Long-Term Education Reform and Planning Development (2010–2020), the transformations of education and teaching are accelerating with the assistance of the development of information technology. In this study, the teaching mode of halving class was taken as the basis, the mixed teaching was taken as the learning method, and the modern information technology--WeChat public platform based on mobile terminal was taken as the learning carrier. Through the comprehensive application of multiple new media and new technology, the mixed teaching of mobile information technology was realized, and the innovative teaching method was designed and put into practice in practical teaching activities. Through experimental teaching research and verification, it was concluded that the mobile network terminal preview self-test can promote and guide the learning of different-level students. The class effect and group field display were positively correlated with the in-class test results and mutual evaluation scores. The WeChat mutual evaluation voting process was fair. In-depth classroom discussion can stimulate students' interest in learning, so that they still have room for improvement on the scores.

Keywords: Information technology · WeChat public platform · Mixed-halving class · Mobile Internet · Automobile specialty

1 Introduction

With the promulgation of the National Outline of Medium and Long-Term Education Reform and Planning Development (2010–2020), the transformations of education and teaching are accelerating with the assistance of the development of information technology. With the advent of Web3.0 era and the popularity of campus WIFI, mobile Pad, mobile phone, WeChat public account, third-party App, group, QR code, MOOC micro-course and other micro-ubiquitous concepts can be further integrated with mixed teaching [1]. This means that the subject of teaching has changed from binary opposition

to integration and unity, and also from information centralization to self-centralization [2]. The “post-00s” new generation of college students are deeply influenced by new resources and new media, and have a strong desire for self-expression. Educational models such as “online E-learning”, “information technology + teaching”, “Internet + school” can stimulate their competitive psychology and learning desire. Therefore, under the background of information-based education and teaching, it is the inevitable trend of education and teaching development to pay attention to students’ learning performance at the micro level, to realize personalized teaching and control the general direction of education and teaching at the macro level [3–5].

2 An Analysis of the Teaching Status of Classroom, WeChat Public Platform and Automotive Courses

Halving class is a teaching model proposed by Chinese scholar Zhang Xincheng of Fudan University in 2014, which is suitable for the teaching characteristics of Chinese universities. It takes “lecturing, internalization and absorption” as the main line. Half of the class time is allocated to teachers for teaching, and the other half is allocated to students for interactive learning in the form of discussion. That is, teachers and students should share half of class time, focusing on students’ questioning, discovery and internalization of problems in the process of discussion and learning [5–8]. This can improve the situations that class content is difficult to digest and students are difficult to master. The WeChat public platform based on mobile terminals is simple, convenient, highly interactive, and has many functions. It can be built into a systematic learning aid platform with the help of a third party, which is similar to the computer learning aid website. At the same time, it is more popular because of its novel form, miniature learning and is not limited by time and place [9–12]. Therefore, the WeChat public platform based on mobile terminals can be used as an important auxiliary tool for classroom teaching.

Students majoring in automotive should have a solid foundation in the theory, construction, application and related content of automobiles. They often have a lot of practical training courses as support, but for the theoretical courses, such as “Principle of Automatic transmission”, “Automotive chassis Construction” and introductory courses, such as “Automotive service system engineering” still have difficulties in learning due to the complex structure of various system components in some vehicles, the working and running process being difficult to be reproduced in practice training. Students usually can’t understand textbooks alone. They rarely read textbooks in advance without supervision. To sum up, it is imperative to combine mobile information technology, the WeChat public platform and automotive majors with mixed halving class teaching innovation and reform.

3 Design of Innovative Application Scheme for Automotive Mixed-Halving Class Based on the WeChat

Based on the study and research of the halving classes and WeChat information technology, and by referring to the concept of “electronic schoolbag is personal digital knowledge base” [13, 14], combined with the “four-five-step process Web + CoQuest

teaching model” [15], this study took the principle and introduction course of automotive major as an example. The innovative teaching scheme of mixed halving classes teaching based on WeChat public platform was designed. The basic process of the innovative application design scheme of mixed halving classroom teaching based on the WeChat public account is shown in Fig. 1.

This classroom teaching is based on the halving classroom teaching mode, taking mixed teaching as the learning method, and using the modern information technology-WeChat public platform based on mobile terminal as the learning carrier to comprehensively control students’ learning status before, during and after the course, so that students can make reasonable use of the fragmented time to learn, deepen their understanding and thinking of the course, and quantify the learning effect through indicators, which makes the evaluation result more objective and reasonable, and plays a better supervisory role.



Fig. 1. The basic process of innovative application design scheme of mixed halving class based on the WeChat public platform

4 Research on the Application Effect of Mixed Teaching in Halving Classes

According to the above teaching scheme design, the experiment and application effect were studied in the theoretical courses of “Electronic Control Technology of Automobile Chassis” and “Automobile Service System Engineering”. The application and results of the teaching examples are introduced as follows.

4.1 Preview Before Class

First of all, there was an experimental study on the effect of pre-class preview in the WeChat public platform. In the course “Electronic Control Technology of Automobile Chassis”, the class is randomly divided into two groups, numbered as Group 1 and Group 2. Among them, the first group of students were guided and required to use the WeChat public platform for pre-class preview and self-test, while the second group of students did not have this link, and the other class processes of the two groups were the same. An in-class test was given after a phase of the course. The full score of the test is 10, and the results are as follows Fig. 2. The results showed that the average scores of Group 1 and Group 2 were 6.1 points and 4.2 points respectively, and the highest and lowest scores were 10 points/2 points and 8 points/1 point respectively. Low average grade points were associated with the difficult test questions. The number of people in the middle score level were not much different, but the high segment score of the Group 1 with the mobile network terminal preview self-test was higher, and the score of low segment was generally higher than that of Group 2, which indicated that the mobile network terminal preview self-test can promote the learning of the students with the high score, and at the same time can actively guide and improve the students with the low score.

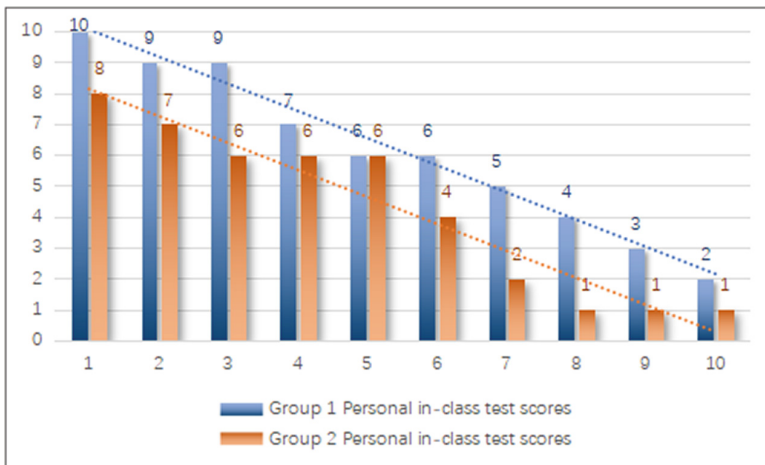


Fig. 2. The WeChat public platform pre-class preview self-test effect experiment test results in class

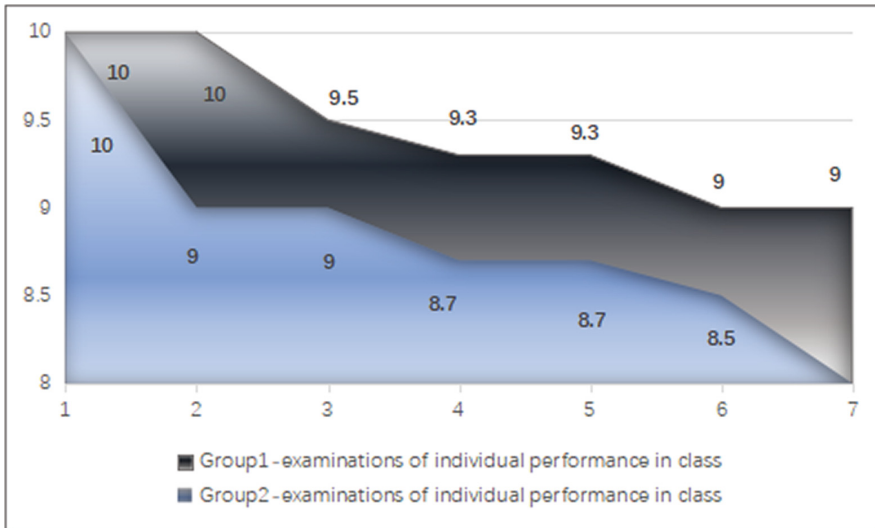


Fig. 3. The results of class discussion tested in class

4.2 Classroom Discussion

Secondly, it was an experimental study on the effect of classroom discussion activities. Also, the same class was randomly divided into two groups, numbered as Group 1 and Group 2. After the teacher's knowledge reconstruction, the first group of students carried out further discussion on the content within the group, raised questions within the group and solved the problems within the group, while the second group of students missed this link and mainly read textbooks, and the two groups of students had the same other processes. An in-class test was conducted after one class, and the test results are shown Fig. 3. As the results shown, the two groups of students had a good test completion, the test scores were all generally more than 8 points, the average score of the first group was 9.4 points, the average score of the second group was 8.8 points. In particular, in the course of class, the first group of students were obviously more active. The results showed that the in-depth discussion can stimulate students' interest in learning, and there is still room for improvement on the grades. In addition, the results of the two groups were similar, which may be related to the fact that the Group 2 of students had more time to read textbooks.

4.3 Voting Session

Finally, it was to verify the assessment results' rationality of the voting process using the WeChat public platform. In this experiment, the class was divided into three groups, and the class learning was based on the WeChat public platform. The learning process was the same. Through the observation and tracking of preview, explanation, discussion, activities, mutual evaluation, testing and other links, part of the data were obtained, as shown in the Fig. 4. In the discussion and activities of the experimental research class,

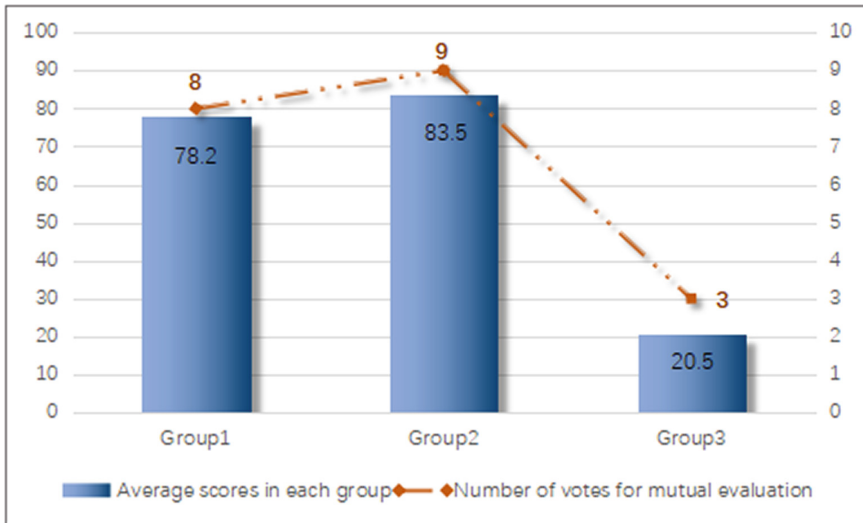


Fig. 4. Verification of the rationality of mutual evaluation and voting on the WeChat public platform

the students in the Group 2 had the best performance in class, with intense discussion within the group, and vivid and complete activity exercises. The students in the Group 1 followed with a high degree of completion, while the Group 3 lacked the degree of cooperation. In the subsequent mutual evaluation and testing, the results showed a high degree of consistency. The average scores of the three groups in the in-class test were 78.2, 83.5 and 20.5 points respectively, and the numbers of mutual votes were 8, 9 and 3, respectively. The verification showed that the test effect was better when the classroom effect and the group field displayed excellent, the mutual evaluation score was also higher. The mutual evaluations and online evaluations were pretty fair.

5 Summary

Through WeChat public platform assisted teaching, students can solve the problems such as browsing the web and not attending lectures, and actively use mobile terminals to interact with each other, which can promote and guide students' learning. In-depth classroom discussion can stimulate students' interest in learning, so that they still have room for the score improvement. When mobile informatization brings many benefits to teaching, we also need to face the problems directly. First, teaching resources, infrastructure, 3D virtual simulation software app and other effective auxiliary facilities are not in place. At the same time, the network platform construction is not perfect, there are often negative feedback of students to the network system, sometimes will affect the learning progress. Secondly, teachers need to master many skills in a short time, such as the H5 page making, the WeChat operation, etc., which are very difficult to complete. Although the mixed information technology based on the WeChat and other mobile terminals has

certain problems and implementation difficulties in teaching, it is still a new direction in teaching reform, which should be boldly tried and actively promoted.

Acknowledgment. This study was funded by the Shandong Provincial Key Project of Higher Education Reform Research [No. Z2020063] and the Shandong Provincial Graduate Education and Teaching Reform Research Project [No. SDYJG21139].

References

1. Xu Hua. Research of Smart Campus Construction and Application Based on the “Internet Plus”. *COMPUTER ENGINEERING & SOFTWARE*,2016,37(10):17-19
2. Fang Bing, Yang Cheng. An analysis of the construction of information-based teaching resources in colleges and universities-For example, Open University. *Education magazine*. June, 2013 (19)88-94.
3. Ten years development plan of education informatization (2011–2020) [EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s3342/201203/133322.html>
4. Duddeestadt J. J. Higher Learning in the Digital Age: An Update on a National Academies Study [EB/OL]. [2013-08-28]. <http://net.educause.edu/upload/presentations/E04/GS01/Educause.pdf>
5. Zhang Xuexin. New exploration of teaching reform in university classrooms. *Education BBS of Fudan university*,2014,12(5):5-10.
6. Li Xxiaona. Discussion on the application of subclasses in automobile construction teaching. *Shandong industrial technology*, 2007,02:143
7. Zhang Gaofei, Ding Yafei. Applied research of “sub-class” in practical training course of iot. *Computer knowledge and technology*,2017.08,13(22):135-136.
8. Jiang Shuman. Study on the hybrid teaching model based on micro-video-pair classroom. Shanghai: Shanghai normal university,2018.03.28.
9. Xue Ling, Zhu Likun. Application of WeChat public number subclass teaching model in urology nursing teaching. *Heilongjiang science*,2017.12,2(23):162-163.
10. Li Hongmei. Teaching design and implementation of computer application foundation for universities based on WeChat public platform. *Education and education informatization*, August, 2008,15:252-254
11. Wang Na, Jiang Hong. Exploration of interactive teaching mode of innovative practical courses based on WeChat platform. *Innovative education research*, 2008,4:36-37.
12. Hao Pingping. Application research of WeChat public platform assisted teaching model in mobile Internet environment.201817(16),177-178.
13. Jiang Jilin, Wang Yanping, Zhang Qingzhen. The development of electronic schoolbag and its application in higher education. *China education informatization*, 2015,17:24-27.
14. Broderson,C.,Christinsen,B.G.,Gronbaek, K., Dindler, C.,& Iverson, O.S. eBag -thedigital schoolbag [DB/OL]. http://www.daimi.au.dk/~bentor/papers/eBag_final.pdf.
15. Zhang Yanfei, Ren Chuanbo, Gong Jinliang, etc. Study of the four-five-step teaching model based on the information-based network teaching platform, *The Chinese Journal of ICT in Education*, 2016,20:43-46.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

