



The Computer-Assistant Online Two-Wheel-Drive Teaching Increase Student Grade in College Political Courses

Yang Yang¹ and Zhengfei Zhao²(✉)

¹ School of Marxism, Wannan Medical College, Wuhu 241002, Anhui, China
13121682@bjtu.edu.cn

² Audit Office, Wannan Medical College, Wuhu 241002, Anhui, China
zzhengfei108@163.com

Abstract. With the rapid development of the internet and online platforms, the adoption rate of online teaching is rapidly spreading to higher education, among which the rain classroom is a widely used methods. There are few studies demonstrate that how computer-assistant online rain classroom combined with other teaching methods can better improve students' learning efficiency. The present study aims to explore the role of Rain Classroom and Problem-Based Learning (PBL) in political courses in colleges, in which 5 classes were selected to adopt the "Rain Classroom" and PBL dual-wheel-driven teaching methods, by using two-wheel-drive teaching method in teaching process, teaching evaluation, and teaching effect. The results indicate that the computer-assistant online two-wheel-drive teaching can significantly improve students' interest in learning, enhance independent learning ability, increase the enthusiasm of classroom interaction, and finally increase the final course grade. Furthermore, the times of PBL in the two-wheel-drive teaching co-related with the increase of the course grade. The present study demonstrates that the two-wheel-drive teaching can significantly improve student grade.

Keywords: Computer-assistant online teaching · two-wheel-drive teaching · college political courses · Rain Classroom · PBL

1 Introduction

The traditional teaching mode is mainly that teachers teach on the podium, while the students sit and listen to the lectures, which could be called of classroom knowledge instillation [4]. This mode relies on the joint participation of teachers and students in the classroom, which is not effective for students' auto-learning initiative. The development of traditional teaching activities is carried out in the presence of teachers and students at the same time, and the two are indispensable, make traditional teaching activities subject to time and space, which greatly limits the role of traditional teaching models in improving students' interest in learning and academic performance in political courses

in colleges. Furthermore, these traditional teaching reduces teachers' enthusiasm for teaching and teaching initiative.

During the COVID-19 epidemic, new online teaching methods became emerged. Rain classroom is one of the most widely used new computer-assistant online teaching methods in college teaching [12]. The Rain Classroom teaching software is mainly jointly developed by Tsinghua University and relevant departments, which aims to connect teachers and students online. It integrates computer technology, big data, emerging Internet, mobile clients, and WeChat mini-programs into the teaching scene, effectively integrating before-class, in-class, and after-class, test-assessment-interaction and other links are organically combined to fully release the diversity of teachers' teaching and the novelty of students' learning [7, 14]. Students' pre-class preview can be completed efficiently anytime and anywhere. The exercises after class increase the students' self-check and self-test and strengthen the learning effect. The whole data record by computer provides comprehensive support for students' learning effect evaluation, which successfully solved the drawbacks that teaching activities are limited by time and space [5].

Problem-Based Learning is a set of methods for designing learning scenarios, also known as inquiry-based learning [13]. The teaching method has been widely used in recent years as a student-centered situational teaching model. It is problem-oriented, student-centered, and discussion-centered new teaching methods. PBL does not have teachers stand in front of the classroom and teach each student the same thing, but instead allows teachers to collaborate with students on a personalized level. According to the needs and stages of students, teaching is carried out in the form of on-site lectures, small group lectures, etc. In the whole learning process, students are the leading ones, and a more open, creative, and innovative learning model is used to replace rote learning, and students independently collect information, discover, and solve problems.

The combination of computer-assistant online Rain Classroom and PBL is to fully integrate the advantages of them and have been applied in other course [1, 16], but the role of the combination have not been studied in college political courses. For explore the role of this combination teaching model, we build a computer-assistant online Rain Classroom and Problem-Based Learning's two-wheel-drive teaching model.

2 Teaching System and Experimental Methods

2.1 College Political Courses

The ideological and political courses of colleges and universities are the main methods of political education for college students [11]. This course takes the common knowledge of socialist material civilization, political civilization, and spiritual civilization construction as the basic content, and guides students to closely integrate with their own economic, political, and cultural life, and experience the process of inquiry learning and social practice. Through the development of curriculum education, students can comprehend the basic viewpoints and methods of dialectical materialism and historical materialism, and effectively improve their ability to participate in modern social life [6]. However, there are many problems in the teaching process of political courses in colleges and universities. How to increase students' enthusiasm for learning and improve the learning

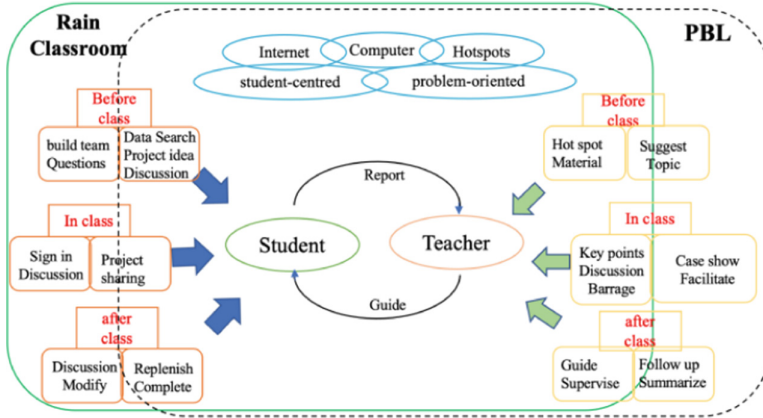


Fig. 1. The model of computer-assisted online Rain Classroom and Problem-Based Learning’s two-wheel-drive teaching (Photo credit: Original)

effect is particularly urgent [10]. New online teaching methods provide new ideas for solving this problem.

2.2 Teaching Process

In the present study, we build the computer-assisted online two-wheel-drive teaching that students are guided to collect and sort out relevant materials of political subjects through teamwork, before-class preview, in-class discussion and after-class reflection and supplementation, and through the solution of different PBL core problems to cultivate students to integrate theoretical knowledge. In the selection of projects, the autonomy and subjective initiative of students should be fully exerted and respected, and teachers will guide, check, modify and improve relevant content. With the in-depth study of political courses, we constantly adjust the direction of discussion topics, improve data collection, freely integrate, optimize, and finally form a complete teaching case-style “Rain classroom + PBL teaching” with theoretical and practical significance. This kind of integrated teaching combines the randomness, interaction, and whole-process participation of rain classroom with PBL’s emphasis on problem, discussion, and collaboration (Fig. 1).

2.3 Teaching Evaluation

Teaching objectives and teaching methods are important aspects that affect evaluation methods and standards [2, 3]. The most important way of teaching evaluation is the students’ course test scores, which mainly include final exam scores and usual grades [8]. The usual grades usually include classroom attendance grades, usual performance grades, and homework grades [9]. Rain Classroom combined with PBL teaching makes good use of Rain Classroom’s full data recording function, which can record and synthesize all aspects of students’ before-class preview, class attendance, in-class notes and interaction, after-class review, and test, etc. At the same time, in the online interactive

sharing process of PBL’s Rain Classroom, students from different teams are used to score each other, score table evaluation and teacher group scoring methods are used to score students’ comprehensive practical ability to carry out PBL project research. To quantitatively measure the teaching effect, the performance calculation method is carried out base on computer assistant online tracing as follow:

The final grade is mainly determined by the final exam (1)

The usual grades include pre-class preview grades, class sign-in grades and homework grades (2)

The comprehensive practice ability grades include student mutual evaluation, grading table evaluation and teacher rating. (3)

The final course grade = (1) * 40% + (2) * 30% + (3) * 30. (4)

In order to evaluate the improvement of students’ upgrading by the computer-assistant online dual-drive teaching mode combining rain classroom and PBL, in the first stage of the present study, the classes were divided into groups and 5 classes adopted traditional offline teaching; 5 classes adopted pure rain classroom teaching; 5 classes adopt the dual-drive teaching mode combining Rain Classroom and PBL, and the final course scores are evaluated and analyzed at the end of the term (Fig. 2). In the second

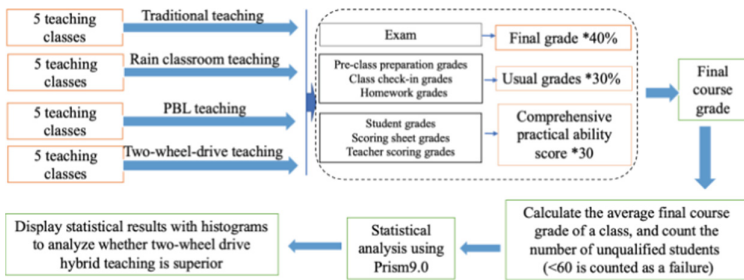


Fig. 2. The first stage of computer-assistant online two-wheel-drive teaching (Photo credit: Original)

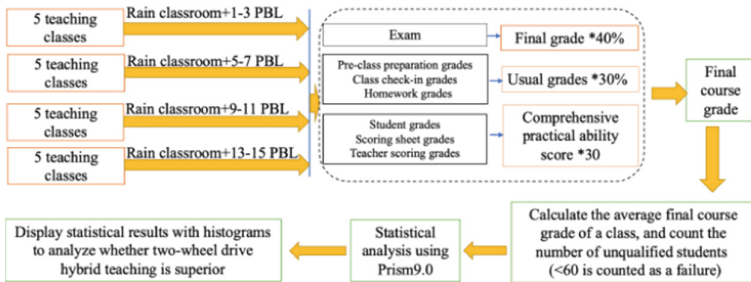


Fig. 3. The second stage of computer-assistant online two-wheel-drive teaching (Photo credit: Original)

stage of teaching, 5 classes carry out rain classroom combined with 1–3 PBL teachings, 5 classes carry out rain classroom combined with 5–7 PBL teachings, 5 classes carry out rain classroom combined with 9–11 PBL teachings, and 5 classes carry out Rain classroom combined with 9–11 PBL teachings. The class conducts rain classroom combined with 13–15 PBL teaching and evaluates and analyzes the final course results at the end of the term (Fig. 3). Prism 9.0 was used to analyze the performance, T test was used for the performance between two groups, and one-way analysis of variance was used for the comparison between multiple groups. $P < 0.05$ was considered a significant difference. The correlation analysis between the final course grades and the times of PBL is directly carried out on the rain classroom combined with different times of PBL teaching.

3 Study Results

3.1 The Computer-Assistant Online Two-Wheel-Drive Teaching Significantly Increase the Final Course Grades of Student

Table showed that Two-wheel drive teaching significantly improves students' interest in learning, improves students' ability to actively learn, and increases students' classroom participation and classroom atmosphere, which can enhance the teaching effect (Table 1). The results of the first stage show that the rain classroom teaching ($p = 0.0508$) or PBL teaching ($p = 0.0949$) can improve the average final course grade of the students to a certain extent, but this improvement has no significant difference (Fig. 4A); while the two-wheel drive teaching can improve the final course grade to 89.21 points, which significantly increased compared with traditional teaching ($P < 0.0001$). On the other hand, there was also a significant reduction in the number of failing grades in the two-wheel-drive teaching (Fig. 4B). These results show that two-wheel-drive teaching can significantly improve student learning and improve student achievement.

3.2 Different Times of PBL in the Computer-Assistant Online Two-Wheel-Drive Teaching Affect the Grade of Students

To further explore the influence of PBL times on students' grade in two-wheel -drive teaching, we designed Rain Classroom + PBL teaching groups with different times. The results show that the combination of different times of PBL teaching in the rain classroom has a significant impact on the average final course grades of students, and the grades increase significantly with the increase of the number of PBLs (Fig. 5).

Table 1. Learning interest, ability and enthusiasm in Two-wheel-drive teaching

Student Group	Learning interest	Learning ability	Learning enthusiasm
Traditional teaching	75.6%	72.5%	62.4%
Rain classroom teaching	83.4%	80.6%	70.6%
PBL teaching	81.5%	83.3%	72.2%
Two-wheel-drive teaching	89.3%	88.5%	83.4%

(Photo credit: Original).

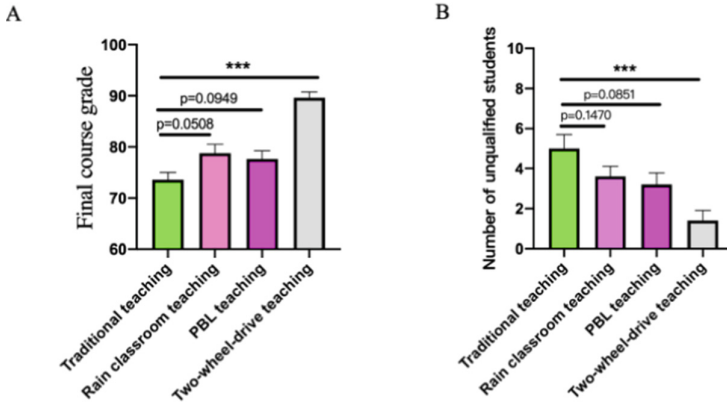


Fig. 4. The effect of different teaching modes on the average final course grade and the number of unqualified students in the class (Photo credit: Original)

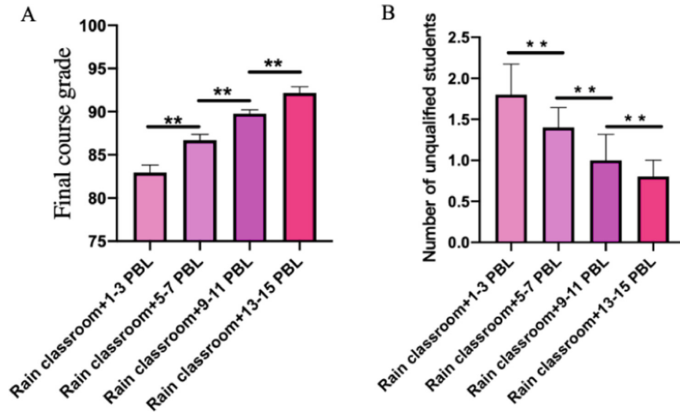


Fig. 5. The influence of rain classroom combined with different PBL times on the average final course grade of students (Photo credit: Original)

3.3 Times of PBL in the Computer-Assistant Online Two-Wheel-Drive Teaching Co-related with Grade of Student

The correlation analysis between the number of PBL teaching in two-wheel drive teaching and students' grade demonstrate that there is a positive correlation between them. It shows that under certain conditions, the more PBL teaching times combined with rain classroom, the more conducive to improving students' grade (Fig. 6).

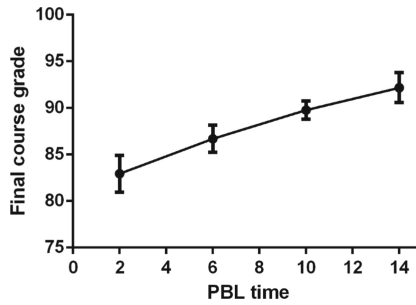


Fig. 6. The correlation analysis of PBL times in Rain classroom with final course grade (Photo credit: Original)

4 Discussion

College political courses have many research problems, including a wide range of content, rigorous language expression and other characteristics, and they are not paid much attention by students [15]. Combined with the characteristics that political courses are closely related to social hot issues, this research compares online rain classroom teaching and offline teaching and compares pure rain classroom teaching or pure PBL teaching, and rain classroom combined with PBL teaching, and finds that computer-assistant online the two wheel-driven teaching can significantly improve students' interest in learning, enhance independent learning ability, increase the enthusiasm of classroom interaction, condense teamwork ability, and fully mobilize students' subjective initiative. Computer-assistant online Rain Classroom and PBL two-wheel drive teaching have transformed the cramming-style teaching in fixed classrooms into problem-oriented, multi-dimensional thinking teamwork learning that is not limited by time and place. Students not only mastered the knowledge points required by the course, but also fully exercised the ability to analyze problems, search and organize data, and cultivate the ability to think independently and solve problems. The two-wheel drive teaching activates the classroom and frees teachers from the process of full lectures. More is to give guidance and guidance. The whole data record of Rain Classroom allows teachers to keep abreast of students' learning status and follow up students' questions. The most important thing is that computer-assistant online Rain Classroom and PBL two-wheel drive teaching significantly reduce the number of students who fail and improve course performance.

5 Conclusion

The present study concludes that computer-assistant online Rain Classroom and PBL two-wheel drive teaching methods are effective and worthy of promotion in college political courses by using comparative research and relative analyze. This study provides a sufficient theoretical basis for better application of computer-assistant online Rain Classroom and PBL two-wheel drive teaching methods in college politics courses to improve students' learning effect in the future. Furthermore, the study provides a good case for the effective application of computer assistant online technology in teaching for college students.

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Conflicts of Interest. The authors declare that they have no conflicts of interest.

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