



Exploration and Practice of Mixed-Mode Teaching for Orienteering Course Based on Mobile Terminals

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Abstract. This paper uses experimental comparisons and questionnaires to study the mixed-mode teaching for the mobile terminal-based Orienteering course by constructing a mobile terminal-based mixed-mode teaching. The study implements integrated teaching evaluation inside and outside the classroom and focuses on formative evaluation of student learning. According to the results of the experiment, the mixed-mode teaching for mobile terminal-based orienteering outperforms the traditional orienteering teaching ($P < 0.05$), and students have higher satisfaction with the mixed-mode teaching for mobile terminal-based orienteering.

Keywords: mobile terminal · orienteering · mixed-mode teaching

1 Introduction

The curriculum is a crucial part of talent cultivation, and the quality of the curriculum directly determines the quality of talents to be cultivated [1]. In China Education Modernization 2035 (2019), it is suggested to actively promote “Internet + education” [2]. In an information-based society, it has become the direction of higher education teaching reform in the world to use information technology to improve the teaching level of higher education. In 2019, the Ministry of Education issued the Implementation Opinions on the Construction of First-class Undergraduate Curriculum, which proposed that universities around the country should actively build various “golden courses” both online and offline and explore the reform of various teaching curriculums [3]. Since 2012, MOOCs and other online teaching platforms have promoted the rapid development of online and offline mixed-mode teaching reform. However, driven by technological intelligence and digitalization, mobile learning supported by mobile smart terminals has become a new teaching mode following online teaching [4]. According to the Statistical Report on the Development of China’s Internet, Chinese mobile internet users have amounted to 1.032 billion as of December 2021 [5]. As indicated by the research of Peking University, college students currently spend 8.33 h using cell phones on average per day, and it can be said that college students cannot live and study without smartphones. The new mobile technology revolution and the popularity of smartphones pave the way for the further development of mobile education.

As higher education continues to be popularized, networked and mobile, the traditional physical education teaching model in colleges and universities exhibits various maladaptations and needs to be changed urgently. These maladaptations mainly include unclear positioning of teaching objectives; lack of up-to-date and practical teaching contents; [6] single teaching mode and backward teaching methods and means [7]; and outdated teaching evaluation methods [8]. As an emerging sport, Orienteering integrates the multidisciplinary characteristics of kinesiology, geography, computer science, etc., and has strong practicality. The traditional Orienteering course has more basic knowledge and different students' foundation, but its teaching hours are constantly reduced by the limitation of time and space, so the conflicts are increasingly prominent. Online and offline mixed-mode teaching breaks through time and space limitations, effectively stimulating students' learning initiative and interest, and can effectively improve learning efficiency and quality. How does mobile learning integrate traditional course teaching? How to realize the integration of online and offline, inside and outside the classroom? How to evaluate students' learning in the mixed-mode teaching for mobile smart terminal-based orienteering course? In this study, the author constructs mixed-mode teaching for the mobile terminal-based Orienteering course and applies it in practice to effectively promote the integration of information technology and curriculum and make reference to the teaching reform for other physical education courses in the context of information technology.

2 Design and Implementation of the Mixed-Mode Teaching Model

2.1 Research Subjects

This study is conducted with sophomore public physical education majors in the 2019 grade at Zhaoqing College who take the course Orienteering in college physical education4 in the spring semester of the 2020–2021 academic year. The course consists of 36 credit hours, 2 h per week. The study consists of eight classes with 45 students each, four experimental classes and four control classes. The experimental classes are taught online and offline, and the control classes are taught traditionally. Both experimental and control classes are taught by the same teacher and have the same teaching objectives and contents according to the syllabus so that a controlled study can be conducted.

2.2 Research Design

The online platform chosen for the experimental class is two orienteering APPs: one is the Beidou Eye APP (Zhaoqing College custom version), and the other is the Orienteering Notes APP. The Beidou Eye APP is a professional orienteering online skills practice product developed by Hailiao Technology Company, designed for online orienteering activities, with the main function of online orienteering punching and practice data management. The company later cooperated with Zhaoqing College orienteering course and developed a customized version of the APP on the original basis, which integrated basic knowledge theory learning, online practice, and online learning data management. Orienteering Notes APP is a software used for post-competition skill analysis after

orienteering skill practice. Additionally, the social software APP WeChat group is used to implement effective pushing of teaching notifications.

The experiment starts from the 3rd week and mainly focuses on orienteering techniques, tactics and competition organization. Students in the experimental class received a detailed introduction of the functions of the Beidou Eye APP and Orienteering Notes APP platform and the purpose of this teaching reform experiment in advance. Both the experimental class and the control class adopt the traditional teaching mode in the first two weeks; at the end of the second week, they are given an in-class skill test and a classroom behavior questionnaire. According to the statistics of the skill test and questionnaire, there is no significant difference between the experimental class and the control class; therefore, the next control experiment can be implemented. The control class adopts the traditional teaching model, while the experimental class makes full use of the APP platform and adopts the online and offline mixed-mode teaching. The teaching of the experimental class consists of 3 stages: pre-class independent learning, in-class interaction, and post-class consolidation and reflection, integrating theoretical learning of basic knowledge, online practice, and online learning data management to learn memorized knowledge before class, improve knowledge and skills during class, and internalize and apply knowledge after class.

2.2.1 Pre-course Stage

Teachers push the learning task list through the WeChat group and upload relevant videos and learning materials through the Beidou Eye APP platform. Students complete the independent learning tasks through the mobile smart terminal platform. Students can send their questions and answers to the “Discussion and Q&A” section of the platform, and teachers can give feedback and answer questions promptly, while their peers can also provide answers. Students use independent learning and collaborative learning as needed before class to initially develop their scientific thinking and ability to solve problems.

2.2.2 In-Class Stage

The online and offline teaching activities are carried out based on the intelligent teaching platform. Offline teaching: teachers will guide to solve the common problems based on the traditional classroom knowledge, skills explanation and teaching and the pre-class learning feedback, such as the explanation of project techniques and tactics; for individual problems, teachers will teach students according to their abilities and provide individualized guidance through project skills group practice, such as designing different levels of orientation routes for different students. In addition, students are encouraged to personalize their learning, such as mapping works, event organization, referee ability, and activity programs. Collaborative learning done in groups and orienteering competitions organized in groups are included in the learning evaluation. Online teaching: students practice their skills online through the Beidou Eye APP, and teachers use the online platform to acquire data related to students' skills while combining it with the Orientation Notes APP to achieve post-competition technical analysis. And then, they

provide feedback to offline personalized guidance to solve students' problems encountered in the learning process and achieve systematic improvement of knowledge and skills.

2.2.3 Post-class Stage

Teachers set up and release extended learning resources through WeChat groups after class, including exercise self-tests, online practice, or group tasks. Students first make post-class summaries and then independently complete individual exercise self-test assignments in the Beidou Eye App or complete group tasks through group cooperation. Teachers set up post-class practice tasks in the Beidou Eye App, and students complete the practice tasks through the platform within the specified time. The teacher monitors students' completion through the background data, provides data feedback, answers questions, and interacts with students in the "discussion forum" of the Beidou Eye App to internalize and apply knowledge.

In order to stimulate students' learning initiative, this teaching reform gives more attention to the process assessment of students' learning. The specific assessment methods are as follows.

The assessment of course learning consists of the following parts: (1) Regular follow-up test (40%): process assessment, offline classroom attendance, and performance; online records of students' activity status in Beidou Eye APP, such as the number of logins, exercise tests, postings, initiating and participating in discussions; skill practice data inside and outside the classroom in Beidou Eye APP and Orientation Notes APP. (2) Individual projects (10%): assessment of students' offline personalized learning cartographic works, event organization, referee ability, and activity programs. (3) Team project (10%): organization and implementation of orienteering competitions done in teamwork. (4) Final test (40%): a summative assessment involving offline orienteering specific skills assessment and online submission of the semester summary.

Teaching evaluation = 50% of usual grade (usual random test (40%) + individual project (10%)) + 10% of midterm grade (team project (10%)) + 40% of final test (special skills assessment 30% + network summary 10%).

3 Assessment of the Implementation Effect of Mixed-Mode Teaching

3.1 Experimental Comparison of the Mixed-Mode Teaching for the Course Orienteering Based on the Mobile Terminal

Through the 1-semester teaching experiment, the experimental and control classes completed the end-of-semester unified examination. According to the results (Table 1): in the short distance examination, both boys and girls in the experimental class have faster performance than boys and girls in the control class, revealing a significant difference ($P < 0.05$).

Table 1. Comparison of mixed-mode teaching and traditional teaching experiment for orienteering in the 2020~2021 academic year

Last name	Experimental class (short distance)		Control class (short distance)		t	p
	n	M ± SD	n	M ± SD		
Male students	132	2185.7 ± 345.9	111	2266.1 ± 301.1	-2.068	0.040
Female students	45	2277.9 ± 224.9	64	2374.3 ± 295.8	-2.048	0.040

Table 2. Survey of students' satisfaction with mixed-mode teaching

Group	Very satisfied	%	Satisfied	%	Average	%	Unsatisfied	%
Experimental group	11	14.67	37	49.33	20	26.67	7	9.33
Control group	2	2.67	12	16.00	36	48.00	25	33.33

3.2 Survey of Students' Satisfaction with Mixed-Mode Teaching

Through the study of mixed-mode teaching, Garrison et al. conclude that mixed-mode teaching can increase the interaction between teachers and students and significantly improve both learning effectiveness and satisfaction [9] (Table 2).

Through a one-semester teaching experiment, 150 students (75 students each in the experimental and control classes) are randomly sampled in 8 classes of the public physical education orienteering course to conduct a course satisfaction survey. According to the analysis of the results (Table 1), the students in the experimental class have higher satisfaction levels with the course than those in the control class. This indicates that the mixed-mode teaching for the course Orienteering based on mobile terminal results in higher student learning satisfaction.

4 Conclusion

4.1 The mobile terminal APP is used as a platform to build mixed-mode teaching for course Orienteering based on mobile terminals and to implement integrated assessment during, in-class, and after class based on formative assessment of student learning.

4.2 Through the teaching experiment, students in the experimental class of the Orienteering course outperform those in the control class in terms of comprehensive technical assessment of orienteering, reaching a significant difference ($P < 0.05$).

4.3 Through the 1-semester teaching experiment, students' learning satisfaction with the mixed-mode for the mobile terminal-based Orienteering course is higher.

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