The Mobile Teaching Method of Law Course Based on Wireless Communication Technology

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Abstract. In order to better improve the teaching effect of law and improve the teaching efficiency of law courses, this paper proposes a mobile teaching method of law courses based on wireless communication technology. First, optimize the law teaching system, combine wireless communication technology to build a mobile teaching platform for law courses, optimize teaching content and teaching evaluation indicators, and achieve the goal of mobile teaching. The experimental results show that the design method can effectively improve the teaching efficiency of law courses, and has certain application value.

Keywords: Wireless communication · Law courses · Mobile teaching · Learning efficiency

1 Introduction

The informatization of higher education has gradually become a trend, and educational technology has intervened in our education and teaching mode in an unprecedented way. In the field of educational technology, wireless communication technology has become increasingly important as the most cutting-edge resource integration technology. In the prospect of the new higher education teaching model, some scholars believe that "the future classroom must be wireless communication data terminal classroom, including electronic textbooks, electronic desks, e-bags, electronic whiteboard, etc. [1]. In terms of resources, from simulated media to digital media, and then to network media, resources are ultimately on the mobile teaching platform, greatly rich content, so as to meet personalized learning." Then, as far as the transformation of legal education mode is concerned, it is very important to give full play to the role of wireless communication technology to achieve the improvement of education efficiency. In order to improve the efficiency of law course education in the era of wireless communication, this paper will start with the transformation of law teaching mode, point out the shortcomings of traditional law teaching mode, and then explore what wireless communication technology can bring to law education. Combined with the essence of wireless communication technology, it will explore the composition of the mobile teaching system of law. Traditional

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law teaching forms have their advantages and disadvantages. On the basis of absorbing the latest scientific and technological achievements, After improvement, there can be more technical advantages [2]. For law teaching, the full application of wireless communication technology means the expansion of teaching coverage, the improvement of students' enthusiasm for learning, and the better integration of teaching resources. By reasonably constructing the mobile teaching mode of law courses, we can effectively use the advantages of wireless communication technology in resource sharing, so that law teaching mode can make better use of technology and achieve the purpose of teaching and learning in the tripartite interaction of teachers, students and managers.

2 Mobile Teaching of Law Course in Wireless Communication Technology

2.1 Law Curriculum System Based on Wireless Communication Technology

In the world, there are two kinds of law teaching methods, one is case teaching, and the other is teaching teaching. Case analysis teaching is to take the case as a kind of reasoning and induction material that can clarify the legal theory from it. Teaching teaching focuses on teachers' platform for teaching relatively abstract concepts, principles, basic principles and theories, aiming to impart knowledge to students. Neither the recently proposed clinic teaching or the ancient annotation teaching has escaped both categories. China's current law teaching mode has four characteristics: first, with the teaching of existing knowledge as the main teaching purpose. The teaching activities of teachers and students still focus on the dissemination of knowledge. Second, classroom teaching is the main teaching method. The teaching mode with knowledge as the main goal is still the main teaching method, and self-study, discussion, research and experimental practice are all in an auxiliary position. Third, teachers and teaching materials are the center [3]. It is entirely teachers who decide the teaching content and teaching methods. There are few cases where students actively ask questions in class, not to mention raising different opinions and arguing with teachers. Students are completely passive and subordinate in teaching. Fourth, take the written test as the main evaluation means. The evaluation of merit students and scholarship grades and the selection of talent market are mainly based on the written test results. In college entrance examination, employment and career, written examination is increasingly widely used as a means to ensure fairness, and strengthens the exam-taking characteristics of education at all levels. Although, there is merit for this teaching model, the way knowledge is spread and shared is now changing rapidly [4]. Due to the information network, it will be more convenient and not enough to master the existing knowledge. Competition will mainly depend on the ability to use existing knowledge to creatively solve problems, and the ability to find new knowledge, while the current university law teaching mode is not conducive to the cultivation of students' innovation ability. From the technical point of view, the related technologies of mobile learning are as follows: mobile terminal, mobile Internet mobile learning platform design and development, and the construction of mobile learning resources [5]. The development and progress of these four technologies make the operation interaction, information exchange, resource storage acquisition and processing more convenient and

fast, and promote the development and application of mobile learning. As shown in Fig. 1:

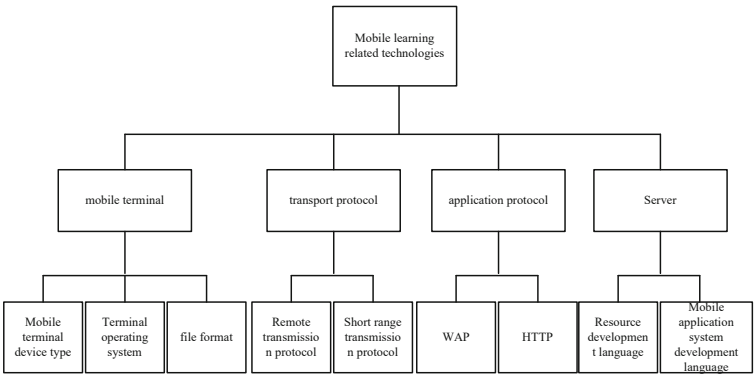

Fig. 1. Structure of wireless communication mobile teaching platform

Mobile teaching platform is a teaching support platform based on wireless communication technology. In the design and development, the resources of the original computer network teaching platform should be used to expand its functions on the basis of the original computer network teaching platform, so as to achieve the purpose of resource sharing and cost saving [6]. In terms of ELearning's digital teaching platform, it should cover all steps of teaching, including online teaching and teaching guidance, online self-study, online teacher-student communication, online homework, online testing and quality assessment and other comprehensive teaching support functions, which can provide real-time and non-real-time teaching interactive support between teachers and students [7]. A network learning platform for teachers and students should generally include teaching design module, learning tool module, collaborative communication module, assignment and review module, online q & A module, learning resource module, intelligent evaluation module and maintenance support module and so on from the current degree of information and the situation of mobile devices, Such as the screen size of mobile devices, mobile device penetration rate, and so on, There is little demand for a complete mobile teaching platform; And based on the auxiliary teaching is only a supplement to school teaching and classroom teaching, Each link of teaching cannot be completely mobile and other reasons It is not necessary for us to implement all of the above modules in the mobile teaching platform, As long as some of the more timely modules are selectively implemented, Such as login, homework assignment reference, online questions and questions video teaching and other modules, Thus, a mobile teaching platform shared by wireless communication network and mobile network is designed for these functions. The development of mobile learning curriculum content resources should reflect the characteristics of diversity. According to the mode of mobile learning, the form of mobile learning course content resources and their production tools can be summarized in Table 1 below:

Table 1. Mobile learning course content resource form and its production tool

Mobile learning mode	Resource form	Resource production method
SMS/MMS mode	Text information	Text editing, tools
	Picture information	Various graphic image making tools
	Short animation information	Flash Lite is a mobile device player, which can enjoy the wonderful content made by flash and make learning content for mobile phones
Web browsing mode	document info	HTML → WML, XHTML and other scripting languages
	View text files online	Text files in txt and PDF formats can be played on mobile learning terminals
	Play audio and video files online	Various audio and video formats change tools
Storage carrying mode	Store read text files	Various audio and video format conversion tools
	Store and play audio and video files	
	Supporting documents	Explanation of necessary audio and video formats for text learning materials

Since the number of users of community wireless communication data is relatively small compared with the public wireless communication data, the cost saving potential of wireless communication data computing is only partially realized. Nowadays, wireless communication technology is mainly a combination of the above methods, which is often called hybrid wireless communication data. Hybrid wireless communication data is a mixture of two or more private, community, or public wireless communication data, but hybrid wireless communication data still requires unique combined entities, thus providing the benefits of multiple deployment modes. This combination expands the deployment options of wireless communication data services, allowing it organizations to use public wireless communication data computing resources to meet temporary needs. Hybrid wireless communication data provides flexibility for internal applications, fault tolerance based on wireless communication data and scalability of services. Teaching methods are often characterized by mixed wireless communication data, as shown in Fig. 2:

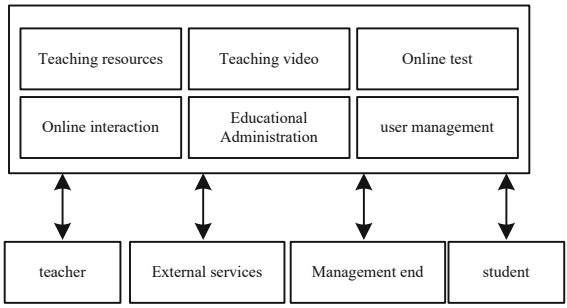

Fig. 2. Mobile education model of law classroom

The model consists of terminal, communication pipeline, and legal education wireless communication data. The terminal is composed of users and their used mobile communication devices. Users are divided into students, teachers, administrators and others according to their functions. Mobile devices can be mobile phones, laptop computers, tablet computers and other communication devices. Communication pipeline refers to the transmission network channel, such as network 3G provided by operators, wireless network WIF covered on campus or in a certain area. Wireless communication data server integrates teaching resources into the wireless communication data of legal education. Students can independently conduct online learning, online testing and so on. Teachers can modify and browse various teaching resources at any time, and communicate with students in real time. The administrator is responsible for managing the wireless communication data server and various users, managing various educational affairs, and integrating teaching resources. This mode mainly focuses on the personalization and portability of students' learning, so it needs to integrate all kinds of users well and reasonably set up mobile document resources.

2.2 Teaching Evaluation Algorithm of Law Course

Mobile learning refers to rely on the more mature wireless mobile network and multimedia technology, network communication technology and other computer means, make teachers and students through mobile terminal equipment, learning at any time, any place, and can make teachers and students for communication, communication, so as to realize the students as the main body of autonomous learning, multimedia has the function of processing, editing images, audio and video. Multimedia teaching resources, can strengthen the students 'attention, with vivid animation and real video, make the students have immersive feeling stored in the teaching server multimedia courseware, can be called at any time, make the platform better service for teaching in the implementation of teaching, as an organic part of the teaching material, teaching media to promote teachers' teaching and students learning plays an important role. Teaching media can make teaching and learning more interesting; It can help students understand knowledge, develop intelligence, improve ability and expand vision; It is conducive to the formation of students' problem consciousness and the cultivation of students' ability to solve practical problems; Cultivate students' cooperative consciousness and spirit. The

proper use of teaching media can make teachers and students get twice the result with half the effort.

Table 2. The advantages of mobile learning and traditional learning

	Traditional learning methods	Mobile Learning
Changes in teaching methods	Based on the description of words and pictures, the course location is in the school classroom or online classroom	More descriptions based on sound, pictures and animation, the course can be in any mobile environment
Communication between teachers and students	Delayed e-mail, passive asynchronous communication	Timely communication, strong interaction and initiative
Student to student communication	Face to face, video conference, e-mail, private space, inefficient group discussion	Timely communication, no geographical restrictions, flexible time
Feedback to students	One to one, asynchronous and delayed, popular description, paper feedback	Personalized description, cost saving and more flexible
Operation and testing	Classroom, standard test, feedback effect is not good	Anytime, anywhere, personalized testing, rich and timely feedback
Test evaluation	Based on theory and words, time and place are limited, and individuals and some groups cooperate	Personalized customization and more communication

Analysis the comparison of mobile learning and traditional learning in Table 2, we can find that the characteristics of mobile learning are formally mobile, learners, learning resources and learning environment are mobile; content is interactive, two-way instant interaction; implementation is digital, mobile learning platform for digital learning, mobile learning is a personalized and emotional process, but due to mobile characteristics, mobile learning is also a highly fragmented experience. Distribute the weight allocation W to the evaluation experts, and invite the experts to independently assign the weight N_{ij} of each index in the first round, and fully explain the reasons. To recover the consultation form, it is necessary to make statistics on data n and calculate the average value and deviation of each index.

$$K = \frac{1}{n} \sum A_j - R_{ij} \tag{1}$$

Report the published data and two indicators to experts, ask them to revise their opinions or support their opinions, and then give more weight in the next vote. After recycling, it is classified and counted, and the final conclusion is the expectation of experts and the embodiment of their importance, with the general expectation being at 60% or higher. If not, the index will be cancelled. After testing, the performance indicators

meet the needs of system detection and monomer detection. The AHP method can be performed with C.R. To measure whether the weighted results are credible, the results are as follows: C.R. It is calculated as follows:

$$C.R. = K\lambda_{\max} - \frac{1}{n+(R.I.)_n} \tag{2}$$

where: $(R.I.)n$ is the evaluation consistency index of order n matrix; $\lambda_{\max}$ is the average consistency index of the matrix. Mobile education platform is a service platform for integrating educational information integration. It has the characteristics of rich knowledge, classroom virtualization and one-stop. Compared with traditional mobile teaching platform, it can teach and conduct exams online. Mobile education is a service platform integrating educational information and communication between teachers and students. It can teach across regions, which makes students' desire to learn stronger and makes the communication between teachers and students closer. Mobile learning under the mobile education platform makes students' independent learning ability stronger, and students can conduct classified learning of each subject according to their own time. Figure 3 shows that the autonomous learning mode of the mobile education platform is characterized by timeliness and flexibility.

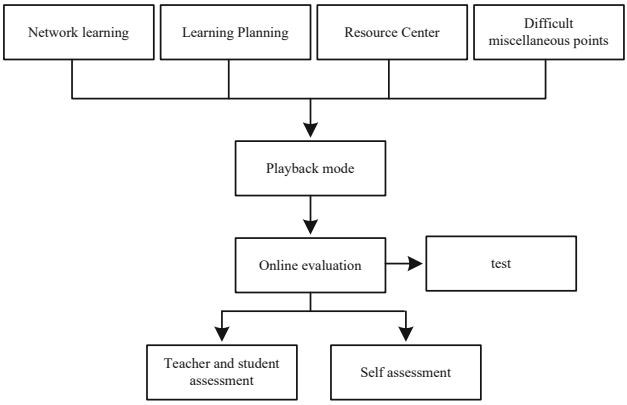

Fig. 3. Independent learning process under the mobile education platform

There are three main conditions for the model to play a role: first, the reasonable setting of courseware. Flexibility and portability is the characteristic of mobile learning, when setting the courseware needs to ensure the short and exquisite courseware, the content is best to 20 min as the node, can not only to avoid the boring courseware, but also conducive to students in the spare time for short learning. At the same time, the courseware should have the function of saving the breakpoints, allowing students to reopen the courseware in other places, without having to play it from scratch. Second, the equal sharing of teaching resources. After the establishment of wireless communication data in legal education, the development of teaching resources is not limited to a certain teaching institution, nor is it restricted by the region. Each law teaching institution can open up a space to enrich teaching resources and provide an equal sharing environment

through resource integration. The third is the construction of virtual platform. Real time interaction is also the advantage of wireless communication data in law education. With the powerful computing and storage capacity of wireless communication technology and application services, wireless communication data in law education provides a real-time interaction platform between teachers and students. Students can share their work experience and curriculum related problems. Teachers can organize students to use BBS or other communication platforms to achieve the purpose of teaching.

2.3 Realization of Mobile Teaching of Law Courses

Mobile learning platform is not an independent platform separated from the existing distance education platform. On the contrary, it needs to rely on the rich educational resources in the existing distance education platform to complete its own educational functions. At present, mobile education based on wireless communication technology is still in the initial stage, and there are still many problems waiting to be discussed and solved. At present stage in continue to study the based on wireless communication network learning at the same time, should also be actively to mobile education, try and explore mobile teaching mode based on wireless communication, curriculum design, resource construction and mobile environment students, teachers, teaching content and teaching media the relationship between the four elements such as key issues, developed suitable for mobile learning teaching products and auxiliary information services. This paper designs and develops a law learning platform based on the wireless communication mobile learning environment. Through this platform, we discuss the design and development of teaching content and the realization of teaching process in mobile teaching. The operation is under the Internet network environment, and ASP language and access database dynamic management platform are used in the background. Here, teachers and administrators can set the type of resources, classify and manage resources, add, modify and delete resources. The main functions are shown in Table 3:

Table 3. Introduction of the background functions of the mobile learning platform

Column	Function introduction
Basic settings	Set the types of resources that can be added
resource management	Modify, delete and add resource classification level-1 management system resources
user	Modify the data of existing users or delete users

In mobile learning platforms, the role of media is also very important. Mobile terminal devices have their own uniqueness. Therefore, so the media used based on mobile phones are different. In mobile applications, mobile phones downloading ringtones and watching movies have become a reality, and related technologies have been relatively mature. Integrating this kind of technology into our teaching will play a great role in promoting students' learning and teaching activities. Here, the relevant tools and knowledge of mobile terminal audio and video development are introduced as the development of teaching resources, and used as the teaching resources of the platform. In order to ensure the smooth progress of mobile learning activities, the server side of the mobile learning platform should provide various basic services. According to the role analysis of teachers and platform manager, the server-side functions are divided into two modules: teacher module and platform manager module, as shown in Fig. 4:

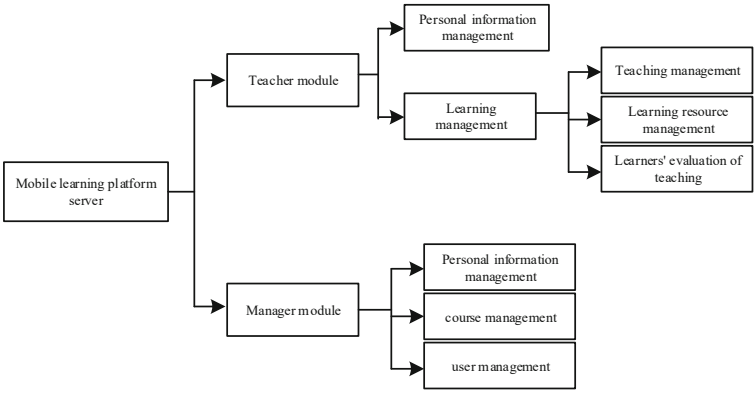

Fig. 4. Functional structure of law teaching management

As shown in Fig. 4, teacher module is to help and support learners by using mobile learning platform. In the platform login interface, the teacher enters his own user name and password and enters the teacher module. To manage the teaching content, upload appropriate learning resources, design teaching activities, evaluate the learning results sent by learners from the mobile learning client, and answer the management module is to support the operation and management of the mobile learning platform. In the platform login interface, the manager enters their own user name and password, and enters the manager module. The manager is responsible for the course arrangement (creation, modification, deletion) and classification, to facilitate the use of learners and teachers, and to conduct information management of learners and teachers, and to timely solve the problems reported by learners and teachers when using the mobile learning platform. Education informatization is a kind of through the use of computer technology, information technology and communication technology to enhance the education of modern education technology, actively develop and make full use of information technology and information resources, to promote the comprehensive modernization reform of education, to adapt to the new requirements for the development of education, to cultivate

the process of talents meet social needs, education informatization model as shown in Fig. 5:

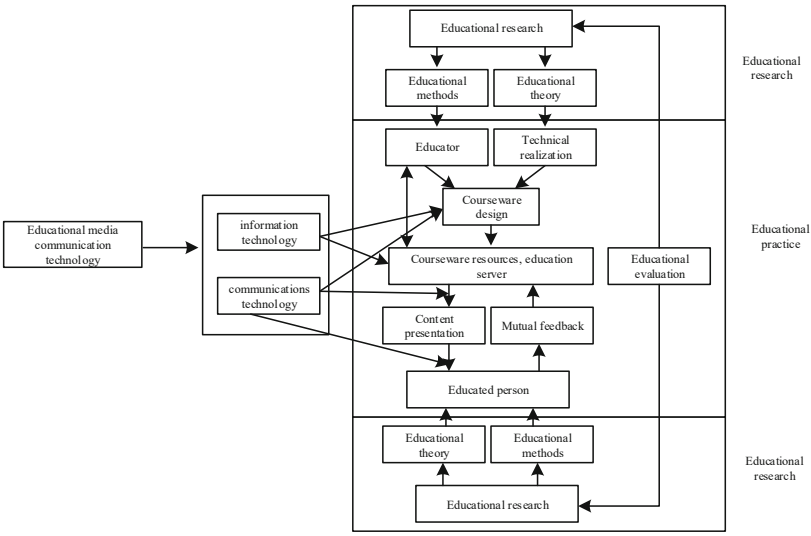

Fig. 5. Education informatization model

The teaching links of mobile teaching include teaching activities such as designing courses, preparing courses, teaching courses, correcting homework, answering questions and learning evaluation. From the perspective of content, the teaching link is very similar to that of traditional education, but its form and focus and teaching design have changed greatly compared with traditional education. First, the separation of teachers and students is the primary feature of network distance education; again, network teaching platform becomes the main means of teaching and learning. In this case, the real-time communication between teachers and students, the implementation conditions of teaching and learning in the network teaching are greatly limited. Therefore, from the perspective of teaching elements, applying mobile learning mode to every link of online teaching can enhance the effect of online learning. A relatively complete mobile learning platform should have the following functional sub modules: resource module, discussion module, question and answer module, test module and other auxiliary modules. The logic structure diagram is shown in Fig. 6:

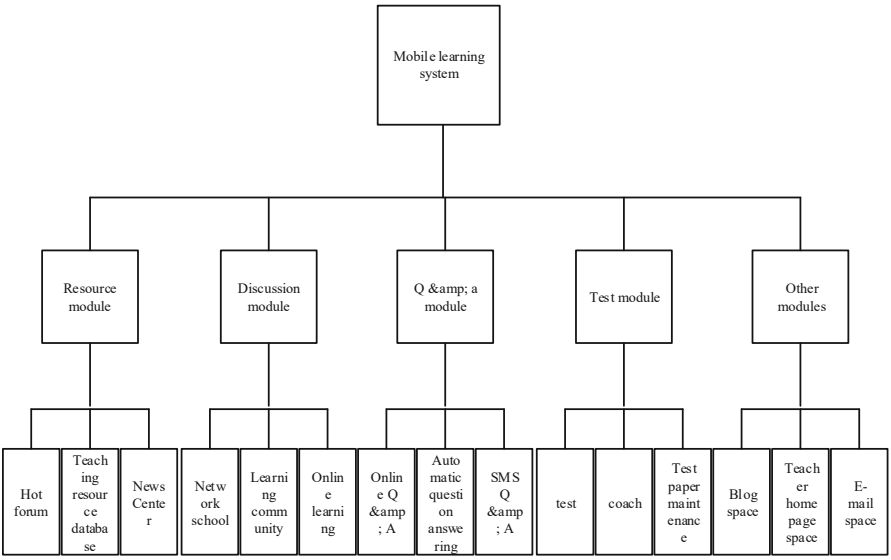

Fig. 6. Function of a mobile teaching platform based on wireless communication

The design and development of learning modules and learning resources in this platform are mainly based on the mobile learning mode of browsing and connection. Due to funds and other problems, the mobile learning mode based on SMS gateway has not been designed and developed, so it is impossible to study the mobile learning of short messages. This part of the function can be performed in further studies on the subsequent platforms. The use object division of the platform design is not detailed yet. At present, there are only two types of users on the platform, but in the real teaching process, the user's needs and functions are different, which are certainly not limited to two types of users. In the follow-up work, different types of users should be divided into different permissions according to specific needs. The improvement of teaching resource database. As it is an exploratory research, the platform does not do much work in the construction of the teaching resource database, but only explores its feasibility. However, as a complete dialogue platform, the construction of the resource library must be perfect. The platform module construction is not perfect enough. As introduced in Sect. 4, mobile learning platform is a complete platform, now part of mobile law platform development module to explore the mobile environment is not enough, such as test module, blog module for the development of the platform and further explore mobile learning is necessary, in the platform follow-up work, can continue to complete the development of these modules and explore the way of teaching in this environment.

3 Analysis of the Experimental Results

According to the research purpose and significance of this topic and the feasibility of the experimental conditions, the respondents were determined to be the teachers and students of a university law school. In order to test the application effect of wireless communication in law teaching, the comparative experiment is designed. The experimental parameters are shown in Table 4 below:

Table 4. Experimental parameters

Project	Data
Power type	High efficiency and energy saving power supply
Processing instruction	Cache instruction
Hard disk	180 GB
Graphics card	ATI mobility radeon standalone graphics card
Detection signal form	TUV radio frequency signal
Cache mode	L3 cache
Data display form	DSP processing signal
Memory capacity	16 GB
Radiation level	Class A
Operation and maintenance voltage	220 V
Power	$\geq$ 200 W

Observation, recording and coding of teacher teaching behavior with Nvivo11 as a research tool. The main interaction types and behaviors of teachers and students in the class are recorded with 30 s as a time unit, and expressed by the corresponding code. Thus, the observation record of the interaction behavior between novice teachers and expert teachers can be obtained as shown in Fig. 7 and Fig. 8:

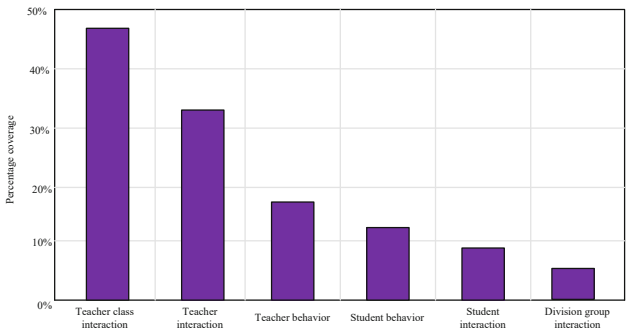

Fig. 7. The interactive behavior coverage of mobile law courses in the classroom offered by novice teachers

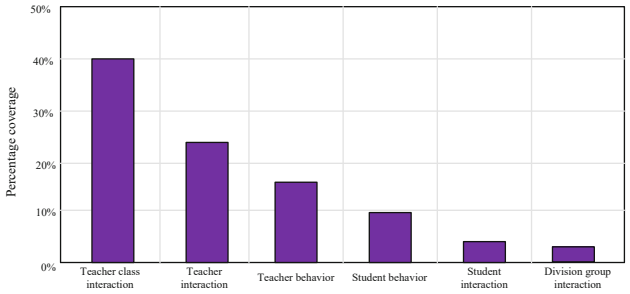

Fig. 8. Coverage of interactive behavior of classroom mobile law courses by expert teachers

As shown in Figs. 7 and 8 above, the coverage rate of the interactive behavior of novice teachers is the largest proportion in the mobile teaching environment. The traditional teaching method and the wireless communication teaching method are selected to compare and analyze the existing deficiencies of the teaching method of wireless communication and improve it. To ensure the consistent experiment time, the student learning efficiency of the traditional teaching method and the wireless communication teaching method is compared and analyzed. The results are shown in Fig. 9.

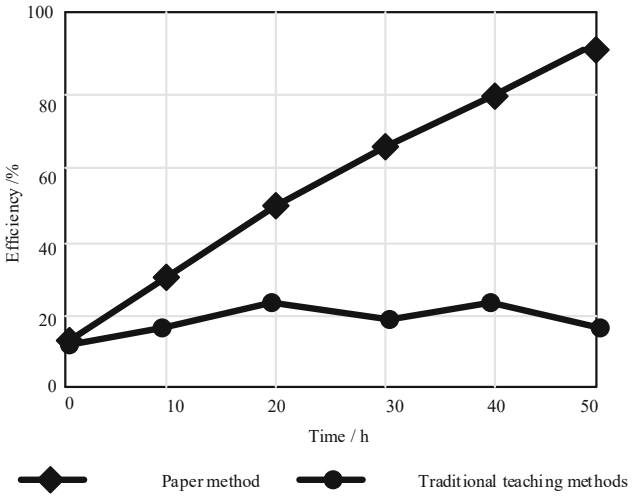

Fig. 9. Comparison of student learning efficiency results between the two methods

According to the above experimental results can get the following experimental conclusion: wireless communication mobile communication teaching method applied to law teaching compared with the traditional method, the method learning efficiency can reach 98%, can improve students 'learning efficiency, strengthen the enthusiasm of learning enthusiasm, strengthen students' practical ability and teamwork spirit, keep the relationship between teachers and students, but also can better application of digital teaching in the classroom. However, under the application of traditional methods, students' learning

efficiency of law courses is always around 20%, which proves that the application of traditional methods can not achieve good teaching effects of law courses and can not complete the teaching tasks of law courses in limited teaching hours. The reason for this result is that this method first optimizes the law teaching system, combines wireless communication technology to build a mobile teaching platform of law courses, Optimize teaching content and teaching evaluation indicators, achieve the goal of mobile teaching, break the limitation of time and space, and maximize teaching efficiency.

In order to further analyze the effectiveness of the design method, the evaluation scores of the teaching quality of law courses under the application of the two methods are compared again, as shown in Fig. 10.

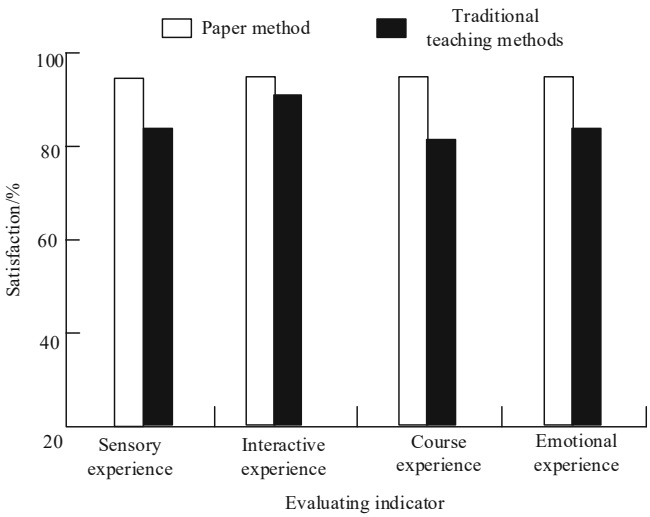

Fig. 10. Comparison results of evaluation indexes of two methods

It can be seen from Fig. 10 that, compared with the traditional method, after applying the design method in this paper, the satisfaction of students is as high as 97%, which is more average, while the satisfaction of the traditional method is only 95%, which proves that the design method has strong advantages in teaching law courses.

4 Conclusion

From the perspective of the development process of multimedia teaching, the integration of high and new technology into education is an inevitable process of educational development and improvement. The application of high and new technology can not change the essence of educational process, but it can change the organizational sequence of educational process, influence the analysis and processing form of education and teaching, thus affecting the teaching effect. With the promotion of new technologies such as wireless communication, mobile learning will certainly be an important form of future development, greatly improving people's learning efficiency and making full use of

teaching resources. With the improvement of people's understanding of mobile learning and the deepening of practice, mobile learning will certainly play a greater role.

References

1. Liang, J., Fang, S., Zhau, Y.: Model predictive control of the fuel cell cathode system based on state quantity estimation. Comput. Simul. **37**(07), 119–122 (2020)
2. Su, J., Xu, R., Yu, S., Wang, B., Wang, J.: Idle slots skipped mechanism based tag identification algorithm with enhanced collision detection. KSII Trans. Internet Inf. Syst. **14**(5), 2294–2309 (2020)
3. Su, J., Xu, R., Yu, S., Wang, B., Wang, J.: Redundant rule detection for software-defined networking. KSII Trans. Internet Inf. Syst. **14**(6), 2735–2751 (2020)
4. Yang, Y., Lin, S., Zhou, Y., et al.: The design and practice of the micro-course mobile teaching system based on the smartphone and the WEB platform. Tech. Autom. Appl. **39**(04), 182–185 (2020)
5. Wang, Q., Yan, R., He, Z., et al.: Reform and practice of polymer physics teaching in mobile learning environment. Chinese Polymer Bull. **06**, 59–63 (2020)
6. Wen, H., Yuan, L., An, A., et al.: Exploration and practice of mobile wisdom teaching mode based on rain classroom. Microcomput. Appl. **36**(11), 16–18 (2020)
7. Zhao, J.: Research on comprehensive training teaching model of business subjects in colleges and universities under the mobile learning environment. Microcomput. Appl. **36**(07), 31–33 (2020)