

Research on the Influence of Multimedia Laboratory Teaching Management System on the Teaching Effect of Laboratory Course

Jiefei Wang^{1,*} Xiaobo Zhang² Xuan Gao³

¹ International hospitality management school, University of Sanya, Sanya, Hainan 572022, China

² Office of Academic Affairs, University of Sanya, Sanya, Hainan 572022, China

³ Tourism management college, University of Sanya, Sanya, Hainan 572022, China

*Corresponding author. Email: 57859389@qq.com

ABSTRACT

With the promotion of education informatization, the construction and application of digital intelligent experimental teaching environment represented by multimedia has been widely valued, however, the current multimedia laboratory teaching still has the problem of how to maintain the classroom teaching order and management effectiveness. In this regard, this study investigates the teaching effectiveness after using multimedia laboratory teaching management system. According to the results, with the application of classroom management system, students' participation in classroom is enhanced, teacher-student discussion is promoted, knowledge sharing is improved, and the flipped teaching effect is affected significantly. Therefore, schools would take the following measures, such as strengthening the cooperation between IT management and laboratory management to achieve joint management of multimedia laboratory classrooms, increasing training for course teachers to operate the classroom management system, and encouraging teachers to maximize students' interest in learning and motivate them to learn.

Keywords: Laboratory teaching, Teaching management system, Multimedia teaching, Teaching effect.

1. INTRODUCTION

With the rapid development of information technology, information technology has also been widely used in university education, promoting the rapid development of university education informatization. [1] The digital intelligent teaching environment represented by multimedia has gradually become a hot spot in the field of laboratory teaching. Theoretically, with the use of digital teaching environment, classroom teaching would be vivid and efficient, at the same time, the transformation of traditional laboratory teaching would be promoted. However, it is not always easy to put this concept into practice and to achieve maximum benefits. One of the biggest challenges is to ensure that students use multimedia to improve

their learning while keeping the classroom orderly. It is well known that a well-managed multimedia classroom not only provides a positive learning environment for students, but also improves their classroom performance and contributes to their academic achievements. However, due to a variety of reasons, such as inexperience in teaching and the complexity of the multimedia teaching environment, the effectiveness of multimedia classroom teaching in colleges and universities is unsatisfactory.

2. PROBLEMS

According to current researches, it can be seen that the order of teaching management in a multimedia environment is very different from that in a traditional classroom setting for laboratory classes. [2] In a multimedia environment, although teachers can give one-to-one instruction to students, walking from one student to another would be a

*Fund: 2019 special research project of first-class undergraduate course construction and teaching of University of Sanya — Research on the "three degree" curriculum construction of tourism and hospitality college oriented by the students' growth" (sxyylbkkc02-04).

challenge for teachers physically. Moreover, for classes with too many students, not every student can get the guidance of teachers in a limited time.

At the same time, while waiting for instruction, students either lose interest in what they are learning or remain idle. In addition, technical breakdowns in equipment would divert students' attention from the content being taught by the lecturer. Thus, there is a need for a software system that not only relieves the teacher from the stress of a tedious job, but also improves the learning environment.

This study selected the course "Hotel Management Information System" in International Hospitality Management School of University of Sanya as the research object, took the impact of multimedia laboratory teaching management system on the teaching effect of experimental courses as the starting point, compared and analyzed students' performance, and evaluated the implementation of teaching management system in the way of experiment. In addition, this study investigated in the form of interviews with teachers, students and IT managers on the effectiveness of using classroom management software to improve the learning environment and enhance student performance.

3. LITERATURE REVIEW

According to previous studies, there was a positive correlation among the classroom time investment, academic activity, academic performance and classroom management. Chen Shijian believed that classroom management referred to a series of activities carried out by teachers in order to guide students to participate in cooperation and active learning, and establish a high-quality classroom atmosphere. [3] Yu Yijiao and Chen Shuang argued that effective classroom management would help students generate high levels of active learning and participation in the classroom learning environment. [4]

Earlier teaching management systems generally had functions, such as locking screens, restricting access, shutting down computers and preventing malicious operations. [5] Thereafter, the teaching management system began to have the functions of keeping students' attention and improving the teaching effectiveness. To make it easier for teachers to understand what students are doing on the client side, modern teaching management system has a special remote monitoring function

that captures the operation on students' computer screens in real time. [6]

Currently, the laboratory teaching management system used by universities in China can be broadly classified into two categories. One is based on the improvement of other commercial management system. [7] Another is to design teaching management system independently. [8] In foreign countries, NetSupport School and NetOp School commercial software are widely used. All kinds of these software have functions such as centralized control of multimedia classrooms across regions, unified management, remote monitoring and maintenance, one-to-one, one-to-more and many-to-many interactive communication between teachers and students, and sharing of specific computer screens between course teachers and students.

4. RESEARCH DESIGN

The study consisted of the following three parts. The first part was to interview five teachers who taught "Hotel Management Information System" through semi-structured interview before the experiment. The interviews included the difficulties encountered in laboratory teaching, classroom management objectives, and the reasons for using the teaching management system.

The second part was an interview with two IT personnel in the laboratory management center. The interviews involved the operation of the classroom management system on the school server and how the system helped them manage the laboratories of the whole school.

The top-domain electronic classroom system used in this study was the system designated by the Laboratory Management Centre. The system would be used in three of the seven experiments in the two modules of the "Hotel Management Information System". A total of 119 students studying "Hotel Management Information System" participated in this study in the spring semester of 2020. In order to ensure the research effect, this study also organized two trainings for teachers to ensure that teachers could operate the classroom management system skillfully in the process of experiment.

The third part included qualitative and quantitative research methods. Quantitative research included two questionnaires, namely, one was for students and teachers, and the other was to compare and analyze the performance of students' classroom tests. Qualitative research included

interviews and feedback from teachers, students and IT employees.

In the comparative analysis, this study adopted the "inter-group quasi-experiment" design. Students who were in the classroom that used top-domain electronics to manage order would be regarded as "experimental group", while other students who were not in the classroom that used top-domain electronics to manage order would be regarded as "control group". There were 65 students in the control group and 54 students in the experimental group. The students in the control group and the experimental group were selected randomly.

The questionnaires mainly adopted descriptive survey methods. The subjects were 54 students and 5 teachers in the experimental group. The questionnaire for students included five parts: top-domain electronic classroom management, its help for class, its role in improving classroom attention, and its role in team cooperation. The questionnaire for teachers included the help of top-domain electronics to teachers' classroom teaching, the impact on classroom attention, the impact on team cooperation in the classroom, the impact on the classroom learning environment, and the ease of

use of top-domain electronics. A five-point Likert scale was used for all questions: strongly disagree, disagree, generally, agree and strongly agree.

5. RESULT ANALYSIS

5.1 Students' Feelings

49 of the 54 students completed the questionnaire, of which 45 questionnaires were valid. According to the results, 88.89% of students believed that using top-domain electronics in class would help them better manage class time; 91.11% of students thought that they were easier to get help from teachers through top-domain electronics; 86.67% of them thought that top-domain electronics could help them improve their attention in class and focus more on the experimental projects to be completed; 82.22% of students thought that top-domain electronics made it easier to cooperate with each other in class; and 84.44% of students thought that the use of top-domain electronics would improve the learning environment of the experimental class. "Figure 1" showed the survey results of students.

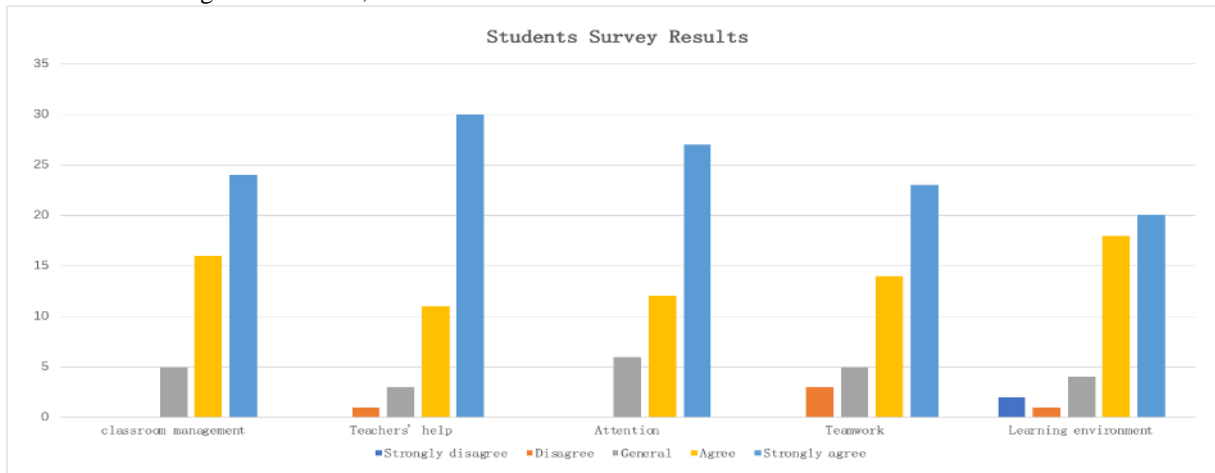


Figure 1 Survey results of students (n = 45).

5.2 Teachers' Feelings

Five teachers completed the questionnaire on the use of top-domain electronic classroom system. Through results, all teachers believed that top-domain electronics would help them better monitor students' computers and facilitate their classroom management; four teachers thought that top-domain electronics would help them understand students' master of experimental projects in time through small tests; and four teachers also fully affirmed the

two aspects of encouraging classroom cooperation and improving the learning environment. However, only three teachers gave a positive answer to the ease of use of top-domain electronics.

5.3 Student Performance Comparison

In the comparative analysis of learning effect, students' performance would be compared with the average score of the three experimental items. The three experiments were Reservation, Night Audit

and Event Management. The Reservation lab is a hands-on test, while the tests for Night Audit and Event Management consist of 50% of the practical test and 50% of the theory. In both experiments, the

comparative analysis of students' scores only took into account the scores of the practical component. "Table 1" showed the average scores of students in the three experiments.

Table 1. Comparison of average scores of control group and experimental group in the experiment

	control group		experimental group	
	Average score (total score)	standard deviation	Average score (total score)	standard deviation
Reservation	65.07 (100)	10.11	78.36 (100)	1.82
Night Audit	35.87 (50)	13.08	41.16 (50)	2.33
Event Management	36.36 (50)	12.05	40.68 (50)	2.46

As can be seen from "Table 1", the average score of three laboratory courses of the experimental group was significantly higher than that of the control group, and the dispersion degree of the average score of the experimental group was significantly lower than that of the control group.

The feedback study on the use of top-domain electronic effects was based on data collected from offline questionnaires, online questionnaires and face-to-face interviews. "Table 2" showed typical feedback.

Table 2. Feedback

Feedback from course teachers	
Teacher A	Top-domain electronic is very easy to use. It can be used to assess how well students have actually acquired knowledge in the experiment.
Teacher B	Top-domain electronic is very effective for the management and control of the laboratory classroom.
Teacher C	Top-domain electronic is classroom management software that is easy to use. Also, the software helps me to better manage my class time in lab classes.
Teacher D	Top-domain electronic helps to improve the efficiency of classroom management in laboratory classes and helps to maximize the 45 minutes of class time. But the software is not easy for older people to master.
Teacher E	Top-domain electrons can help me save class time and organize group discussions in the laboratory class. I prefer the function of remote monitoring all students' screens in top-domain electronics, because it can promote students to study the laboratory content more seriously.
IT personnel's feedback	
IT personnel	Top-domain electronics can install and resolve any software-related issues remotely, without the need for us to be on-site in the laboratory to resolve the problems that occur. There is no disruption to the normal class, ensuring consistency in the content of classroom lectures.
Students' feedback	
Student A	It is better to follow the teacher's guidance on my computer screen to learn the operation steps than to look at the project operation steps displayed on the blackboard. It can make me pay more attention and concentrate on learning the content.
Student B	I think my study efficiency has been improved, and the situations of wandering in class have been reduced a lot.
Student C	Top-domain electronics make it easier for students to help and communicate with each other, and this way of communication and consultation will make me feel more comfortable
Student D	In case of problems I don't understand, I can more ask teachers for help and get more teachers' attention with the help of top-domain electronics.
Student E	The teacher's monitoring of my computer forced me to focus more on learning from the teacher rather than browsing websites or playing games
Student F	The Top-domain electronics allow me to see the teacher's specific operation more clearly, and also makes me pay more attention.
Teaching supervisors' feedback	
teaching supervisor	The use of top-domain electronics with remote desktop control function in the laboratory class can make the classroom teaching management more effective. The communication between students and between students and teachers becomes clearer, and will not interfere with the learning of other students in essence. Top-domain electronics play an obvious role in improving students' learning enthusiasm and teachers' management and control of the classroom.

6. DISCUSSION

Overall, the evaluation of the use of classroom management system tools in multimedia teaching proves that the classroom management system is effective in improving multimedia teaching, especially the teaching and learning environment in experimental courses, and improving students'

performance. More than 93% of people believe that classroom management system can improve classroom learning environment and teaching environment. The remote desktop control function enables teachers to monitor the computer screen of the whole class from a central control computer, and communicate with the students of the whole class in various forms, such as one-to-one form,

one-to-many form and many-to-many form. Compared with traditional classrooms or multimedia classrooms without classroom management system, classroom management system greatly improves the teaching environment and teaching effect. Most respondents believe that it is necessary to install a classroom management system in the multimedia laboratory. Finally, the results of "inter-group quasi-experiment" show that compared with the control group, the scores of students in the experimental group are improved, the average score of students in the experimental group has improved significantly, and the range is about 15%.

7. CONCLUSION

This study confirms that the installation of classroom management system in multimedia classroom plays a role in the improvement of teaching methods, especially experimental teaching methods. Classroom management system not only improves the degree of students' participation in experimental teaching, but also increases the interactive communication between teachers and students, which is also very effective for flipped teaching. The classroom management system can help teachers demonstrate the specific operation steps of the experimental project closely, and can also be used to communicate with students in various forms through chat tools, and urge students to complete the experimental teaching tasks. In addition, classroom management system can help save teachers' time and reduce workload, allow group discussion and learning, and promote discussion and knowledge sharing among students.

More importantly, students can communicate with teachers without disturbing other students. Therefore, it is suggested that the classroom management system can be installed in the multimedia laboratory of other disciplines. At the same time, it is necessary to strive to realize the joint management of all multimedia laboratories and multimedia classrooms in the school through the cooperation between the IT management department and the laboratory management department, so as to stimulate students' learning interest and mobilize students' learning enthusiasm to the greatest extent.

AUTHORS' CONTRIBUTIONS

Jiefei Wang was responsible for experimental design and contributed to revising and editing,

Xiaobo Zhang analysed data, and Xuan Gao wrote the manuscript.

REFERENCES

- [1] Zai Faxun. Research and analysis of multimedia classroom management system of College of Tourism and Culture of Yunnan University [D]. Yunnan University, 2016. (in Chinese)
- [2] Gao Xiangmin. Research on the management of multimedia teaching equipment based on FMEA [D]. Nanchang University, 2016. (in Chinese)
- [3] Chen Shijian. On the change of contemporary classroom management [J]. Journal of Guangxi Normal University (Philosophy and Social Science Edition), 2002(01):83-88. (in Chinese)
- [4] Yu Yijiao, Chen Shuang. A review of classroom management research at home and abroad [J]. Literature and Education, 2020(31):167-170. (in Chinese)
- [5] Liu Hong, Li Lingbo. Design and implementation of a web-based central control and management system for multimedia teaching equipment [J]. Experimental Technology and Management, 2010, 27(11): 225-227+231. (in Chinese)
- [6] Yu Chongchong, Huang Liping. Virtual construction of machine room and multimedia classroom management system [J], Laboratory research and exploration, 2014,33 (04): 228-232 + 276. (in Chinese)
- [7] Song Shuqiang. Exploration and practice of Digital Campus — an interview with Jiang Dongxing, director of computer and information management center of Tsinghua University [J], Modern educational technology, 2007 (08): 5-8. (in Chinese)
- [8] Xue Laijun. Design and implementation of integrated management system for networked multimedia classroom [D], Huaqiao University, 2016. (in Chinese)