

Current Situation and Reflections of IT Teaching in Junior High School--Taking the learning of Excel as an example

Huansong Yang¹, Youyou Zhang²

¹(Hangzhou Normal University)

²(Hangzhou Normal University, China)

Corresponding author: Youyou Zhang

Abstract: With the rapid development of the Internet and mobile information technology, the state has made it clear that "Internet+" education has become an important development project for national education. Information technology education is also playing an increasingly important role in the development of students, and online and offline hybrid teaching is a teaching mode that is very suitable for information technology. Online and offline blended teaching is a new teaching model that has emerged in the mobile internet era, and is a combination of online learning and the advantages of traditional teaching. However, there are still problems with online and offline blended teaching such as uncertainty in the use of educational resources, so a more appropriate teaching process system needs to be tapped to achieve better teaching results.

Keywords: junior high school information technology, online and offline blended teaching, learning resources, educational resources

I. INTRODUCTION

Promoting the integration and development of information technology and education into the classroom has become the trend of education nowadays. Online and offline hybrid teaching is a new teaching mode that has emerged in the mobile Internet era, and a teaching mode that combines the advantages of online learning on the Internet with traditional teaching. In this model, online teaching entails teachers uploading course learning resources on education platforms via the internet, and students using resources in online learning platforms such as laptops and mobile phone clients to complete various tasks. This paper takes the junior high school information technology course as an example and examines a suitable process system to adapt to the diversity of educational software to achieve better teaching results, and to bring the system into the classroom to better implement online and offline blended teaching in the classroom.

II. INVESTIGATION OF THE TEACHING SITUATION OF INFORMATION TECHNOLOGY IN JUNIOR HIGH SCHOOL

The object of this research is the seventh grade students, and the content of the research is selected from the seventh grade information technology course on Excel, using "Formulas and Functions" as a reference. The course is taught in the same way before and after, and the subject is taught by the same teacher to achieve the same conditions as far as possible.

A. Student learning

Before students learn about Excel data processing, they receive teaching resources from textbooks only and are unfamiliar with this piece of data processing knowledge. Most students do not do pre-reading work before class, so in class, they will not be able to keep up with the teacher's progress. According to the survey, students' concentration is not sustained for long periods of time and can be very distracting, resulting in infrequent interaction with the teacher; completion of homework after class is determined by the severity of the teacher, and most students have little self-control. The survey was conducted to determine how well students received what they had learnt by observing how well they completed their homework and how often they interacted in class. As the survey in Figure 1 shows, students' homework is not well completed; the time and content of their studies in school are not well distributed. In addition, due to the heavy tasks assigned by teachers, students spend more energy on their studies and neglect sports, resulting in a low level of physical fitness for the majority of students; long hours of inefficient learning prevent students from developing physically and mentally.

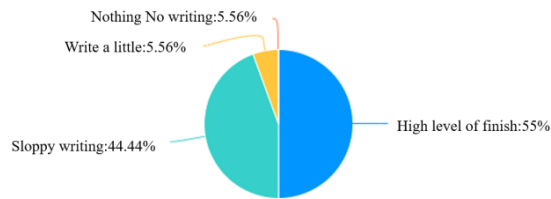


Fig.1. Assignment completion

B. Teachers' teaching

Teachers are already familiar with the courseware of "Formulas and Functions" in Excel, but the progress of the teachers' lessons has to be relatively slowed down due to the lack of pre-study of the students before the lessons. The multimedia room in the school is equipped with computer software versions for students that do not meet the requirements needed for teaching, which also creates some problems in teaching. It was found that the most commonly used version of Office related software did not match the syllabus and therefore needed to be upgraded. In addition, most of the teachers' lesson plans used old lesson plans from previous years, which lacked new ideas. Throughout the lessons, teachers mostly used the lecture method, leaving very little time for students to think and discuss and no time for students to explore on their own. Moreover, teachers rarely set stage tasks for students in the classroom, resulting in the completion of students' post-lesson assignments and the quality of their completion falling short of expectations, as shown in Figure 2.

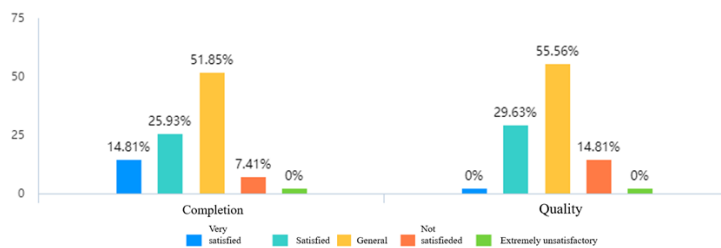


Fig.2. Assignment completion and satisfaction

III. ANALYSIS OF THE PROBLEMS OF TEACHING INFORMATION TECHNOLOGY IN JUNIOR HIGH SCHOOL

A. Teaching resources are not up to standard

The survey shows that the teaching tools provided by schools are outdated and the computer software versions are low, making it difficult for the teaching process to keep up with the ideas of teaching design and for the quality of teaching to reach the expected results. Teachers mostly use a single lecture method, and it is difficult to attract students' interest with pure text-based courseware. Slightly more advanced teaching resources cannot be presented, resulting in students not being able to get a full sense of classroom experience and participation.

B. Rigid teaching implementation process

Under the demand of examinations and the situation that IT courses are not taken seriously, teachers always passively teach students all the examination points within the time given by the Ministry of Education, and teachers' teaching tasks are heavy and teaching time is tight, which leads to the majority of teachers adopting the form of "one word", telling students the examination points directly and making them memorise them, rather than This has led to the majority of teachers adopting a 'one-liner' approach, telling students the test points and making them learn them by rote, rather than letting them explore and master them on their own. This creates a dependency mentality and is not conducive to active learning. In the classroom, teachers tend to fill up the classroom[2], leaving little time for students to communicate, discuss and think. Students are passive recipients of knowledge, and interaction with the teacher is infrequent and almost non-existent, which is not conducive to students' mastery of knowledge and the cultivation of a spirit of enquiry.

C. Inadequate feedback on teaching evaluation

The extent to which students have received knowledge cannot be judged solely on the basis of post-lesson quizzes, but also on the basis of how well they have listened to the lesson, how well they have participated in the lesson and how well they have completed the post-lesson assignments. Single post-lesson

quizzes prevent teachers from tracking student learning and there is insufficient feedback between teachers and students to develop and implement appropriate post-lesson improvement tasks for students.

IV. ANALYSIS OF THE DEVELOPMENT OF ONLINE AND OFFLINE HYBRID TEACHING MODE OF JUNIOR HIGH SCHOOL INFORMATION TECHNOLOGY

A. Feasibility analysis of the online and offline hybrid teaching mode of junior high school information technology

The junior high school IT course is a highly operational and practical course. With the continuous development of technology, the content of IT courses is constantly updated. As a new teaching mode, the online/offline hybrid teaching mode can play an effective role in the IT classroom, which also requires specific teaching design. The application of online and offline hybrid teaching mode in junior high school IT classrooms requires both theoretical support of the hybrid teaching mode and a stable teaching environment [13].

B. Overview of the online and offline hybrid teaching mode of information technology in junior secondary schools

With the rapid development of mobile Internet, the teaching mode of school curriculum has also changed. The use of big data, mobile Internet and other information technology has enabled the information transfer of course content, thus realising accurate teaching and greatly improving teaching quality. All secondary schools are actively adopting the online and offline hybrid teaching model, of which there are many teaching systems, but the most common one is Nails.

C. Construction of a hybrid online and offline teaching mode for junior secondary IT

1) Online independent pre-study before class

Before the class starts, the teacher will upload the courseware related to the course to the pinned file and upload the links to the relevant web pages, and release the pre-study tasks and task notifications. Students check the task notifications and confirm the pre-reading tasks, then do independent study online according to the needs of the task, complete the pre-reading tasks and submit them to expand their knowledge base for offline learning in class.

2) In-class offline classroom teaching

In class, students are invited to share their pre-reading, and the teacher will explain the relevant knowledge points in a targeted manner and design various consolidation questions that students will answer as they go along. At the same time, the teacher designs guided topics to address key teaching points and organises offline discussions with students, and uses pinned activities such as "voting" and "countdown" to organise online interaction with students. Through interesting interactions, students' desire to master knowledge is enhanced. In the classroom, teachers can selectively address students' questions. For problems that are common to students, the teacher can explain them systematically and slow them down to ensure that they are solved; for individual problems that exist among students, the teacher can play the role of group discussion and encourage students to discuss and communicate with each other, and then the teacher can guide them, which can largely improve students' ability to think about and solve problems.

3) After-school mixed extension training

After the lesson, teachers can assign after-school homework for students based on the lectures in the lesson. After the students have completed their homework, they can upload and submit it through their home school book. At the same time, teachers need to reflect on the implementation of the lesson and optimise the lesson plan. Teachers can also upload resources for tasks that need to be extended according to the learning needs of different students so that students can learn independently. At the end of the lesson, teachers can take simple quizzes on what students have learnt in class, count the scores and understand the common problems that students have and answer them in a group, or chat directly with students about individual problems to help them better grasp what they have learnt. Teachers can also design questionnaires to find out how satisfied students are with the blended learning model and what they think about it [14].

V. ANALYSIS OF THE PRACTICE AND EFFECTIVENESS OF THE ONLINE AND OFFLINE HYBRID TEACHING MODE OF JUNIOR HIGH SCHOOL INFORMATION TECHNOLOGY

A. Design and practice of online and offline hybrid teaching mode in junior secondary IT

Take "Formulas and Functions" as an example, and develop in detail the specific implementation process of the online and offline hybrid teaching mode in the IT curriculum.

1) Teaching analysis

a) Analysis of the learning situation

The target students of the course "Formulas and Functions" are Year 7 students, who have a strong interest in learning information technology, and each student has a different level of mastery of basic information technology knowledge and skills. After a period of study, students have already had some experience and ability in independent inquiry learning, cooperation, communication and discussion, and have a certain mastery of basic operation and basic skills. In addition, students need to be encouraged to conduct independent inquiry, online and offline discussion and exchange, hands-on practice, and teacher-student cooperation to summarise and summarise knowledge together and experience the learning process [15].

b) Teaching objectives

- Knowledge and skills

Students will be able to master the use of Excel formulas through the study of Formulas and Functions and will be able to master the application of basic functions such as SUM and AVERAGE in Excel.

- Process and Methods

Students will develop their independent learning skills and hands-on skills through teacher-led explanations and student hands-on operations.

- Emotional Attitude and Values

Students will experience the use of formulas and functions in Excel and develop the ability to think and explore on their own. At the same time, they will experience the joy of success in the process of completing tasks and be able to apply the knowledge they have learnt to solve practical problems in life.

c) Teaching focus and difficulties

- Key points: the use of Excel formulas and functions
- Difficulties: the basic format and integrated use of formulas and functions

d) Teaching Preparation

- Multimedia room
- "Formulas and Functions" PPT
- "Formulas and Functions" exercise form

2) Teaching design

a) Online independent pre-reading before the lesson

Before the lesson starts, the lesson materials and the tables used in the exercises are uploaded to the pinned file for students' reference. Students will be given a pre-reading task to complete and submit within a set time frame through independent study. The teacher uses the submitted assignments to determine what problems the students have, as shown in Figure 3.

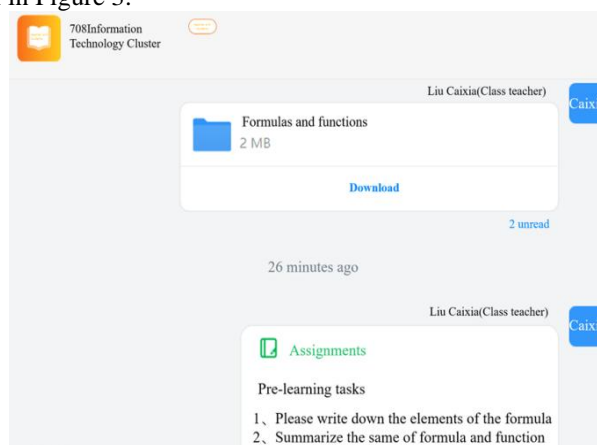


Fig.3. Pre-lesson tasks

b) In-class offline classroom teaching

- Context creation, introducing new lessons

Teacher: What do students usually do at weekends? (PPT show home page)

Students: watch TV, brush Jitterbug, read novels, play badminton

Teacher: According to the answers given by students just now, the teacher found that children nowadays are

addicted to mobile phones, tablets, etc. and have become proper internet users. This shows that the number of Internet users in our country is increasing year by year. So now we can see a table of "the scale of the number of Internet users in China", through this table, students, we want to quickly sort out these data, through the calculation of the information we want to know, which will need to use the formula we are about to learn. (Board book "formulas and functions")

- Task-driven, independent exploration

Teacher: Issue Task 1: Calculate the usage rate of instant messaging in 2011. Ask students to demonstrate. (Show the "Formulas and Functions" table)

Students: Explore independently and complete Task 1 (students actively demonstrate on stage)

Teacher: Ask a question. In the demonstration, we can see that the calculated usage rate is a decimal, but what do we generally say about usage rates in mathematics?

Students: The percentage form.

Teacher: Issue Task 2: Convert all usage rates into percentage form. Ask students to demonstrate and go around the table, giving help to students who have problems.

Students: Complete Task 2 and share and discuss in small groups, giving guidance to each other.

Teacher and students: summarise the elements of the formula and the steps for using it. (PPT shows page 2)

Teacher: Launch a polling activity on pins for a small exercise on formulas, leaving time for students to discuss and exchange ideas in small groups before starting. (Show the pinned poll topic)

Students: Students think carefully and complete their answers based on what they have learned.

Teacher: Explain the mini-exercise and post Task 3: Calculate the total number of Internet users in 2011. And ask students to demonstrate. (PPT show page 5)

Students: Work in groups to complete Task 3 and have the group leader demonstrate.

Teacher: Post Task 4: Calculate the average usage rate in 2011. Walk around the stage during this time and help students who are having difficulty.

Students: Work in small groups to complete Task 4.

- Cooperative communication and classroom summary

Teacher and students: Summarise the components of the function and how it is used, and compare it with the formula to find similarities and differences, and ask students to share their ideas. (PPT show page 6)

c) Post-lesson mixed extension training

Post-lesson assignments are posted for students in the nail group. Students need to complete and submit them within a specified time, and the teacher collects the students' assignments and checks the students' mastery of knowledge. At the same time, students can ask their teachers for answers at school if they are struggling, or stay on the pinned page to chat privately with the teacher if they are too late to ask. The teacher sees the message and solves the problem for the student. Teachers reflect on themselves based on the completion of students' homework, optimise lesson plans and highlight important and difficult points.

B. Analysis of the effectiveness of the online and offline hybrid teaching mode of information technology in junior secondary schools

1) Design of questionnaire

The experiment was carried out in a middle school, and after the practice, questionnaires were administered to classmates as well as teachers. The questionnaire mainly concerned the students' learning status, the degree of receiving knowledge and the concentration of attention under the online and offline hybrid teaching mode. The questionnaires were distributed to students in a class of Year 7 at the end of the teaching implementation, and the students were allowed to fill in and return the questionnaires centrally.

2) Survey results and analysis

a) Students' acceptance of knowledge

According to the survey, under the online and offline hybrid teaching mode, students paid more attention to the pre-study work before class, which prompted them to study purposefully in class, focus on listening to the lectures for the knowledge they did not understand, and have a general understanding of the knowledge points through the pre-study process. Secondly, as the lesson plans are updated in class, it greatly engages students' interest in learning. At the end of the lesson, the teacher will answer questions online in addition to tutoring in school, making it easier for students to receive their knowledge.

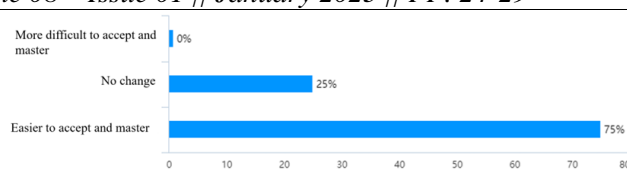


Fig.4. Level of student acceptance of knowledge

b) Students' means of problem solving

According to the survey, when students are faced with a problem, most of them choose to learn independently, explore their knowledge as well as ask their classmates and work in groups. With the online and offline hybrid teaching model, most students overcome their dependency on learning, enhance cooperation with their peers and develop their cooperation skills. It also develops students' ability to think independently to solve problems. The number of people who ignore problems and do not go to solve them is basically zero, indicating that students' motivation to learn is greatly enhanced and can effectively improve their learning efficiency.



Fig.5. Student problem solving tools

c) Completion of students' homework

After investigation, students' homework completion in the IT class using the online and offline hybrid teaching mode was much better compared to before because they had pre-reading in place before class and could keep up with the progress in class, plus the messages sent in the pinned group would be reminded when it was time, which could prevent students from forgetting to hand in their homework and served as a reminder.

VI. Conclusion

Based on relevant theoretical research and practical mapping, this project has explored and researched the integration of junior high school IT and offline hybrid teaching models, and found that the existing online and offline hybrid teaching models have substantially improved the learning outcomes for students. Novel lesson plans were researched, in-depth junior high school IT classrooms were practised, and initial evaluations were conducted through questionnaires. The online/offline blended teaching model has been a major trend and is not only limited to IT courses, but other subjects can also adopt this model and bridge the communication gap between parents, students and teachers with the help of pegging. However, this study is only an attempt on a small lesson in Excel, and due to the objective conditions, the subjects of this study are only individual classes, there are certain limitations, so we need to further expand the scope of the experimental subjects for further research.

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