Investigation and Analysis of the Current Situation of Information Technology Classroom Example Teaching in High School

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Abstract: *In the current information technology classroom teaching in high school, teachers use more traditional example teaching methods and simple example teaching resources. In order to enhancing the use of example teaching and enrich example teaching resources, questionnaires and interviews employs in this paper. This paper studies the current situation of classroom example teaching, student example learning demand analysis, teacher example teaching current situation and demand analysis, and puts forward specific optimization path on the basis of this, in order to provide reference for the improvement of example teaching.*

Keywords: *High school information technology, Example teaching, Investigation and analysis*

1. Introduction

According to the High School Information Technology Curriculum Standards (2017 Edition, Revised in 2020), senior high school information technology curriculum should cultivate students' core literacy, including information awareness, computational thinking, digital learning and innovation, and information social responsibility. It is found that case-based learning plays an important guiding role in the acquisition of students' cognitive skills and the improvement of their transfer ability, and plays an important role in the training of students' computational thinking. case-based learning is a learning method or teaching method in which students observe, read and think about examples on the basis of existing knowledge and experience, learn new knowledge and new skills such as conceptual principles or operational skills, and master their application rules. It is widely used in mathematics, physics, chemistry, computer and other subject fields[1].

In addition, the "China Education Modernization 2035" issued by the Central Committee of the Communist Party of China and The State Council in 2019 emphasized: "Make full use of modern information technology, enrich and innovate curriculum forms; Establish a mechanism for co-construction and sharing of digital educational resources [2]. In mid-July 2021, the Ministry of Education and other ten departments jointly issued the 5G Application "Set Sail" Action Plan (2021-2023), which clearly put forward the development direction of smart education. Under this situation, educators need to seize the opportunity of information technology development, effectively integrate information teaching resources with teaching, and make reasonable and efficient use of information teaching resources. So as to improve their own information-based teaching quality [3]. These guiding documents are of great significance. Therefore, as a participant in the training of talents, whether the example teaching method is effective and whether the teaching form is digital plays an important role in the training of talents. In this context, the traditional example teaching will not be able to meet the needs. In order to improve the quality of example teaching, it is necessary to understand the current situation of example teaching in high school information technology courses, the use of example teaching resources and demand analysis, so as to provide a theoretical basis for further improving example teaching.

2. Survey object and method

This survey is conducted on a high school in Yunnan Province. Considering that information

technology courses in high school are mainly offered to students in senior one, the survey objects are mainly students and teachers in senior one. Questionnaire survey and interview methods were adopted in this study. Based on literature search and under the guidance of teachers, a questionnaire on the Current Situation and Demand of example teaching of information Technology in high school was formulated for this survey. The questionnaire was distributed to students in paper form, and the survey subjects completed the questionnaire independently and submitted it on the spot. At the same time, the teachers of a high school in Yunnan Province were interviewed to have a more detailed understanding of the current situation and needs of classroom example teaching from the perspective of teachers, and to deepen the depth of research.

3. Survey results and analysis

3.1 Present situation of classroom example teaching

According to the survey (see Table 1 for details), teachers frequently use examples and digital resources in class. According to the data, 67.44% of students mentioned that teachers often explain with examples in lectures, and teachers often use digital resources to explain knowledge, but the example resources teachers explain are mostly limited to texts and pictures. Other forms of resources are rarely or never used.

Table 1: Classroom examples and use of digital resources.

Problem	Options	Frequency	Percent
Does your teacher give examples when she comes across more complex knowledge?	often	203	67.44%
	occasionally	76	25.25%
	seldom	14	4.65%
	Will not	8	2.66%
Do your teachers use digital resources in the classroom?	often	177	58.8%
	occasionally	94	31.23%
	seldom	26	8.64%
	Will not	4	1.33%
What type of example resource does your teacher use when teaching?	text	269	89.37%
	picture	277	92.03%
	Micro video	59	19.60%
	ANIMATIONS	35	11.63%

3.2 Student case-based learning needs analysis

3.2.1 Analysis of students' demand for classroom example teaching

According to the survey results (see Table 2 for details), the most popular choice among students is "more use of rich teaching resources", accounting for 63.79%, followed by "more practical content", accounting for 58.47%, and ranking third is "more time for explaining examples and practicing examples". It is worth noting that the same problem as the case-based learning style needs is that students rarely choose options involving communication with teachers and autonomous learning, indicating that students' students exhibit deficiencies in communication and self-learning abilities. Therefore, it is imperative for teachers to focus on the cultivation of students' communication ability and independent learning ability in daily teaching.

Table 2: Students' demand for classroom example teaching.

Problem	Options	Frequency	Percent
What changes would you like to see in the teaching of examples in the information technology classroom?	More time to explain examples and practice examples	136	45.18%
	Let the students speak more and communicate with each other	55	18.27%
	Use rich teaching resources to teach more	192	63.79%
	The content is more realistic for life	176	58.47%
	Let students explore for themselves and deepen their understanding	105	34.88%

3.2.2 Analysis of students' demand for learning style of example

By giving examples of common operation and algorithm courses in information technology courses, the demand of students' learning style is investigated. The results show (see Table 3) that in operation classes, about 40% of the students expressed a preference for teachers to demonstrate while students operate at the same time. About 30% of the students said that they prefer to perform the operation themselves after the teacher's demonstration. About 20% of students like to refer to example teaching videos for independent learning. In general, no matter the operation course or the algorithm course, students tend to be teacher-led learners.

Table 3: Preferred learning style.

	Options	Frequency	Percent
Operation course	Reference example teaching video Autonomous operation (Autonomous learning method)	71	23.59%
	Practice while demonstrating	123	40.86%
	Demonstrate before you practice	107	35.55%
Algorithm course	Autonomous learning method based on case-based learning resources	78	25.91%
	Teaching learning method based on case-based learning resources	158	52.49%
	Task learning method based on example learning resources	65	21.59%

3.2.3 Analysis of students' demand for example resources

According to the survey results (see Table 4 for details), micro-video is the resource type that students choose the most, accounting for 85.71%. Actionable learning resources and animation occupy the second and third places, accounting for 72.43% and 64.78% respectively. Secondly, more students choose cases in life (57.81%), classic game algorithms (47.51%) and pictures(43.52%), and fewer students choose text. In general, students prefer example learning resources with vivid images, close to life and strong operability. It can be seen that operability, interaction, imagery and life are the types of resources that students need.

Table 4: Example learning resource type propensity.

Problem	Options	Frequency	Percent
example learning resource type propensity	text	48	15.95%
	picture	131	43.52%
	Micro video	258	85.71%
	ANIMATIONS	195	64.78%
	Life case	174	57.81%
	Actionable learning resources	218	72.43%
	Classic game algorithm	143	47.51%
	Knowledge structure graph	61	20.27%

3.3 Analysis of teacher interview results

3.3.1 Teacher example teaching status and demand analysis

1) Teacher example teaching methods

According to the survey, the teaching methods of teachers are mostly lecturing and task-driven. Through interviews with teachers who use lecturing in most cases, it is found that although the class hours of information technology courses in high school are short, the teaching tasks can be completed in a limited time by using lecturing, but the overall atmosphere of the class is dull, and students do not have a deep understanding and memory. According to the interviews with teachers who use task-driven and independent inquiry methods in classroom teaching, task-driven or independent inquiry methods often require at least two class periods in the face of difficult learning content, but the school arranges one class hour per week for each class. If the whole class is compressed into one class hour, students' grasp of the material is insufficiently solid. Some students can't keep up with the pace, and eventually the task is not completed.

2) Teacher example teaching resource acquisition method

Through interviews with high school information technology teachers, it is learned that teachers usually acquire resources through online downloads. As there are few resources on the Internet for teaching content and students' characteristics, teachers need to carry out simple secondary processing. When asked whether they would take the initiative to learn the software related to development resources and self-production resources, most teachers said that they would less.

3) Problems existing in the use of teachers' example teaching resources

According to the interview, teachers will also use more examples to explain knowledge in class, and teachers also recognize that rich example teaching resources are conducive to improving students' learning interest and are enlightening to students. However, the example resources used in class are still mostly text and pictures. The specific reason is that due to the limited ability of teachers and the difficulty in obtaining teaching resources, they seldom use rich resources. In addition, I learned that most teachers do not regularly update their teaching resources.

4. High school information technology curriculum example teaching optimization path

4.1 Enrich example teaching resources based on students' needs

The results of the questionnaire survey show that teachers often use examples to explain knowledge in class, but the example teaching resources are mainly text and pictures. With the advent of the information age and the implementation of the new curriculum reform, the application of digital teaching resources in senior middle school information technology teaching has become the only way of modern education development, which has injected new vitality into the educational information reform [4]. Therefore, example learning resources should not be limited to text and pictures, but should use the power of modern science and technology to improve the quality of the classroom with the advantage of digitalization. According to the survey, the resource types of micro video and animation are the most popular among students. Example resources should primarily consist of these two types, with others serving as supplementary material. Given the high production costs associated with micro-videos and animations, many teachers may not have enough professional skills to make rich resources, and the classroom utilization rate is low. Therefore, it is urgent to make micro-video and animation example resources that meet the teaching objectives, teaching content and students' characteristics in the current information technology classroom. In addition, for specific example learning resources, students tend to prefer operable learning resources. Since the characteristics of information technology courses emphasize practical operation, students' demands are also very reasonable. Therefore, in the production of example teaching resources, relevant example resource products can be developed, such as web pages and small game examples. Students can learn how to design web pages and how to develop games in the products, and can change the programs in them to have a deeper understanding of how these web pages and games operate.

From the analysis of students' demand for classroom example teaching, it is found that students hope that example teaching can increase the time of explanation and practice of example problems, use rich teaching resources and make the content more practical. In view of the above problems, first of all, when designing example teaching resources, we should pay attention to students' understanding and conform to students' cognitive level. To help students learn knowledge from simple to deep, teachers should also pay attention to students' understanding of the examples in teaching, so as to reduce students' learning burden. Secondly, we should strengthen the construction of teaching resources, and pay attention to stimulating students' learning interest when designing example learning resources. The interest comes from the fact that the human brain effectively organizes the existing old knowledge and successfully organizes the corresponding old knowledge through external environmental factors, so that the old knowledge can successfully connect with the new knowledge and explain the new knowledge within the scope of the existing thinking ability, and then complete the learning and absorption of the new knowledge. Since information technology comes from the development of social life, therefore, Example teaching resources should be designed from the standpoint of students' real-life experiences, so that students can easily establish the connection between new and old knowledge and thus generate learning interest [4].

4.2 To improve the class quality for the purpose of improving the example teaching

In example teaching, teachers usually use the teaching method to show complete examples or incomplete examples for teaching. Incomplete examples can be designed and presented to learners in the form of sentences missing certain keywords and calculation formulas missing certain operational symbols, so that students can make up the missing content in the learning process, which can improve the learning effect [5]. But there are other ways teachers can teach. According to the principle of example presentation, first of all, teachers can present correct and incorrect examples for teaching comparison. Zhang Qingxiang et al pointed out that in the teaching process, presenting certain true and false examples for learners can help learners better understand mistakes. By explaining the causes of mistakes, it is helpful for learners to understand and master correct knowledge [6]. Secondly, teachers can adopt the decreasing presentation method to gradually reduce the problem-solving steps in the example teaching. Shi Yuejie emphasizes that the gradual presentation of constructivism can stimulate learners' self-learning and knowledge construction in the learning process, and can provide learners with an external cognitive construction framework [7].

Through the survey, it is found that in the preferences for example-based teaching methods, fewer students choose learning methods related to independent learning, which can be seen that students lack the awareness of independent learning. As example learning, like autonomous learning, emphasizes the principal position of students in learning activities, teachers, as assistants and promoters of learning activities, provide personalized help and guidance to students. The most important purpose of this method is to cultivate students' learning autonomy, initiative and innovation, so that they can develop the learning habit of independent thinking and independent inquiry [8]. Therefore, teachers can not focus on explanation in example teaching, but can provide examples to students and give relevant guidance. According to the self-explanation effect, Dong Chengwen et al. pointed out that the guidance to promote self-explanation can be provided in the example instructional design. The guidance provided falls into two categories: one is to explain examples to promote learners' understanding of steps and principles; the other is to provide learners with comparative examples to help learners distinguish problem categories. The main guidance methods are "training" and "prompt". The first way is training. To inform learners of the importance of self-explanation, and ask learners to construct a self-solving model through examples and compare it with other examples. The second method is prompt, which prompts learners to make example comparison and emphasizes the possibility of example comparison in the problem solving of analogical reasoning. Through mutual comparison, learners can generate the solution schema of abstract problems including general problem solving principles [6]. By providing self-explanatory guidance, students can stimulate their subjective initiative and improve their independent learning ability.

4.3 The example teaching resource platform is developed based on teachers' needs

According to the interviews with teachers, teachers often use example teaching in class, and the problems they encounter when using example teaching resources are as follows: the quality of the resources varies greatly, and the target is not strong. Due to the limitations of some teachers' professional ability, they are unable to make teaching resources suitable for students, resulting in poor classroom results. Therefore, first of all, the design of example teaching resources should be tailored to fit the teaching content and student characteristics and in line with the teaching content and characteristics of students; second, example teaching resources should be easy for teachers to obtain and promote their professional development. We can use the power of modern science and technology to establish a corresponding example teaching resource platform combined with the example teaching needs, and the platform can offer tutorials on creating example resources. Teachers can make targeted high-quality example resources according to the teaching on the platform, and upload and share the resources made by themselves, so that teachers can learn from each other and communicate with each other. Through the platform, teachers can quickly make and obtain relevant resources, and their professional ability will be improved, thus reducing the teaching pressure of teachers and shifting their energy to teaching design and students' needs.

5. Conclusion

Through investigation, this study found that there were some problems in the example teaching method and the use of example teaching resources in the information technology classroom of a high school in Yunnan Province, which limited the development of students' ability to a great extent. In this

regard, this paper puts forward the optimization path of enriching example teaching resources based on students' needs, improving example teaching for the purpose of improving class quality, and developing example teaching resource platform based on teachers' needs, offering insights to enhance the quality of example-based teaching in high school IT classrooms.

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