

The Application of Micro-Course in Middle School Information Technology Curriculum

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Abstract: With the rapid development of a highly information-based society, "micro-course", a new form of teaching resources, has come into being in the context of the development of the digital age due to its strong ability to express complex knowledge, flexibility, and shortness. Therefore, ^[1] there is a certain positive research significance to study the application of "micro-course" in the subject of information technology in order to optimize the teaching effect of information technology courses. The article first expounds the basic theoretical knowledge such as the concept, characteristics and application principles of micro-course, and then starts with the investigation background, through the preliminary analysis of the design of the information technology micro-course in middle schools, and proposes two aspects of the overall frame structure diagram and the partial frame structure diagram. Micro-course design and construction of application mode.

Keywords: Micro-Course; Information Technology Course; Application

1. An overview of micro-courses

1.1 The concept and characteristics of micro-course

Micro-courses refer to the tiny courses developed by front-line teachers with a duration of about five minutes. They originate from teachers' educational and teaching practice, are needed and used by teachers, and solve thorny problems in their work. Micro-courses are not only a tool, but also a new paradigm for teacher growth. Based on the definition of micro-courses, the author found that micro-courses mainly have the following basic characteristics: 1. Micro-courses are micro-learning topics for teaching purposes based on new curriculum standards and teaching practice requirements; 2. Micro-courses are online or mobile in the micro era. Relatively semi-independent teaching content for the purpose of learning; 3. The micro-course is mainly short and concise actual teaching content with teaching videos as the carrier; 4. The content of the micro-course is relatively simple, and each micro-course only describes one knowledge point or teaching Content; 5. The micro-course has a time limit, the general duration is 3 to 5 minutes, and it should not exceed 10 minutes.

1.2 Application principles of micro-courses

1.2.1 Combining with practical teaching activities

The determination of the core content of the micro-course is based on specific subject requirements. If it is ultimately divorced from actual teaching and cannot be applied to actual teaching activities, the micro-course will lose its core value and development significance.^[1]

1.2.2 Effective integration and connection with other teaching resources

The final result of the micro-course is still a kind of teaching and learning resource. Its application must fully consider the integration of other teaching resources, so as to avoid the repetition of knowledge and the overlapping application of

resources, resulting in unnecessary resource redundancy. The application of teaching resources must have its own characteristics, so as to be related and different from other teaching resources.

1.2.3 Timely adjust the application method of micro-course

The application method of micro-course has its own direction. In the early stage of its design, the application method should be considered. However, according to the unexpected situation in teaching and the influence of other environmental factors, its application should also be adjusted and changed in time. method, with the maximum teaching effect as the starting point.

2. Preliminary analysis of information technology micro-course design in middle schools

2.1 Investigation background

The promotion and application of any research results must be based on corresponding investigations to understand the existing problems, so as to effectively solve the problems according to the problems, so that the development and research can be based on the practicality, necessity, credibility and reliability. Feasibility to provide data support. Therefore, based on this foundation, during March 2014, the author conducted a preliminary questionnaire survey and interview on the current situation of middle school information technology courses and the corresponding needs for micro-courses. The subjects of this investigation and experiment are all the second-grade students of a middle school in Nanjing, Jiangsu, as well as some corresponding teachers of information technology courses and teachers of other subjects.^[3]

2.2 Demonstration of preliminary requirements for micro-course development and design

Through the investigation, the author made the following summary for the main problems existing in the current curriculum of information technology courses in middle schools and corresponding solutions, as shown in Table 1:

Table 1 Summary analysis of the current status of information technology courses and corresponding measures

main problem	Description of related issues	solution
The content of teaching materials is lagging behind	Information technology knowledge is updated quickly, the teaching content of textbooks cannot meet its rapid changes, and the students' knowledge system cannot be supplemented and improved in time.	Develop timely and flexible teaching resources in line with the development trend of information technology
Insufficient teaching time	Information technology is a subject that integrates theoretical knowledge and operational skills, and because it is not the main subject, there is a clear contrast between the achievement of teaching goals and the teaching time, which leads to teachers expanding the teaching of knowledge within a limited time, and it is difficult for students to digest it.	Develop teaching resources that are less time-consuming and meet teaching goals
A single form of teaching resources	The teaching resources are mainly pictures and the content of the corresponding teaching materials. There are few high-quality teaching resources, which cannot meet the cognitive characteristics of junior high school students, resulting in a relatively rigid teaching model.	Develop teaching resources such as animation and video that meet students' cognitive characteristics and meet actual teaching needs

The individual differences of students are obvious	Students have different starting points. Teachers have to consider the individual differences of students and achieve the development of students as a whole. The teaching task is relatively arduous.	Develop targeted and concise teaching resources, and choose teaching resources without causing students' learning burden
Weak teachers	The mobility of information technology teachers is weak, resulting in less "fresh blood" for teachers, and relatively weak new teaching concepts and ideological levels	Provide a simple and practical resource development model for front-line teachers under the condition of continuously enriching the teaching staff

From the analysis of the current state of information technology courses in middle schools and the solutions, we can see that the author believes that "micro-course", a new form of teaching resources, has certain necessity and practicability in the development and application of subject education, because The characteristics of micro-courses satisfy these solutions, but in order to make the demand analysis of micro-courses more convincing, the author further conducts a preliminary demand analysis and investigation on the needs of micro-courses.^[2] (Note: Considering the cognitive situation of students, the professional term "micro-course" does not appear in the questionnaire of "students' learning status and needs analysis of information technology class learners in secondary schools", with "3-5 minutes video or The description of "Animation Teaching Resources" is replaced, and in the teacher's questionnaire, the survey is directly carried out with "micro-course")
Examples:

Student Questionnaire 1 Are you interested in playing a 3-5 minute video or animation short film related to the teaching content in class?

(A) Very interested (B) Relatively interested (C) Fair (D) I don't care

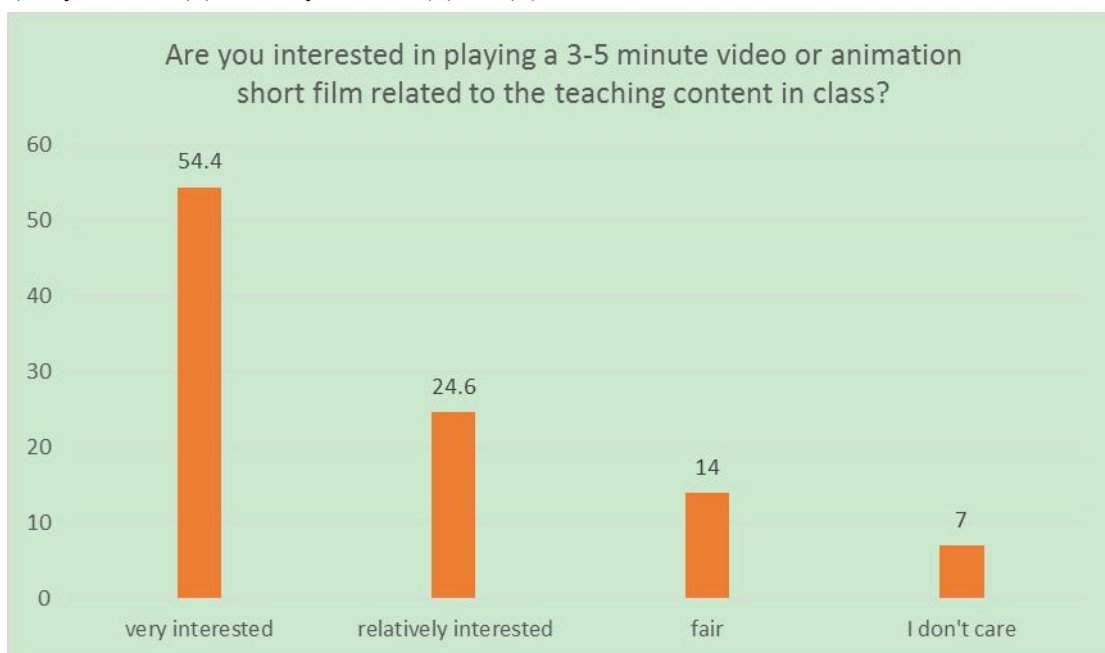


Figure 1 The relationship between micro-course demand and student interest

Student Questionnaire 2 (multiple choices) What do you think is the reason for the 3-5 minute video or animation related to the teaching content that attracts you?

- (A) General teaching resources are too boring, such teaching resources are lively and interesting, and more attractive
- (B) The content of this type of teaching resources involves teaching content and can refine the main knowledge points
- (C) This kind of teaching resources has a short time, and can have more time to learn other knowledge
- (D) Other

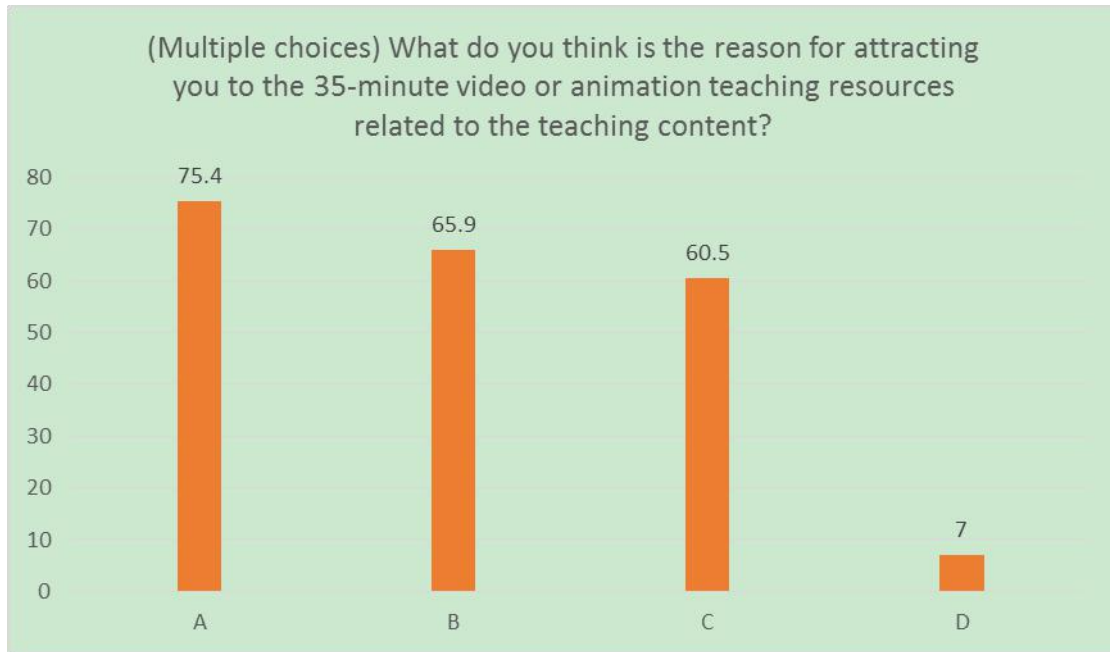


Figure 2 Students' attitudes towards micro-courses

After preliminary investigation and analysis, we can optimistically see that the development and research of micro-course, a new type of teaching resource, has been fully recognized and positively affirmed by teachers and students, thus fully demonstrating that micro-course has certain needs and can achieve a certain degree of achievement. It is necessary and feasible to design and develop micro-courses in subject areas to optimize the teaching effect of information technology courses.

3. Design of micro-course and construction of application model

At present, the research on micro-course is in its infancy, and there is no clear definition in theory, and there is little research on the design model of micro-course. Therefore, after conducting theoretical research, the author believes that the design and application model of micro-course should be studied and constructed. It is necessary to provide some reference for researchers and designers of micro-courses. The design and application mode construction of this micro-course is mainly divided into two basic modules:

3.1 Analysis of the overall frame structure of the design and application mode of micro-courses

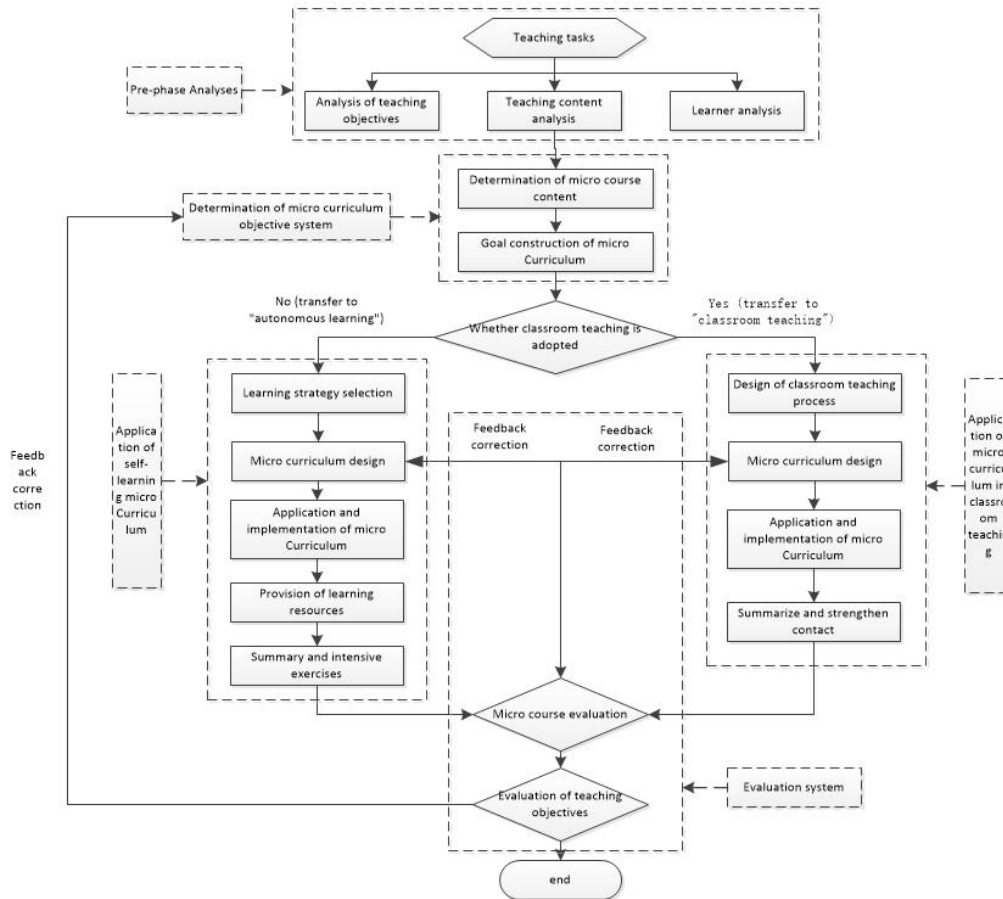


Figure 3 Design and application mode combination framework of micro-course (overall frame structure diagram)

3.1.1 The determination of the micro-course target system is based on the previous analysis

As a new form of teaching resources, micro-courses are analyzed according to their characteristics, and it is clarified that the development process should also follow the relevant characteristics and procedures of teaching resource development. Therefore, before determining the target system of micro-courses, it is necessary to fully combine the teaching objectives of subject teaching, teaching content and the relevant needs and characteristics of learners, based on this, so as to set the teaching objectives of the micro-course and select the teaching content of the micro-course.

(1) Analysis of teaching objectives. According to Bloom's classification theory of educational goals, it is clear what three-dimensional goals students need to achieve for the corresponding teaching content, and whether a knowledge point needs to be known or should be learned to understand or use, etc. Learning outcomes and standards, which provide the basis for the goal-setting of micro-courses, as teaching objectives should always run through the design of micro-courses.

(2) Analysis of teaching content. Clarify what students need to learn, the learning results to be obtained, the problems that need to be solved in teaching, as well as the key points and difficulties of the corresponding teaching content, so as to provide a basis for the content selection of micro-courses.

(3) Learner analysis. Determine the learner's basic knowledge, cognitive ability and learning needs, fully take the student's point of view as the starting point and end point, provide a basis for the scope and depth of the content of the micro-course, and avoid the use of the micro-course resources after the design is useless. Value and teaching significance.

Through the preliminary analysis of the three, it is possible to extract and analyze the corresponding depth and scope of the content of the micro-course and the teaching objectives of the micro-course, so that the target system of the micro-course obtained from the analysis is evidence-based, and thus the design Only micro-courses can truly achieve learning goals and truly give full play to their practical value.

3.1.2 Determine its teaching form and design and implement it according to the micro-course target system

The content of the micro-course is semi-independent, so teachers can choose whether to use it for classroom teaching or students' autonomous learning according to the actual teaching situation, but the starting point of the selection should fully consider how to make the micro-course play its maximum effect.

(1) It is precisely because the application of micro-course has its certain flexibility. When micro-course is used in classroom teaching, it can be fully applied in combination with the actual situation of classroom teaching. It can be used as an introduction part of teaching to stimulate students' interest in learning through the creation of micro-courses, and it can also be used as a teaching part of expansion and improvement to promote students' high development. When used in classroom teaching, the content of general micro-course is conceptual and abstract knowledge content, because this kind of knowledge is easy to make students feel boring, micro-course can well stimulate students' enthusiasm for learning, and Effectively improve the teaching effect.

(2) When the micro-course is used for students' autonomous learning, it can be used as a "mistake" to create an environment for students' independent exploration or collaborative learning, build a conceptual framework for it, and allow students to gradually climb until the learner completes it by himself. For the construction of the meaning of the knowledge learned, the micro-course teaching content used for students' autonomous learning is mostly open-type and has a certain level of thinking, which fully develops the students' brain thinking. However, it is worth noting that when micro-courses are used for students' autonomous learning, teachers must provide students with sufficient learning scaffolds, and the learning scaffolds provided by teachers must be targeted, innovative, appropriate and diverse to ensure that micro-courses are used in The effectiveness of students' autonomous learning and the role of providing learning support are mainly as follows: learning support materials ensure the fluency and effectiveness of students' autonomous learning process, and ensure students' success in completing tasks; learning support materials can effectively develop students It allows students to explore different depths of the same knowledge point from different angles, and provides clues for the development of students' thinking ability.

In order to better optimize the effect of the teaching scaffold, the author believes that the provision of learning resources should be placed after the implementation of micro-courses, so that students can further study and think according to their own perceptions and cognitive levels after learning. Before the implementation of the course, it cannot effectively promote students' innovative and in-depth thinking, and it is easy to carry out directional and inertial thinking in the subconscious according to the learning content given by the teaching. After the application and implementation of the micro-course, whether the micro-course is used for classroom teaching or students' self-learning, the final corresponding summary and reinforcement should be carried out so as to allow students to consolidate their new knowledge and firmly establish a knowledge system.

3.1.3 A complete evaluation system guarantees the practical value of micro-courses

After the end of the micro-course design and application, it does not mean the end. It is necessary to conduct a systematic evaluation of the micro-course. Through a perfect evaluation system, the application effect of the micro-course can be tested, so as to promote the continuous improvement of the micro-course and ensure the micro-course. objectivity, comprehensiveness, should Usability and science. [10]The evaluation indicators of the micro-course in this paper are

comprehensively considered from two aspects, namely the evaluation of the teaching objectives of the micro-course and the design evaluation of the micro-course. The deficiencies of micro-courses, etc., in order to make timely corresponding adjustments.[8]

(1) Evaluation of teaching objectives: Students are tested and evaluated through the post-test of their knowledge level. Teachers conduct a comprehensive analysis and evaluation of students' tests and the wrong places in the micro-course combined with the knowledge point layout of the micro-course. Designers can timely and intuitively understand the mastery of students, and through the feedback information obtained, modify the teaching objectives of the micro-course to achieve the teaching effect.

(2) Design evaluation of the micro-course: Through the evaluation rubric, understand the relevant evaluations such as the artistic effect of the micro-course screen and the display effect of the knowledge point layout, so as to modify the layout of the micro-course to achieve the desired effect.

3.2 Analysis of the local frame structure diagram of the design of the micro-course

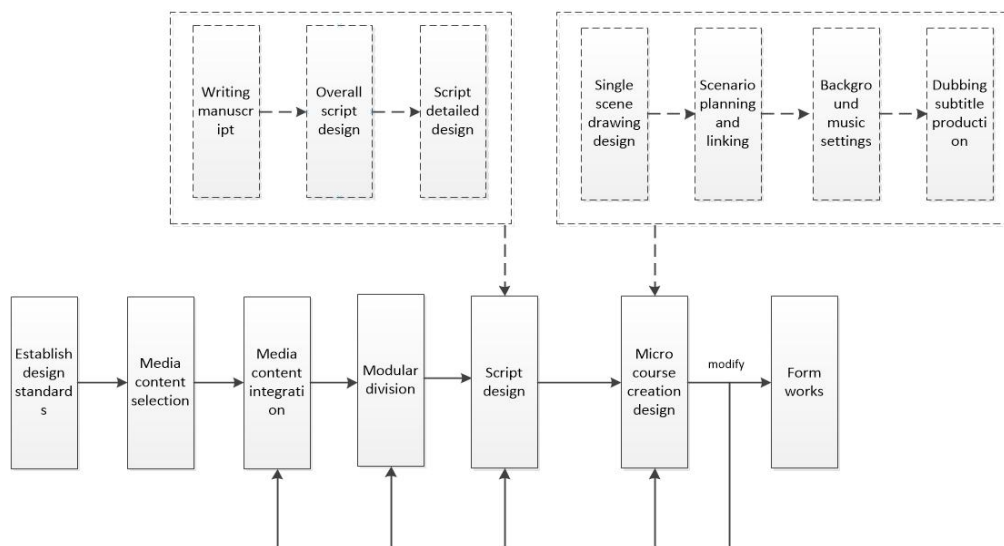


Figure 4 Design and application mode combination framework of micro-course (partial frame structure diagram)^[5]

Figure 4 shows the partial frame structure diagram of the design and application mode of the micro-course - the partial framework of the design of the micro-course. Analysis, establishment of the micro-course target system, etc., will not be repeated here, and only the design framework of the micro-course will be analyzed here.

3.2.1 Establish design standards

Establishing design standards is like creating a beautiful painting. First, you must determine the style of the painting, such as ink painting or abstract painting. Only by establishing the overall design tone can it be easy to create. The same is true for micro-course design. To design a micro-course, we must first ensure that the micro-course has a consistent internal design, and select the appropriate design tone according to the type of micro-course content. If the overall design style of the micro-course is too messy, it will cause students Necessary learning difficulties.^[9]

3.2.2 Selection of media content

The selection of media content refers to the materials needed to design the content of the micro-course. Abundant materials are the first step to the success of micro-course design. With enough resources, the design of micro-courses is easy to come by. However, the capacity of materials today is very large, the types are very complex, and the advantages and

disadvantages of materials are It is directly related to the learning efficiency of the micro-course. It does not mean that the more materials are used, the better the teaching effect will be. The fundamental principle is to strive to "select media content for the time of the educational goal". Therefore, how to filter out the topics related to the content of the micro-course? Appropriate materials are the embodiment of the systematization and organization of the micro-course design process.^[6]

Based on the following basic requirements, the author has designed a brief flow chart for the selection of micro-course media content for the reference of micro-course designers and teachers, as shown in Figure 5: (1) Taking the course content as the criterion, screening and teaching content (2) Take the learner as the center, select the materials that meet the needs of students and the cognitive characteristics of students; (3) Take the teaching objectives as the purpose, select the relevant materials that are scientific, practical and valuable.^[7]

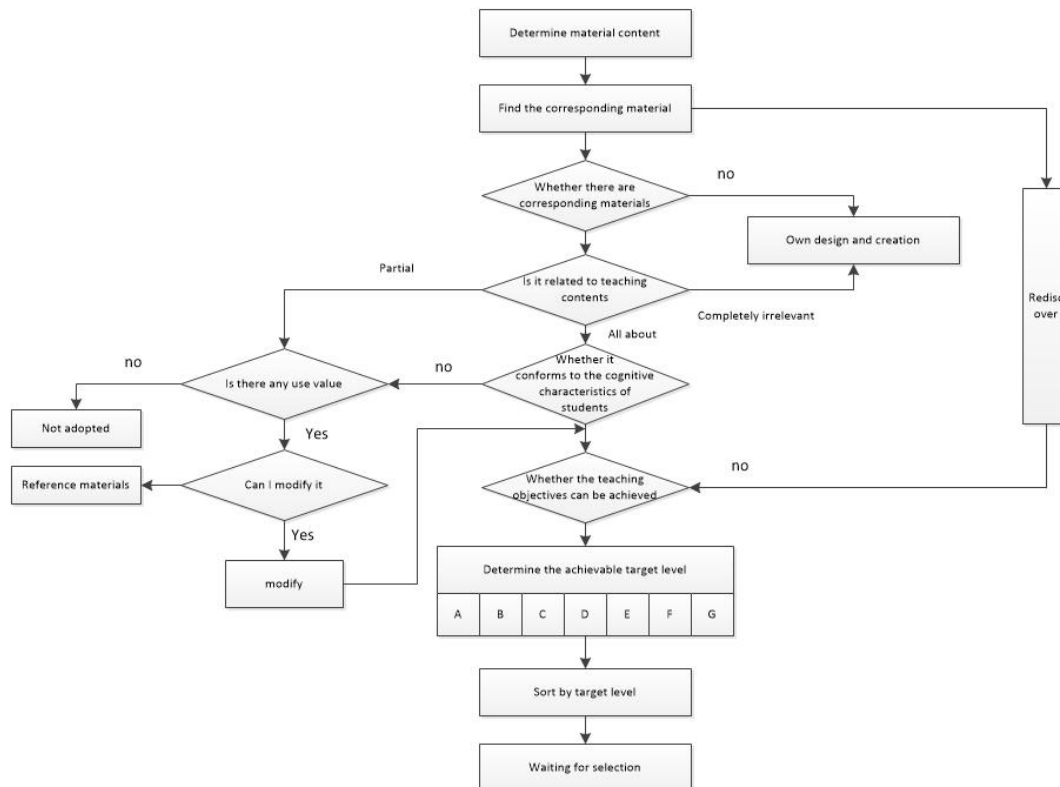


Figure 5 The basic process of media content selection in micro-courses

3.2.3 Media Content Integration

The integration of media content refers to mining and refining the materials that meet the requirements. As shown in Figure 5, from material search, hoof selection to final material sorting according to the corresponding target level, this process can well sort out the importance and practicability of the material. Micro-course designers can classify the teaching resources that meet the teaching objectives of the micro-course according to the grades that meet the teaching objectives. Grade A is the best choice, which basically meets the overall design requirements and teaching objectives of the micro-course, and is divided into B in turn. , C, D, E, F, in the case of rich media materials, try not to choose materials below D level. According to the final classification of resource levels, it can provide a solid basis for the micro-course design to fully achieve the teaching objectives. Such a process also facilitates the integration of media content. Designers can select according to the functions of different materials, and make corresponding modifications to suitable materials, such as deleting some outdated ones that have been widely used. It is worth noting that after the integration of media materials, the corresponding materials are numbered, which can facilitate the design of micro-courses.

3.2.4 Modular division

The modularization of the content of the micro-course is the basis of script creation. Although the micro-course is only a few minutes, it can be said that "the sparrow is small and complete with all the internal organs". Even if the micro-course in a few minutes only reflects one teaching knowledge point and teaching content, the introduction, deepening and sublimation of the knowledge point are not enough. The design still needs to be carefully considered. Therefore, according to the content of the micro-course, it can be divided into several modules to ensure the cohesion and systematization of the content of the micro-course. In this link, the knowledge points to be presented in the content of the micro-course should be subdivided, and the corresponding knowledge points should be numbered to facilitate the design of the micro-course.

3.2.5 Script design

Script is a presentation method that shows the sequence of each knowledge point according to the specific teaching process and the sequence of teaching content. It is the direct basis for the production of micro-course works. The script design process in this paper consists of three steps, which are the writing of the text manuscript, the overall design of the script and the design of the detailed script. Through these links, it provides a basis for the systematization of the content of the micro-course. The micro-courses in this article are based on specific disciplines, so script design must follow certain principles, adhere to the concept of new curriculum standards and specific discipline requirements, and create in line with students' cognitive laws, that is, script text and pictures should be in line with students' learning interests, it can stimulate their enthusiasm for learning. The overall layout of each page or animation of the micro-course should be easy for students to grasp the key points, so as to facilitate students' understanding and experience of practical micro-courses.

(1) Writing the text manuscript: analyze the expression, language and other keynotes of the content of the micro-course, record it in writing, and attach corresponding annotations, that is, explain the design intention of this paragraph of text, and fully understand the text by writing the text manuscript. The content and teaching objectives of the micro-course. (2) Overall script design: carry out an overall planning and design for the layout, graphics, text or presentation methods of the entire micro-course. (3) Detailed script design: According to the principles and directions of the overall script design, the application integration of each part of the micro-course design will be described in more detail.

3.2.6 Micro-course creation and design

After the basic framework process of micro-course design is carried out step by step, the final design of micro-course is mainly for the selection of music and other auxiliary aspects. Since some micro-courses are mainly explained through text, they do not need to be equipped with background music. Therefore, teachers and micro-course design Designers need to be selected according to the actual situation. The framework diagram in this paper only provides some methods and tools for designers and researchers to learn from.^[4]

In short, the design of the micro-course mainly considers the following basic principles: (1) Scientific: the content of knowledge points is accurate, the screen layout is logical, and conforms to cognitive laws. The selection of materials will help students break through learning difficulties. (2) Practicality: Micro-courses are easy for students to review and master, and build their own knowledge system. (3) Intuitiveness: both pictures and texts, the lines and words are concise and clear, the organization is clear, easy for students to recall, and the key words are eye-catching and easy to remember. (4) Innovation: The new and old knowledge points are handled properly, not simply the superposition of old knowledge. (5) Artistic: The overall beauty of micro-courses stimulates students' interest in learning

4. Development or application of information technology micro-courses in middle schools

The popularization of electronic products provides a foundation for the application of micro-courses; with the popularization of electronic products such as smart phones, tablet computers, computers, etc., the traditional reading and learning mode of students has changed. If students use electronic products before and after class Learning the content of

classroom teaching and achieving the purpose of previewing or consolidating knowledge must be a deep extension of classroom teaching and an innovative teaching mode^[4].

There are many excellent softwares for making micro-lectures, there are abundant micro-lecture resources on the Internet, and the wide application of micro-lectures. Screen recording software for micro-lectures includes Camtasia Studio, Screen2swf, Screen Recording Expert, etc. You can also use mobile phones, digital cameras, DV and other camera equipment to shoot and record, you can also use screen recording software to record 3-5 minutes of audio or video micro-lectures, and store them on electronic products or cloud teaching platforms, so that students can , in class and after class to get effective learning, so that classroom teaching (or learning) is not limited by time and region. It is also suitable for students' personalized and in-depth learning needs.

Information technology course is a course with strong practical operation. The information technology class is mainly to master knowledge and skills through practical operation, which is basically explained while operating. Some operations are difficult for students to master in a short period of time because of the many details. At this stage, the number of information technology classes in junior high schools is relatively small, the number of classes led by teachers is large, and the school has more chores about information technology. In order to solve the contradiction of less time and heavy tasks and improve the teaching efficiency of information technology in junior high schools, it is a good method to introduce online micro-lectures into information technology teaching. The mode of passive class attendance by students is more conducive to students' learning of information technology knowledge and skills.^[8]

Micro-lectures are more prominent in the teaching of audio and video software and image processing software.^[6] For example, when learning audio processing software (Adobe Audition) and image processing software (Photoshop, Fireworks), according to the characteristics of these software: strong operability, many knowledge points, and many operation steps. Our teachers can use the screen recording software Camtasia Studio to create micro-lectures about Photoshop image processing and store them on the computer or cloud teaching platform for students to learn at any time. Improve students' effective learning while increasing the effective use of information technology products.

Information technology service is a bridge between students and teachers in classroom teaching, and teachers can use information technology to assist teaching. Since micro-lectures are stored on the cloud teaching platform, when students study online, they can discuss knowledge points on the cloud teaching platform, interact with classmates and teachers, and teachers can also answer questions or guide online.

The application of micro-lectures in the flipped classroom teaching mode has improved the teaching effectiveness of information technology in junior high schools. In order to improve teaching efficiency, our teachers need to do streamlined micro-lectures. First of all, prepare lessons carefully, do a good job of analyzing the learning situation, and show the core of the course and the most difficult operations for students with concise videos, so that students can avoid detours and master information technology knowledge and skills in pleasure. In a word, in the modern information technology environment, the popular application of smart phones, tablet computers, and computers has promoted the repeated viewing and utilization of micro-lecture teaching videos.^[10] Micro-lecture application teaching can effectively save teacher resources and improve the utilization rate of teaching resources. At the same time, it helps students to consolidate and master key and difficult knowledge. With the increasing importance of information technology courses, information technology educators should actively promote the reform of information technology education, and apply micro-lectures to the learning activities of information technology courses, so that students can fully acquire the autonomy of learning. At present, there are still many issues worthy of research and discussion in the application teaching of micro-lectures. As an information technology teacher, I will continue to explore in the practical teaching of micro-lectures.

Conclusion

Micro-course is a revolution in teaching mode, learning method and teaching resource expression in the rapidly developing information age environment. By analyzing and defining the relevant concepts of today's micro-course, this paper summarizes the corresponding micro-courses suitable for the field of subject education. Through the investigation and analysis, it pointed out the problems existing in the middle school information technology curriculum, and demonstrated the

early requirements of micro-course development and design; finally, based on the above analysis, a micro-course design and application model combination strategy framework for middle school information technology curriculum was constructed. It provides relevant reference for other micro-course researchers and designers, and also provides a new perspective for the design and application of micro-course in the field of subject education, confirming that micro-course has a broad application in the field of education. prospect.

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