Application Research of "Micro Lecture" Based on "Shadow Teaching"

Minjun Cai, Doudou Li, and Xiaotao Li

Abstract—**Based on the design concept of "shadow teaching", the teacher can on the one hand apply "micro lecture" into the classroom teaching, and on the other hand substitute or supply teachers' concentrated teaching method with micro-video resources. In this way, teachers become students' learning guiders and collaborators. The paper adopts the development ideas of turning a big class to "micro lecture" based on the application of the junior middle school physics to make the "shadow teaching " be well implemented in classroom.**

Index Terms—**The junior middle school physics, development, design.**

I. INTRODUCTION

The "micro lecture" as one kind of fragment study resources gives rise to a question, that is, how do carry on optimizational construction and the reasonable application to meet learners' personalized needs. This question thus has become the current important research topics. The main purpose of "shade teaching" is to liberate the teacher from the traditional classroom instruction, and turn them to the guider and partner of students in classroom study so as to inject new vitality to the application of "micro lecture".

II. MEANING OF "SHADOW TEACHING" AND "MICRO LECTURE"

A. Understanding of "Micro Lecture"

As a new form of education, "Micro Lecture" has caught wide attention by scholars both at home and abroad and brought various understandings of it among education researchers.Hu Tiesheng from Foshan Education Bureau in Guangdong came up with its construction concept [1] and defined "micro lecture" as follows: an organic combination of various teaching resources which, in accordance with new curriculum standards and the requirements of teaching practices, takes teaching video as a main carrier and reflects that teachers in classroom teaching conduct activities of teaching and learning, aiming at some knowledge point or teaching process [2] In terms of its practical application,

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"micro lecture" always takes some knowledge point, key and difficult point, doubtful point or question in textbooks as the teaching core and teaching design is carried out around this core. Although different from traditional classes characterized by lengthiness and extensive knowledge, "micro lecture" is a complete and independent modular structure. Nowadays "micro lecture" has become the teaching methods recognized by teachers in both primary and secondary schools. "Micro lecture" is necessary for both times development and educational reforms [3].

B. What Is "Shadow Teaching"?

"Shadow teaching" has some inherent links to such concepts as "shadow education", "shadow teacher" and "shadow learning". They all represent a kind of affirmation and application of potential educational resources, and are a kind of education form different from formal lectures.

"Shadow Education" refers to the "shadow" of education inside school. Coaching, training and tutoring outside school are set up to make up for the shortages of education inside school, so "shadow teacher" refers to teachers from different cramming schools.

And other understandings of shadow "teacher" are as following. On the one hand they regard it as an activity in which the training teachers follow "guru" teachers at the scene of the real environment, observing "guru" daily teaching behavior and teaching scientific research behavior meticulously, and then give full play to their initiative according to the training work plan in "national training plan". At the same time, these training teachers integrated autonomous learning behavior such as "listening, looking, asking, discussing, thinking, and writing" as a whole with deep feeling and understanding "guru's" discipline and teaching scientific research ideas, strategies and behavior ways of training; On the other hand it refers to the training teachers themselves.

In English teaching, "shadow teaching" can also be called a method to train students' ability of listening and speaking through audio and video. This paper puts forward "shadow teaching" mainly from the perspective of relations between "micro lecture" and teachers as well as students. "Shadow" in this paper refers mainly to teachers' teaching video. In classes, teachers will no longer take a sole reliance on such tools as blackboards, chalks, textbooks or PPT to narrate, demonstrate and explain, but carry out teaching by playing teaching video, thus relieving themselves from teaching. At this time, teachers bear the same perspective as students and discuss questions as a learner with students. During this process, the teacher changes from a lecturer into students' instructor and cooperator in learning.

C. Application of "Micro Lecture" to "Shadow Teaching"

As a new model of teaching, "micro lecture" has become growingly popular in recent years and takes micro-video as its main carrier. As for students, it provides students with an independent learning environment and meets their individualized learning of knowledge points in different subjects, so they can learn according to need, which on one hand makes up for deficiency and on the other hand enhances knowledge. As for teachers, they won't play the role of sage on the stage any more but become a mentor around students. Teachers' teaching video is saved forever, which can be used for reference and amendment. "Shadow video" is an important structural support for "shadow teaching". Teaching process in traditional classroom teaching is recorded live and select what's best from this huge "shadow video", and then process only those contents that are substantial to students' learning. Doing this would strengthen students' expectation of teachers' new teaching method. "Shadow teaching" not only reflects the application reasonability of "micro lecture" but also can arouse students' enthusiasm. "Shadow teaching" relieving teachers from teaching provides them with a chance to face up to their own teaching process, while "shadow video" like a mirror makes it easier for teachers to find out problems in teaching. In a word, the application of "shadow teaching" to "micro lecture" will play an active role in boosting the transformation of traditional classroom teaching.

III. RESEARCH INTO "MICRO LECTURE" DESIGN

A. Design of Contents

"Micro lecture" as a complete and independent teaching module takes micro-video as both its main presentation form and carrier. The development and design of micro-video contents are a systemized procedure, which requires lots of efforts from the producer. The writer mainly summarizes three kinds of sources and producing methods for "micro lecture".

1) Classroom recording, namely to record teachers' classroom teaching video with smart photography camera equipment, forming a "macro lecture" video that has as much time as a traditional class, and then conduct subsequent editing and processing;

2) Screen recorder: lecturers explain knowledge points with the help of PPT, which consists of texts, sounds, videos as well as lecturers' teaching language and is produced by screen recorder.

3) Software composition: use such materials as animation videos and pictures to compose with some software a small video that simulates real classroom situation to explain some knowledge point.

Although different in contents, "micro lecture" is finally displayed in the form of video, which breaks the non-reproducibility of traditional classes and facilitates the learning and mastering of knowledge points by students of different levels. At the same time, it helps teachers with after-class reflection in the use of their own classroom micro-video, promoting teachers' professional development and teaching level. The writer mainly adopts the first producing method, namely "macro lecture micronization",

and the procedure of contents design is as follows.

Firstly the preparation and acquisition of resources

"Macro lecture" video can be downloaded from Internet or copied elsewhere. Or you can record a whole class with photography camera equipment.

Secondly the determine of the topic of "micro lecture"

A perfect "micro lecture" always has a clear topic and teaching activities are conducted around this topic. David Penrose once came up with the concept of "micro lecture", requiring teachers to associate teaching contents closely with teaching objectives, which makes it easier to get a "more focused learning experience" [4] So a clear focus is the most significant characteristic of "micro lecture", namely to explain thoroughly by focusing teaching contents on some specific knowledge point.

Thirdly is the contents design of "Micro lecture"

According to requirements of curriculum standards and characteristics of teaching objects, teaching design is the vision and arrangement that put various elements in order and decide suitable teaching scheme. It includes student analysis, teaching objectives, teaching key and difficult points, teaching procedure and so on. The design of "micro lecture" also needs to put these factors into consideration. Liang Leming, based on analysis of 36 "micro lectures" both at home and abroad, brought forward a general design model [5]. In this model, its necessary to make frontal analysis, mainly including such aspects as learning contents analysis and learning demand analysis.

Fourthly is the subsequent processing and producing of video

After the topic is decided and teaching design well done, proper video processing software is chosen to carry out, combined with the topic and teaching design, subsequent processing of "macro lecture", keeping necessary contents, deleting what's unnecessary and adjusting to appropriate order to form a complete a teaching structure. Then comes some fine revising, such as beautifying video and pictures, setting suitable background music and adding proper texts at some links.

B. Application Design

If a whole class video is used as "shadow" in teaching, there won't be much difference from traditional classes. In this case, we just reuse a teacher's real class procedure in a new teaching environment, which may not arouse much interest and attention in students. The writer micronizes a teacher's real class video and combined with "shadow teaching", processes into "micro lecture" for teaching, which not only ensures the shortness and pithiness of "micro lecture", but also makes learning novel and interesting.

Students in traditional classes can perceive a teacher's teaching procedure only through real classroom teaching, but this issue can be better settled by application of "shadow teaching" to teaching. "Micro lecture" provides students with a good and independent learning environment. Students no longer perceive a teacher's teaching only in traditional classrooms and during specific period of time. On the contrary, students can make preview according to need before class, carry out classroom learning based on "shadow video" selected by teachers during class, and after class review those

knowledge points they don't master well in class in order to strengthen and consolidate.

"Shadow teaching" can efficiently help students with their learning and at the same, promote teachers' professional development. The application of "shadow teaching" to "micro lecture" plays a role in the three stages of classroom teaching.

1) Lesson preparation before class: Before class, teachers can prepare lessons with the help of other teachers' "shadow video". When watching other teachers' "shadow video", they can learn from other teacher's advantages and apply these advantages to their own teaching,

2) Teaching assistance during class: In the use of "shadow teaching", teachers won't talk too much on the stage but rely on previously prepared "micro lecture", which refers to the edited small video recording their own teaching procedure. Thus teachers carry out teaching by playing "micro lecture". It seems that teachers are teaching through their own "shadow", and teachers themselves as participants and learners learn together with students.

3) Teaching reflection after class: "Micro lecture" changes the non-reproducibility of traditional teaching and provides basis for teaching reflection. In the opinion of Schon, reflection means that professionals during their course of work can construct or reconstruct problems encountered and explore them further with the problems in the background [6]. Reflection here means that in a more direct way, teachers can search for problems in teaching by their own "shadow video". Watching their own "shadow video" is just like being faced with a mirror.

IV. Application of "Micro Lecture" to Physics Teaching in Junior Middle School

Individual differences in students lead to different learning pace and students can't have a good understanding of key points and difficulties in their learning. The design of "micro lecture" aims at promoting learning pertinence and efficiency, and exploring how to apply "shadow teaching" to "micro lecture". The writer chooses "Atmospheric Pressure" from tenth chapter of volume one of physics for eighth grade by PEP(People's Education Press).

A. Development of "Micro Lecture"

1) To record video: This video is a record of a class taught by teacher L in a secondary school. The way of teaching engages several experiments combined with a PPT presentation.

2) Decide the theme of "micro lecture": The main point of the chapter "atmospheric pressure" is to understand the existence of the atmospheric pressure and to use it to explain some simple physical phenomena. The difficulty is to do the Torricellion experiment using mercury (Hg) in order to measure the value of the atmospheric pressure from which students are expected to learn how to measure it and remember it. During the class, it is quite hard to understand, "measure the value of the atmospheric pressure". It has been tested in exams for

long. Therefore, I decide to choose this part as the theme of this "micro lecture."

3) About the instructional design of "micro lecture": Whether a "micro lecture" can achieve the expected aim or not depends on the instructional design. The teaching procedure of this class mainly focuses on the introduction of this new lesson, the teacher's teaching and the summary of the class, three aspects. The teacher in this video is quite careful to use four experiments in the intro. However, "micro lecture" doesn't allow sufficient time compared with the traditional class. It is required to shorten time of the intro, so I only select one experiment as the introduction of the new lesson. The experiment is that a cup is covered with a cardboard with all the air out and full of water. Then, let students guess what will happen after inverting it. After all the students finish guessing, the teacher will take the action and show the phenomenon that the cardboard will not drop and the water will not spill. Then, to encourage students to guess the reason. By this experiment, the teacher can successfully lead students to the new teaching content. The main point of the "micro lecture" is to illustrate how to measure the value of the atmospheric pressure and show the process of the measuring experiment using mercury (Hg) by video in class which can also avoid the hidden danger of the poisonous mercury in the experiment done by the teacher himself. Finally, I have decided the structure of this "micro lecture": using a lead-in experiment to prove the existence of the atmospheric pressure — the teacher explains the phenomenon and finds the reason—let students list examples to illustrate some phenomena related to the atmospheric pressure — show the measuring experiment — the teacher leads students to calculate and remember the value of the atmospheric pressure firmly — summary of the class.

4) Utilize the video processing software: Corel VideStudio12 is easy but multi-functional video editing software. The main features are: the steps of operation are easy to understand, the interface is simple and bright, it has the function of bulk conversion and so on. This "micro lecture" mainly relies on this software to edit its material according to the content of the theme. Below are the procedure of the video processing:

Firstly, convert the format of the video and import it to video resources library of Corel VideStudio12

Secondly, split the video and remove some useless parts.

Thirdly, integrate the four main split parts by "micro processing"

Fourthly, create the framework of the "micro lecture"

B. Apply "Shadow Teaching" to the Trials of the "Micro Lecture"

The applications of "micro lecture" are not simply intended for the evaluation or the contest. It should be utilized more for teaching [7]. Applying "shadow teaching" to the physics "micro lecture" can make up for the weakness of the class teaching. It can focus on some specific content then help delivering it. It is a quite good and useful teaching method.

1) Of students: In physics classroom teaching, students

usually study a new lesson with curiosity when teacher applies shadow teaching to content knowledge learning with providing micro lecture. This micro lecture begins with interesting and small experiments, and students' attention will be gradually and highly concentrated with the progress of the micro lecture. Teacher can appropriately stop or replay the micro lecture when students do not have timely understanding towards one knowledge point, by doing which students will have enough time to think, at this moment teacher becomes a right-hand man in students' learning process.

2) Of teachers: Micro lecture is a kind of innovation and promotion towards conventional teaching model for junior high school physics teachers, which optimizes the effects of physical experiments and in turn encourages teachers to apply micro lecture to conducting targeted teaching. Besides, the application of shadow teaching leaves physics teachers more time for carrying out scientific research.

Teachers apply micro lecture to their classroom teaching, in terms of them this micro lecture is like their own teaching shadow and in terms of students whose teachers in turn become their learning shadow. Meanwhile the application of micro lecture reduces teachers' burden in lesson preparation and classroom teaching, and teachers will spend more time participating in students' learning and this can also narrow the distance between teachers and students. When problems found in the shadow video during the teaching process, teachers can immediately suspend and correct in time. In addition, teachers can induce students to infer other things from one fact. For example, after playing the lecture of atmospheric pressure teachers can suspend the micro video and leave students some time to positively think whether there are some other phenomena that also prove the existence of atmospheric pressure.

V. Conclusion

The purpose of the application of micro lecture is to better serve teachers' teaching and students' learning. Applying shadow teaching to micro lecture achieves students' autonomous learning and teachers' individualized teaching, and it also motivates students' interest in learning and promotes teachers' professional development. Therefore the majority of teachers should actively participate in the development of the micro lecture, and teachers develop high-quality micro lecture resources based on improving their teaching level which is the prerequisite for students to conduct autonomous learning by applying micro lecture.

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