Discussion on Teaching Reform of Mathematical Analysis

Zhiyong Ma
Shanghai Second Polytechnic University
School of Science
Shanghai, China
2360 Jin Hai Road, Pudong District, Shanghai, China
Email: mazhiyong1980@hotmail.com

***Abstract*—The Current problems of the mathematics analysis courses in science and engineering colleges and universities is unsatisfactory. People's traditional concepts of mathematical analysis courses need to be updated. From the future educational development to proceed, this article briefly discusses the mathematical analysis course on teaching reform from two aspects, minicourse and virtual classroom.**

Keywords—Mathematical analysis, Virtual Classroom, Minicourse

I. INTRODUCTION

Mathematical analysis [1,2] is the most important professional basic course of mathematics, information and calculation, and it has a very important role in cultivating students' good mathematical literacy and so on. It spent about 300 years from production and development of modern calculus to sophisticated mathematical analysis course system, , it is almost basis for all subsequent courses; learn better or bad directly affect the subsequent course of study.

Nowadays people have already admitted that mathematics is not only a tool, but also a culture. Therefore, it should have two educational functions, one is technology, and the other is culture. By means of studying this course can improve students' comprehensive characters and cultural accomplishment, let students learn how to think, enhance the ability of solving problems. Though Mathematical analysis study can offer you a view from mathematician, enriching your ways of observing the world; offer you a wise brain, helping you in thinking rationally; offer you a curious mind, ensuring you have a strong desire for knowledge; offer you a set of researching patter, making it as your telescope and microscope in exploring the secrets of the world; offer you a new optometry, seeking your dreamland in cross discipline.

According to a survey of different professions studied mathematical analysis of students, students generally considered difficult to learn mathematical analysis, this course of study often feel unable to start, the vast majority of students can not comprehend the ideas and methods of mathematical analysis, such problems in addition to the course itself difficult, learning methods shall not be treated, another important reason is that raising the level of diversification of teaching and teaching methods. In view of this situation, in order to reduce the ability of teachers and students in teaching and learning difficulty about this course, to improve the quality of teaching this course and to improve students' mathematical quality, especially analyze and solve problems, it is necessary to teaching content and teaching methods of this course for some discussion of reform.

II. THE TEACHING METHOD REFORM

A. Virtual Classroom

Virtual technology pull mankind from the reality of life in the world into a virtual world, humans began shuttling between the real and virtual worlds; virtual classrooms have emerged at the same time. Therefore, the "Internet" changed the world, traditional mode of education inevitably be a revolutionary change, though some people think it is a "scourge" to talk about network discoloration, but the Internet as a representative of progressive education educational production productivity tool, changing the traditional pattern of teacher-student relationship fundamentally, also it changed the direction of educational philosophy, which will inevitably lead to reconstruction of a new educational order.

1. Virtual Classroom features

There are four characteristics [4] about Virtual Classroom: First, create a virtual classroom to achieve a multi-level classroom teaching across the virtual classroom, it can across class, across grade, cross-school, inter-regional, inter-provincial city, even across countries, so that students which in different classes, different schools, different places, different ethnic groups, different national exchanges can exchange each other, showing students around the joint study and research on the same topic, express their opinions, mutual contend scenes. Second, by teaching platforms, forums and chat combined with chartroom to achieve a real integration of classroom and virtual classroom between teachers and students anywhere, as long as the terminal can log on the Internet, you can carry out educational activities. Virtual

classroom unlimited extension of the reality classroom so that both can be seen on the Internet, visual exchange, also can help achieve anonymity questions and answers between teachers and students. Third is to use the network to open up the virtual classroom will read the content and make read range extension. From the virtual classroom which opened by the school or local library, the student can get voice, text, images, graphics, animation and other information which offered by multimedia computer to enable them to do illustrations, combining static and dynamic. According to their own knowledge structure and interests, student choices and decisions to read the direction and content, free to travel in the ocean of information. The fourth is using virtual classroom can improve learning efficiency and quality. Teachers make the text content and other related content to a nonlinear, multidimensional information network, students can very easily put new knowledge integrated into the structure of their knowledge, to obtain in-depth understanding of information, adequate comparison information, and then complete the memory, analyze, compare, and even comprehensive evaluation in the reading process.

2. Superiority

Network technology as the representative of the virtual classroom represents the development direction of modern educational productivity. First, the virtual classroom let students to independent learning, enjoy learning facilitated. Secondly, the "virtual classroom" provides for the students a broad application stage of reading and writing. Third, interconnected, mutually extended, interactive complementarity, integration of teaching and learning activities of virtual classroom and reality classroom teaching can communicate through answering questions plate and teacher, so that put the schools and teachers resources shared to address educational equity and Choosing problem. Fourth, this holographic expression of virtual classroom provides realistic performance results for teaching, to achieve a real classroom ignition, prairie fire of virtual classroom situation. They do not have the affected from geographical and time, to acquire knowledge of the scope and greatly expanded capacity, expand their horizons and perception of space.

B. Micro lesson

1. Basic features of micro lesson [3]: (1) It's dapper. A topic, a focus is design for the problems in the student's learning, it is very suitable for self-learning. (2) Time and place can be arbitrary choice, there is a lot of autonomy, as long as there is the desire to learn, and it can be realized. (3) To adapt to different students, video playback speed adjustment, so that the students according their basic and acceptance of different levels to control of the speed of the video. (4) The video can be played repeatedly, those students who usually reaction slow and shy to ask questions can calmly repeated viewing, it's better solution for underachiever Transformation. (5) It's suitable for self-study. Micro lesson not only focus on teaching, but also on learning, micro class simulation one-to-one teaching scene, it's different from one-to-many daily classroom teaching form, it is very suitable for self-learning.

2. Using micro lesson features, we can use micro-lesson on "Mathematical analysis" teaching.

Ideas on design Micro lesson in "Mathematical Analysis" teaching. (1) Self-study before class. Before class, the teacher according to the characteristics of teaching content, knowledge points, recording a number of instructional videos, so that students have a general understanding from independent learning new knowledge, new knowledge. For example, the concept of limits in "Mathematical Analysis" is an important and difficult to understand the concept, but the limits of thought throughout the "Mathematical Analysis" course. When teachers explain the first limit concept, firstly, to record a video about the concept of the limit, introduce background about the concept of limits, as well as relevant knowledge in the video. (2) Cooperative in Learning Course. Let students watch the video material in advance, to realize personalized teaching, self-teaching, and improve the effectiveness of classroom teaching. In actual classroom teaching, for teaching content, ask questions, allow students to self-learning based on previous teaching video, collaboration and inquiry, cooperative learning. (3) Summary reflection after school. After the classroom, students write learning reflection on online teaching platform, exchange gains; at the same time, focusing on the cultivation of students' professionalism, to guide students to feel experience, collaboration and exchange of experience between them. While to cultivate students spontaneously and initiative to solve learning problems, at the same time, to develop awareness of teamwork.

C. Other aspects of reform

1. Mathematical culture's bring in [5].

Since mathematic analysis has both the cultural and technically functions in education. We are not supposed to just analysis those concepts, theorem, principles and formulas, as the past. We also need to tell something about the Mathematical culture, the origin, and the question 'what is mathematics' that refers to the attitude about mathematics. Combine with the teaching about analyzing mathematics. We could introduce some history and some relevant experts. By doing this, not only could we have a wonderful teaching, but also it is really necessary.

2. Mathematical analysis and design of experiments.

The course of Mathematical analysis can mix the Mathematical experiments and Mathematical modeling concept together Because Mathematical experiments can make students more realistically and more intuitive way understand the Mathematical theory in the Mathematical analysis by student hands on experiments Mathematical modeling is the further and improve of Mathematical experiment and it can solve the actual problem by using Mathematical theory. Here the actual problem which referred to may have no ready made answers, no fixed method and no special Mathematical tools and methods.

But students can choose the most suitable tools to set up the Mathematical model and find the solution. At the same time the Mathematical modeling is popular among the domestic universities. This point is not special from the American Mathematical modeling contest enrollment situation

in recent years. The lesson of Mathematical analysis should comply with the characteristics of Sichuan. And make students have a good beginning.

A good teacher is not only able to let his students understand what Mathematical analysis is, but also make a difference on the life of students. To make math as a life-long career when a math-major student stride forward into the university. What in his curious eyes expose a confutation about the major-course study and a worry about future? Mathematical analysis is an important course which students face at the first. So what and how can we improve the students' math accomplishment as well as rising interests and confidence in major-course study is a question which our teacher should think about. There is a heavy burden and a long road in reforming of Mathematical analysis education. Let us strive together to make this event relaxing to the country' face and talented person-training well done.

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