

# Analysis on the Network Teaching Reform of College Mathematics Teachers under the Trend of Educational Informatization

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**Abstract**—The development of educational information technology has promoted structural and innovative changes in various fields of human social development. In the field of education, educational informatization is gradually becoming the endogenous variable of systematic changes in education, and further promotes the reform of educational concepts and teaching methods.

Under the trend of education informationization, advanced mathematics, as a basic subject, should adapt to the development trend of educational information technology as soon as possible, improve teachers' informationization literacy, construct network teaching resources, explore the characteristics of "Internet+ mathematics teaching", and promote the teaching reform of advanced mathematics.

**Index Terms**—Education informationization, advanced mathematics, network teaching reform

## I. INTRODUCTION

In the 21st century, with the rapid development of information technology, educational informatization is having an impact on all aspects of education in the field of education, and the integration of educational informatization and college teaching is getting closer and closer.

## II. THE CONNOTATION OF EDUCATIONAL INFORMATIZATION

Educational informatization pays more attention to the cultivation of students' dominant position and learning ability, and pays more attention to the integration of resources, the application of educational technology and the transformation to the cultivation of information literacy and innovation ability. Educational informatization puts forward new requirements for teaching reform in terms of teaching thinking transformation, resource presentation mode, technical literacy ability, teaching process and methods [1], which requires teachers to fully integrate with information and communication technology in the teaching process, and pay attention to the initiative of learners in the education process, so as to realize the learner-centered teaching mode of "teacher-guided learning and student-led learning".

## III. THE PROBLEMS EXISTING IN THE ADVANCED MATHEMATICS TEACHING IN ORDINARY COLLEGES AND UNIVERSITIES

The influence of educational information technology on education has attracted more and more attention of college teachers and become an important part of their teaching work. However, in the actual teaching process, there is still a big gap between the integration of educational information technology



with education and the requirements of the times, and the deep integration of information technology and classroom teaching is not enough. It is mainly manifested in the lack of digital learning resource construction quality and learning support service ability, teachers' insufficient information technology literacy and informatization teaching motivation and innovation ability, as well as the low level of informatization teaching atmosphere creation and application. At present, there are mainly the following problems in advanced mathematics teaching in colleges and universities

1) In terms of resource construction and learning support, there are problems of insufficient construction, low quality and inadequate service.

The construction of many advanced mathematics curriculum resources is too traditional. Due to the nature and characteristics of the advanced mathematics course, great efforts are needed in the production of resources. Some of the existing curriculum resources are made only based on the traditional courseware recording mode with too much content and long time, which is not suitable for the learning characteristics of contemporary college students, making the original boring teaching even less accepted by students. At the same time, there is a lack of learning support services in the process of resource construction. Students can only watch videos to do exercises, lack teacher-student interaction, classmate interaction and support of related resources. Therefore, the result that students use information resources is poor.

2) In the aspect of information literacy, teachers' learning attitude is weakened, and their technical ability and innovation ability are insufficient.

Many teachers have been accustomed to the classroom teaching mode for many years, and lack the determination and method of reform in the teaching process, so they are content with the status quo.

In the face of the impact of COVID-19, due to the

lack of their own information literacy, many teachers have insufficient responses to the network learning based on information technology. At the beginning, they treated online learning with a repulsive attitude, but later they just stood in front of the computer and read from the book, allowing classroom teaching activities to be mechanically transferred to the network world. The central position of students was not reflected, and the teaching effect could not be improved but would have a negative effect.

3) The design and application of situational teaching do not match the requirements of network teaching.

Based on the characteristics of space-time separation of network teaching, Network learning under the trend of educational informatization especially needs classroom situational teaching design. Only by designing a reasonable network learning atmosphere can we attract students' interest and enhance their attention. Network technology tools also provide us with more solutions and paths to design teaching situations, which need to be actively explored in teaching. However, in the network teaching environment, the strong theoretical characteristics of advanced mathematics make many teachers ignore its basic characteristics, and failed to achieve the effective connection between basic features and practical applications. In the teaching process, the teachers are limited to the derivation and application of formulas and theorems, and still adopts the traditional cramming teaching, who cannot well combine mathematical theory with practical application.

4) The teaching process of advanced mathematics is less student-centered, and the subject status of students is not obvious.

Educational informatization urges teachers to focus on the new needs of social development for talent training, pay attention to the construction of learner-centered education and teaching mode guided



by informatization, and make the education mode more suitable for people's learning. In the process of teaching, many teachers are used to design courses from the perspective of "teaching", ignoring the "learning" of students, so that students are still passive receivers in the process of learning. Another aspect of the neglect of learner centrality in the teaching process is that the teaching attaches great importance to the explanation of knowledge and ignores the cultivation of methods and abilities. As for the consolidation of knowledge points, students are only asked to do problems instead of introspection, and are not designed to find problems in introspection and solve problems by means of mutual assistance and consulting materials. As a result, teaching has only completed the lowest level of tasks, with limited help for ability cultivation, and the position of student center can not be reflected.

#### IV. THE REFORM PATH OF NETWORK TEACHING OF ADVANCED MATHEMATICS TEACHERS

The above problems are common problems faced by advanced mathematics teachers in the process of educational informatization. The fundamental reason is that in the process of transformation from traditional teaching to information-based teaching, they do not have a deep understanding of educational informatization, lack of recognition and insufficient preparation.

Educational informationization requires great changes in mathematics teaching in colleges and universities, which should integrate design, classroom and learning support services, and implement a new teaching model combining online and offline. Teachers in the classroom organization, should have systematic thinking, information thinking and service-oriented thinking, need their deep understanding of new education teaching idea, in-depth analysis of college students in 21st century learning characteristics, combining with the teaching

and learning requirements to design their own teaching organization, which can make the advanced mathematics teaching more reflect the subject characteristics of advanced mathematic, more close to reality and easy for students to learn.

To sum up, based on the three principles of systematical thinking, informationization thinking and service-oriented thinking, the reform of advanced mathematics teaching should be carried out from the aspects of teaching concept, teacher professionalization, network resource construction, teaching design and teaching service, in order to achieve the goal of advanced mathematic network teaching reform.

1) Change ideas, take learners as the center, and promote students' independent and effective learning.

The future education takes "learners" as the center and attaches more importance to students' independent learning. As teachers, they should change their ideas from "teacher-centered" to "learner-centered".

Larke(2019) effectively explained in his research on how schools can best prepare young people for social survival and life in the 21st century that the adoption of new technologies by teachers will be seen as a necessity to be deployed in a wider educational ecosystem [2].

Education modernization has made the individual interactions and expressions of identity of today's students completely different from those experienced by their teachers and parents. When applying the new educational information technology to teaching design, advanced mathematics teachers should pay attention to making more young people have the ability to acquire knowledge and ability through digital resources and realistic resources, and have the confidence to participate in the increasingly digital world.

At the same time, attention should be paid to the cultivation of knowledge construction ability in the design process. Through the combination of online



and offline methods, students can learn to construct their own knowledge system while learning knowledge, and also learn interpersonal communication, self-confidence, autonomy, and more sense of social responsibility.

2) Build online course resources based on information thinking.

Advanced mathematics is an abstract and logical basic course, so many courses are not intuitive enough in the design process due to the limitations of technical tools in offline classroom teaching. But the rapid development of information technology provides convenience to solve this problem.

Macfarlane (2019) emphasizes the call for more effective use of digital technology. More funds must be invested in digital resources, and teachers should be equipped with information thinking and ready to accept the access of equipment to ensure the construction of digital resources [3].

The rapid development of information technology makes the expression of various mathematical models more intuitive. In the teaching process, teachers can set up to let students personally experience the design and production process by means of technology. For example, when calculating the volume of curved column in double integral, drawing and design with information technology will make the abstract theory easier to understand.

3) Enhance the level of teacher professionalization based on systematic thinking.

As the organizer of classroom activities, teachers decide the direction and breadth of the application of information technology in the classroom. Therefore, the level of teachers' professional construction is the key element to integrate the curriculum content and design by using technology, and plays an important role in the development of educational informatization.

The subject characteristics of advanced mathematics make many teachers accustomed to the

teaching design of chalk + blackboard, which makes them reluctant to make changes. But it also restricts the innovation of advanced mathematics teaching in the educational informationization age. Therefore, the professional construction of college mathematics teachers has become an important factor affecting the teaching effect. The overall design of online teaching requires teachers to combine the course content and the characteristics of online learning to design the course.

The construction of professional ability of college mathematics teachers should pay attention to systematic thinking, further explore the role of teachers in the integration of technology and classroom from the aspects of content and design, and study the construction of professional ability of teachers from the aspects of information literacy, technical ability and responsibility consciousness cultivation [4].

4) Based on service-oriented thinking, improve teaching design and attach importance to learning support services.

The learner-centered teaching requires the teacher to change from the role of classroom manager and center to the role of classroom organizer, coordinator and service provider.

The service-oriented thinking requires that we should fully design the coherence of the knowledge system, pay attention to the cohesion of content, and design the explanation mode in the teaching preparation. In the teaching process, the situational teaching design should be emphasized, which requires college mathematics teachers to explore new educational practice through action research, pay attention to students' participation in the teaching process, and increase the self-efficacy of information technology for both teachers and students. After class, we attach importance to learning support services, prepare sufficient resources to meet students' independent learning, build communication channels,

and be ready to answer questions online at any time to meet students' learning needs.

#### V. CONCLUSION

Educational informatization puts forward higher requirements to college teachers from aspects of teaching idea information technology. As a basic course with high difficulty, higher mathematics requires teachers to make full preparation from curriculum preparation, curriculum teaching to after-class learning support service, and organize curriculum teaching with systematic thinking, information thinking and service-oriented thinking. Therefore, the network teaching concept can be integrated into the whole teaching process of teachers, and the higher mathematics teaching can be more suitable for the requirements of educational informatization, so as to achieve various teaching objectives.

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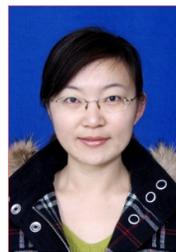
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project" Research on the cultivation of primary and secondary school students' core literacy from the perspective of stem Education" (JY-01-202011)

#### REFERENCES

- [1] Educational Informatization: China's Strategy of Educational Modernization. Electronic Education Research, 2019, 40(09): 2+129.
- [2] Larke, L. (2019). Agentic neglect: Teachers as gatekeepers of England's national computing curriculum. *British Journal of Educational Technology*, 50(3), 1137–1150. <https://doi.org/10.1111/bjet.12744>.
- [3] Macfarlane, A. E. (2019). Devices and desires: Competing visions of a good education in the digital age. *British Journal of Educational Technology*, 50(3), 1125–1136. <https://doi.org/10.1111/bjet.12764>.
- [4] Gu Xiaoqing, Yi Yuhe. Thinking on educational innovation enabled by technology from the perspective of educational ecology. *China Electronic Education*, 2019(11): 17-23+59.

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