

Improvement and Practice of Secondary School Geography Teachers' Informatization Teaching Ability Based on the Perspective of MOOCs

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Received: 14 July 2021; Revised: 20 September 2021; Accepted: 10 November 2021; Published: 08 February 2022

Abstract: The modernization of education requires secondary school teachers to improve their information-based teaching ability, and applying MOOCs to secondary school geography classroom teaching is also a new attempt. Applying MOOCs to secondary school geography classrooms can change the traditional teaching mode and cultivate students' independent learning ability. This paper mainly explores the feasibility of applying MOOC to secondary school geography teachers in the classroom and proposes strategies for teachers to effectively improve their informational teaching ability and level in applying MOOC to teaching. At the same time, the teaching method of combining MOOC with the flipped classroom is proposed for the inherent shortcomings of MOOC itself. The article also discusses practical ways to improve secondary school geography teachers' information ability, including changing teachers' teaching concepts, strengthening teachers' training, increasing hardware investment, and building digital campuses. The study can provide a reference for current secondary school geography teachers to improve their ability and use of information technology and innovate classroom teaching modes and methods.

IndexTerms: MOOCs, middle school geography, informatization.

1. Introduction

Educational informatization refers to the informatization of teachers' teaching methods, method of teaching, teaching contents. It means teaching through multimedia, computers, and other modern educational informatization means. The use of educational informatization by teachers in classroom teaching helps to promote students to receive better knowledge and helps to promote the development of education modernization. MOOC also emerged under the background of educational informatization [1, 2]. MOOC (MOOC: Massive Open Online Course) is a massive open online course that created a free online learning platform on the internet where students can learn many free and high-quality courses. This mode of teaching and learning allows large numbers of students to learn online simultaneously, with a more open platform, richer content, and a more diverse structure [3, 4]. This learning model breaks downtime and space constraints, making it more convenient for students to learn and access more quality learning resources. MOOC can provide higher quality education for areas where educational resources are scarce, and it can also provide higher quality educational resources for students to make up for the lack of traditional classroom teaching. At the same time, MOOC also helps ease the allocation of educational resources further and promote a more reasonable allocation of educational resources and educational equity. In addition, MOOCs can effectively realize the sharing of high-quality educational resources.

However, the application and implementation of MOOC education in secondary school classrooms have revealed many problems. For example, many MOOCs are built to fulfill the quantitative targets, and the course content is disconnected from the teaching needs. A MOOC class is simply one or more people learning from a machine, lacking interaction of ideas, opinions, and students' supervision. In terms of the attractiveness of the course, most courses are only video-based classroom teaching. The lecture format is solidified, lacking entertainment elements, which seriously affects students' learning motivation, and the actual classroom effect is not as good as traditional teaching [1, 2]. In addition, some

data show that the pass rate of MOOCs at this stage is only 4%-20%, and the reason for the low pass rate is that the problems that arise in the process of learning through the catechism platform cannot be solved in time. Some scholars have also examined MOOC data to improve design, delivery, and evaluation [5, 6].

The emergence of new teaching methods based on information technology provides teachers with new ideas for teaching innovation. However, at this stage, the teaching force in some schools has not been able to adapt to the changes in teaching methods brought about by information technology. The online teaching and learning model has become an adequate alternative to traditional classroom teaching and learning and is very useful in facilitating online teaching and learning for learners, especially for teachers. The hybrid format has been widely used in developed countries and contributes to developing digital literacy skills [7]. Blended teaching strategies have become an integral part of the educational system of the 21st century [8]. Therefore, this paper attempts to apply MOOC to middle school geography teaching. This paper looks for strategies that better adapt to the middle school geography classroom by analyzing the information-based teaching ability that middle school geography teachers should have. To give full play to the advantages of MOOC, solve the problems existing in MOOC textbooks, ensure teaching quality and efficiency, the author puts forward the teaching mode of combining MOOC with the flipped class to improve the information-based teaching ability of middle school geography teachers.

Applying the MOOC teaching model to the classroom puts forward higher requirements for teachers' teaching level, which requires teachers to pay attention to the latest education development, update their teaching concepts, and learn the latest teaching information technology, thus improving teachers' informatization ability. In MOOC teaching, teachers constantly pay attention to students' learning and adjust their teaching methods, promoting teachers' information-based teaching ability. This paper analyzes the current situation of catechism in secondary school geography teaching and analyzes the unique advantages of catechism in secondary school geography teaching. It also puts forward the informatization literacy that teachers should have in catechism, and finally, the strategies for teachers' informatization ability improvement are proposed.

2. The application of MOOC in Secondary School Geography Teaching

Based on the analysis of a large amount of literature, this paper analyzes the advantages of MOOC in junior high school geography teaching, taking into account the actual situation of integrating MOOC with junior high school geography teaching. Based on the uniqueness of geography, the author puts forward the teaching strategy of combining MOOC with flipped class and the strategy of further improving the informatization ability of geography teachers.

2.1 The current situation of applying MOOC in secondary school geography teaching

2.1.1 Unequal distribution of educational resources and lack of teaching resources for secondary school MOOC

The uneven economic development between regions in China has led to the uneven distribution of educational resources in China, especially in the western region, which lacks a large number of highly qualified teachers, insufficient hardware facilities, and backward teaching concepts of teachers. At the same time, local governments allocate educational resources according to the level of schools and invest a large amount of money in "window schools", such as national model schools, provincial model schools, municipal model schools, and even district model schools. The above approach causes a further imbalance in the distribution of educational resources, which in turn leads to many social problems [9]. The vigorous development of MOOC can provide students in backward regions with better quality courses so that they can receive better education, further reduce the problem of uneven regional economic development resulting in the distribution of educational resources, promote a more reasonable distribution of educational resources in China, and promote the realization of educational equity in China. At present, there are fewer teaching resources for MOOC in secondary school, which is also an important reason for the less application of the MOOC teaching model in secondary school geography teaching.

2.1.2 Poor independent learning skills of students

On the one hand, the application of MOOC in geography is greatly influenced by the students' independent learning ability. Because of the poor self-control ability of some students, especially with the increasing popularity of the internet, secondary school students' access to the internet has become an essential part of their daily life. Many students are addicted to the cell phone network and escape from reality. A survey shows a particular group of students in almost all secondary schools, and most of the students in this group come from self-employed business people, business owners, freelancers, families with disabilities, and families of corporate workers. Their parents are too busy with business and work to take care of their children, not to educate them effectively and reasonably [10]. The result is that these children have less self-control and are more likely to form the bad habit of Internet addiction. Leung L developed the Mobile Phone Addiction Index Scale (MPAI) to measure cell phone dependence in an attempt to investigate the reasons for students' inability to effectively self-control their cell phone use behaviors, reduced efficiency in life and learning, avoidance of real-life situations, and addiction to cell phone networks from the perspectives of social functioning and emotional experiences [11, 12]. It has been shown that responsibility negatively predicts total MPAI score, loss of control, and inefficiency. Individuals with low responsibility have weaker willpower, less self-control, carelessness, and lack of planning and

organization [13, 14]. Consciously controlling impulses and resisting the goal of satisfying immediate needs and wants and thus hopefully bringing long-term benefits is the purpose of self-control behavior, the regulation and control of an individual physical and mental activities, thoughts, and behaviors [15, 16]. Problem behaviors such as drug addiction, delinquency, academic failure, gambling, and smoking are associated with higher or lower levels of self-control. Individuals with lower self-control have more problem behaviors, such as being aggressive, active, and delinquent [17, 18]. Another reason for childrens' poor self-control in China is the large number of children left behind due to their parents going out to work. Studies have shown that left-behind children often exhibit delinquent behaviors that lack self-control, such as disobedience, violating school discipline, and staying out at night. Their academic behaviors and daily rows differed significantly from whether their parents were at home or not [19].

The MOOC teaching model is prominent in students' autonomous learning. Without the traditional classroom constraints, some students' learning enthusiasm is reduced, and their learning attitude is not paid attention to, which will lead to the significantly reduced effect of MOOC, which can not achieve the teaching effect expected by teachers. On the other hand, middle school students are faced with the pressure of continuing education. In the traditional classroom teaching model, teachers instill knowledge into students, and students rely highly on what teachers teach. Once geography teachers adopt the MOOC teaching model, it will lead to students' inability to balance the learning between other subjects, weakening students' learning of geography, which is not conducive to further teaching. Therefore, solving students' independent learning supervision and guaranteeing the systematic and sustainable learning process are the keys to accelerating the promotion of geography MOOC teaching in secondary schools [20].

2.1.3 Teachers' backward teaching concepts and lack of IT knowledge

Under the teaching model of the classroom lecture system, teachers rely on the teacher-centered classroom teaching model to deliver knowledge to students, which cannot present more intuitive and vivid teaching content for students. If teachers cannot update their educational concepts and correctly understand the importance of information technology in teaching, they will not consciously improve their information technology teaching level [21]. Due to the backwardness of hardware facilities in some schools and the lack of information technology supporting facilities, teachers have no conditions and opportunities to use information technology for teaching, and lose the initiative and enthusiasm of learning and using information technology, which makes many teachers lack information technology knowledge and pay no attention to information technology learning. Compared with the past, especially in rural schools, compared with the past, although the hardware and software facilities for information-based teaching have significantly improved, most teachers still lack information technology knowledge. This situation is related to teachers' factors and the construction of course materials on the current network platform. The platforms primarily provide mainly electronic documents, courseware, and videos but lack teaching resources that provide interaction between teachers and students. Teachers' lack of information technology brings great resistance to the popularization of advanced teaching behaviors and teaching models [22]. However, for secondary school geography teachers, it is vital to change the concept of teaching and adopt the latest teaching methods to improve the quality of teaching, especially in today's rapid development of information technology, the emergence of the "Internet +" education mode of education such as MOOC, micro-class, flipped classroom. Using modern information technology to teach is a necessary teaching ability for modern secondary school geography teachers. In fact, "Information Literacy" includes the ability to judge when information is needed and to know how to obtain information and how to evaluate and effectively use the information needed, which is essentially an essential ability required by global Informatization [23].

2.2 The advantages of implementing MOOC in secondary school geography teaching

2.2.1 Change the traditional teaching model

In the traditional teaching model, teachers use the classroom teaching system to teach. Teachers have clear teaching objectives and lecture contents. Before the class, the teacher prepares the lesson according to the requirements of the syllabus. What the teacher teaches in the classroom is all that the students learn. However, students' learning content is limited to the textbook's content, but it is not conducive to expanding students' thinking and learning. Such an approach does not help to expand students' minds and personalize their development. MOOC provides students with a broader range of knowledge beyond what is taught in the classroom, and students can choose the content they are interested in through MOOC, which helps expand the scope of their imagination.

The teaching model of MOOC provides students with teaching videos and includes after-class assignments and off-class evaluations for communication with teachers after completing the teaching tasks. The interaction between students and teachers allows students to communicate with the teacher promptly to resolve their doubts and questions. Secondary school geography teachers can integrate geography classrooms with MOOC classrooms, thus forming a new geography MOOC teaching model conducive to promoting the modernization of the geography teaching process and sharing high-quality secondary school geography teaching resources. The introduction of the MOOC teaching model into secondary school geography teaching is more helpful to cultivate innovative talents and improve the overall efficiency of classroom teaching [24].

2.2.2 Improving students' ability to learn independently and highlighting their leading role

The introduction of MOOCs into the secondary school geography classroom can help secondary school students understand geography more efficiently, while the MOOC teaching method gives students the right to choose the learning content, allowing them to choose their interest in the content. Teachers also provide students with more opportunities for independent learning by continuously improving the content of MOOC, enriching course resources, and improving after-class assignments and off-class investigations. Teachers can also ask more questions for students to think and discuss based on the tasks they have been assigned on the MOOC platform, and then teachers can answer the questions that students have, which is a way to develop students' independent learning ability through student-student interaction and teacher-student interaction in the teaching process. The teaching model of secondary school geography MOOC also helps students understand the macroscopic nature of geography subjects more efficiently and increases their interest. At the same time, the information-based teaching model also helps to teach students according to their abilities and promotes their individual development. Teachers impart knowledge to students in a guided manner, which better reflects the heuristic teaching and highlights the leading position of students. As an inevitable product of network and information age, MOOCs change the blackboard and chalk presentation mode and break the traditional classroom with its openness and autonomy, making the previous teaching mode of "what the teacher says, what the students listen" with boring content lively and vivid, and improving the teacher-student interaction which was greatly restricted. It has also improved the interaction between teachers and students and established the leading position of students so that more universities have joined the MOOC platform [25].

2.2.3 MOOC provides students with targeted learning materials

Teachers need students' logical thinking skills and spatial imagination when analyzing the interrelationship between human activities and the environment in a region. Especially in the traditional classroom, when some teaching materials can not be well presented to students, teachers can use the teaching tool of MOOC classes. Teachers can find teaching materials in advance, edit them into teaching videos and play them in class. For example, when teaching the lesson "Water on Earth", teachers can find a high-speed fixed-point photography video about the water cycle and demonstrate the effect of the water cycle with an international map [26]. This way of teaching improves the efficiency of teaching and makes students understand geography better. The application of MOOCs in secondary school geography teaching makes the geography materials in the classroom more vivid. Also, the geography materials are limited to pictures and text and can be used in geography software or let students experience the latest applications such as 3D maps in the classroom, which is easier to stimulate students' interest. MOOC provides prosperous resources for teaching and learning, helps secondary school students understand the macroscopic nature of geography more efficiently, and makes secondary school geography classrooms more colorful and teaching methods more diversified.

3. The Information Quality of Secondary School Geography Teachers in the Context of Curriculum

Teachers' information-based teaching ability is the ability of teachers to teach through information technology under the guidance of modern teaching theory and relying on the support of modern information technology. In China, the "Standards for Information Technology Application Competence of Primary and Secondary School Teachers (Trial)" distinguishes five dimensions of IT application competence from the perspective of teachers' educational and teaching work and teachers' professional development: technology literacy, planning and preparation, organization and management, assessment and diagnosis, and learning and development [24]. In the context of MOOC, to measure the ability of secondary school teachers to use MOOC, we need to judge whether secondary school teachers need to have the ability of MOOC instructional design, video production, and teaching ability using MOOC.

3.1 Using MOOC to carry out teaching.

3.1.1 Get Familiar with MOOC Platform

The prerequisite for teachers to apply the MOOC platform for teaching is that teachers themselves must be familiar with the use of the MOOC platform and the functions on the MOOC platform, including how to upload videos, how to publish assignments, correct students' homework, and view students' learning completion progress. Only when teachers are proficient in operating the functions of the MOOC platform can they ensure the effectiveness of the MOOC teaching model and improve the efficiency of MOOC teaching.

3.1.2 Teaching ability to combine MOOC and flipped classroom

The flipped classroom, also known as the "up-side-down classroom", is a classroom where students are given the initiative to master the basics through independent learning before class while spending valuable time focusing on more profound knowledge and understanding. The combination of MOOC and flipped classrooms can help students to learn independently and improve their innovation ability. The flipped classroom teaching model with MOOC as a carrier is an important way to enhance the core literacy of secondary school students in geography [27]. Teachers adopt the teaching

model of combining the MOOC form with the flipped classroom, which requires teachers to complete the curriculum design with the flipped classroom, and teachers need to post the teaching tasks to the MOOC platform before the class, and students in need to complete the tasks set by teachers. Students discuss the problems that arise in the learning process in the classroom, and teachers answer questions and solve problems. After the lesson, the teacher must reflect on the teaching and evaluate the students' learning process. The combination of MOOC and flipped classrooms can significantly improve teaching efficiency and enhance students' learning ability and innovation (Figure 1). The combination of MOOC, a high-quality learning resource, and "flipped classroom", which focuses on differences, can help improve teaching quality [28].

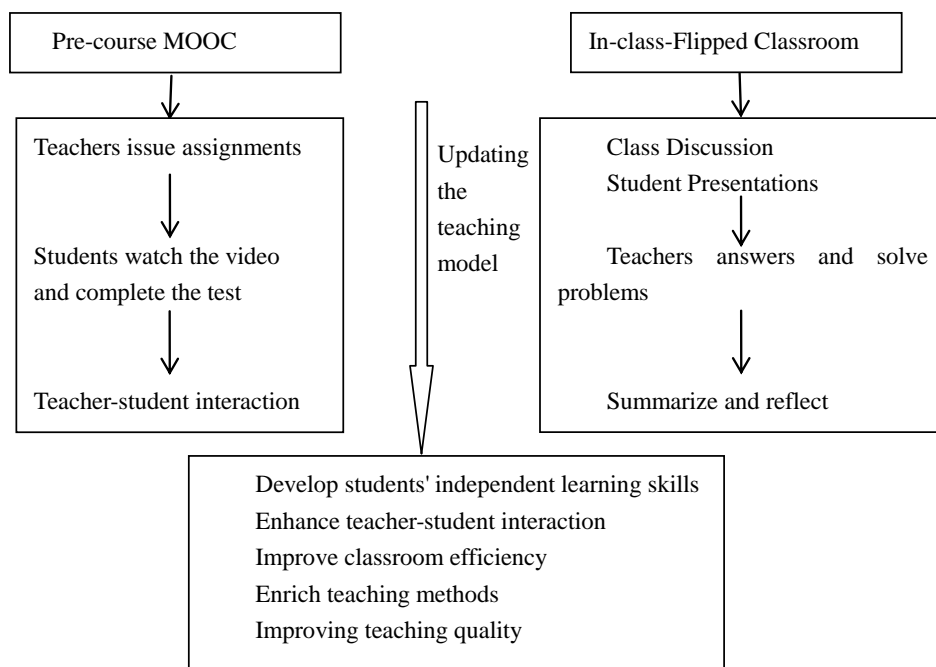


Fig. 1. Combined teaching model of MOOC and flipped classroom

3.2 Capabilities of MOOC video production

In MOOC teaching, whether teachers can produce MOOC videos is a very critical ability. Because the content of MOOC videos directly determines the effectiveness of teaching, teachers must pay attention to the production of MOOC videos. MOOCs videos are mainly used for teaching and have specific professional requirements, so each curriculum must have specialized qualities different from traditional course teaching and specific conference recording. Each video is carefully crafted to conform to the original lesson plan and focus and inlay the homework and learning exchange areas to make the MOOCs classroom more innovative, lively, and interactive [29]. Because MOOCs have the characteristics of large-scale, open, online, and courses [30], the production of MOOCs videos follows certain principles and processes to avoid the phenomenon of "A good course cannot be shot by anyone, people cannot shoot good lessons" [31]. A good MOOC video not only requires a complete team, mainly including instructional designers, lecturers, video filmmakers (including filmmakers and producers), and resource managers, but also involves several links, such as instructional design, video filming, post-production, and video review [32]. Teachers recording MOOC includes planning, recording, editing, output, and other processes. First, teachers should have clear teaching objectives for the recorded teaching content, write lesson plans and make presentations. Secondly, in recording teaching videos, teachers need to pay attention to the videos' clarity, picture quality, and graphics to ensure that the sound is clear, the picture is clear, and there is no jitter. Finally, the editing of videos requires teachers to be proficient in using video editing software.

4. Strategies to Improve Secondary School Geography Teachers' Informatization Ability

4.1 Change the concept of teaching and update teachers' information technology teaching concept in time

Teachers' teaching concepts significantly influence the effectiveness of classroom teaching, and their teaching philosophy affects teaching methods and teaching models. Under the traditional classroom teaching model, the teacher, the book, and the classroom are the center of the teaching model. Teachers often do not pay attention to the independent guidance of students, do not pay attention to the individual development of students. Students often receive knowledge passively and cannot actively explore, which leads to suppressing students' interests. In the information age, as one of the objects of change, teachers must accept the challenge from openness to their previous knowledge authority status [33]. Therefore, teachers should actively update their teaching philosophy, learn more about the latest modern teaching methods,

provide a more open platform for students to explore their interests, and move from a closed-form teaching organization to a more open form of organization. MOOC provides a more open learning platform for students. Students are no longer limited to classroom learning and can choose what they like according to their interests and preferences. The teacher also discusses and answers the questions they encounter during the learning process in the classroom. This way can realize student-student interaction and teacher-student interaction, which is more helpful to help students learn knowledge, develop their thinking, develop their individuality, and highlight the leading position of students.

4.2 Conduct teacher training to improve teachers' information technology teaching ability

The deep integration of information technology and education teaching has benefited from the rapid development of the internet, which has brought significant opportunities and challenges for the development of science and technology in education. Whether information-based teaching can be carried out successfully is closely related to teachers' information-based teaching ability, willingness to reform teaching, time and energy investment, and other factors [34]. Teachers' ability of information-based teaching directly controls the quality of information-based teaching. Information technology teaching ability is not a single "information technology + teaching", but a multi-dimensional and comprehensive ability based on teachers' professional development, which needs to be enhanced through teacher development centers, lectures and training, and other forms, with educational information technology as one of the most common training contents [35].

When secondary school geography teachers adopt the MOOC teaching model, in order to make it easier for students to understand and accept and to meet the cognitive development level of secondary school students, teachers need to improve their quality, not only to have a solid professional knowledge, but also to have a high level of information technology literacy. Regarding teacher training, teachers should be provided with systematic learning opportunities to learn the latest teaching methods and update their teaching concepts to enhance their learning of the ideas and concepts related to information-based teaching. Schools should develop policies to encourage teachers to attend special training outside of school to master cutting-edge technologies [36]. Schools should pay attention to teachers' IT operation skills, conduct seminars on information technology literacy enhancement, and hire high-level IT personnel to guide teachers' information skills training. Schools can also play the role of an IT training platform by integrating the practical training content of IT teaching to meet the need of all teachers to improve their IT teaching ability [37].

4.3 The school strengthens the investment in hardware facilities and promotes the construction of campus education information technology

The continuous promotion of education informatization has prompted the deep integration of information technology and education teaching [38]. In promoting the construction of an information campus, to create an information teaching atmosphere for teachers and students, the school should first improve the information teaching platform while developing high-quality information teaching resources and continuously promoting the information sharing of high-quality information teaching resources. Maintaining communication and contact between schools and other schools, different schools can build informalized teaching platforms to keep sharing teaching resources, so that teachers with the same teaching content can communicate on the platform and pass on their teaching experience. Government departments should also pay attention to education investment worldwide, increase funding for schools in backward areas, help these areas build and update teaching informatization equipment and networks, and alleviate the uneven distribution of education resources. The education department coordinates the organization, increases the financial, technical, and configuration support for catechism, absorbs core talents, and establishes research centers [39]. All these are conducive to promoting teachers to use information technology and teaching resources in schools to optimize teaching methods and the teaching process, improve students' independent learning ability, and vigorously improve teaching quality, thus promoting education in China.

4.4 Construction of teaching evaluation mechanism

To ensure the effectiveness of information-based teaching, schools can establish teaching feedback channels to evaluate and reflect on teachers' information-based teaching ability in a holistic manner. Establishing optimal feedback channels is an essential element and the primary method of conducting teaching evaluation [40]. Teaching feedback is the teacher's reflection in the teaching process and the student's assessment of the teacher's teaching process feedback teaching. Tools for teaching evaluation can include test papers, questionnaires, test scales, evaluation gauges, observation record forms, growth records, and electronic portfolios. The feedback of teaching evaluation should consist of: whether the classroom teaching objectives are accomplished under the use of information technology teaching mode; students' attitudes towards the classroom; whether the information technology teaching methods have improved the efficiency of the class, and in which aspects of the teaching process need to be improved and perfected. Teachers can get timely and adequate information about students' responses in the information-based teaching mode through teaching evaluation feedback. Teaching reflection is an essential factor in the improvement of teachers' professional abilities. Teachers get a full range of feedback information through the evaluation mechanism, and then they reflect on their teaching and continuously improve their information-based classroom teaching.

5. Conclusion

Improving teachers' ability to teach and use information technology is an essential measure in promoting education informatization. Schools should consider establishing a reasonable teaching evaluation mechanism to evaluate whether secondary school geography teachers can improve their teaching ability by learning and using MOOCs. However, the information technology skills of teachers using MOOC teaching are only one aspect of information technology teaching ability. The continuous development of information technology and new technologies require teachers to accept new educational concepts and continuously learn and master new intelligent teaching techniques. At the same time, teachers need to constantly change their teaching methods and means to adapt to the requirements of information-based teaching.

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How to cite this paper: Li Nan, Zhang Yong, "Improvement and Practice of Secondary School Geography Teachers' Informatization Teaching Ability Based on the Perspective of MOOCs", *International Journal of Education and Management Engineering (IJEME)*, Vol.12, No.1, pp. 11-18, 2022. DOI: 10.5815/ijeme.2022.01.02