

# Flipped Classroom Based on MOOC and VR With Real-time Interaction and Multidisciplinary Integration in Diagnostics in Chinese Medicine

Qianxin Wu<sup>1, a</sup>, Li Sun<sup>1, b, \*</sup>

<sup>1</sup> College of Traditional Chinese Medicine, Jinan University, Guangzhou, 510632, China

<sup>a</sup> giotto9669@stu2019.jnu.edu.cn, <sup>b</sup> 354597197@qq.com

## Abstract

**Diagnostics in Chinese Medicine is a fundamental subject in Traditional Chinese Medicine. The introduction of flipped classroom in the course Diagnostics in Chinese Medicine can remedy the disadvantage in the classical education pattern, as well as enhance students' learning enthusiasm. In this paper, we will elaborate a new teaching pattern, flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration, which provides a new perspective for the innovation of educational pattern in Diagnostics in Chinese Medicine.**

## Keywords

**Flipped classroom; MOOC; Virtual simulation; Diagnostics in Chinese Medicine.**

## 1. Introduction

The courses Diagnostics in Chinese Medicine is one of the compulsory curriculum for the students majoring in TCM-related disciplines, and is a bridge course connecting the basic theory and clinical practice in TCM teaching system. The course focuses not only on teaching the basic theories and professional knowledge about TCM diagnosis, but also aims to help students build up a new mindset that applies the knowledge they have learned to guide their clinical practice, which can enhance their problem-solving capability when encountering clinical challenges. However, there are various disadvantages in the classical education pattern of the course Diagnosis of Chinese Medicine, such as the stereotypical teaching methods, insufficient interaction between teachers and students, and the serious disconnection between basic theory teaching and clinical practice.

Flipped classroom was first proposed and applied in the United States, which is a new teaching mode relying on the development of Internet information technology [1]. In this mode, teachers post the course videos on the Internet so that students can learn it before class time and then consolidate what they have learned during the class. By redistributing the time in class and transferring the initiative from the teacher to the students, the flipped classroom provides a more active, flexible and convenient way for students to enjoy learning, which can remedy the limitations of the traditional teaching model and therefore is more popular among students [2]. The use of flipped classroom in medical education is also increasing steadily [3, 4]. It was reported as early as 2016 that the introduction of MOOC in the the course Diagnosis in Chinese Medicine could achieve excellent effects [5]. On that based, Professor Sun Li from Jinan University added a virtual simulation VR course and pioneered a teaching pattern that Flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration, which is applied to the course Diagnosis in Chinese Medicine, This new pattern can effectively ameliorate the shortcomings in the traditional classroom and obtain the maximum advantage.

This paper will detail the content of this new pattern and its application in the course Diagnosis of Chinese Medicine so as to provide a new idea for the innovation of that course, as a contribution to the cultivation of innovative and practical TCM clinical medicine professionals.

## **2. The Contents of the Flipped Classroom Based on MOOC and VR with Real-time Interaction and Multidisciplinary Integration**

The flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration is a hybrid teaching platform that built on two national-level MOOC and VR courses of Diagnosis in Chinese Medicine, in which the teachers make flexible use of real-time instruments, such as QQ group, WeChat Official Accounts and Super Star Learning App, to interact with their students. The core of this teaching pattern is the integration of student-centered and theoretical instruction with clinical practice.

### **2.1. Improvement of MOOC**

Back in 2016, Prof. Sun produced a MOOC course on Chinese Medicine Diagnostics and simultaneously published it on five major MOOC platforms in China, including China University MOOC, XuetangX, CNMOOC, Treentry and Super Star MOOC. In recent years, the original curriculum has been constantly improving with multifarious videos and pictures required for teaching, and a complete database of examination system and clinical case for the course has been established. In this innovative pattern, with a view to the management of the students, the SuperStar MOOC platform was chosen to provide better supervision and guidance as well as refinement of students performance.

### **2.2. Establishment of Virtual Simulation(VR)**

Clinical practice has always been a shortcoming for students majoring in Traditional Chinese medicine. In order to cultivate the clinical method of thought among TCM students and provide students with the opportunity in clinical practice as early as possible, Prof. Sun built a VR course "Virtual Simulation Experiment for Standardized Patients in TCM Diagnosis" in 2018, as a companion to the MOOC course.

### **2.3. Application of Real-time Interactive Instruments**

One of the interactive tools is the QQ group, where teachers are able to send course lectures, relevant learning materials and real-time learning announcements to their students. In the hybrid teaching pattern, teachers set up a proprietary QQ group for each class. Another important interactive tool is the WeChat Official Accounts. Medical records and clinical experience of Diagnosis in Chinese Medicine will be posted on the WeChat official accounts that specially set up for this course for the learners to review at any time. The major instrument that plays the most important role in real-time interaction is the Super Star Learning App, which offers various functions such as classroom check-in, interactive blank-filling, and online Q&A. The combined application of SuperStar MOOC platform and Super Star Learning App assure the flipped classroom can carry out, in which teachers can successfully implement medical case teaching, scenario-based teaching and inquiry-based teaching.

### **2.4. Multidisciplinary Integration**

During the course of Diagnosis in Chinese Medicine, experts and professors from various disciplines such as gynecology, pediatrics and acupuncture are invited to the class to talk about their clinical experience, including the diagnosis and treatment of common diseases, massage manipulation and practicum on advanced acupuncture techniques. As a result, students are able to combine theoretical learning with clinical cases and develop a deep recognition of how

to guide clinical practice by theory, which achieves the improvement of their dialectical thinking ability and the professional quality of TCM.

### **3. The Application of the Flipped Classroom Based on MOOC and VR with Real-time Interaction and Multidisciplinary Integration**

#### **3.1. Instructional Design And Preview Before The Lesson**

Before the class, teachers need to prepare videos, pictures and PowerPoint of the flipped teaching. They also require to prepares interaction programs and course check-in solutions on the Super Star Learning App, as well as upload class assignments and learning materials in the QQ class-group. According to the teaching arrangement, students should preview and complete exercises on SuperStar MOOC platform before the lesson and present their reflections on what they are learning.

#### **3.2. Implementation of the Flipped Class During the Lesson**

Since students have already completed the corresponding chapter on the MOOC platform, that is, instead of spending a lot of time on theory in the textbook, teachers only explain the important and difficult points to internalize the knowledge. The class focuses on scenario-based and case-based teaching of medical cases and simulated patients, and allows students to engage in group discussions about them. During the class, teachers take course check-in, real-time interaction and student Q&A by the Super Star Learning App, which encourages students to attend the course on time and actively participate in the course interaction, so as to ensure the teaching effectiveness.

#### **3.3. Focus on Learning Process and Efficiency after the Lesson**

Through the MOOC platform, teachers can keep track of students' learning progress and efficiency by statistically measuring video learning time, homework assignments, class participation and usual performance. After that, teachers provide individualized supervision through QQ groups to the students who are lagging behind in their study progress and whose usual grades are not up to standard, so that they can be reminded to fix their attention on the course.

### **4. The Feedback of the Flipped Classroom Based on MOOC and VR with Real-time Interaction and Multidisciplinary Integration**

Since the application of this new pattern in the course of Diagnosis in Chinese Medicine, in the last 5 years, the MOOC course was inundated with more than 500,000 applications and the VR course has attracted more than 15,000 learners, making it one of the top courses in TCM teaching system. This educational mode has been awarded first prize in several provincial and national teaching case competitions.

In addition, student feedback on the flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration was collected via a questionnaire. The survey (Table 1) indicate that students are generally satisfied with this innovative learning model as it increases their interest and motivation in learning, and also enhances their ability to put mental knowledge into practice, which will enable them to be competent in clinical practice later on.

**Table 1.** The questionnaire result of the flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration (%)

	Agreement			Disagreement			Opposition		
	class 2018	class 2019	class 2020	class 2018	class 2019	class 2020	class 2018	class 2019	class 2020
Improve learning interest	98.04	98.41	96.78	1.96	1.59	1.61	0	0	1.61
Improve the motivation of learning	94.12	98.41	96.77	3.92	0	3.23	1.96	1.59	0
Improve learning ability	96.08	100	98.39	3.92	0	1.61	0	0	0
Objective evaluation of learning	100	100	98.39	0	0	1.61	0	0	0
Acceptance of the new teaching pattern	94.12	96.82	96.78	5.88	3.18	3.23	0	0	0

## 5. Conclusion

The feedback of the flipped classroom based on MOOC and VR with real-time interaction and multidisciplinary integration breaks away from the old single teaching model as it combines online real-time interaction and offline flipped classroom through teaching platforms and interactive tools, which can significantly improve education quality. The application of this teaching mode in the course of Diagnosis in Chinese Medicine is an advance in disseminating the traditional knowledge of TCM by modern information technology, and is an effective improvement on a traditional course that is short of clinical practice. It has been proved that this education pattern provides new ideas for the innovation of the course of Diagnosis in Chinese Medicine and even other curriculums of TCM, which is an effective way to build a responsible clinical medical staff of traditional Chinese medicine.

## References

- [1] Bergmann J, Sams A.: Flip Your Classroom: Reach Every Student in Every Class Every Day, International Society for Technology in Education, 2012, p. 112.
- [2] Ramnanan CJ, Pound LD: Advances in medical education and practice: student perceptions of the flipped classroom. *Adv Med Educ Pract*, vol. 8 (2017), p. 63-73.
- [3] Chen F, Lui AM and Martinelli SM. : A systematic review of the effectiveness of flipped classrooms in medical education. *MED EDUC*, vol. 51 (2017) No. 6, p. 585-597.
- [4] Street SE, Gilliland KO, McNeil C and Royal K. The Flipped Classroom Improved Medical Student Performance and Satisfaction in a Pre-clinical Physiology Course. *Medical Science Educator*, Vol. 25 (2015), p.35-43.