

The Connotation of Flipped Classroom and Strategies for Practice in Higher Education

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ABSTRACT

Since the new century, the flipped classroom has gradually become the focus of teaching reform and teaching research. The flipped classroom is the result of the gradual development of higher education in the information age and provides a new way of thinking for higher teaching. The article mainly studied the inner meaning, the theoretical basis of a flipped classroom by reading relevant literature, and how higher education can be better implemented through the flipped classroom. The flipped classroom needs to be optimised in terms of subject curriculum system, development of teaching and research, student assessment and teaching platform to improve the quality of teaching and learning in higher education. It is hoped that this will provide some reference for the practice and research of the flipped classroom in higher education.

Keywords: *Flipped classroom; Higher education; Teaching and learning reform*

1. INTRODUCTION

In the 21st century, information technology has continued to develop, the concepts of teaching have been updated, and the new teaching method of online and offline independent learning, the flipped classroom, has received increasing attention from educators and has become a hot topic in educational reform.

Studies have found that traditional lecture-based teaching is still the main teaching method in higher education classrooms [1]. In traditional teaching models, students are often asked to remember isolated pieces of knowledge, even if they do not have a strong memory. The flipped classroom, on the other hand, fosters the ability to move from passive to active learning and emphasises student engagement in the teaching and learning process. Active learning approaches to teaching and learning encompass a continuum from discussion to structured teaching and learning methods, mainly including collaborative learning, case studies, peer-to-peer teaching, inquiry-based learning, problem-based learning and project-based learning [2]. Active learning approaches contribute to the overall literacy of students and are an important reflection of the quality of graduates in 21st century society.

Currently, China is standing at a new historical starting point and is at a critical stage of becoming a strong country in higher education [3]. Therefore, raising the standard of higher education, improving the quality of higher education and making it more efficient is the way to achieve the goal. Educators are working hard to achieve this goal. One of the ways in which the 'classroom revolution' is taking place is through the use of the flipped classroom model, which has had a positive impact on classroom teaching. The flipped classroom has changed the traditional classroom from a passive and one-way lecture to a new way of thinking about teaching and learning in the information age.

Compared with basic education or general flipped classroom research, there are relatively few studies on flipped classroom in higher education in China. This paper takes the flipped classroom in higher education as an object of investigation, systematically compares the connotation and theoretical basis of the flipped classroom, and provides useful suggestions for teaching reform in Chinese universities in the information age.

2. THE CONNOTATION OF FLIPPED CLASSROOM

Carl Reidsema, Roger Hadgraft and Lydia Kavanagh mention that in a flipped classroom, students need to

complete initial learning online in order to engage in structured learning activities with their teachers and peers in the classroom. Students may face considerable challenges: instead of learning through listening to lectures, as in traditional teaching methods, they learn through short and to-the-point videos with discussions [4].

The most important feature of the flipped classroom is the presentation, which is not just the teacher's narration or the board, but the use of multimedia technologies such as courseware, audio and video. The new generation of information technology not only helps to create teaching situations and develop students' thinking skills, but also increases students' interest in learning. At the same time, multimedia technology can also create a personalised learning model, allowing students to freely organise their learning time and space. The flipped classroom aims to improve teaching quality and promote student development, using information technology to end the passive, receptive learning of traditional classrooms, transferring the choice and decision to learners, who can manage their own learning time and achieve personalised learning and personalised training [5]. Innovations in educational technology help students better understand the content and improve their learning efficiency. It also helps teachers to keep track of student learning trends, provide feedback on learning using online quizzes, and use data to analyse student learning.

The change in the way knowledge is delivered is only one of the features of the flipped classroom. At the heart of the flipped classroom is the flipping of the traditional classroom by moving a lot of direct instruction out of the classroom and using class time for meaningful deeper learning. Students thus move from passive listening to lectures to a combination of learning and thinking. This is because instead of lectures in the classroom, the teacher engages in group discussions, practice, interactive inquiry and question and answer sessions. If students do not reflect after watching the video, then they will not be able to complete the group activities well. At the same time, the discussion and practice will make the students' knowledge framework more open. If the teacher's lecture gives students a framework as a trunk, through the flipped classroom, the framework becomes more than a trunk, with many branches.

The flipped classroom also changes the roles of the teacher and students. The teacher takes on more of a 'directing' role, being the leader of the class, the controller of the pace of the class, or the evaluator of student performance. This is the role of the 'director'. Students become the evaluators and questioners of questions, the researchers and explorers of knowledge, the participants and interactors of discussions.

3. THEORETICAL FOUNDATIONS OF THE FLIPPED CLASSROOM

3.1 Mastery learning theory

In his 1971 book *Learning for Mastery*, Bloom refers to 'mastery learning'. Bloom argues that learning attainment depends on the cognitive and affective prerequisites of the learner and the quality of the teacher's instruction [6]. Bloom argues that it is possible for the majority of students (over 90%) to achieve mastery if the best quality of instruction is provided and enough time is given to prepare students cognitively and emotionally [7]. The flipped classroom also strives to find the right approach for each student. Students are also not limited in their learning by time and can watch the videos at any time until they are able to master the knowledge.

3.2 Constructivist learning theory

Constructivist learning theory was first proposed by Piaget in Switzerland. Knowledge is not acquired through transmission by a teacher, but is a process by which learners acquire knowledge through meaningful construction with the help of other people (including teachers and learning partners) in a certain context, i.e. a socio-cultural context [8], using the necessary learning materials. In other words, the amount of knowledge that students can acquire depends on their ability to construct meaning from their own experiences. The flipped classroom helps students to think about what they have learnt before the lesson and to construct knowledge with their own efforts.

3.3 Cognitive load theory

The most representative of cognitive load research is Sweller et al.'s trichotomous approach, which divides cognitive load into three categories, namely intrinsic, extrinsic and related cognitive load [9]. The goal of instructional design is to strive to trigger a lower cognitive load to achieve the best learning outcome. Pre-lesson videos are provided in the flipped classroom to help students build readiness and face the knowledge with relative confidence. Such pre-class preparation facilitates a lower cognitive load for students.

4. STRATEGIES FOR THE FLIPPED CLASSROOM IN PRACTICE

Flipped classroom is one of the effective ways to improve the quality of higher education. However, as the practice of flipped classroom deepens, there are many challenges in the traditional classroom, teachers' view of teaching and students' view of learning, etc., which need to be continuously researched.

4.1 Optimising the subject and curriculum system

In Chinese higher education, once you have chosen a major, it is difficult to learn about other majors. For example, the architecture major at one Chinese university focuses on courses such as Fundamentals of Architectural Design, Introduction to Architecture, Architectural Art and Architectural Mechanics. Students are not given a real degree of freedom to learn. If the quality of higher education is to be improved through flipped classrooms, it is necessary to optimise the subject and curriculum system and break down the barriers of specialisation.

Universities can rely on educational platforms to provide students with a diverse range of courses. Students can take relevant courses and watch micro-lessons according to their interests and needs. In the foundation stage of freshman and sophomore years, focus on the integration of general education and subject knowledge. For example, thinking skills and cultural literacy are arranged in general education and interdisciplinary learning is encouraged. In the junior and senior years, it can be based on two major systems: academic and workplace. On the one hand, the depth of the curriculum is increased, and on the other hand, practical skills are emphasized.

Table 1 The curriculum of an architecture major at a Chinese university

	Monday	Tuesday	Wednesday	Thursday	Friday
1st	Mental Health Education for University Students	Architectural Mechanics	Architectural Art	University English	Fundamentals of Architectural Design
2nd					
3rd	Outline of Modern Chinese History				
4th					
5th					
6th					
7th	University English	Fundamentals of Architectural Design	Introduction to Architecture		
8th					

4.2 Focus on the synergistic development of research and teaching.

At the tertiary level, learning knowledge is not the only goal; talent development and scientific innovation are also integral parts of the goal. Through the flipped classroom, teachers and students can engage in discussion and enquiry within a single learning platform. The academic process of the teacher will be integrated into the practical process of the flipped classroom for the students, and research and teaching can be transformed into each other. With scientific research as the aim and the flipped classroom as the pathway, students are able to construct their own knowledge and improve their creative skills. Through the flipped classroom, teachers and students will have full academic freedom and subjectivity to participate and fulfill the educational governance goals

of talent development and scientific innovation together in a form of equal dialogue.

4.3 Improve the assessment and evaluation of the course

The flipped classroom is no longer 'mark-based'. Teachers should also focus more on formative assessment rather than summative assessment. One of the criteria for assessment is whether students have improved their independent learning skills. Teachers can assess students by observing their participation in class, test results, reflections on the learning process, communication on the learning platform, group work and so on. A full range of assessments with multiple indicators can help teachers gain a more comprehensive understanding of students' mastery of knowledge points.

The purpose of assessment and evaluation is not only to evaluate students, but to encourage them and hopefully to urge them to develop better. For example, it is necessary for the assessment of students' academic standards to include independent learning, group work and participation in classroom activities in a quantitative form, to form a comprehensive assessment system for learning and development. This will promote the internal drive for learning and students will always have the interest and motivation to learn.

4.4 Optimise the design of the teaching platform

Due to its characteristics, the flipped classroom cannot be separated from the support of the teaching platform. The teaching platform constrains the development of higher education. An excellent teaching platform has the effect of improving teaching quality with half the effort. Firstly, the design of the flipped teaching platform should be smooth and simple, in line with the psychological and cognitive characteristics of students. Secondly, the teaching platform can be developed with functions such as multi-fold speed and real-time comments. Finally, the teaching platform should focus on the feedback mechanism. A fully functional teaching platform can not only provide videos for students to browse and learn, but also record students' learning, view their progress in time and carry out suitable teaching activities. Some advanced teaching systems can rely on tools to monitor the brain so as to have an accurate grasp of student learning.

5. CONCLUSION

The flipped classroom can be traced back to the peer-to-peer teaching style of Harvard University in the 1990s. Students are free to pace and content their learning with their individual learning styles and learning styles. Students watch videos and work on their knowledge before class. The teacher organises group activities in class for students to internalise their knowledge. At the end of the lesson on the teaching platform, the teacher provides quizzes or questionnaires to test the students' learning. Bloom's mastery learning theory, Piaget's constructivist learning theory and Sweller's cognitive load theory are the theoretical foundations of the flipped classroom. The flipped classroom model of teaching and learning requires schools to emphasise a combination of information literacy and student-led learning on the one hand; on the other hand, the transformation of teaching and learning is distinctly contemporary and strongly forward-looking. The flipped classroom gives new value and meaning to higher education. Higher education needs to plan subject curricula and allocate teaching resources efficiently. The flipped classroom offers the possibility of synergy between research and teaching. Teachers use formative assessment in the process of evaluating

students and establish an evaluation system with diversified evaluation criteria and assessment methods. The optimisation of the teaching platform can also be included in the reform. There are many shortcomings in the paper. The development of flipped classroom in Chinese higher education still has a lot of way to go, such as the development of localisation, the integration of theory and practice, and the improvement of teachers' professionalism. More future exploration is needed in these areas.

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