

## A Study on the Constituent of the Flipped Classroom

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### Abstract

The flipped classroom integrates traditional teaching elements and achieves essential transformation via digital media, forming a new model distinct from conventional classrooms and general online education. This paper analyzes its core components, including lectures, reading, discussion, assessment, curriculum organization, and credit recognition, to reveal operational features, innovations, and dilemmas. It identifies digital reconstruction, copyright balance, communication optimization, assessment improvement, personalized design, and identity accreditation as critical issues. The flipped classroom is defined by being massive, open, free, and online, with core values of educational equity, teaching innovation, and research reform. This study clarifies its boundaries with other educational models and provides a theoretical reference for its high-quality development.

### Keywords

Constituent elements of the flipped classroom; Traditional teaching elements; Boundaries.

### 1. Introduction

The components of the flipped classroom teaching model embody both the common features of traditional classrooms and the unique characteristics of the digital era. It incorporates traditional teaching elements such as classroom instruction, reading materials, discussion, testing and assessment, and curriculum organization, yet their connotations have undergone an essential transformation due to the digitalization of delivery media. In a large-scale online learning context, learners with diverse educational backgrounds, comprehension abilities, and language levels participate together, which redefines the role of each teaching element. When these elements are organically integrated into a whole, the flipped classroom becomes a new teaching model distinct from both traditional classrooms and general online education. Starting from its core components, this paper analyzes the operational characteristics, development dilemmas, and essential connotations of the flipped classroom, and clarifies its boundaries from other educational models.

### 2. In-class Lectures: Digital Reconstruction of the Core Link

In-class lectures have always been the most core and valuable link in teaching activities, whose essence lies in the effective transmission of professional knowledge and practical experience, and they occupy an absolutely dominant position especially in higher education. Different from basic education which focuses on cognitive and behavioral training, higher education's demand for the efficient transmission and reception of a large amount of information has made the importance of in-class lectures increasingly prominent. Professor Donald Bligh pointed out in *What's the Use of Lectures* that among the four outcomes that every teacher emphasizes students should acquire through teaching activities (acquiring information, promoting thinking,

changing perspectives, and developing behaviors and skills), the accurate acquisition of information is the only criterion to verify the effectiveness of the lecture model, a criterion that also applies to the flipped classroom but is by no means a simple reproduction of the traditional lecture model [1].

Some argue that online lectures in the flipped classroom are merely moving traditional classrooms onto the screen, lacking innovative value. This perception overlooks the groundbreaking changes that the flipped classroom has brought to the lecture model. Lectures in the flipped classroom are not a digital copy of traditional lectures, but a comprehensive reconstruction combining technical characteristics and learners' needs, with core changes reflected in three dimensions: time design, learning autonomy and technology integration.

### **2.1. Time Design**

In terms of time design, since lectures are targeted at students, research results should be based on the limit values of students' sustained attention and active memory. [2] The flipped classroom breaks the time limit of 1 to 2 hours for traditional lectures and disassembles courses into fragmented small segments. Professor Bligh suggests controlling the duration of a single lecture within 20 to 30 minutes. In practical application, platforms such as edX and Coursera divide weekly video courses of 1 to 3 hours into 5 to 15-minute segments, and Udacity even breaks down lecture content into clips of less than two minutes. This fragmented design is more in line with the attention rules of online learning and improves the efficiency of knowledge reception.

### **2.2. Learning Autonomy**

In terms of learning autonomy, lectures recorded in audio or video form also provide learners with the initiative to control their learning progress—they can freely switch between the pause, fast-forward and rewind buttons to adjust the speed of lectures according to their own acceptance and comprehension levels. Such flexible control based on individual circumstances is unimaginable in the lecture link of traditional classrooms. Learners with sufficient knowledge reserves can quickly skip the content they have mastered; those who encounter learning difficulties can repeatedly review key content, and even consult it at any time when completing assignments and assessments, truly realizing personalized learning. Meanwhile, the emergence of high-tech auxiliary technologies such as speech speed adjustment and external subtitles has provided thoughtful learning support for non-native speakers and become a standard configuration for video lectures in the flipped classroom.

### **2.3. Technology Integration**

In terms of technology integration, lectures in the flipped classroom are no longer limited to a single form of knowledge explanation, but are developing towards immersion and interactivity to distinguish themselves from other online systems. Relying on technical and financial support, developers of the flipped classroom have integrated real-time communication technologies, and created an immersive experience for learners through shooting interviews, field visits and other scenes. For example, Professor David Cox's Neuroscience course at Harvard University takes learners to visit research places such as laboratories and hospitals; Udacity's Introduction to Psychology sets up interview and short drama programs, allowing learners to communicate with experts on professional topics face to face. Such diversified lecture forms have made the value of in-class lectures go beyond simple information transmission.

It is worth noting that although the richness of innovative technologies is an essential element of most successful flipped classroom courses, the ultimate success of the flipped classroom as a whole is still determined by teachers' comprehensive qualities. Consistent with the traditional educational philosophy, as the hosts of the lecture link, excellent teachers can integrate teaching art and personal charisma into online lectures and convey positive energy beyond

knowledge. Their public speaking talent, teaching skills and ability to teach students in accordance with their aptitude are the key to organically connecting other teaching links. Professor Michael Sandel's Justice course at Harvard University is a typical case: its offline version is hard to get a seat for, and the online version even had over 60,000 registrations overnight after its launch on the edX platform. Teachers' personal charisma has become the core source of course attraction. Even though the flipped classroom relies on digital technology, teachers remain the core of in-class lectures and the key factor determining the overall quality of the course.

Of course, there are still many problems with video lectures in the current flipped classroom. Most courses have flaws in hardware such as lighting and sound, and some even have omissions in picture connection. However, some less well-known courses can create an intimate classroom atmosphere in their lectures, a trait that big-name courses lack. In general, on the basis of retaining the traditional core value, in-class lectures of the flipped classroom have realized model innovation through technological empowerment, and teachers' comprehensive qualities are the fundamental factor determining the success or failure of this link.

### **3. Reading: Balancing Copyright Dilemmas and Open Resource Provision**

Reading is an important part of teaching activities. From ancient written educational materials to modern textbooks and extracurricular readings, the forms of reading resources have been constantly evolving, yet they have always undertaken the important role of knowledge supplementation and ability cultivation. [3] In traditional higher education, majors such as mathematics and science take textbooks as the core reading materials, while social sciences and humanities emphasize extensive reading of extracurricular books. Even with designated textbooks, professors will assign additional extracurricular reading tasks to consolidate students' professional foundation. In the digital age, however, the way of acquiring reading resources has undergone fundamental changes. The "open" and "free" attributes of the flipped classroom have plunged the reading link into dual dilemmas of copyright regulation and resource supply, while also driving the continuous innovation of reading resource acquisition models.

#### **3.1. Copyright Dilemmas and Solutions**

The copy and paste technologies in the digital age have made the dissemination of reading resources convenient, but also triggered disputes over intellectual property rights, a problem that has become more prominent due to the characteristics of the flipped classroom's audience. The vast majority of flipped classroom learners are not officially registered university students, and the special agreements signed by universities with copyright owners only apply to their own students. Flipped classroom learners obtaining copyrighted reading materials for free is unfair to copyright owners. At the same time, as "Massive Open Online Courses (MOOCs)", the "open" principle of the flipped classroom requires teaching materials to be freely accessible to the public. If course reading materials need to be purchased, it will violate the original intention of the flipped classroom for openness and accessibility to all, making the reading link a major problem in the initial stage of the flipped classroom's development.

To avoid copyright disputes, the flipped classroom initially adopted the strategy of deleting reading lists or only providing optional reading lists, which directly led to learners' weak professional foundation. Compared with registered students in traditional university classrooms, flipped classroom learners have obvious gaps in the accuracy and breadth of professional knowledge due to the lack of systematic reading training. This problem has become increasingly severe with the increase in flipped classroom programs, forcing developers and teaching professors to seek new solutions.

At present, the flipped classroom mainly solves the problem of reading resource supply and balances copyright protection and resource openness through three methods.

First, linking to public free electronic resources and open-access journals. [4] Such resources belong to the public domain and involve no copyright issues, serving as an important source of reading resources for the flipped classroom. However, this method has obvious limitations: cutting-edge content and modern and contemporary materials of some courses are protected by copyright and difficult to obtain through public resources. For example, the History of Modern and Postmodern Thought course on the Coursera platform can only turn to secondary resources such as video interviews when explaining content of the 20th and 21st centuries, unable to provide original works.

Second, professors negotiate with publishers to obtain free authorization for reading materials by waiving royalties, providing limited-time free access and other means. Professor Gregory Nagy of Harvard University is a forerunner: he waived the royalties of the textbook for his Ancient Greek Heroes course, allowing learners to obtain materials for free. Driven by this trend, traditional publishers have also launched limited-time free services, opening electronic materials and open-access journal educational resources to learners for free during the course, and providing discounted printed versions after the course ends. This not only protects the interests of copyright owners but also meets the resource needs of the flipped classroom.

Third, exploring free resources and evading intellectual property rules. With the development of the flipped classroom, developers and professors have accumulated rich experience in screening free resources, and can more skillfully integrate various free reading resources to meet the reading needs of courses.

### **3.2. Task Monitoring and Progress Supervision**

Another core issue of the reading link is the monitoring of the completion of reading tasks. In traditional higher education, although teachers can assign reading tasks, it is difficult for them to effectively monitor students' completion. Richard Arum and Josipa Roksa conducted a detailed investigation and discussion on students' reading behavior in their book *Academically Adrift: Limited Learning on College Campuses* published in 2011. [5] The flipped classroom adopts a zero-monitoring curriculum design and cannot accurately grasp learners' reading situation, which makes self-motivation and self-discipline essential qualities for completing flipped classroom courses. Whether reading tasks are completed has become the main criterion to distinguish the learning effects of flipped classroom learners: those who complete the designated reading can effectively improve their professional quality, while those who do not gain little.

Restricted by copyright dilemmas, the reading link of the flipped classroom has been constantly exploring new models of resource supply, adhering to the core principles of "openness" and "freedom", and gradually making up for the reading gap with traditional classrooms. At the same time, the zero-monitoring feature of the reading link puts forward higher requirements for learners' autonomous learning ability, becoming an important factor affecting the learning effect of the flipped classroom.

## **4. Discussion of Questions and Learning Groups: Innovation and Limitations of Online Communication**

The emergence of distance education has led to an endless debate on the advantages and disadvantages of online education and traditional classroom education, and the online transformation of question discussion, an important link in teaching activities, has also become one of the core contents of the flipped classroom [6].

Relying on modern network technology, the discussion of questions and the establishment of learning groups in the flipped classroom have broken the constraints of time and space, forming a completely different communication model from traditional classrooms. It has both incomparable advantages over traditional classrooms and inevitable limitations that are hard to make up for, and its development has always centered on technological empowerment and experience optimization [7].

#### **4.1. Advantages of Environmental Atmosphere**

Question discussion in the flipped classroom is based on online forums as the basic carrier. As an asynchronous communication tool, online forums cannot realize real-time communication, but provide learners with sufficient space for thinking and expression. Compared with face-to-face discussions in traditional classrooms, online forums allow shy and inarticulate learners to get rid of psychological pressure and express their views freely; at the same time, learners have ample time to sort out their thinking before answering questions, resulting in higher accuracy and completeness of communication. They can even achieve efficient cross-time communication through message boards. This model is like the online comment system for works, where learners can give feedback on their views at any time and conduct in-depth exchanges with teachers and classmates, becoming the basic form of question discussion in the flipped classroom.

#### **4.2. Advantages of Tools and Technologies**

With the development of network technology, the communication tools of the flipped classroom have been continuously upgraded. The integration of synchronous communication technology has enabled online discussions to achieve a "face-to-face" experience. Audio and video conference platforms such as Skype and Google Hangouts have been embedded into learning management systems, making real-time communication between teachers and students, and among students possible, and replicating the vivid teaching scenes of traditional classrooms. At the same time, the integration of social media such as Facebook and Google+ with teaching has diversified communication forms: teachers can set up their own social platforms to release courses and organize discussions, and supplement classroom teaching content through blogs; students can form social circles, learning circles and cooperative project circles to carry out exchanges and discussions in various ways. As a result, the boundary between traditional classrooms and online education has become increasingly blurred.

#### **4.3. Advantages of Data Collection**

Another important value of online discussion platforms is to provide real and rich data support for educational research. Traditional educational research mostly adopts indirect methods to investigate students' academic performance and behaviors, such as term papers and comprehensive assessments. In contrast, online discussion platforms can record all communication behaviors of learners, providing accurate data analysis samples for scientific research. A Silicon Valley company once provided online discussion platforms for more than 10,000 classes, recording the behavioral patterns of students in more than 3,600 courses from over 500 educational institutions. Through one and a half years of follow-up analysis, it summarized learners' behavioral patterns, development potential and academic prospects—an academic value that traditional classroom education cannot achieve [8].

#### **4.4. Limitations and Breakthroughs**

Although the discussion of questions in the flipped classroom has realized formal innovation relying on technology, it faces many practical limitations due to its "massive" attribute. First, the imbalance of discussion participation. The number of registered students in the flipped classroom is in the tens of thousands. Even if 5%-15% of persistent learners become

active participants in online forums, their number is still huge, leading to a large number of discussion posts being submerged. Professor Sandel's Justice course at Harvard University requires students to speak at least twice a week. Tens of thousands of posts make most content unanswered, and less than 1% of the main posts can get a small amount of support, greatly reducing the effectiveness of discussions.

Second, the insufficient stability of learning groups. The flipped classroom builds virtual forums for learners based on region, language and interest, and also supports them to form offline learning groups. However, since learners come from all over the world, offline groups can only be realized in densely populated metropolises. Moreover, affected by the pace of life and pressure, most offline groups dissolve after several gatherings.

Third, the limited depth and effectiveness of discussions. Although online discussion platforms can realize the exchange of views, real human dialogue includes non-verbal factors such as facial expressions and body language, which cannot be transmitted in the online environment. This makes it difficult for online forums to complete in-depth opinion-exchange discussions in traditional classrooms, and also unable to replace the value of informal exchanges such as dormitory chats.

To solve the above problems, developers of the flipped classroom have been constantly improving platform functions and optimizing the discussion experience. For example, setting up personalized virtual social areas to allow learners to accurately find like-minded partners; launching a "live office" video system where the main teachers focus on answering hot forum questions every week; the Coursera platform even launched the "Learning Hub" project to realize the organic combination of online learning and classroom learning, providing information supplementation for traditional classrooms in developing countries. At the same time, the discussion link of the flipped classroom has always adhered to the design purpose of "learners being teachers to each other". In the large-scale communication environment, learners in professional fields can provide rich knowledge support for others, forming a good atmosphere of sharing and communication. Even if there are a small number of fierce debates, they cannot cover up its core value of knowledge exchange.

In general, the discussion of questions and the establishment of learning groups in the flipped classroom have realized the innovation of communication models relying on technology, broken the time and space constraints of traditional classrooms, provided learners with a diversified communication platform, and also offered valuable data resources for educational research. However, restricted by the "massive" attribute and technical conditions, it still has limitations in communication effectiveness, group stability and other aspects. Its future development still needs to focus on experience optimization and efficiency improvement.

## **5. Testing and Assessment: The Weak Link and Breakthrough Directions of the Flipped Classroom**

Testing and assessment are important components of teaching activities, undertaking the core functions of examining learning effects and consolidating knowledge mastery. In the flipped classroom, testing and assessment also run through the entire learning process, but have become one of the weakest links of the whole project due to the characteristics of large scale and online operation. The current testing and assessment system of the flipped classroom has obvious problems in technology application, assessment methods and difficulty design. It can neither match the assessment effect of traditional classrooms nor effectively distinguish learners' learning levels, becoming a key factor restricting the development of the flipped classroom.

Testing and assessment in the flipped classroom run through the entire learning process, forming a multi-dimensional assessment system, but mainly consist of formal and simplistic

assessments. Impromptu questions are interspersed in lecture videos to grasp learners' comprehension level, and correct answers can obtain bonus points, but they are usually not included in the final total score; the assessment of homework is mostly carried out in the form of small quizzes and answer announcements, and whether the scores are included in the final grade varies from course to course; the final assessment mainly relies on automatic scoring systems, with objective questions such as multiple-choice questions, matching questions and fill-in-the-blank questions as the main types of test papers. Some courses include the scores of project tasks in the final grade, which are evaluated by learners themselves or team members in accordance with the standards set by professors. All assessment links are initiated based on learners' requirements, which is also an important reason why the flipped classroom adopts a combination of computer automatic scoring and peer assessment.

### **5.1. Underutilization of Technological Value**

From a technical perspective, the testing and assessment of the flipped classroom is not lacking in technical support, but failing to give full play to the value of technology. As early as decades ago, learning management systems such as Blackboard and Moodle have realized the automatic scoring function, supporting tests of various objective question types; advanced artificial intelligence assessment systems can even realize complex assessments such as paper preliminary inspection and ability testing, and can even conduct adaptive tests according to learners' test results and recommend suitable learning content. At the same time, publishers provide teachers with search access to the question banks supporting textbooks, allowing traditional teachers to transform their teaching experience and assessment methods into the flipped classroom. However, in practical application, the testing and assessment of the flipped classroom still takes the linear assessment method as the core, relying on objective questions of automatic scoring programs, and failing to make full use of advanced assessment technologies, resulting in a great reduction in assessment effectiveness.

### **5.2. Unscientific Design of the Assessment System**

The core problems of the current testing and assessment of the flipped classroom are reflected in three aspects: assessment design, assessment methods and difficulty control.

First, the homogenization of assessment design, lacking pertinence and challenge. The test question banks of the flipped classroom are mostly derived from the teaching resources of traditional classrooms, being a digital reproduction of the traditional assessment model. There are a large number of simple questions with only two options, and no challenging questions are designed according to the characteristics of online learning and large scale, making it impossible to effectively distinguish learners' mastery of knowledge. An ideal flipped classroom test should accurately examine learners' learning effects through personalized and comprehensive questions.

Second, the limitations of assessment methods, with obvious subjective biases in peer assessment. To adapt to the characteristics of a large-scale audience, the flipped classroom widely adopts peer assessment to evaluate subjective assignments such as papers. Learners are required to evaluate 3 to 5 classmates' assignments, give scores and comments, and the final score of an assignment is the average of all scores. Although this method can integrate various views, and professors refer to peer assessment results with an 88% probability when determining the final score, untrained learners have obvious subjective biases in scoring. Factors such as language ability and personal preferences will affect the scoring results. Even with a unified scoring standard, it is impossible to eliminate the interference of subjective psychology [9].

Third, the imbalance of difficulty control, with the difficulty deliberately reduced to pursue the pass rate. The pass rate of the flipped classroom is usually controlled at 60% -70%, and courses

with a high score rate of 80%-95% will receive special recognition. Most courses provide learners with up to 100 make-up exam opportunities, and even use the same test papers, resulting in some learners being able to pass without mastering knowledge, only by recitation or guesswork. The reasons for this phenomenon are, on the one hand, the flipped classroom is facing a credibility crisis, and developers find it difficult to put an end to behaviors such as ghostwriting, plagiarism and cheating, so question setters have to reduce the difficulty of test questions due to many concerns; on the other hand, to prevent learners from abandoning courses due to excessive difficulty, professors deliberately reduce the number and difficulty of assignments and tests, ignoring the core function of testing and assessment.

### 5.3. Improvement Paths

Although there are many problems with the testing and assessment of the flipped classroom, some courses are making positive innovative attempts, providing ideas for the improvement of the assessment system. For example, some courses integrating mathematics, science and statistics require learners to complete test questions using comprehensive data, whose difficulty and authenticity are much higher than simple objective questions, effectively avoiding score acquisition by guesswork; the Science and Cooking flipped classroom course at Harvard University requires learners to complete indoor experiments every week and conduct self-assessment, with the scoring criteria announced after the submission of assignments, improving the pertinence and effectiveness of assessment; at the same time, some courses attempt to combine the "automatic scoring system for paper preliminary inspection" with peer assessment, unifying the scoring standards by adjusting the "inter-rater reliability" and reducing subjective biases.

The weakness of the flipped classroom's testing and assessment is essentially a reflection of its role as a "substitute for traditional education". At present, most learners participate in the flipped classroom only as a helpless choice due to the high tuition fees of traditional education. The fact that courses cannot provide officially recognized credits and academic qualifications also makes professors lack the motivation to design high-difficulty assessments. To break through this dilemma, developers of the flipped classroom must establish a challenging testing and assessment system, taking examining learning effects and exploring learning potential as the core goals of assessment, and realize the specialization and precision of the assessment system through technological empowerment and model innovation. Only in this way can the flipped classroom break away from the limitation of being a substitute for traditional education and truly become an independent and high-quality teaching model.

## 6. Curriculum Organization: Organic Integration of Elements and Personalized Design

No course is a simple addition of various teaching links. As a large-scale and open online teaching model, the flipped classroom attaches more importance to curriculum organization. Organizers need to effectively integrate elements such as in-class lectures, reading, question discussion, and testing and assessment into an organic whole, and maximize the synergetic effect of each link through reasonable progress setting, class hour allocation and standard formulation. The "experimental" and "massive" characteristics of the flipped classroom determine that its curriculum organization cannot adopt a one-size-fits-all model, but must take into account both learning rules and learners' personalized needs, which also makes curriculum organization the core embodiment of the differentiated development of the flipped classroom.

### 6.1. Progress Setting

Progress setting is the core content of the flipped classroom's curriculum organization, which is currently mainly divided into two modes: fixed teaching progress and flexible teaching

progress. Both modes have their own advantages and disadvantages, and are suitable for different course types and learning needs. Most courses on platforms such as edX and Coursera adopt the fixed progress mode, announcing the course progress and exam dates in advance, providing all learning materials, and requiring learners to complete lecture viewing and assignment submission within a specified time limit to obtain course grades. This mode can create a sense of urgency for learners, stimulate their learning potential and improve learning efficiency. For the question discussion link, a unified progress can ensure that learners learn the same content in the same period, realizing effective online communication. The Udacity platform, however, adopts the flexible progress mode, namely the "on-demand" mode. Learners can independently decide the start time of learning and the completion time of assignments, with no deadlines set by the system, and can adjust their learning progress according to their own knowledge reserves and comprehension abilities, truly realizing personalized learning. The choice of the two progress modes has a direct impact on the nature of the course and the effect of each link. For the question discussion link, the fixed progress mode is a prerequisite for effective communication. Only when learners complete the learning content synchronously can they carry out targeted discussions in the forum; under the flexible progress mode, learners' communication is mostly limited to the level of tests and assignments, making it difficult to form in-depth knowledge discussions. For the testing and assessment link, the fixed progress mode can better guarantee learners' credibility, and clear deadlines can effectively avoid the problem of excessive exposure of test questions; under the flexible progress mode, test questions and assignments are online for a long time, which is easy to cause cheating behaviors. Moreover, if professors fail to adjust the questions in a timely manner, the credibility advantage of the fixed progress mode will also disappear. At the same time, with the continuous accumulation of flipped classroom learning materials, the fixed progress mode also needs to make appropriate adjustments to provide learners with certain progress choices and achieve a balance between fixity and flexibility.

## 6.2. Class Hour Allocation

Class hour allocation is a key part of curriculum organization in flipped classrooms. Unlike traditional year-long university courses, flipped classrooms tend to use shorter durations, mainly 12–16week semester courses or 6–8week short courses. The 6–8week format is widely favored for its clear structure and low dropout rate, but shorter class hours often lead to lower learning requirements, fewer readings, simpler assessments, and weaker in-depth knowledge delivery. Some long-duration courses, such as Harvard X's 15-month Chinese History, are designed to support systematic and deep learning.

Curriculum organization focuses on organic integration and personalized design. Instructors set progress, class hours, and standards based on teaching goals. Because flipped classrooms are experimental and modular, no universal standard exists; instead, design must respect learner differences and learning rules. Courses can choose fixed or flexible schedules and adjust dynamically during delivery. Such flexibility and personalization help flipped classrooms attract large audiences [10].

High-quality curriculum integration ensures lectures, reading, discussion, and assessment work together to create synergy. Overly rigid design weakens online learning advantages. Thus, flipped classrooms must follow holistic design and personalized implementation, support mutual reinforcement among components, and preserve learner autonomy to maximize teaching effectiveness

## 7. Graduation and Credits: Dilemmas of Identity Recognition and Development Opportunities

Graduation certification and credit acquisition are core incentive mechanisms and official recognition of learning outcomes. As a free and open online teaching model, the flipped classroom has long been trapped in identity recognition dilemmas regarding credits and credentials. The conflict between its free openness and universities' economic interests makes it difficult for learners to gain equivalent academic recognition to traditional on-campus students, which has become a major constraint to its development. Nevertheless, as the flipped classroom matures, universities' attitudes are shifting, creating new opportunities for credit recognition.

The credit issue was first highlighted by Professor Sebastian Thrun at Stanford University. His free online Artificial Intelligence course drew massive enrollment, yet he could not issue Stanford-certified credentials. After negotiation, qualified learners received certificates marked as non-credit-bearing, setting a common practice for top universities: learners may obtain stamped completion certificates but not formal academic credits, mainly to protect universities' economic interests.

In the early stage, universities remained conservative about credit recognition. As flipped classrooms gained influence, many shifted to a hybrid model: free access to courses with paid credit options. Learners also enjoy greater autonomy in choosing platforms such as iTunes. This transition has opened a market-oriented path for credit recognition.

Despite such concessions, differential treatment and a "dual attitude" persist among universities. On the one hand, they participate in flipped classroom projects to fulfill social welfare responsibilities and acknowledge certificate quality. On the other hand, they regard flipped classroom achievements as inferior to traditional credit courses. This dual standard hinders public recognition and leaves flipped classrooms labeled as non-formal education.

Essentially, credit and credential recognition reflects value recognition of the flipped classroom. Without official academic accreditation, its qualifications lack credibility, making it hard to attract academic-oriented learners and compete with traditional education. To address this, the flipped classroom must upgrade teaching quality and assessment systems; universities should break interest barriers and build tailored credit frameworks; governments can provide policy support to standardize certification.

With further development, new opportunities have emerged. More universities are partnering with platforms for credit recognition, and enterprises are increasingly accepting flipped classroom credentials in recruitment. These trends signal growing social recognition of its educational value. With improved quality and stronger social demand, the certification system for flipped classrooms will continue to improve.

## 8. Definition of the Essence of the Flipped Classroom: Core Characteristics and Value Core

After examining the constituent elements of the flipped classroom, this study focuses on clarifying its essential connotation and boundaries with other educational models. Current definitions are often controversial: some equate flipped classrooms directly with MOOCs, while others judge them by platform or institutional reputation. Such views fail to capture the genuine essence. The flipped classroom is defined not only by its external features but also by its core value. Only when both dimensions are integrated can a model be recognized as a true flipped classroom.

Externally, the flipped classroom is characterized by the four MOOC attributes: Massive, Open, Online, and Course. Among these, Openness and Free access serve as the defining criteria that

distinguish it from other forms of online education. A genuine flipped classroom is open to all users without thresholds. Learners can obtain full learning materials free of charge, with no requirements for academic background, major, or mandatory purchases. Courses that impose financial barriers or entry qualifications cannot be defined as flipped classrooms.

Notably, openness does not mean absolute unrestriction. Optional preparatory guidance or non-compulsory paid services—such as Harvard's paid laboratory experience in Neuroscience—do not violate the free and open principle. Similarly, limited enrollment for experimental classes to ensure discussion quality, as adopted in some Harvard projects, does not negate its fundamental nature.

The term Massive refers not only to high enrollment but to unlimited global accessibility. Whether a course attracts millions of downloads on iTunes U or hundreds of registrations on edX, it qualifies as massive if it transcends the limits of traditional classrooms. Furthermore, instructional format and pacing—such as Udacity's flexible on-demand mode or audio-based lectures—are not defining criteria.

Defining flipped classrooms by platform prestige or university reputation is overly narrow. Although Coursera, edX, and Udacity are regarded as major platforms, the expansion of Future Learn, Canvas.net MOOC, Udemy, and the launch of MOOC.org by edX and Google have diversified the ecosystem and broken the monopoly of established platforms. Therefore, platform and institutional reputation should not be used as standards for identification.

At the value core, the flipped classroom represents educational model innovation and methodological revolution. It embodies three values: educational equity, experimental teaching, and research reform. These features fundamentally separate it from conventional online education.

Early developers centered their goals on exploring learning mechanisms and the transformative role of technology. EdX focuses on how technology reshapes learning and teaching. Daphne Koller of Coursera notes that large-scale learner data has shifted educational research from hypothetical reasoning to empirical evidence, achieving a methodological revolution. Stephen Downes argues that openness liberates research from the limitations of traditional classrooms [11].

Accordingly, the flipped classroom is not merely a digital version of traditional instruction. It is a genuine educational innovation. It promotes equity by providing free access to high-quality resources worldwide. It embraces experimentalism by continuously updating teaching designs, technologies, and assessments. It advances research by supplying massive behavioral data that deepens the understanding of learning.

In summary, the authentic flipped classroom integrates external features—massive, open, free, and online—with intrinsic values: educational equity, teaching innovation, and research reform. It is open to all without thresholds and committed to educational transformation. Regardless of platform size, institutional fame, or learner volume, projects satisfying these dual dimensions represent typical flipped classrooms.

Despite challenges in copyright, assessment, and recognition, the flipped classroom carries strong innovative and equitable value. With continuous improvement of its components and adherence to its foundational principles, it will mature into a major force for educational equity and reform. This analysis of its elements and essence provides a theoretical foundation for its professional, high-quality, and inclusive development.

## 9. Summary

In a word, a true flipped classroom is the unity of external characteristics and value core. It not only has the external characteristics of "massive, open, free and online teaching", providing

educational resources to the public without any thresholds, but also contains the value core of educational equity, teaching innovation and scientific research reform, taking promoting educational development and exploring learning rules as its core goals. Any online education project with these characteristics can be called a typical flipped classroom, regardless of the size of its platform, the reputation of its university or the number of its learners.

As a new teaching model, the flipped classroom is facing many dilemmas such as copyright, assessment and identity recognition in its development process. However, its innovations in links such as in-class lectures, reading and question discussion, as well as its value in educational equity and scientific research reform, endow it with broad development prospects. In the future, the development of the flipped classroom needs to continuously improve each constituent element, solve the practical problems in development, and at the same time adhere to its core characteristics and value core. Driven by both technological empowerment and model innovation, it will truly become an important force to promote educational equity and educational reform. The research on the constituent elements and inherent connotations of the flipped classroom will also provide theoretical support for its subsequent development and promote it to develop in a more professional, high-quality and inclusive direction.

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- [8] See Jeffrey R. Young. What a Tech Start-Up's Data Say About What Works in Classroom Forums. *The Chronicle of Higher Education*, August 21, 2012. [http://chronicle.com/blogs/wiredcampus/what-a-tech-start-ups-data-say-about-what-works-in-classroom-forums/38960?cid=at&utm\\_source=at&utm\\_medium=en](http://chronicle.com/blogs/wiredcampus/what-a-tech-start-ups-data-say-about-what-works-in-classroom-forums/38960?cid=at&utm_source=at&utm_medium=en).
- [9] See Delmar Lewis. The Future of the University. *The New York Times*, November 20, 2012, p. A1.
- [10] See Steven Leckart. Stanford's Teaching Experiment Will Permanently Change How Universities Educate. *Wired*, Vol. 20, No. 4 (Spring 2012).
- [11] See Daphne Koller. What We're Learning from Online Education. TED Talk, August 2012. [http://www.ted.com/talks/daphne\\_koller\\_what\\_we\\_re\\_learning\\_from\\_online\\_education.html](http://www.ted.com/talks/daphne_koller_what_we_re_learning_from_online_education.html).