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Student Satisfaction with the Massive Open Online Course Application (MOOC) in Sichuan University, China

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Abstract

The globalization of higher education has become an unavoidable tendency of higher education development in today's society. The advancement of information technology has generated a new model of learning that transcends time and location, and the methods and channels for acquiring knowledge have fundamentally changed. Many countries urge residents to continue their education throughout their lives to keep their knowledge current and adapt to changing circumstances. Accordingly, the number of adult lifelong learners has substantially increased. MOOCs (Massive Open Online Course) are still in their early stages of developing into mainstream of online education, with many areas needing improvement. It is simply too early to predict if MOOCs will revolutionize higher education.

This study investigates and analyzes college students' appraisal and satisfaction with MOOCs using a questionnaire-based survey. Results reveal that students' overall satisfaction with the MOOC arranged in practical courses is relatively high.

Keywords: *Massive Open Online Course (MOOC), Udacity, Coursera, Catechism, China Knowledge Network*

1. Introduction

1.1 Research Background

The education community has been excited about sharing Open Educational Resources since the introduction of the contemporary Internet, particularly since the growth of social networking (OER). The Massachusetts Institute of Technology launched the Open Courseware Movement in 2002. (MIT). The institution utilizes the Internet as a dissemination medium to make high-quality teaching and learning resources available to students worldwide. UNESCO suggested the Open Educational Resources (OER) initiative for worldwide resource sharing the same year. "

From the research and practice of information technology applications in the 1950s to the rapid expansion of online education enterprises in the Internet setting in this century, online education in China has seen the development of radio, television in university, and online education. Because this online education's course content and delivery techniques are mere replicas of traditional classrooms, these kinds of online education have remained lukewarm.

MOOC, an acronym for Massive Open Online Course, was developed in 2008 as a new kind of online education.

Udacity and Coursera, two major MOOC websites, were launched in the first half of 2012. Millions of students have registered, and more than 100 world-renowned universities have contributed to the development of MOOC courses, totaling more than 500. "The first year of MOOC," according to the New York Times, MOOC was recognized as one of the top ten education events in the United States by the American conventional media "Time" in 2012. MOOC in China is still in its early phases of development as an online education channel, and much work needs to be done to improve it.

It is vital to strengthen the use of MOOC in university teaching against the realistic backdrop to satisfy contemporary development needs: by fully understanding the advantages of the MOOC teaching mode, taking advantage of its strengths and complementing its weaknesses, making full use of information technology, and taking the initiative to change the existing university teaching mode, improve the quality of teaching, and cultivate all-round quality talents with high cultural literacy, strong innovation ability, and independent learning a based on objective and dialectical knowledge and understanding of MOOC.

1.2 Research Objectives

1. To investigate the basic information of college students at Sichuan University's Jinjiang College, such as the respondents' personal information, such as gender, age, and whether they have the instruments to use MOOC;
2. To investigate how college students rate the quality of the MOOC taught in the practical class, including the MOOC's fluency, the MOOC content's effectiveness, and the overall effectiveness of the MOOC teaches.
3. To determine total MOOC satisfaction among college students, and
4. To investigate the impact of MOOC quality on student satisfaction.

1.3 Significance of the Study

MOOCs are a relatively new concept that has only been established in China for a short time. However, it is indisputable that they substantially impact China's teaching manner, teaching quality, and higher education progress. The backdrop for this study is a MOOC teaching practice: the MOOC's concept, philosophy, and characteristics to propose how it applies to university practice teaching in the current era. Chinese education researchers' keen interest in the growth of MOOC and the transformation of university teaching modes contributes to the transformation of Chinese university

teaching modes. It is of outstanding academic and theoretical importance for successfully implementing the MOOC era's transformation in the Chinese university teaching paradigm.

1.4 Practical Implications

This paper discusses the weaknesses of existing university teaching models based on research on MOOC and university teaching models and the impact of MOOC on university teaching models. It proposes the application of MOOC in university practical teaching: conducive to ensuring and improving teaching quality, for the smooth implementation of university teaching model changes, higher education being more adaptable to the diversified needs of the international society, and to the current requirements of deepening the reform of university teaching model. The study's significance is critical to boosting today's society's fundamental competitiveness and advancing the popularization and internationalization of higher education. As a result, studying the shift in university teaching modes in the MOOC era is extremely practical.

1.5 Scope of the Study

The diversity of China's university organizations adds to the challenge of assessing higher education instruction, which is still in its early stages of growth in China and is still being explored and developed. The change in China's university teaching model in the MOOC era has raised the bar for current higher education teaching assessments. As a result, higher education teaching assessment should draw on the assessment methods of developed European countries and the MOOC assessment system to meet the current development needs.

According to the results of literature searches, there is limited research on the quality and satisfaction of MOOC lessons in China. This study aims to use the satisfaction model to understand how college students at Jinjiang College of Sichuan University evaluate the quality of MOOC teaching and their overall satisfaction with MOOC.

1.6 Limitation

The shortcomings of this study that it is only a preliminary exploration of student satisfaction with the quality of MOOC catechism, and only a brief discussion of the resulting model.

2. Literature Review

2.1 Definition of Essential Concepts

The China Knowledge Network was used to evaluate relevant literature to define MOOC and university teaching models.

2.1.1 MOOC

Universities in the West have been experimenting with distant education since the 1990s. By the turn of the century, organizations such as the United Nations and universities had begun the Open Educational Resources movement, which advocated for the availability of non-commercial educational resources to students and instructors worldwide via information technology.

In 2008, the University of Manitoba in Canada hosted a course with over 2,200 participants: only 25 of whom were university students, while the rest participated via the Internet, a form of instruction known at the time as MOOC, Massive Open Online Course, or Massive Open Online Classroom, whose acronym was also phonetically translated into Chinese as "慕课". MOOC creators believed that a MOOC is a type of course in which both participants and course resources are scattered over the Internet and that this type of learning is most effective when the course is open. This method of instruction differs from previous online courses. It stresses Internet technologies such as forums, video sites, and blogs to promote discussion and communication among students. This type of MOOC is known as cMOOC, and it is based on the connectivism learning theory. However, this model has more significant requirements for learning participants' abilities.

Other forms of behaviourist-based programs, sometimes known as xMOOCs, are Udacity, which launched in the fall of 2011, and edX and Coursera, which launched in 2012 and xMOOCs are more in line with traditional teaching methods and principles. Learning participants can also participate in course discussions on a specific website or program, including videos, quizzes, and assignments. This MOOC can be integrated into existing university courses, and credit can be given based on previous grades.

The MOOC is a course with learning participants from anywhere and developed teaching resources that are fully developed externally and will run better as it grows in size. It can also connect learning participants with experts in individual subject disciplines through discussions and exchanges on the web.

2.1.2 The University Teaching Model

Scholars nowadays examine the university teaching model from various angles, as well as the meaning and diversity of the teaching style. Researchers recommend that teaching mode needs to consider the stable relationship between the elements of teaching activities (objectives, curriculum content, methods, environment, teachers, students, and evaluation) and the structural form of the teaching process under the guidance of certain educational philosophy, educational theory, and learning theory, as well as the joint support of teaching environment and teaching resource (Li and Yang, 2015). Teaching theory and teaching ideology are the soul of education and determine the scientific development of the teaching model. Theoretical foundation, goal orientation, operation technique, realization circumstances, and effect evaluation are

normally included in a full teaching model.

2.1.3 Personality Characteristics of the MOOC

MOOC differs from the standard teaching model as an emergent teaching modality. MOOC's individual qualities are mostly expressed in the following aspects based on MOOC's teaching practice.

(1) Massive class sizes and a wide range of learner identities

The large student size implies tens of thousands of students studying the MOOC, and the Coursera site alone has nearly 10 million registered users. Learners in the same course may come from all over the world, with various cultural backgrounds, levels of experience, motivations and reasons for enrolling.

(2) Accessibility to learning resources

The evolution of the internet society requires resource sharing. Learners worldwide can access high-quality educational resources for free as long as they have access to the Internet. These learning tools are available to everybody regardless of age, colour, race, time, space, or geography. A high level of sharing of high-quality teaching and learning resources aids internationalization in higher education and can improve the global quality of human learning.

(3) Learning styles personalization

Learning can be personalized so that students can study selectively and purposefully based on their choices. In the internet era, personalized learning has been designed to fulfil the demands of diverse learners from various backgrounds and levels to learn more efficiently and conveniently online.

(4) Classroom communication that is interactive in real-time

Traditional classroom communication methods are less convenient and adaptable than real-time interactivity. This interactive application aids in the formation of teaching communities, which can significantly increase learners' enthusiasm for learning while also improving quality and efficiency. Learners can provide timely feedback on their learning using the platform's automated assessment system, enhancing their involvement and learning quality.

(5) The research system's self-organization and social nature

Under specific conditions, a research system's self-organization means that it can develop into an orderly organization on its own. The MOOC can produce and evolve itself in a coordinated manner, and it will improve during the process. MOOC's emergence and growth are inextricably linked to society. MOOC is possible due to the continual development of civilization, the maturation of socioeconomic conditions, and the growing need of people.

2.1.4 Concept of Customer Satisfaction

Following is a summary of the research and discussion of various researchers on customer satisfaction, including four critical representative opinions on this topic.

(1) A transactional satisfaction perspective

From a transactional satisfaction perspective, customer satisfaction cannot be achieved without a specific transaction, and this process must include a specific buying situation. Customer satisfaction is an emotional response to a customer's assessment of the benefits received during a product or service transaction.

(2) A perspective of overall contentment

According to this viewpoint, customer pleasure is a holistic consumer attitude created via cumulative experience. All of the customer's good and poor purchases are included in the cumulative experience discussed here.

(3) Satisfaction with cognitive type evaluation

Customer satisfaction, in the cognitive type evaluation perspective, is a perception involving comparison and evaluation. The degree of conformity between the actual perception of the service received by the customer in reality and the preconceived expectation of the service will determine customer satisfaction. The higher the degree of conformity between the two, the higher customer satisfaction will become.

(4) Emotional evaluation satisfaction perspective

According to this viewpoint, customer happiness is a subjective emotional response of customers to purchasing behaviour that is both emotive and transient. Contentment is directly determined by the customer's subjective sense of excellent or negative evaluation; if the subjective perception is good, satisfaction is high; if the subjective perception is terrible, satisfaction is low.

Based on the trade-offs between the above perspectives, this study chose to adopt the viewpoint of affective evaluation of satisfaction and defines student satisfaction as a subjective perception result of the teacher's teaching methods and contents used during the learning process, based on the characteristics of college students' MOOC use.

2.2 Exploration of the Direct Relationship of Variables

2.2.1 Effect of course fluency on student satisfaction

Tengteng and Jijun (2020) concluded that undergraduate students' satisfaction with the teaching of specialized courses is an essential motivator for improving the quality of undergraduate teaching and students' learning effectiveness. The authors combined the reform initiatives related to the construction of "New Engineering" to examine the effects of four variables: namely, teacher classroom teaching style, teacher academic support for students, interdisciplinarity of the curriculum, and multiple assessments and evaluation methods on undergraduate science and engineering students' satisfaction with teaching in their major courses. The study found that: the teacher's classroom teaching style, course fluency, teacher's academic support for students, and interdisciplinary the course all significantly influenced students' satisfaction with teaching in professional courses. Multiple assessments and evaluation methods had a partially mediating role in the path from teacher's academic support for students to satisfaction with teaching in professional courses. A fully mediating role in the path from interdisciplinarity of the course to satisfaction with teaching in professional courses, and multiple assessments and evaluation methods, had a fully

mediating role in the path from teacher's academic support for students to satisfaction with teaching in professional courses. Moreover, multiple assessments and evaluation methods on professional courses were more evident in key universities than in non-key universities.

2.2.2 Effect of Content Effectiveness on Student Satisfaction

Sun and Yang (2016) theoretically analyzed 1520 survey data in Jiangsu Province to construct and test a structural equation model of satisfaction with practical teaching in colleges and universities. The research results showed that College image has a significant direct positive effect on students' expectations. College image has no significant direct effect on students' satisfaction but indirectly through multiple mediating variables and multiple paths. Students' expectation indirectly affects satisfaction mainly through 2 mediating variables of perceived effectiveness of practice teaching and perceived value of practice teaching. Perceived effectiveness of practice teaching has a direct effect on satisfaction and an indirect effect. The perceived effectiveness of practice teaching has both a direct effect on satisfaction and an indirect effect through the mediating variable of perceived value; the perceived value of practice teaching content effectiveness has a significant positive effect on satisfaction.

Xian's (2019) paper used college students in 9 colleges and universities in Hainan Province as the object of investigation and research and obtained 2878 valid questionnaires by using the questionnaire survey method and empirically analyzed the factors influencing English teaching satisfaction from 3 aspects, such as students' factors, teachers' factors, and environmental factors. The study found that students' English performance improvement, teachers' responsibility and teaching methods, the Teachers' effectiveness of teaching content, teachers' use of spare time to guide students' learning, teachers' emphasis on guiding to stimulate students' interest, English library materials, class learning atmosphere, and the degree to which the school attaches importance to English education are essential factors influencing college students' satisfaction with English teaching.

2.2.3 Effect of the Importance of Knowledge Points on Student Satisfaction

Xinyang and Jie (2020) used SPSS22.0 and AMOS24.0 to build an online teaching satisfaction model based on the current situation of online teaching in colleges and universities during the prevention and control of the new crown epidemic, and they investigated the main influencing factors of online teaching satisfaction of college students in three aspects: teaching quality, self-learning quality, and environmental quality. With a total of 27 observations, the analysis covers eight variables, including: learning autonomy, online learning potential, network resources, and back-end guarantee. The researchers proposed countermeasures to improve online teaching satisfaction among college students based on their research findings as to how online teaching in colleges and universities can be improved and reformed.

Li, Hua, and Junxiu (2021) developed an online teaching satisfaction evaluation

index system based on data from a questionnaire survey which evaluated online teaching satisfaction using principal component analysis, and further investigated the contributing elements of satisfaction. The study's findings revealed that online teaching satisfaction was high in general, with the student subject factor and teacher quality factor being the most important influencing factors on online teaching. The importance of online teaching knowledge points had less impact on satisfaction with online teaching.

2.2.4 Effect of Teaching Effectiveness on Student Satisfaction

The procedural teaching of the MOOC course reflects the practical form of behaviourist learning theory. Learners can design or alter their learning plans based on their learning capacity, leisure time constraints, learning progress, and other personal conditions in procedural learning and progressively accomplish the course's ultimate aim. According to behaviourist learning theory, the specific approach of adopting procedural teaching is to split the course content into several units based on the general purpose of the course and then divide these units into tiny steps. Through timely testing, the learner may understand their learning effect after learning one of the sub-course topics. To summarize, procedural training must be implemented using the concepts of positive response, short stages, immediate feedback, and self-paced learning.

The technique of instruction used in MOOC courses is procedural teaching. The knowledge points are used to organize the content of MOOC platform courses. Course parts usually are about two hours of course videos, and they are designed by MOOC courses based on their knowledge capability, syllabus, and teaching objectives. However, these course films are finally broken down into 8 to 15-minute knowledge modules that students can study. Students can use in terms of teaching techniques; this follows Skinner's behaviourist learning theory's small-step concept. The emphasis on reinforcing connections in behaviourist learning theory is mostly represented in the online quizzes and assignments created for the MOOC platform's course videos. Quizzes, assignments, and tests are all included in each knowledge module. These integrated quizzes do not affect a learner's course grade, allowing them to relax and better understand their personal learning needs while also improving their enthusiasm to learn. The course grade does not include the test outcomes. They motivate students to apply what they have learned and actively pursue knowledge mastery.

University teaching satisfaction indicators assist the current condition and monitor the quality of university teaching, which is essential for enhancing university teaching and fostering innovative talents (Zhang et al, 2014).

Hu and Huang (2017) has stated that the shift in classroom teaching methods and the continued promotion of MOOCs, the education world is encouraged to pay close attention to the role of flipped classrooms in China's educational transformation. A model of characteristics impacting satisfaction with flipped classrooms in China was suggested, with adult students as the study object. Adult students were chosen to participate in an empirical survey, which was fitted with structural equations. It was discovered that, when compared to traditional classroom teaching, the majority of

students in adult colleges and universities have no significant preference for flipped classroom teaching mode; the teaching environment, teaching process, and teaching effect in a flipped classroom have a significant influence on teaching satisfaction, with teaching effect having the most significant degree of influence, and teaching environment and teaching process having the least significant degree of influence on teaching satisfaction; and the teaching environment, teaching process, and teaching effect have a significant influence on teaching satisfaction. Finally, the moderating effect of demographic factors demonstrated that gender and education had no effect in a teaching environment, teaching method, or teaching effect on teaching satisfaction, although school and category did.

Qin et al. (2022) conducted a study on “Online Teaching Satisfaction and Willingness involving 92,807 male students and 12,1247 female students in 334 colleges and universities using the “Online Learning Survey Database of College Students in the Epidemic Period” developed by the Faculty Development Center of Xiamen University. The Technology Acceptance Model was used to evaluate the impact of perceived utility, ease of use, and external environment on students' satisfaction and willingness to continue utilizing online teaching and learning by gender (TAM). Male and female students assessed online teaching satisfaction and intention to keep using positively, however, there were substantial disparities in the processes of online teaching contentment and intention to keep using between male and female students, according to the study. The findings contradicted the widely held belief that men had a natural advantage in technology use, showing that girls were equally tolerant of online education as men but demanded higher quality and outcomes. Objectively, there are gender variations in satisfaction with online education and willingness to continue using it. However, they are not natural differences, and enhancing the quality of online education is critical to changing college students' perceptions of the quality and outcomes of online education.

2.3 Constructing the Research Model

In this present study a model of university teacher satisfaction was developed for use in this research. The model was empirically tested using structural equation techniques after 962 valid samples were obtained from five prominent universities in Guangdong Province. Four antecedent variables on teacher satisfaction were studied: student expectations, classroom teaching quality, practical teaching quality, and independent learning quality. Student expectations had a large negative impact on teaching satisfaction, while classroom teaching quality, practical teaching quality, and independent learning quality had a significant favorable impact. Teaching quality in the classroom had the most significant impact on teacher satisfaction. Furthermore, student expectations had a more significant impact on the quality of independent learning and the second-highest impact on the quality of classroom and practical learning. Based on these research findings, four hypothesizes were proposed (Figure 1):

Whether the catechism is lagging or not, the students' learning pleasure is influenced by their ability to watch the MOOC videos with understanding.

- Effectiveness of MOOC content: students' satisfaction will be affected by whether or not the catechism will assist them.
- The significance of MOOC knowledge points: students' satisfaction with catechism will suffer if they are simply a collection of shared knowledge points.

The overall effect of catechetical instruction: the higher the total effect of catechism education, the more satisfied pupils will be with the MOOC.

MOOC

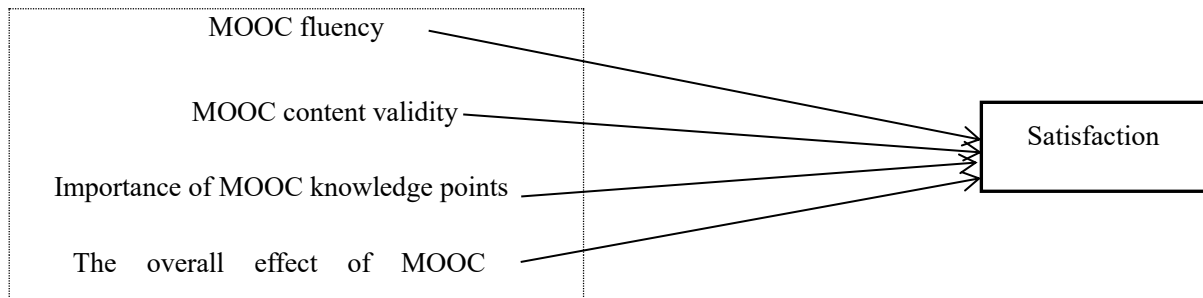


Figure 1. The Conceptual Model

3. Research Methodology

3.1 Study Design Process

Figure 2 presents the sequence of the research study.

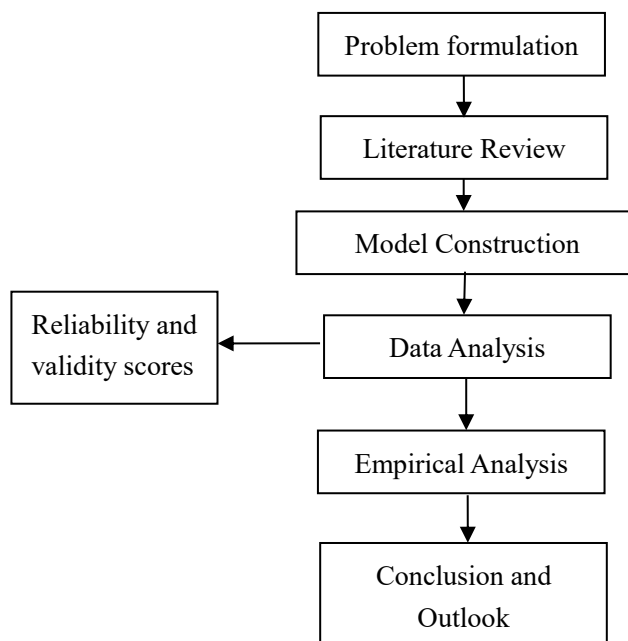


Figure 2. Flow chart of the study

3.2 The Survey

After the students completed the MOOC experiment, they used the questionnaire star to survey university students in Sichuan University Jinjiang College. The result of this study offers an analytical understanding of the MOOC's application in university practice teaching in Sichuan University Jinjiang College.

400 questionnaires were disseminated, and returned 380 valid questionnaires, leading to recovery rate 95%.

3.3 Data Analysis

After the sample data was obtained, the questionnaire data were subjected to descriptive statistical analysis using statistical software.

Factor analysis was utilized to develop the analysis to determine the aspects that affect students' satisfaction with the MOOC.

The primary goal of factor analysis is to reduce dimensionality by condensing the original variables with complex interactions into a few integrated factors. The main idea is to categorize the original variables by the degree of explanation and treat those with stronger correlation and closer links as factors. Public factors are those that have a high association in one dimension.

The basic model is as follows

$$\begin{cases} x_1 = \mu_{11}f_1 + \mu_{12}f_2 + \mu_{13}f_3 + \dots + \mu_{1n}f_n + \varepsilon_1, \\ x_2 = \mu_{21}f_1 + \mu_{22}f_2 + \mu_{23}f_3 + \dots + \mu_{2n}f_n + \varepsilon_2, \\ x_3 = \mu_{31}f_1 + \mu_{32}f_2 + \mu_{33}f_3 + \dots + \mu_{3n}f_n + \varepsilon_3, \\ \vdots \end{cases}$$

$f_1, f_2, f_3, \dots, f_n$ is the common factor of the observed variables in the model, which explains the correlation between the variables; $\varepsilon_1, \varepsilon_2, \varepsilon_3, \dots, \varepsilon_n$ is the special factor, which represents the part of each variable that cannot be explained by the common factor; μ_{ij} is the factor loading, which is equivalent to the standard regression coefficient in multiple regression analysis, and represents the loading of the i variable on the j common factor ($i = 1, 2, 3, \dots, n; j = 1, 2, 3, \dots, n$). In simplified matrix form, this can be expressed as

Where: $x = (x_1, x_2, x_3, \dots, x_n)^T$; $f = (f_1, f_2, f_3, \dots, f_n)^T$; $\varepsilon = (\varepsilon_1, \varepsilon_2, \varepsilon_3, \dots, \varepsilon_n)^T$

$$A = \begin{bmatrix} \mu_{11} & \mu_{12} & \mu_{13} & \dots & \mu_{1n} \\ \mu_{21} & \mu_{22} & \mu_{23} & \dots & \mu_{2n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \end{bmatrix}$$

$x = (x_1, x_2, x_3, \dots, x_n)^T$ is a vector of observed variables with mean $E(x) = 0$;
 $f = (f_1, f_2, f_3, \dots, f_n)^T$ are mutually independent common factor vectors with mean $E(f) = 0$ and covariance matrix $\text{cov}(f) = I$, i.e. the component vectors are independent of each other.

$\varepsilon = (\varepsilon_1, \varepsilon_2, \varepsilon_3, \dots, \varepsilon_n)^T$ is a special factor vector indicating the fraction of

observations that cannot be explained by the common factor, with a mean value of $E(\varepsilon) = 0$; and

A is the factor loading matrix, and μ_{ij} indicates the degree of influence of x_i and f_j .

The generation of factor variables and the interpretation of factor variables are the two main concerns of factor analysis. Solving these two fundamental challenges will allow the factor analysis to go smoothly. As a result, the factor analysis is finished using these two guiding notions in the subsequent data processing and transposition adjustments.

Factor analysis requires this. This stage examines the relationship between the original variables to see if factor analysis is appropriate. As a result, a high connection between the original variables is required; if the original variables are independent of one another or the correlation is not apparent, there is no information overlap, or the information overlap is inefficient. It is impossible to execute synthesis and focus.

Extraction of factors is the most critical step in the factor analysis process. The original variables are aggregated into many factors that are independent of one another and are utilized to replace variable information. This stage addresses the issue of efficiently extracting factors while also verifying that the proposed factors are reasonable.

Another vital aspect of factor analysis is factor naming. Factor naming is becoming interpretive. Following the procedures outlined above, public factors are created, which reflect the information from all original variables. Each public factor can reflect the knowledge of different combinations of original variables after factor rotation. The purpose of factor naming interpretation is to clarify the meaning of these public variables in practical applications. It is not favorable to further research if the meaning of the extracted factors is unclear after merging the original variables into numerous factors; it is vital to make the meaning of the extracted factors clear and able to be utilized to describe the problem under study. Using various methodologies, this stage should clarify the true significance of the extracted elements. Because the analyst can understand the primary information contained in the factor based on the name, the analyst can reduce the introduction of related situations. For example, the operating capacity factor primarily reflects information about the enterprise's operating capacity variables. The solvency factor primarily reflects information regarding the company's solvency. The solvency factor reflects the leading information.

Factor scores are calculated. For data modelling, factor analysis decreases the number of variables and replaces the original variables with the extracted factors, and factor scores can be determined using appropriate data processing software. The factor scores of each sample variable are calculated in this stage. This stage can determine the score for each factor and a total score based on the actual needs, laying the groundwork for the data analysis that follows.

4. Results

4.1 The Survey

The sample data for the empirical study were gathered through questionnaires. A total of 400 questionnaires were issued to students at Sichuan University Jinjiang College, and 380 were collected, with a valid questionnaire return rate of 95%.

4.2 Reliability Analysis

In this study, Cronbach's coefficient will be used to measure the reliability of each measurement scale. A highly reliable measurement instrument is one with Cronbach's alpha coefficient more than 0.90, but 0.7 or above is acceptable (Hair et al., 2006).

The reliability of the measurement scale for each study variable is shown in Table 1, passing the required reliability threshold.

Table 1. Reliability of the Variables

Measurement Dimension	Cronbach's Alpha Coefficient
MOOC quality evaluation scale	Cronbach's Alpha Coefficient = 0.951
Satisfaction	Cronbach's Alpha Coefficient = 0.914

Data source: According to the questionnaire data, using SPSS 20.0 analysis to collate.

4.3. Validity Assessment

The construct validity of this study was analyzed by principal component analysis and maximum variance rotation using SPSS 22.0. The conditions that must be met for the principal component analysis are KMO and Bartlett's tests. In particular, the more the value of KMO near 1, the more suitable the principal component analysis, and when $KMO < 0.7$, it is not suitable for principal component analysis.

Table 2. KMO values and Bartlett's sphericity test results

Variables	KMO value	Approximate cardinality distribution	Significance
MOOC quality evaluation scale	0.903	4093.873	0.00
Satisfaction	0.913	1539.873	0.00

Data source: According to the questionnaire data, using SPSS 20.0 analysis to collate

In Table 2, the values of KMO for the independent and dependent variables are 0.903 and $0.913 > 0.7$, respectively; also, the value of the significance test is 0.000, indicating that the scale passes the significance test. That is, it is suitable for factor analysis.

4.4. Profile Description

Gender and Grade distribution of students:

As shown in Table 3, the gender distribution and grade distribution of the questionnaire students were more balanced, reducing the bias of the results brought by gender and grade factors. Among the 380 valid questionnaires recovered, 198 were male questionnaires, accounting for 52.11% of the valid questionnaires; the remaining 47.89% are female.

The years in schools are: 73 freshman questionnaires, accounting for 19.21%; one hundred nineteen sophomore questionnaires, accounting for 31.32%; one hundred three questionnaires in junior year, accounting for 27.11%; the senior questionnaires were 74, accounting for 19.47%.

Table 3. Gender and grade distribution of students

Variables		Number of people (person)	One hundred percent
Title	Male	198	52.11
	Female	182	47.89
Grade	Freshman year	73	19.21
	Sophomore	119	31.32
	Junior	103	27.11
	Senior Year	74	19.47

(2) Frequency of using the MOOC

The frequency of using catechism varies among students, and surprisingly, as shown in Table 4, is quite equally distributed, ranging between 14.21% to 23.95%.

Table 4. Frequency of MOOC Use by Students

	Number of people (pcs)	Percentage (%)
Many	64	16.84
Comparatively more	89	23.42
General	54	14.21
Less	82	21.58
Rarely	91	23.95

(3) Satisfaction with MOOC

The majority of the students, 67.11 %, are satisfied (more and very). Generally, satisfaction 14.74%, leaving only 18.15% not really satisfied and very dissatisfied (combined).

Table 5. Satisfaction Survey of Practical Course MOOC

Grade	Level of Satisfaction	
	Number of people (pcs)	Percentage (%)
Very satisfied	138	36.32
More satisfied	117	30.79
General satisfaction	56	14.74
Not really satisfied	42	11.05
Very dissatisfied	27	7.1

4.4 Factor Analysis

The following is the factor analysis of the independent variable MOOC quality. The common factors were extracted using the principal component method. The eigen values of the factors extracted needed to be greater than 1. The loadings of each factor were obtained after orthogonal rotation using the maximum difference method (Varimax).

Table 6. Table of Total Variance Explained by Factors Related to the MOOC

Ingredients	Initial Eigen value			Extraction of squares and loading		
	Total	% of variance	Cumulative percentage	Total	% of variance	Cumulative percentage
1	7.734	48.340	48.340	7.734	48.340	48.340
2	2.186	13.664	62.004	2.186	13.664	62.004
3	1.437	8.982	70.986	1.437	8.982	70.986
4	1.401	8.758	79.744	1.401	8.758	79.744
5	.451	2.822	82.566			
6	.406	2.539	85.104			
7	.380	2.376	87.481			
8	.347	2.166	89.646			
9	.314	1.961	91.607			
10	.299	1.867	93.475			
11	.272	1.701	95.176			
12	.249	1.559	96.734			
13	.168	1.048	97.782			
14	.136	.850	98.632			
15	.123	.769	99.401			
16	.096	.599	100.000			

Data source: According to the questionnaire data, using spss20.0 analysis to collate

With a cumulative contribution total variance explained at 79.744%, the four qualities of catechism fit the dimension stated in the literature, namely MOOC fluency, content validity, the importance of MOOC knowledge points, and the overall effect of MOOC teaching.

4.5 Simple Regression Analysis

Prior to regression analysis, the study performs the correlations analysis, and the result reveals that the four dimensions of the catechism are significantly correlated to Sig. 0.001 **.

Table 7. Analysis of Correlations

		MOOC fluency	Content validity	Importance of knowledge points	Overall effect of teaching
Student Satisfaction	Pearson Correlation	.498**	.463**	.402**	.474**
	Significance (Bilateral)	.000	.000	.000	.000
	N	380	380	380	380

Data source: According to the questionnaire data, using SPSS20.0 analysis to collate

Accordingly, the study proceeded to simple regression analysis, with the result given in Table 8, and “importance of knowledge point” is the only statistically significant predictor to explain student satisfaction with the MOOC.

5. Conclusion and Recommendations

5.1. Conclusion

Students’ satisfaction with catechism was the dependent variable in this study, whereas MOOC fluency, MOOC content effectiveness, catechism content effectiveness, and the overall efficacy of MOOC teaching were the independent variables. The following results were reached after doing theoretical and practical analysis and research to investigate the impact of the four dimensions of the independent variable on the dependent variable.

First, the descriptive statistics reveal that students are generally pleased with the approach of the practical class layout.

Second, the dependent variable is significantly influenced by the four aspects of MOOC fluency, MOOC content effectiveness, and overall effectiveness of catechism instruction. The dependent and independent variables were shown to be related simultaneously.

Third, the four dimensions of the independent variables are regressed on the dependent variable using regression analysis, and r^2 is larger than 70%, showing that the regression is robustly strong.

Table 8. Simple Regression Result

Models	Non-standardized coefficient		Standard coefficient	t	Sig.	Adjustment of R-side
	B	Standard Error				
(Constant)	1.111	.267		4.161	.142	
MOOC fluency	.195	.055	.213	3.547	.173	.724
Content validity	.205	.053	.213	3.868	.216	
<i>Importance of knowledge points</i>	.113	.051	.120	2.203	.028	
Overall effect of teaching	.231	.056	.229	4.140	.294	

5.2 Recommendations

To increase instruction quality, colleges must shift their educational mindsets, strengthen teaching teams, implement a comprehensive curriculum system, create a digital teaching environment, and establish a school-level digital teaching resource centre. Only then will the colleges be able to engage students in catechism classes better and improve their satisfaction levels.

5.2.1 Change Traditional Educational Thinking and Concepts

The soul of higher education development is an educational philosophy, and educational philosophy will shape the type of educational practice. The advancement of information technology has generated a new style of learning that spans time and place, and the means and channel by which people acquire knowledge has fundamentally changed. Many countries have suggested lifelong education to meet the needs of rapid national development. Several countries urge residents to continue learning and updating their expertise to address national development needs. The widespread use of catechism has brought significant opportunities and difficulties to China's higher education system. In light of this reality, we must first relax our thoughts, shift traditional educational thinking, update the concept of schooling and education in reform practice, and enhance the foundation of online education. As a result, the traditional notion of higher education can be altered in the following ways.

To begin, alter the standard paradigm of talent development. Universities' principal aim is to develop talent. Traditional higher education should use the Internet to give learners a larger learning environment. Learners can engage in more open and diverse learning in a network environment, which benefits their overall growth. The number of adult lifelong learners has increased, as have the demographic profiles and backgrounds of learners, and the needs for lifelong education can now be met through the Internet.

Second, it is critical to comprehend the university's resource-based perspective completely. It is a symbiotic relationship. A good institution has a wide range of resources, including appropriate hardware, a high-quality faculty, and a higher social status. A good school's resources are far more than a typical institution. A school with many resources will be more visible, which will lead to more good students being recruited. With additional human resources, the school will be able to attract more finance, which will aid in its expansion.

Third, alter the university's developmental mindset. According to traditional universities, higher education is the final step of a person's education. We should challenge this way of thinking in this highly evolved Internet era. Universities should fully understand their social service functions, provide a broader learning space for most learners, and give full play to their social service functions. The rationale is that the information-based society requires personalized and diverse talents, which universities cannot provide with only three to four years of education.

5.2.2 Strengthen the Quality and Skills of the University Teaching Team

The advancement of academics is inextricably linked to the advancement of the university. The school will thrive if the teachers are vital. The university's quality of education can only be improved by consistently strengthening faculty quality and skills. In the age of the Internet, a high level of teaching can help a university gain a foothold in the information economy. The global rise of catechism, in particular, has increased the availability of learning resources and made teaching methods more flexible and democratized, compelling teachers to adapt their old teaching conceptions and approaches.

Create a faculty development centre first. Such a Faculty Development Center would serve the needs of professors, but it can also help students improve their learning ability and skills. Establishing a teacher development centre can help college teachers improve their classroom teaching abilities. Teachers will need specialized technical personnel for various purposes: to help them improve their use of teaching technology and change the traditional face-to-face teaching mode, innovate the current teaching mode, establish a student-centred teaching concept, and learn to use computers skillfully in the teaching process and explore the online teaching model.

Such a centre will need to have a high-level technical team, i.e. a faculty development centre, should also be developed to provide teachers with teaching technology-related assistance. Teachers should be able to get instructional technology advice from the faculty development centre. In addition, the faculty development centre should provide ongoing training for teachers and establish a staged training plan for

teachers with varying levels of teaching technology. Teachers should stay current on new technologies, methodologies, and teaching concepts and enrich themselves in terms of knowledge, logical use of instructional media, improved teaching design, and appropriate curriculum design and structure.

Second, encourage instructors to use research in their classrooms. Teachers are urged to incorporate research into their regular teaching activities and engage in research-based teaching. The teaching philosophy of MOOC's student learning development-centred teaching philosophy has been demonstrated. Our colleges and universities are beginning to shift their teaching methodology to "student learning-centred." Constructivism is the belief that cognitive individuals must assimilate and adapt to their surroundings to reach equilibrium. This balance is accomplished through a dynamic process of development. The individual's constant enrichment, progress, and improvement occur in this emotional cycle. Active construction, not passive reception, shapes knowledge. As a result, knowledge does not provide solutions to all issues, implying that information is reprocessed and rebuilt for the specific problem's scenario.

Research and education do not exist in isolation; they are inextricably linked and mutually beneficial. There are two approaches to research-based instruction: First, teachers then incorporate their findings into teaching materials for students to examine and study. This will challenge pupils' creative learning abilities while improving their research abilities. Second, to convey their research findings in the classroom, teachers will focus on their classroom research on teaching and learning. Then they will focus on a variety of cutting-edge and practical research topics in an ongoing study. This will encourage teachers to seek out new, authentic, and cutting-edge teaching materials regularly, thereby improving their research skills and, as a result, the quality of their instruction.

5.2.3 Constructing a Complete Curriculum

With the introduction of MOOC, the traditional university teaching approach must be altered. The MOOC age is characterized by widely shared knowledge, allowing learners to access high-quality courses worldwide for free over the Internet. In this environment, China's higher education curriculum must be updated to reflect the current period. In general, we can create high-quality courses in the following methods.

The first step is to introduce high-quality catechism classes. The first is the implementation of high-quality catechism courses in higher education institutions to improve the university's course quality and generate top-notch pupils. Because the quality of teachers at schools varies, so does the quality of the courses teach by these teachers. The addition of necessary high-quality catechism courses can compensate for the low-quality courses. The non-core curriculum at the school is overly convoluted, some of the existing courses are of poor quality, and some elective courses are not offered at all. In this situation, introducing high-quality catechism classes will allow students to select high-quality catechism courses, which will benefit their entire development.

Second, develop an outstanding core curriculum. It must be exceptional for

something to gain a foothold in society or develop over time. Education is both; for a college to improve, it must have a core competitive core curriculum in addition to a high-quality faculty team. If a school's core curriculum is not competitive, it will inevitably fall behind and be replaced by a superior institution. Colleges and universities should continue to concentrate on their core curriculum or, if possible, construct core strengths and focus on developing a well-rounded and highly skilled teaching staff. Schools can share as many quality courses as possible through the catechism platform to attract more learners and improve the school's visibility and maintain core competitiveness in the competition among universities and in the process. Ultimately, it aims to continue consolidating and strengthening the core curriculum and pushing to a degree to the world platform.

Third, MOOC technology is employed in offline education. Because of the help of Internet technology, cloud computing technology, and comprehensive data analysis technology, MOOC online education may progress smoothly. Universities can incorporate these technologies into their everyday teaching operations and better manage the entire learning process. Teachers should learn how to use these technologies in their daily teaching activities to analyze students' strengths and weaknesses, create training programs for each student and personalize student training. The aim is to meet the learning needs of learners with different characteristics and the country's need to cultivate innovative talents.

5.2.4 Development of a Digital Teaching Environment

The rapid advancement of technology in higher education has offered an unprecedented challenge to traditional teaching methods in China. The cultivation of inventive abilities is becoming more critical in higher education. By modifying the traditional teaching setting and creating a digital teaching environment, we can enable online teaching, individualized teaching, and burgeoning online catechism instruction.

To begin, define the driving idea for creating a digital learning environment. Prior to constructing a digital teaching environment, college and university officials should first define the guiding ideology for doing so: unified planning, comprehensive design, general arrangement, and step-by-step implementation. A cross-time and cross-platform digital teaching environment is a notion. It is a multimedia teaching environment, a network teaching environment, and a technology service system that supports teaching. The digital education environment is a massive system with advanced technology that spans several sectors. As a result, to successfully promote the building of a digital teaching environment, we must thoroughly combine technical resources, human resources, and physical equipment resources and make full use of the advantages of education technology.

Second, colleges and universities should concentrate on developing a multimedia system. When creating digital teaching materials, colleges and universities should concentrate on subsystems such as multi-functional multimedia systems, open learning systems, online teaching platforms, and online question-answer systems. Teaching techniques can provide suitable guidance to students and guide them to use more

learning ways since these subsystems can improve the teaching classroom. The openness of the learning system allows students to access learning resources at any time and from any location, enriching the relevant materials of the courses they are studying, which aids teachers' teaching and encourages students to learn in multiple ways. A well-designed teaching management system and support service system can make a big difference in how successfully teaching and learning go. Finally, teachers and students learn how to use technology for teaching and learning.

5.2.5 Establishing a School-level Digital Teaching Resource Centre

Establishing a school-level digital teaching resource centre in the MOOC age can help China's higher education system. In recent years, the government and schools have put much effort into building digital teaching resource centres at the school level. However, creating digital teaching resource centres in China's universities is insufficient to satisfy the development of an education network. In order to implement digital teaching resource centres, more research and trials are required. This present paper will conclude with recommendations based on three factors: the concept, concepts, and the architecture of a school-based digital teaching resource centre.

First, define the digital teaching resource centre's design concept. The design concept of the digital teaching resource centre, namely "sharing, aggregation, and application," must be clarified. Learning resources distributed on the network can be learned, shared, and effectively used by learners of various backgrounds and levels. Aggregation means pooling the required teaching materials together and putting the pooled learning materials on the network for learners to learn; application means allowing learners of various backgrounds and levels to learn and use the learning resources distributed on the network. Application refers to creating an environment in which learners from various backgrounds may study and apply these aggregated learning materials and maximize the usage of these aggregated teaching resources to maximize their role.

Second, justify the idea of building a digital teaching resource centre at the school level. Conceptually, technically, and administratively, establishing a school-level digital teaching resource centre should be rationalized. Establishing a school-level digital teaching resource centre maximizes sharing and utilizing high-quality teaching resources. In other words, it is to carry out unified planning and management of teaching resources in the digital teaching resource centre and establish a mechanism to ensure that the digital teaching resource centre built can run smoothly and effectively. Technically, it is to use relevant technologies to ensure that the built digital teaching resource centre can run smoothly and effectively. The teaching resources of the digital teaching resource centre can be shared in multiple ways by using relevant technologies, which allows for the sharing and collaboration of teaching resources in multiple directions to be solved. Regarding running and implementing the digital teaching resource centre, the resource centre should create teaching resource outlets for the entire world, aggregating all high-quality teaching resources.

Building a digital teaching resource centre has the role of storing, managing, and

evaluating aggregated teaching resources in terms of teaching resource management. Different learners can use different methods to search, explore, and download the pooled educational resources on the Internet. They can decipher the characteristics of downloaded learning materials and save them in their resource library. The four modules that make up the digital teaching resource centre are teaching resource administration, teaching resource generation, knowledge integration, and teaching resource extension. Teachers should create different module designs for different modules of teaching resources and track the information status of teaching resources. The knowledge integration stage aims to reprocess and integrate offline teaching resources into a scientific and practical teaching resource system. Thus, learners can use them later; the knowledge integration stage's role can reprocess and reintegrate the offline teaching resources to become a scientific and practical teaching resource system.

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APPENDIX
QUESTIONNAIRE

1. Your gender: A. male B. female
2. Your age: A. 18 years old or younger
B. 18-22 years old C. 23 years old or older
3. Your year: A. Freshman B. Sophomore C. Junior D. Senior
4. Have you participated in other MOOC before that? A. Yes B. No
5. Do you have a learning tool for MOOC? (e.g., laptop, cell phone, tablet, etc.) A. Yes B. No
6. How many times you take MOOC classes: A. a lot B. more C. average D. less E. very little

This questionnaire is to study: the relationship between factors related to the content of the catechism and satisfaction. The questionnaires use a five-point Likert scale, with option “1” meaning “strongly disagree” and option “5” meaning “strongly agree”.

Please combine your latest catechism experience and answer the following questions. Tick (✓) the most appropriate response scale for each statement.

	1	2	3	4	5
The MOOC arranged for practical classes is very smooth.					
The MOOC arranged for practical classes rarely lags					
The MOOC arranged for practical classes is convenient to watch back.					
The MOOC arranged for practical classes covers the basics.					
The MOOC content arranged for the practical classes is very effective.					
The MOOC arranged for the practical classes contains most of the key contents.					
The MOOC content of the practical classes is arranged to help you master the teaching focus.					
The overall effect of teaching MOOC is very good					
MOOC is more effective than ordinary teaching methods.					
You would prefer a MOOC teaching method					
You will recommend MOOC to your classmates					
You are satisfied with the MOOC teaching					