Research on Teaching Satisfaction under the Application of Social Media Tools From the perspective of multiple incentives

Liu Yong[1], Fan Zheng[1], Cindy Millman[2*], Wang Shixin[3]
[1]Wuhan University of Science and Technology, Evergrande School of Management, Wuhan, Hubei, China
[2]Birmingham City University, Faculty of Business, Law and Social Sciences, Birmingham, UK
[3]Wuhan University of Science and Technology, Evergrande School of Management, Wuhan, Hubei, China
*Corresponding Author.

***Abstract*—**Education big data has risen to China's national strategy, and the construction of education big data has ushered in major historical development opportunities (Zhang Wei, 2017). Social media, as the collector of the most micro-level education big data, supports the entire data ecology. Social media-based mixed teaching is changing the traditional classroom, but we still know very little about the current status of social media teaching, especially the internal and external environment of social media teaching for college teachers. In this study, a questionnaire survey was used to systematically investigate the satisfaction of college students with mixed teaching based on social media. The study found that in the mixed teaching process, teachers can have an impact on teaching results through multiple incentive modes; among them, spiritual and interactive incentives can have a significant impact on teaching satisfaction; this will provide a useful reference for college social media teaching. Promoting the transformation of the role of teachers in colleges and universities helps to promote the high development of education.

***Abstract*—**Social media; Incentive mode; Perceived effectiveness; Teaching satisfaction

I. INTRODUCTION

A. Research Background

Higher education bears arduous task of cultivating high-level professional talents, boosting science, technology and culture, and advancing socialist modernization. The task is a core mission for improving teaching quality and comprehensively promoting the development of higher education, and also one basic requirement for the building and development of great power in higher education. At present, the rapid development of our Internet technology has fully entered education field, opening up a brand-new path for teaching in universities. In the new era, colleges and universities must make full use of social media tools to give students with comprehensive guidance and provide necessary assistance for classroom teaching. Application of social media tools to classroom teaching in colleges and universities can fully satisfy students' curiosity about classroom participation and meet students' needs for self-development. Therefore, college teachers must use social media as a good teaching means, adopt a variety of incentive modes to stimulate students' participation enthusiasm, improve students' learning efficiency, instruct students to continuously explore and develop thinking, thereby thoroughly and comprehensively promoting college students' quality improvement in the new era of education.

B. Research Purpose and Significance

a. Research purpose

(1) To study effective teaching incentive models for improving teaching quality and satisfaction under the impact of self-perceived social media effectiveness.

(2) To study how different teaching motivation models under the impact of self-perceived social media effectiveness indirectly improve teaching satisfaction through teaching quality perception.

b. Research significance

(1) Theoretical significance

On the basis of the existing theoretical research, this paper conducts in-depth exploration into the influence of different teaching incentive methods on college teaching satisfaction via the regulatory effect of self-perceived social media effectiveness. It expands the theoretical research on self-perceived effectiveness in college teaching scenarios.

(2) Practical significance

This paper provides effective reference opinions for improving college course teaching quality and increasing course teaching satisfaction. It encourages college teachers to use social media tools to realize role transition in college classroom teaching and helps boost high-level development of college social media teaching.

C. Research Methods and Content

a. Research methods

(1) Literature research method

By consulting relevant literature on self-perceived effectiveness and social media teaching, this paper explores college students' self-perceived effectiveness for social tools, and the important role of social media teaching in classroom teaching. By analyzing and sorting existing literature, it summarizes the contributions and shortcomings of existing theoretical research, searches innovative points of research, thus providing theoretical reference and support for the setting of various variable factors in the model hypothesis research herein.

(2) Questionnaire survey method

To further understand college students' perceived effectiveness for social media, this paper evaluates social media teaching quality and satisfaction under a variety of incentive modes. Based on questionnaire survey, this paper accesses the data and information required for the model research herein, and provides rigorous and detailed data support for research through statistical analysis of SPSS data.

b. Research content

The research content of this paper will be divided into the following five chapters, and each chapter is specifically illustrated as follows.

In introduction part, it mainly introduces the research background of this paper, and briefly describes the educational background of the new media era. At the same time, the research purpose and significance of the paper are explained.

In the literature review part, it mainly elaborates the theoretical research on social media teaching and self-perceived effectiveness by scholars at home and abroad, systematically summarizes the existing theoretical research results, and then leads to the research direction and research ideas therein.

In the research method and design part, it mainly displays the research model herein, and systematically introduces the various variables in the research model and the relationship between them. After establishment of the research model, model hypotheses are made, the research questionnaire is designed, and preliminary descriptive statistics and analysis are made on the

questionnaire results.

In the data analysis part, through in-depth and comprehensive analysis and research on the questionnaire survey results, various data in the research model are tested and compared to explore the significant relationship between the research model variables, so that the overall effect of the hypothetical model and existing research hypotheses can be tested.

In conclusions and prospects, based on data analysis, this paper analyzes and summarizes the research results, then leads to the research conclusions herein. At the same time, it provides useful suggestions for social media teaching. In addition, deficiencies in the research process are systematically summarized with optimization suggestions given.

II. LITERATURE REVIEW

A. Related research theories on self-perceived effectiveness

Self-efficiency is an individual's belief in whether one can make achievement [1]. It mainly originates from four aspects: personal experience and a series of physical and mental reactions in the process, substitution experience and verbal persuasion [2].

Subjective self-efficiency is a kind of self-recognition towards general event processing capability based on personal experience and feelings. Objective self-efficiency is a kind of self-cognition towards general event analysis and processing capabilities based on others' experience and speech [3].

Another key factor affecting users' information search behavior is self-efficiency. Users' information needs, retrieval strategies, retrieval efficiency, information evaluation and other entire information search processes are all subject to its influence [4]. People with high levels of self-efficiency can flexibly switch search strategies, selectively abandon analysis and hybrid strategies, and switch to intuitive search strategies, but users with low self-efficiency rarely have such capabilities because information is meaningful to oneself in this process. Self-efficiency effectively affects searchers' expected search results, which further affects their final search efficiency [5].

Perceived usefulness formally proposed in the Technology Acceptance Model (TAM) is a key factor to measure users' willingness for continued usage. Davis, the model proposer, explained perceived usefulness as the degree to which others believe that a particular mechanism can be used to improve work efficiency. Generally, with stronger perception of use, one is more positive towards use. With stronger perceived ease of use, the user has stronger perceived usefulness [6].

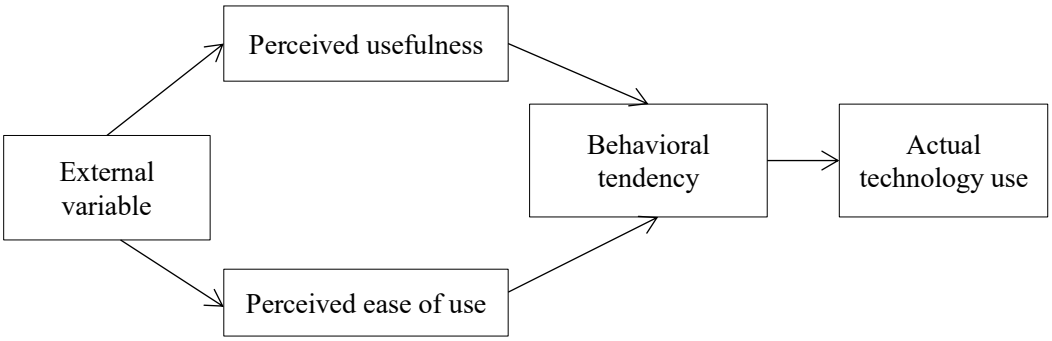

Figure I. TAM perceived usefulness model

In fact, when functions applied to a certain technology is easier to understand, it is easier for people to recognize it, and users have greater perceived use. The perceived ease of use is actually a process of expected estimation, while perceived usefulness is the result of the expected estimation [7]. Perceived usefulness indicates the degree to which the subject believes that the use of a particular tool system can improve work performance [8].

TAM2 believes that usefulness in people's idea will be affected by social norms in varying degrees. Individual users usually abide by certain social norms to maintain a good image and gain support from others, which is an important reason why increased perceived usefulness leads to higher intention to use. In the process of instrumental cognition, individuals usually think that the perceived ease of use, work relevance, the output quality of the technology, and magnitude of the effect perceived by others and obtainable via the technology, namely a kind of result demonstration, all together affect the final degree of perceived usefulness [9].

Perceived usefulness and satisfaction are the key factors that affect the continuous use intention of information users. It can be expected that the perceived usefulness and satisfaction exert certain indirect impact on the continuous use intention. Davis's research emphasizes the importance of research. He pointed out that both perceived usefulness and perceived ease of use are closely related to the use relevance.

What's in sharp contrast to perceived ease of use is perceived usefulness which has a more significant impact. Generally speaking, in a new system, appropriate useful functions are very effective [11]. Perceived usefulness is affected by the following factors: first, work relevance and output quality affect the perceived usefulness together, because the output quality and users' perceived usefulness are directly proportional to the degree of work relevance; second, social norms can affect perceived usefulness which continues to grow with the increase in accumulated experience of use [12].

B. Related Research Theories on Social Media Teaching

Social media is characterized by openness, digital identity, cooperation and collaboration. Social networks can be regarded as one component of individual learning environment [13]. With regard to relevance between the perceived usefulness, openness of social media and individual users' willingness to use information, fundamentally speaking, the first is relational value, the second is communication value, the third is information value, and the fourth is instrumental value. Social media covers the above four dimensions. It represents an Internet application that can help people establish and maintain social network. The primary function of social media is to establish and maintain interpersonal relationships, which is manifested in relational value [14].

The close connection between social network media and the development of the times is a scientific benchmark of the times, which reflects the following characteristics: 1. Social network media is extensive. Because of the network environment, people have entered a new network age. For instance, application of equipment like mobile phones and computer enables people to truly become information receivers and disseminators; 2. Social media features dissemination timeliness, which gets rid of the constraints of timing or unidirectional dissemination of traditional media, thus reflecting real-time and timeliness nature of information interaction; 3. Interactive users can communicate and publish opinions via social media, and effectively interact throughout the process of information collection and release [15].

In the "Internet +" era, social media teaching has made new developments, showing relatively broad connotations. It refers to a teaching mode of using any social media in teaching practice, and innovating teaching design and changing the teaching process by integration of teaching resources based on social media functions [16].

Xu Jinfen found that subject and object, subjective and objective are the two core dimensions of social media teaching status survey, who makes analysis from the subjective and objective cognitions in practical teaching and classroom norms, and investigates the teaching effect from different aspects.

Liang Linmei conducts in-depth research on teachers' social media teaching from three different

dimensions: behavior and ability, training, incentive methods provided by institutions, attitudes. Liang Linmei et al. pay further attention to teaching interaction on the basis of “subjective and objective” dimensions [17].

The most basic functional module of education is interaction, including interaction between students, interaction between students and teachers, and interaction content. Social media can be: the group formed together by classmates and people with the same interests, which is effectively organized as the basis. Social media tools allow, encourage, and authorize all users to develop formal and informal relationships, while also encouraging, sharing, recommending, and commenting on contents with authors’ permission to browse. Fundamentally speaking, social media tools are not controlled by teachers' organizations, but are a system customized by individuals to meet their own personal needs [18].

Through research, Yang Genfu et al. believe that the factors that affect the completion rate of social media teaching users include four points: first, design factors, such as content quantity and quality, independent learning support, and interaction between platforms; second, learners’ self-professional development needs, for example, learners' learning history, professional background and learning interest, independent learning capability, and adaptability to learning methods; third, factors in the learning environment, such as teacher support, collaborative learning, etc.; fourth, institutional constraints, such as school policies, credit system, learning rewards and punishments, etc. [19]. Perceived usefulness, as a key influencing variable of willingness to use, needs to pay attention to availability of platform resources to effectively reduce teachers’ teaching burden and foster individual innovative characteristics; subjective norms, as an important variable that affects willingness to use, should pay more attention to follow up teaching and research activities, focus on cultivating "leaders" in smart classroom teaching. In addition, information technology self-efficiency may bring a certain negative impact on willingness to use [20].

C. Related Research Theories on Teaching Quality Satisfaction

Ramsden et al. found that students’ perception of teaching quality and curriculum burden have close relation to their adoption of surface approach to learning [21].

Tian Mei et al. believe that while variables of student background and learning style are controlled, the three variables of basic skills, emphasis on independence, and good teaching still have a significant impact on students’ perceived satisfaction with teaching quality. At this time, appropriate burden no longer has a significant impact [22]. Obviously, students’ perception of classroom teaching and their perception of satisfaction with teaching quality are indirectly produced through the learning style variables. However, when analyzed from the changes in the regression coefficients, the indirect influence produced by learning style is relatively small.

Zhang Bei et al. [23] believe that teaching satisfaction refers to the comprehensive degree of students' recognition towards the quality of practical teaching, classroom teaching and autonomous learning. In the classroom, if students feel happy and recognized by the teacher, and at the same time gain knowledge, then both theoretical proficiency and practical capability will be significantly improved. In summary, students’ self-expectations, the quality of teaching practice, the quality of real-time teaching and the quality of students’ autonomous learning will all bring different effects on teaching satisfaction. These are the common factors constituting the premise of teaching satisfaction.

In addition, Xu Hong, Yao Yue et al. believe in the study of incentive mechanism theory and models that, the incentive models to improve teaching satisfaction include three dimensions: material reward, spiritual incentive, and interactive incentive [24].

III. RESEARCH MODELS AND HYPOTHESES

A. Research Objects

The research object of this paper is college students. Through questionnaire surveys, their cognition and evaluation of social media teaching satisfaction are gathered, so as to further analyze and study the effective incentive model that can improve students' satisfaction with teaching.

B. Research Design

a. Model establishment

Based on the above theoretical research foundation, the theoretical research model of this paper is constructed, as shown in the Fig. 2 below:

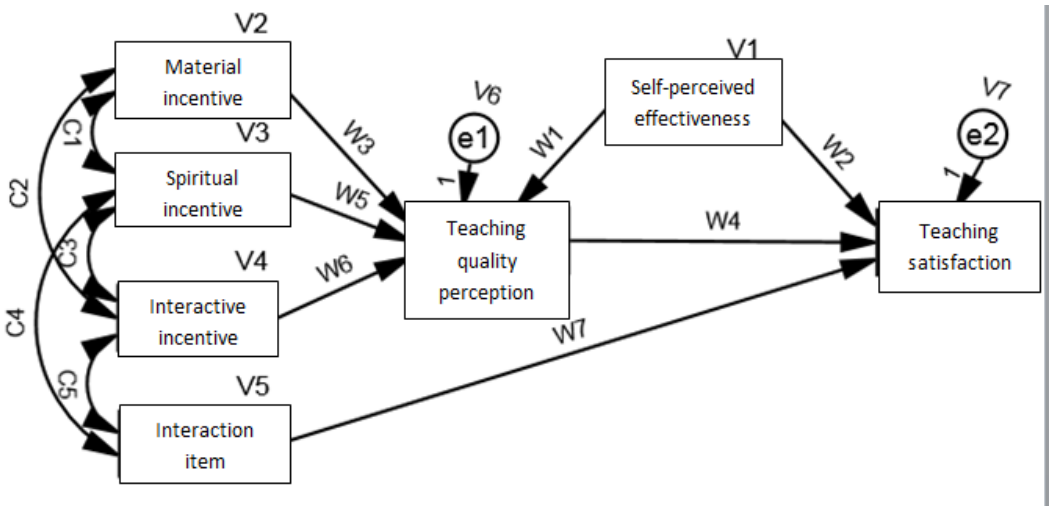

Figure II. Research model diagram

In the research model of this paper, the multiple incentive methods are divided into three different categories: "material incentive", "spiritual incentive", and "interactive reward", which are used as the observation variables (independent variables) of the research model; with perception of teaching quality as a mediation variable, teaching satisfaction as a dependent variable, college students' self-perceived social media effectiveness as a regulatory variable, the influence path of teaching quality perception on teaching satisfaction is adjusted. The variables are specifically explained as follows.

Material incentives refer to the means of material stimulation to encourage students to actively participate in classroom teaching. The main forms of material incentives include red envelope rewards and score bonuses.

Spiritual incentive refers to the incentive method that acts on students' psychology. In the classroom teaching process, teachers actively guide students to classroom learning, improve students' verbal expression skills by recognition and encouragement as the main means to enhance their self-confidence and learning enthusiasm, so that students more actively participate in classroom teaching.

Interactive incentive means to encourage timely and effective teacher-student interaction in the teaching process, encourage real-time interaction and cooperation between students, thereby enhancing intimacy of classroom teaching, and enabling as many students as possible to get involved in classroom education.

Teaching quality perception refers to students' comprehensive evaluation & experience of teaching effect, which mainly includes the overall perception of improvement effect of classroom teaching on learning efficiency, homework completion quality, and academic performance.

Teaching satisfaction is mainly subject to influence of students' expectations and students'

perceived quality. It refers to the overall teaching evaluation based on the perception of teaching quality, including satisfaction towards course effect, satisfaction evaluation on the teaching teacher, and willingness to actively recommend the course teacher to others, etc.

b. Research hypotheses

Teaching satisfaction refers to the disappointment or happiness, negative or positive psychological feeling of college students when comparing the received teaching service and harvest with their previous expectations [25].

Teaching satisfaction is jointly affected by students' expectations and students' perceived quality. Multiple incentive models can impact students' expectations during the teaching process, thereby affecting the final teaching satisfaction; in addition, in the social media environment, students' self-perceived social media effectiveness will also impact teaching quality perception and teaching satisfaction [26].

Based on the above theoretical research, this paper proposes specific research hypotheses as follows:

First, the relationship between material incentives and teaching satisfaction.

H1a: Material incentives have a direct and significant positive impact on teaching satisfaction.

H1b: Material incentives significantly positively affect teaching satisfaction through mediation effect of teaching quality perception.

H1c: The mediation effect of material incentives via teaching quality perception is significantly positively regulated by self-perceived social media effectiveness.

Second, the relationship between spiritual incentives and teaching satisfaction.

H2a: Spiritual incentive has a direct and significant positive impact on teaching satisfaction.

H2b: Spiritual incentives significantly positively affect teaching satisfaction through mediation effect of teaching quality perception.

H2c: The mediation effect of spiritual incentives via teaching quality perception is significantly positively regulated by self-perceived social media effectiveness.

Third, the relationship between interactive incentives and teaching satisfaction.

H3a: Interactive incentives have a direct and significant positive impact on teaching satisfaction.

H3b: Interactive incentives significantly positively affect teaching satisfaction through mediation effect of teaching quality perception.

H3c: The mediation effect of interactive motivation via teaching quality perception is significantly positively regulated by self-perceived social media effectiveness.

IV. QUESTIONNAIRE SURVEY AND DATA ANALYSIS

A. Questionnaire Design

a. Questionnaire scale

The item design of the questionnaire is in the form of Likert 10-level scale from 1-10 in ascending order, which represents the degree of intention from "full noncompliance" to "full compliance". The specific item design of the questionnaire is as follows:

TABLE I. SCALE ITEM DESIGN

Variable	Item	Item Content
Material incentives	A1	Social media classroom activity is linked to grades. I will increase my participation
	A2	There are red envelopes for active social media classes, I will increase my participation

Spiritual incentives	B1	Social media classroom performance is recognized by the teacher, I will increase my participation
	B2	Social media classroom presentation is appreciated by the teacher, I will increase my participation
Interactive incentives	C1	Social media classroom encourages teacher-student interaction, I will increase my participation
	C2	Social media class encourages communication and cooperation among students, I will increase my participation
self-perceived social media effectiveness	D1	It provides up-to-date and useful information and knowledge
	D2	It can solve the difficulties encountered in life
	D3	It increases confidence in handling accidents
	D4	Problems encountered in learning can be solved through it
Teaching quality perception	E1	I think social media teaching improves homework completion quality
	E2	I think social media teaching can help improve learning efficiency
	E3	Social media teaching has improved my academic performance
Teaching Satisfaction	F1	I'm very satisfied with social media classroom teaching effect
	F2	I will recommend and share this social media teaching course
	F3	I will recommend the course teacher

b. Questionnaire distribution and collection

According to the subject to be studied herein, the questionnaire adopts scale items to investigate from multiple angles college students' teaching quality satisfaction under multiple incentive modes. The questionnaire is mainly distributed to college students from many universities in Wuhan.

c. Sample descriptive statistics

The questionnaires are mainly distributed through random sampling of electronic questionnaires. In the past half month, a total of 200 questionnaires were distributed, 170 questionnaires were recovered, and 6 invalid questionnaires were deleted. A total of 164 valid questionnaires were obtained, with an effective recovery rate of 96.4%. Where, there are 72 boys, accounting for 43.9% of the total, 92 girls, accounting for 56.1% of the total; freshmen account for 14.3%, sophomores account for 33.5%, juniors account for 20.3%, and seniors account for 31.9%; In general, the statistical requirements are satisfied, so this sample can meet the needs of this research.

TABLE II. QUESTIONNAIRE STATISTICAL RESULTS

		Frequency	**percentage**	**Effective *percentage***	**Cumulative *percentage***
Effective	male	72	43.9	43.9	32.3
	female	92	56.1	56.1	100.0
	total	164	100.0	100.0	

B. Reliability and Validity Analysis

SPSS21.0 is used to analyze the questionnaire results. The first is reliability and validity analysis:

TABLE III. RELIABILITY STATISTICS

Cronbach's Alpha	based on standardized terms	item number
.948	.952	19

Table IV

KMO metrics of sampling adequacy		918
Bartlett's sphericity test	Approximate chi-square	2028.804
	df	120
	Sig.	0.000

TABLE V RESULTS OF VARIABLE VALIDITY ANALYSIS

Variable	KMO	Sig	item number
Material incentive	0.774	0.000	2
Spiritual incentive	0.726	0.000	2
Interactive incentive	0.821	0.000	2
Self-perceived effectiveness	0.807	0.000	4
Teaching quality perception	0.755	0.000	3
Teaching satisfaction	0.843	0.000	3

TABLE VI. TOTAL VARIANCE EXPLAINED

Component	Initial eigenvalue			Extraction sums of squared loadings			Rotation Sums of Squared Loadings		
	Total	*% of variance*	*Cumulative%*	*Total*	*% of variance*	*Cumulative%*	*Total*	*% of variance*	*Cumulative%*
1	8.298	51.862	51.862	8.298	51.862	51.862	6.021	37.630	37.630
2	1.983	12.392	64.254	1.983	12.392	64.254	2.959	18.492	56.122
3	1.201	7.507	71.760	1.201	7.507	71.760	2.502	15.639	71.760
Extraction method: principal component analysis									

As shown in Table III, the reliability coefficient is 0.948, which is greater than 0.9, indicating that the questionnaire data generally has ideal reliability condition.

As shown in Table IV, the overall KMO value of the sample is 0.918, which is greater than 0.6. Therefore, it passes the Bartlett sphericity test standard, which shows that the sample data has good validity. At the same time, the cumulative variance interpretation rate is calculated to be 71.76%>50% after rotation, which enables effective extraction of information amount in the research questionnaire items. From Table IV-III, we can see that the KMO values of material incentives, spiritual incentives, interactive incentives, self-perceived social media effectiveness, teaching quality perception, and teaching satisfaction are all> 0.7, which suggests that the questionnaire

sample data is suitable for factor analysis. To conclude, the research data has good structural validity.

C. Correlation Analysis

First, the correlation analysis is made for the three observed variables of material incentive, spiritual incentive and interactive incentive, with analysis results shown in Table VII.

TABLE VII. CORRELATION ANALYSIS OF INDEPENDENT VARIABLES

					Material incentive	Spiritual incentive	Interactive incentive
Material incentive	Pearson correlation				1	.358**	.349**
	Significance (bilateral)					.000	.000
	N				164	164	164
	Bootstrap[c]	deviation			0	.004	-.001
		Standard error			0	.090	.081
		95% confidence interval	Lower limit		1	.172	.186
			Upper limit		1	.535	.504
Spiritual incentive	Pearson correlation				.358**	1	.326**
	Significance (bilateral)				.000		.000
	N				164	164	164
	Bootstrap[c]	deviation			.004	0	-.001
		Standard error			.090	0	.056
		95% confidence interval	Lower limit		.172	1	.571
			Upper limit		.535	1	.796
Interactive incentive	Pearson correlation				.349**	.326**	1
	Significance (bilateral)				.000	0	
	N				164	164	164
	Bootstrap[c]	deviation			-.001	-.001	0
		Standard error			.081	.056	0
		95% confidence interval	Lower limit		.186	.571	1
			Upper limit		.504	.796	1

From the analysis results, it can be seen that: the correlation coefficient between material incentives and spiritual incentives is 0.358, and the correlation coefficient between them and interactive incentives is 0.349; while for spiritual incentives and interactive incentives, the correlation coefficient between the two is 0.326. To sum up, the correlation coefficient between the observed variables is between 0.2-0.4, which indicates weak correlation. To conclude, the three independent variables have weak correlation, which can be studied as independent observation variables if possibility of collinearity is excluded.

D. Regression Analysis

In the regression analysis, the three incentive modes of material incentive, spiritual incentive and

interactive incentive are used as observation variables; teaching satisfaction is used as dependent variable for regression analysis, with results shown in VIII.

TABLE VIII MODEL SUMMARY 1

Model	R	R square	Adjusted R square	standard error of estimate	Durbin-Watson
1	.637[a]	.406	.395	1.22914	1.707
a. Predictor variables: (constant), interactive incentive, material reward, spiritual encouragement.					
b. Dependent variable: satisfaction					

TABLE IX. MODEL SUMMARY 2

Model		Sum of Squares	df	Mean Square	F	Sig.
	regression	165.373	3	55.124	36.488	.000[b]
	Residual error	241.724	160	1.511		
	Total	407.098	163			
a. Dependent variable: satisfaction						
b. Predictor variables: (constant), interactive incentive, material reward, spiritual encouragement.						

It can be seen from Table IX that the goodness of fit of the regression model is 0.637>0.5, indicating that the mode has high goodness of fit to the observed value, which is fine in overall; the DW residual independence test shows that the DW value is 1.7, which is between 1.5 -2.5, indicating nonexistence of autocorrelation phenomenon.

TABLE X VARIABLE CORRELATION COEFFICIENT TABLE

Model		Non-standardized coefficient		Standard coefficient	t	Sig.
		B	***Standard error***	***Trial version***		
	(Constant)	2.174	.450		4.830	.000
	Material incentive	.076	.049	.102	1.551	.123
	Spiritual incentive	.273	.074	.316	3.668	.000
	Interactive incentive	.299	.079	.326	3.801	.000

In Table X, the Sig values of spiritual incentives and interactive incentives are both less than 0.05, indicating their significant impact on the dependent variable of teaching satisfaction; while the Sig value of material incentive is 0.123, which is greater than 0.05, indicating significant weakening of its impact on the dependent variable of teaching satisfaction.

It can be seen from Table X that Sig<0.05, which indicates that the linear regression equation is significant; according to FINV function calculation, 2.661<36.488, which means that each explanatory variable included in the model is combined to exert a significant effect on the explained variable.

E. Analysis of Regulatory Mediation Effect

a. Direct effects

Data analysis is carried out through PROCESS tool in SPSS21, with material incentives, spiritual incentives, and interactive incentives as independent variables, and teaching satisfaction as dependent variable. The analysis results are shown in Table XI.

TABLE XI RESULTS OF DIRECT EFFECTS

	Effect	**Se**	**t**	**p**	**LLCI**	**ULCI**
X1	0.0913	0.0436	2.0966	0.0375	0.0053	0.1772
X2	0.195	0.0462	4.2209	0.0000	0.1038	0.2083
X3	0.2196	0.0446	4.9268	0.0000	0.1316	0.3677

The analysis results show that among the direct effects, material incentive has a P value of 0.0375<0.05, but 0.0375>0.0000, that is, material incentive has insignificant direct effect on teaching satisfaction; spiritual incentive has a P value of 0.0000<0.05, that is, spiritual incentive has insignificant direct effect on teaching satisfaction; interactive incentive has a P value of 0.0000<0.05, that is, interactive incentive has a significant direct effect on teaching satisfaction. Therefore, H1a does not hold; while hypotheses of H2a and H3a hold.

b. Mediation effect

(1) Mediation model analysis 1

With material incentive as independent variable, teaching quality perception as mediation variable, and teaching satisfaction as dependent variable, SPSS21's PROCESS tool is used for analysis, with the analysis results shown in Table XII.

TABLE XII MEDIATION EFFECT ANALYSIS 1

	coeff	**se**	**t**	**p**
constant	0.000	0.0764	1.000	0.000
Material incentive	0.2697	0.0757	3.5654	0.0005
constant	0.000	0.0402	0.000	1.000
Material incentive	0.1069	0.0419	2.5529	0.0116
teaching quality perception	0.8241	0.0419	19.6739	0.000

From the results of mediation effect analysis 1, we can see that in the first half of the mediation effect model, material incentives have a significant impact on teaching quality perception (P<0.05); while in the second half, teaching quality perception has a significant impact on teaching satisfaction (P<0.05). To sum up, in this mediation model, material incentives can have a significant impact on teaching satisfaction through the mediation effect of teaching quality perception. Therefore, H1b is established.

(2) Mediation model analysis 2

With spiritual incentive as an independent variable, teaching quality perception as a mediation variable, and teaching satisfaction as a dependent variable, the analysis results are shown in Table XIII.

TABLE XIII MEDIATION EFFECT 2

	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
constant	0.000	0.0675	0.000	1.000	-0.1333	0.1333
spiritual incentive	0.5074	0.0677	7.4939	0.000	0.3737	0.6411

constant	0.000	0.0388	0.000	1.000	-0.0766	0.0766
spiritual incentive	0.1973	0.0451	4.3705	0.000	0.1081	0.2864
teaching quality perception	0.7528	0.0451	16.6771	0.000	0.6637	0.842

The results of mediation effect analysis 2 show that in the first half of the mediation effect model, spiritual incentive has a significant impact on teaching quality perception (P<0.05); while in the second half, teaching quality perception has a significant impact on teaching satisfaction (P<0.05). To sum up, in this mediation model, spiritual incentive can have a significant impact on teaching satisfaction through the mediation effect of teaching quality perception. Therefore, H2b is established.

(3) Mediation model analysis 3

With interaction incentive as an independent variable, teaching quality perception as a mediation variable, and teaching satisfaction as a dependent variable, the data analysis results are shown in Table XIV.

TABLE XIV MEDIATION EFFECT 3

	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
constant	0.000	0.0688	0.000	1.000	-0.1358	0.1358
Interactive incentive	0.4788	0.089	6.9414	0.000	0.3426	0.615
constant	0.000	0.038	0.000	1.000	-0.075	0.075
Interactive incentive	0.1973	0.0451	4.3705	0.000	0.1081	0.2864
Teaching quality perception	0.7453	0.0434	17.1783	0.000	0.6596	0.831

From the results of mediation effect analysis 2, we can see that in the first half of the mediation effect model, interactive incentives have a significant impact on teaching quality perception (P<0.05); while in the second half, teaching quality perception has a significant impact on teaching satisfaction (P<0.05). To sum up, in this mediation model, interactive incentives significantly impact teaching satisfaction through the mediation effect of teaching quality perception. Therefore, H3b is established.

c. Regulated mediation effect

Next, a regulated mediation model is established to test whether the mediation effect in which multiple incentive models affect teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness.

Based on model research of mediation effect, we innovatively introduce self-perceived social media effectiveness as a regulatory variable to adjust the influence path of teaching quality perception on teaching satisfaction in the second half of the mediation model. In terms of model research, we still classify the research models into three groups for data analysis and verification based on observed variables (material incentives, spiritual incentives, and interactive incentives). The specific three groups of regulated mediation models are designed as shown in Fig. 3-5

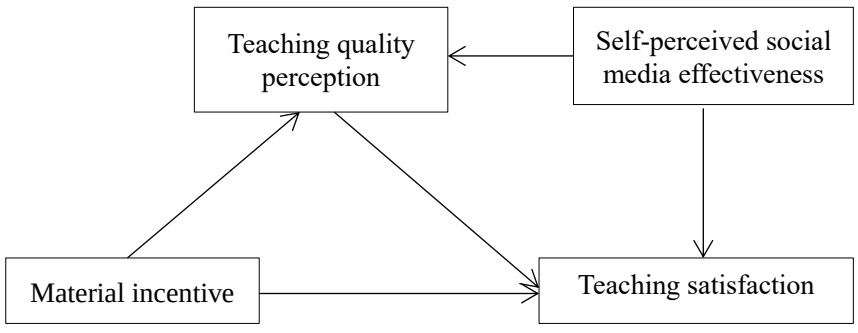

Figure III. Regulated mediation model 1

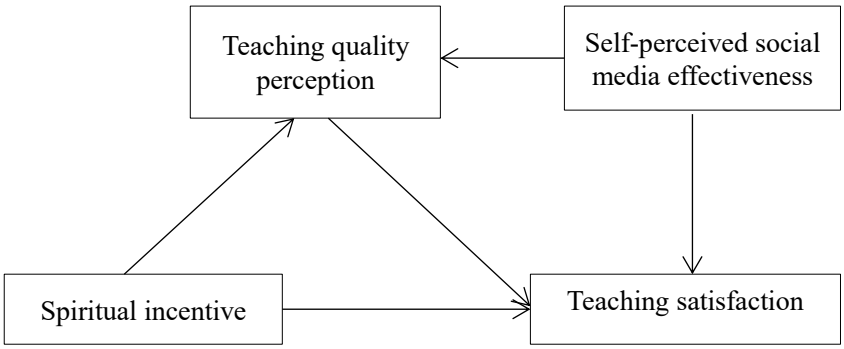

Figure IV. Regulated mediation model 2

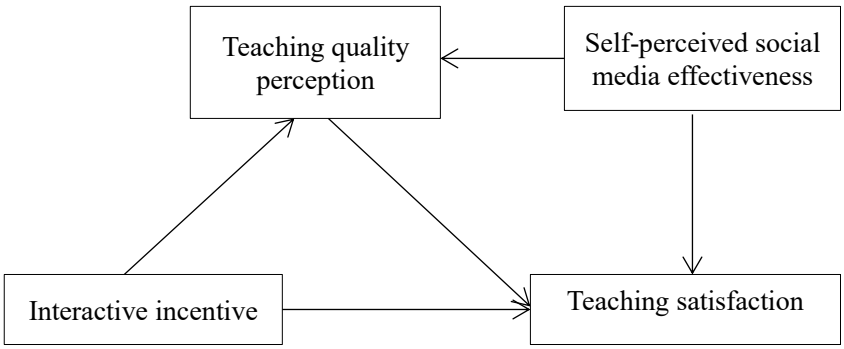

Figure V. Regulated mediation model 3

In Model 1, the independent variable is material incentive, the mediation variable is teaching quality perception, the dependent variable is teaching satisfaction, the regulatory variable is self-perceived social media effectiveness, and the interaction item is teaching quality perception* self-perceived social media effectiveness. In Model 2, the independent variable is spiritual incentive, the mediation variable is teaching quality perception, the dependent variable is teaching satisfaction, and the regulatory variable is self-perceived social media effectiveness. In Model 3, the independent variable is interactive incentive, the mediation variable is teaching quality perception, the dependent variable is teaching satisfaction, and the regulatory variable is self-perceived social media effectiveness. The data analysis results are shown in Table XV.

TABLE XV SUMMARY OF REGULATED MEDIATION EFFECTS

	coeff	**se**	**t**	**p**	**LLCI**	**ULCI**
constant	0.0215	0.0431	0.4975	0.6195	0.1067	0.0637
Material incentive	0.0913	0.0435	2.0966	0.0376	-0.1067	0.0637
teaching quality perception	0.8189	0.0468	17.4965	0.000	0.0053	0.1772
Self-perceived effectiveness	0.0369	0.0474	0.7784	0.0475	0.7265	0.9114
Int_1	0.0449	0.033	1.3636	0.1746	-0.0202	0.11
constant	0.0272	0.0414	0.6557	0.513	-0.109	0.0546
Spiritual incentive	0.195	0.0462	4.2209	0.000	0.1038	0.2863
teaching quality perception	0.7564	0.0481	15.7248	0.000	0.6614	0.8514
Self-perceived effectiveness	0.0169	0.0454	0.3724	0.0301	-0.0728	0.1066

Int_2	0.2589	0.0314	1.8133	0.0317	-0.0051	0.1188
constant	-0.0272	0.0414	-0.6557	0.513	-0.109	0.0546
interactive incentive	0.195	0.0462	4.2209	0.000	0.1316	0.3077
teaching quality perception	0.7517	0.0481	15.7248	0.000	0.6593	0.8440
Self-perceived effectiveness	0.1012	0.0448	0.3724	0.0401	-0.0779	0.0983
Int_3	0.1569	0.0308	1.5416	0.0421	0.0134	0.1048

Through data analysis, it can be known that in the regulated mediation model with material incentives as the observed variable, the significance coefficient of the interactive item Int_1 is 0.1746, which is greater than 0.05, indicating that in this group of models, self-perceived social media effectiveness has weak regulatory effect on teaching quality perception and teaching satisfaction; in the regulated mediation model with spiritual incentive as the observed variable, the significance coefficient of the interaction item Int_2 is 0.0301, which is less than 0.05, indicating that in this group of models, self-perceived social media effectiveness has significant regulatory effect on teaching quality perception and teaching satisfaction; in the regulated mediation model with interactive incentives as the observed variable, the significance coefficient of the interaction item Int_3 is 0.0421, which is less than 0.05, indicating that in this group of models, self-perceived social media effectiveness has a significant regulatory effect on teaching quality perception and teaching satisfaction.

Specifically, firstly, it is tested whether the mediation effect in which material incentives impact teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness. The results show that material incentives have significant effect on teaching quality perception and the confidence interval of β=0.2697 is [0.1203,0.4191]. The interaction item between teaching quality perception and self-perceived social media effectiveness has insignificant effect on teaching satisfaction, β=0.0499, and the 95% confidence interval is [-0.0202,0.11]. Material incentive has significant impact on teaching satisfaction, β=0.0913, 95% confidence interval is [0.0053, 0.1772]. Teaching quality perception has significant effect on teaching satisfaction, β=0.8189, and 95% confidence interval is [0.7265, 0.9114].

Next, we test whether the mediation effect in which spiritual incentives impact teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness. The results show that spiritual incentives have significant effect on teaching quality perception, and the confidence interval of β=0.5074 is [0.3737, 0.6411]. The interaction item between teaching quality perception and self-perceived social media effectiveness has a significant effect on teaching satisfaction, β=0.0569, and the 95% confidence interval is [-0.0051, 0.1188]. Spiritual incentive has significant effect on teaching satisfaction, β=0.195, and 95% confidence interval is [0.1038, 0.2863]; teaching quality perception has significant effect on teaching satisfaction, β=0.7564, and 95% confidence interval is [0.6614, 0.8514].

Finally, it is tested whether the mediation effect in which interactive incentives impact teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness. The results show that interactive incentives have significant effect on teaching quality perception and the confidence interval of β=0.4788 is [0.3426, 0.6150]. The interaction item between teaching quality perception and self-perceived social media effectiveness has insignificant effect on teaching satisfaction, β=0.1569, and the 95% confidence interval is [0.0134,0.1048]. Interactive incentive has significant impact on teaching satisfaction, β=0.195, 95% confidence interval is [0.1316, 0.3077]. Teaching quality perception has a significant effect on teaching satisfaction, β=0.7564, and 95% confidence interval is[0.6593,0.8440].

Based on the above results, the regulated mediation model proposed herein can be supported when the observed variables are spiritual incentives and interactive incentives. The mediation effect

in which spiritual incentives and interactive incentives impact teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness; while the mediation effect in which material incentives impact teaching satisfaction through teaching quality perception is not significantly regulated by self-perceived social media effectiveness. Therefore, among the regulated mediation model hypotheses, H1c does not hold, H2c and H3c hold.

V. Conclusions and prospects

A. Research Conclusions

a. Mediation effect of teaching quality perception

Through research, it can be known that teaching quality perception plays partial significant positive mediation role in the impact of material incentives, spiritual incentives, and interactive incentives on teaching satisfaction. The research findings can be illustrated from the following perspectives. First, in the process of social media classroom teaching, multiple incentive models can stimulate students' enthusiasm for classroom participation, improve classroom participation efficiency, so that students unconsciously take correct learning attitude and input more energy and time to complete learning tasks, leading to significant improvement in homework completion quality, course learning efficiency and academic performance. In this way, students will have a high degree of comprehensive recognition towards classroom teaching quality, practical teaching quality and autonomous learning quality, thus feeling happy and fruitful, with both theoretical proficiency and practical capability improved. Teaching quality perception is a key factor affecting teaching satisfaction. Therefore, the three incentive modes can significantly impact teaching satisfaction through the mediation effect of teaching quality perception.

b. The regulatory effect of self-perceived social media effectiveness

This study also tests whether the mediation effect in which the three incentive modes act on the second half of teaching satisfaction through teaching quality perception is regulated by self-perceived social media effectiveness. The study found that the second half of the mediation model with material incentives as an observation variable is not significantly regulated by self-perceived social media effectiveness. In other words, under this incentive model, the impact of teaching quality perception on teaching satisfaction is not strengthened by students' self-perceived social media effectiveness.

There may be two reasons for this result. First of all, self-perceived social media effectiveness refers to people's self-awareness of general transaction processing capabilities based on one’s own experiences and feelings of social media usage, that is, the cognition towards the utility that social media tools can bring. According to the questionnaire survey results, students’ self-perceived social media effectiveness is mainly manifested in information retrieval, problem solving and self-confidence enhancement, and these aspects mainly involve psychological or spiritual satisfaction. Therefore, such regulatory effect is mainly reflected in psychological level, but is insignificant in the material level. Therefore, when material incentives impact teaching satisfaction through teaching quality perception, self-perceived social media effectiveness plays insignificant regulatory role. Second, material incentives have insignificant direct effect on teaching satisfaction, but have significant indirect effect on teaching satisfaction through the mediation effect of teaching quality, which suggests that material incentive model can stimulate students’ learning passion and increase their learning enthusiasm, thus improving teaching quality perception and impacting teaching satisfaction through indirect positive effects. When there is regulatory effect of self-perceived social media effectiveness, because teaching quality perception is affected by material incentive, but perceived effectiveness mainly manifests as non-material strengthened regulation, there is insignificant regulatory effect on the second half of the path.

The second half of the mediation model with spiritual incentives and interactive incentives as observation variables is significantly regulated by self-perceived social media effectiveness. In other words, under these two incentive modes, the impact of teaching quality perception on teaching satisfaction can be strengthened by students' self-perceived social media effectiveness.

The main reason for this result is that, first of all, spiritual incentive mainly manifests as teacher's recognition and appreciation of students' participation in social media classroom teaching; interactive incentive mainly manifests as teacher's action of encouraging students to actively participate in teacher-student interaction and interaction among classmates in the social media classroom. Both of the two incentive modes can improve students' psychological expectations towards classroom quality satisfaction, let them acquire spiritual and psychological self-recognition and others' recognition, thereby improving their subjective satisfaction. Self-perceived social media effectiveness as a regulatory variable mainly manifests as effectiveness perception during the use of social media tools. Therefore, in the second half of model showing the impact of spiritual incentives and interactive incentives on teaching satisfaction via teaching quality perception, self-perceived effectiveness can intensively adjust teaching quality perception and teaching satisfaction based on the influence of independent variables. This also further illustrates the important role of spiritual incentives and interactive incentives in improving teaching satisfaction.

B. Enlightenment and Suggestions

First, in the process of social media teaching, students' teaching quality perception will affect the final teaching satisfaction, and the use of effective incentive models in teaching can mobilize students' enthusiasm for classroom participation and increase learning efficiency, thereby enhancing students' teaching quality perception. As a result, we must flexibly adopt incentives in the teaching process to achieve the expected teaching results.

Second, with the increasing development of Internet information technology, college students have increasingly higher usage of and reliance on social media tools. Therefore, they have higher self-perceived effectiveness towards social media tools. Under the regulatory effect of self-perceived social media effectiveness, different incentive models have different effects on teaching quality perception and teaching satisfaction. It is necessary to accurately grasp students' demands and satisfaction points, and use appropriate incentive modes to improve teaching effects and teaching satisfaction.

Third, while participating in social media teaching, students pay more attention to spiritual and psychological satisfaction, and value recognition and praise in classroom participation and performance so as to prove their participation value and enhance self-confidence and enthusiasm. Therefore, compared with material incentives, spiritual and interactive incentives can better mobilize students' learning enthusiasm, improve learning efficiency and homework completion quality, thereby positively and significantly affecting teaching quality perception, ultimately improving students' satisfaction with course teaching. Therefore, teachers need actively instruct students to participate in discussions and express their opinions in the course teaching process, encourage and recognize their performance from different perspectives. In addition, it is necessary to add teacher-student interaction links in the course teaching process. For task-based topics, more free discussion can be carried out in the form of study groups to let students communicate with each other, activate the classroom atmosphere, enhance learning participation, and thereby achieve teaching expectations.

C. Shortcomings and Prospects

There are still many shortcomings in the research process of this paper, mainly in the following aspects:

First, the sample size is small. Due to limitation in objective conditions, the author's questionnaire sample size is relatively small, which makes the significance level of regulatory effect fail to reach a very ideal state in research of regulated mediation model, so the expected results of the study are not fully achieved.

Second, in order to facilitate research and demonstration, the author uses material incentives, spiritual incentives, and interactive incentives as three independent variables to conduct model research separately. However, correlation analysis between the three independent variables indicates weak correlation and it cannot be considered that the three variables are completely independent of each other. That is to say, the research model herein is based on an ideal independence model. To draw more thorough and comprehensive research conclusions, it is necessary to make more rigorous and detailed structural equation model research regarding the effect of the three incentive modes on teaching quality perception and teaching satisfaction.

ACKNOWLEDGMENTS

This paper is supported by the 2019 School-level Teaching Research Project: Cultivation of Innovation and Entrepreneurship Ability of Economics and Management Students from the Perspective of Teacher and Student Self-perceived Effectiveness (2019X041).

REFERENCES

[1] A. BANDURA, “Self-efficacy: toward a unifying theory of behavior change”. Psychological review, vol. 84, pp. 191~215.

[2] M. Bates, “The design of browsing and berry picking techniques for the online search interface”. Online information review, pp. 407~424

[3] G. Zhu, L. Ma, 2010. “Consumer adoption model and empirical research based on social cognition theory”. Nankai Business Review vol. 3, pp. 12~21

[4] D. J. Tan, S. N. Ren, X. X. Zhang. “A review of research on self-efficacy in information seeking behavior”. Information Studies: Theory & Practice, vol. 36, 2013.

[5] T. Hong, “The internet and tobacco cessation: the roles of internet self-efficacy and search task on the information-seeking process”. Journal of computer-mediated cmunication, vol. 11, pp. 536~556.

[6] F. D. Davis, P. R. Warshaw, “User acceptance of computer technology: a comparison of two theoretical models”. Management science, vol. 8, pp. 982~1003, 1989.

[7] F. D. Aavis, “Perceived usefulness perceived ease of use and user acceptance of information technology”. MIS quarterly, vol. 3, pp. 319~340, 1989.

[8] V. Venkatesh, D. Fred, A. T. Davis, “Theoretical extension of the technology acceptance”. Management Science, vol. 46, pp. 186~204, 2000.

[9] B. “An empirical analysis of the antecedents of electronic commerce service continuance”. Decision Support Systems, vol. 32, pp. 201~214.

[10] B. David, Daniel, W. D. Woody. “E-textbooks at what cost? Performance and use of electronic v. print texts”. Computers & Education, vol. 2, pp. 12~14, 2013.

[11] H. Bala, Venkatesh, “Technology acceptance model 3 and a research agenda on interventions”. Decision Sciences, vol. 39, pp. 273~315, 2008.

[12] L. Johnson, A. Levine, and R. Smith, “The 2009 horizonre-port. Austin TX”. The New Media Corporation, vol. 25, pp. 243~250, 2015.

[13] N. B. Ellison, “Benefits of Facebook ‘Friends: social capital and college students' use of online social network. Sites”. Journal of Computer-mediated Communication, vol. 12, pp. 1143~1168, 2007.

[14] K. Harman, J. Coughlin, and S. Moore, “Social media strategies in higher education”. Transformation in Teaching, vol. 45, pp. 87~95, 2016.

[15] Z. X. Li, G. N. Xu, J. X. Huang, “Role of social network media in improving ideological and political education level of college students”. Times Figure, vol. 25, pp. 50~51, 2019.

[16] J. F. Xu, B. B. Li, “Investigation and research on the status quo of teaching reflection by English teachers in Chinese colleges and universities”. Foreign Language World, vol. 4, pp. 6~15.

[17] T. Anderson, “Modes of interaction in distance education: Recent developments and research questions”. Modes of interaction in distance education, vol. 21, pp. 129~144, 2012.

[18] T. Anderson, “Learning technology through three generations of technology enhanced distance education pedagogy”. European Journal of Open, Distance and E-Learning, vol. 45, pp. 122~142, 2012.

[19] G. F. Yang, “Research on factors influencing continuous use behavior of MOOC users”. Open Education Research, vol. 1, pp. 100~111, 2016.

[20] Y. F. Lu, S. P. Yi, R. W. Yun, “A study on teachers' willingness to use smart teaching platform: taking smart classroom teaching practices in primary and middle schools in three cities as examples”, Modern Educational Technology, vol. 9, pp. 46~51, 2019.

[21] P. Ramsden, “Student learning and perceptions of the academic environment”. Higher Education, vol. 32, pp. 411~427, 1979.

[22] M. Tian, G. S. Lu, “Analysis of the relationship between students’ perceived classroom learning environment, learning styles and teaching quality satisfaction”. Fudan Education Forum, vol. 1, pp. 38~44, 2016.

[23] B. Zhang, J. B. Lin, “An empirical analysis on the factors influencing college teaching satisfaction——based on the perspective of student expectation and student perceived quality”. Fudan Education Forum, vol. 4, pp. 59~64, 2014.

[24] H. Xu, Y. Yao, W. G. Yang, “Research on the theory and model of incentive mechanism”. Teaching and Research, vol. 2, pp. 44~49, 2008.

[25] F T. Mavondo, Y. Tsarenko, M. Gabbott, “International and local student satisfaction: resources and capabilities perspective”. Journal of Marketing for Higher Education, vol. 14, pp. 41~60, 2004.

[26] H. J. Xiong, D. L. Ma, “An empirical analysis on the factors influencing undergraduate teaching quality satisfaction”. Higher Education Exploration, vol. 1, pp. 83~89, 2013.