Research on the Innovation Path of Classroom Evaluation Methods Under the Background of Informatization

Taking the Application of ACSI Model as an Example

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Abstract. With the continuous popularization of the Internet and information technology, profound changes have taken place in higher education, and more and more new technologies and methods are used in classroom evaluation. Drawing on the ACSI model, this paper uses the social work classroom in the author's school as a pilot, and uses AMOS22.0 to fit and analyze the outcome equation model, and finally proposes a model of the factors influencing learner satisfaction. The results show that students' personalized needs positively influence learners' perceived quality, perceived value and final learning satisfaction of the flipped classroom; students' perceived quality of the flipped classroom does not directly influence students' satisfaction, but indirectly influences students' satisfaction through the perceived value of the flipped classroom as a mediating variable.

Keywords: perceived quality · perceived value · learning satisfaction · personalized needs

1 Introduction

In the era of rapid development of modern information technology, various teaching modes have emerged in the context of information technology, especially the sudden new crown epidemic in 2020 has promoted the normalization of online teaching. In the context of the information age, educators should actively use information technology, change the traditional teaching model, innovate teaching methods, recognize the importance of applying information technology in higher education teaching, be able to improve the quality and efficiency of classroom teaching with a new teaching model and innovative teaching methods, build a new teaching model around the flipped classroom and information technology, transform students' learning styles, and integrate diverse teaching content to meet students' learning needs.

Flipped classroom is a kind of innovative teaching model in which the time inside and outside the classroom is optimized and the learning progress is determined and mastered by the learners themselves. More and more universities are exploring the flipped classroom to different degrees, and the innovative teaching model is also applied to various courses. Flipped classroom transforms students from passive learners to active

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participants and explorers, stimulates students' motivation and sense of achievement, and enhances their spirit of knowledge seeking and teamwork. Therefore, students' satisfaction should become an important research topic of flipped classroom, which is not only beneficial to the application of flipped classroom teaching mode in higher education, but also to find out the influencing factors and constitutive mechanisms of learner satisfaction in social work courses in colleges and universities.

2 The Main Problems of Current Teaching Evaluation

The evaluation method is relatively single and cannot meet the requirements of modern classroom. The classroom supported by information technology and resources makes up for the shortcomings of the traditional classroom teaching style, which is visualized, high capacity and comprehensive. The teaching is designed in an integrated way before, during and after class, and the form of teaching and learning is mixed, emphasizing high interaction and attaching great importance to feedback. At present, most colleges and universities basically use the evaluation method mainly to listen to classes and students' evaluation, and carry out targeted listening to classes through the problems that arise during the evaluation, which is a single evaluation method in general. At the same time, the classroom evaluation and assessment methods are mostly implemented to evaluate the teaching quality and teachers' ability through the assessment of teaching form, while often the classroom presentation is only a part of teachers' comprehensive ability, which does not represent teachers' teaching ability and is not equal to the teaching quality. In addition, students' evaluation is usually placed at the mid-term or the end of the term, so the information cannot be fed back to the teachers in time, and the information of classroom teaching process cannot be collected and analyzed effectively in time [2].

The evaluation standard of the effectiveness of information technology teaching is not clear. At present, classroom teaching evaluation practices or research are less involved in the effective application of information technology and resources of specific evaluation standards, especially for college students, more comprehensive and objective, with little operable evaluation standards. In the absence of evaluation standards, information technology simply for the sake of information technology will lead to ineffective information technology teaching, typical performance such as teaching design is too tedious and fancy; teaching implementation flows in the performance display or mechanical playback of information resources; excessive stacking and use of information resources and technology leads to knowledge capacity beyond the students' acceptance; in the transformation of modern student-centered teaching mode supported by information technology. In the transformation of modern student-centered teaching mode supported by information technology, students' main position is not grasped properly, and their main position is overly emphasized, leading to their indulgence in the classroom. This will make the students know only half of the classroom teaching, and this form of information-based teaching even lacks the interactive characteristics of the traditional teaching classroom, and finally makes the students' interest in learning the course disappear. Based on this, it is urgent to establish more scientific and comprehensive classroom teaching evaluation criteria along with the in-depth use of technology to improve the effectiveness of the use of information technology and resources, promote the benign development of teaching reform, and guide teachers to improve modern teaching concepts.

There is a gap between teachers' information literacy and the speed of improvement and the development of information-based teaching. At present, teachers involved in teaching quality management, especially those directly involved in classroom teaching evaluation, are generally older, and although they are experienced in teaching, they lack information literacy and have lower acceptance ability and are slow to improve [4]. As we all know, because of the operability of teaching evaluation, it is impossible to give very concrete and complicated evaluation criteria, so it requires a high degree of information literacy and concepts of evaluators to reach scientific evaluation. It is also necessary for the quality evaluation index makers to have high information literacy so as to establish a scientific and reasonable system to continuously improve and revise the index system.

3 The Importance of Applying Information Technology in Teaching Evaluation

Classroom evaluation is an important part of teaching activities. The flipped classroom teaching model takes students' learning results as the core, collects learning evidence and effect data, and blurs the boundaries between evaluation and learning, evaluation and teaching. At present, the flipped classroom still adopts traditional teaching evaluation methods and lacks a substantial evaluation system for the flipped classroom teaching model. Applying information technology to teaching evaluation is conducive to transforming the drawbacks of the traditional classroom teaching evaluation model. Since the new era, with the reform of higher education teaching, the application of information technology in teaching evaluation has been widely recognized, and the increasingly diversified new technological means used in teaching evaluation has become an effective breakthrough to improve the quality of classroom teaching. The application of information technology in classroom teaching evaluation not only can scientifically grasp the classroom effect in terms of teaching resources, teaching methods and teaching quality, but more importantly, teachers can continuously promote the reform of classroom education and teaching through the application of diversified teaching evaluation methods. The application of information technology also brings a series of new challenges. For teachers to bring into play the value of information technology in classroom teaching evaluation, teachers themselves must have strong teaching organization and teaching management skills in order to bring the advantages of information technology into play and make it better serve classroom teaching.

Teachers use information technology in classroom teaching for teaching and evaluation, which can rely on information technology to make classroom knowledge more three-dimensional and enable teachers to have a more objective and comprehensive understanding of classroom effects. Promote teachers to use information technology to reconstruct classroom teaching, combine teaching content with students' interests in classroom teaching, and further highlight the advantages of applying information technology in classroom teaching.

4 Analytical Framework and Research Assumptions

4.1 Analytical Framework

This paper draws on the American Customer Satisfaction Index ACSI model to construct an analytical framework. In Western education research, the ACSI model has been widely used in education quality evaluation and monitoring studies [5]. In 1996, Fomell proposed a causal model of customer satisfaction consisting of six latent variables based on a study of customer satisfaction in the United States. Among them, "perceived quality", "perceived value" and "customer expectations" are the independent variables of "customer satisfaction", while "customer satisfaction" influences "customer complaints" and "customer loyalty" [1]. Since the research object of this paper is on teaching satisfaction in flipped classrooms, which is different from the topic analyzed by the ACSI model, this paper makes appropriate adjustments to the specific latent variable measures and impact paths of the ACSI model. Specifically, the analysis framework in this paper consists of four main variables: customer satisfaction ("help with learning performance", "willingness to participate in the future" and "overall satisfaction level"), perceived quality (interactive platform dimension, online course dimension and physical classroom dimension), perceived value of the learner (the level of time spent by the learner and the efficiency of learning), and personalized needs.

4.2 Research Assumptions

According to the above adjustments of the ACSI model, the higher the personalized needs of students, the more obvious the effect of flipped classroom teaching, thus contributing to the overall satisfaction of students. Students with higher personalized needs pay more attention to the experience of the interactive platform, and are more able to feel the practicality of online course knowledge and the internalization and sublimation of traditional classroom knowledge, thus gaining a stronger sense of satisfaction. In addition, learners with higher personalized needs can better enhance their perception of the flipped classroom teaching mode in the process of experiencing it. Based on the above analysis, this paper proposes the following three hypotheses.

Hypothesis 1: Students' individualized needs positively affect perceived quality.
Hypothesis 2: Students' individualized needs positively affect perceived value.
Hypothesis 3: Students' individualized needs positively influence learner satisfaction.

At the same time, students' perceptions of the quality of flipped classrooms are mainly obtained by comparing them with traditional classrooms or regular online courses, and the relevant comparisons focus mainly on learning efficiency. Therefore, students' perception of the quality of flipped classrooms affects their evaluation of satisfaction and perceived value to a certain extent. On the one hand, the higher the perceived quality of the teaching mode, the more effective it is in improving learning performance, which directly increases satisfaction with the flipped classroom; on the other hand, the higher the perceived quality of the teaching mode, the more efficient and relaxed the learning process is, which in turn increases the perceived value. Based on the above analysis, this paper proposes three more hypotheses as follows.

Hypothesis 4: Students' perceived quality positively influences learner satisfaction.
Hypothesis 5: Students' perceived quality positively influences learner perceived value.
Hypothesis 6: Students' perceived value positively enhances learner satisfaction.

5 Data, Analysis Method and Test of Structural Model

5.1 Questionnaire Design and Data Collection

In this study, 132 undergraduate students in the social work program of the author's school, class of 2017, were selected to teach the professional foundation course "Introduction to Social Work" using flipped classroom. The teacher pre-recorded 28 micro-lessons (20–25 min each) by chapter and uploaded them to the school's online course platform, each with accompanying teaching objectives, plans and reading materials. At the same time, in order to attract students' attention, each micro-lesson is populated with exercises from time to time to test students' knowledge acquisition in the micro-lesson. The instructor can also use relevant exercises to gather students' internalization of relevant knowledge, difficulties in understanding and learning difficulties. When students encounter learning difficulties or doubts, they can ask questions through the model course learning platform, or communicate with other learners online, or have instant online teacher-student Q&A with the instructor. The interactive learning platform not only provides an interactive platform for interactive learning, but also helps instructors to grasp the difficulties and key points of knowledge. At the end of the whole study, students will receive online testing and teaching assessment to facilitate teachers to collect data, grasp the teaching progress and improve the teaching mode. After one semester of teaching practice, a questionnaire survey will be conducted on students' satisfaction with the classroom reform. The questionnaire was scored on a five-point Richter scale, from 1 to 5, indicating "disagree completely," "disagree somewhat," "agree somewhat," and "agree completely. agree" and "completely agree". After the survey, a total of 129 valid questionnaires were obtained, accounting for 97.7% of the total number of questionnaires.

5.2 Reliability and Validity Analysis

To ensure the credibility of the questionnaire, this paper conducted an intrinsic reliability analysis of the questionnaire scales. According to the results in Table 1, the Cronbach's α coefficients of the reliability tests for perceived quality, personalized needs, perceived value, and learning satisfaction all reached above 0.805, exceeding the reliability criterion of 0.700, which means that the questionnaires have good internal consistency. For the structural validity of the questionnaire, this paper was conducted using KMO and Bartlett's spherical tests, and the results in Table 2 show that the KMO test values all exceeded 0.700, and the significance of Bartlett's spherical test was $0.000 < 0.05$, which shows that the structural validity of the questionnaire scale is good.

Table 1. Questionnaire scales and reliability indicators

Main variables of the model	Problems of measurement	Average value	Standard deviation	Cronbach's alpha coefficient
Perceived Quality	A1: The online learning platform helps me to understand the difficult points in my study.	3.230	0.421	0.851
	A2: The online learning platform makes it easy for me to search for information when I encounter problems in my studies.	3.243	0.610	
	A3: The interface of the online learning platform is designed to facilitate me to ask questions and answer questions online.	3.152	0.476	
	A4: Online courses give me more knowledge.	3.141	0.523	
	A5: I felt that the social work online classes were helpful in understanding the course.	3.322	0.415	
	A6: I am satisfied with the smoothness of the online classroom network.	3.133	0.564	
	A7: The reading materials corresponding to the online classroom are easy to download and relatively well designed.	3.188	0.454	
	A8: In the face-to-face classroom, I can learn effectively and collaboratively with my classmates.	3.171	0.476	
	A9: In the face-to-face classes, I was able to get knowledgeable coaching and help from the instructor.	3.263	0.456	
Personalized needs	B1: I prefer a study mode where time is freely mastered.	3.204	0.676	0.805
	B2: I can independently search for knowledge and content related to my studies.	3.115	0.345	

(*continued*)

Table 1. (*continued*)

Main variables of the model	Problems of measurement	Average value	Standard deviation	Cronbach's alpha coefficient
	B3: I prefer to make my own decisions about the pace of learning and the strategies I use.	2.886	0.543	
Perceived Value	C1: Compared to the traditional learning model, using the flipped classroom model allows me to spend less time learning about the course.	2.987	0.467	0.853
	C2: The use of the flipped classroom model has enabled me to learn more about the course than the traditional learning model.	3.028	0.532	
Learning Satisfaction	D1: Compared to the traditional learning model, I think the flipped classroom is a better overall learning experience.	3.129	0.467	0.849
	D2: I think the flipped classroom can help me improve my grades compared to the traditional learning model.	3.030	0.488	
	D3: I would like to continue using the flipped classroom learning model.	3.288	0.587	

Table 2. KMO test and Bartlett's sphericity test

Indications		Perceived Quality	Personalized needs	Perceived Value	Learning Satisfaction
KMO test		0.851	0.813	0.794	0.802
Bartlett's sphericity test	Cardinality statistic	1022.754	1839.233	1096.752	867.604
	Degree of freedom	15	7	9	11
	Significance level	0.000	0.000	0.000	0.000

5.3 Data Analysis and Model Testing

In this paper, AMOS22.0 was used to analyze the data and test the structural equation model, in which the estimation method was the Maximum Likelihood method. Whether the structural equation model is supported by the data depends mainly on the path relationships in the equation model and is presented as standardized coefficients. Meanwhile, for the latent variable analysis of the mediating effect of the research model, this paper uses the built-in self-help method (Bootstrap) function of AMOS, which can eliminate the influence of data non-normality on the test of mediating effect to a certain extent and enhance the reliability of the analysis of mediating effect by means of continuous orientation sampling. Through the operation of AMOS22.0 software, the values of indicators reflecting the degree of model fit were obtained in this paper.3 Among them, the ratio of cardinality to degrees of freedom (x2/DF) was 2.113 < 3.000, indicating good model fitness; meanwhile, the RMSEA was 0.048 < 0.05, indicating good model fitness; the values of NFI, GFI, CFI, IFI, TLI and AGFI all had values greater than 0.9, representing compliance with the criteria of fitness. The R2 of the overall model explaining learning satisfaction was 0.413, indicating that the model explains well the mechanisms constituting learning satisfaction. The preliminary results of the estimation by the great likelihood method are shown in Fig. 1, and the results show that all the hypotheses are at the significant level except hypothesis four, and the research hypothesis is accepted. Specifically, learners' individualized needs positively affect learners' perceived quality, perceived value and final learning satisfaction of the flipped classroom at the same time, with path coefficients of 0.267, 0.138 and 0.378, respectively, all at significant levels; the standardized path coefficient of hypothesis four is 0.057 and does not pass the significant level, implying that students' perceived quality, perceived value and final learning

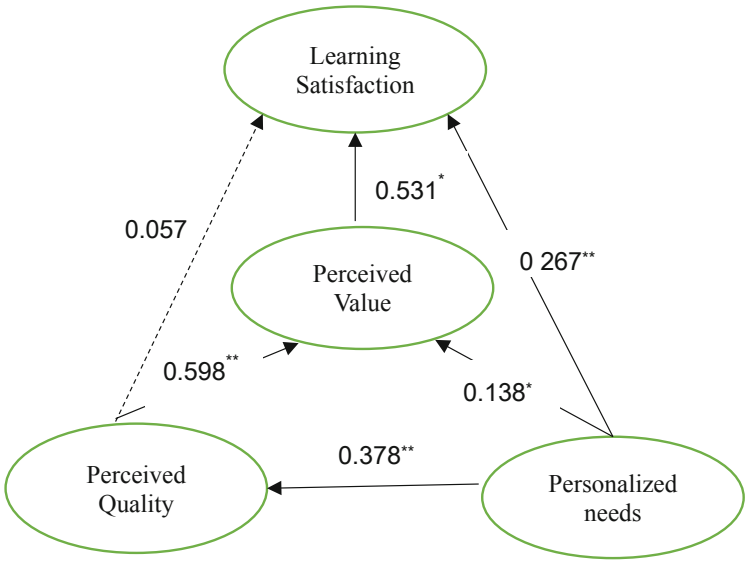

Fig. 1. Structural model examination diagram. *denotes $p < 0.05$, **denotes $p < 0.01$

Table 3. Summary of the main model fit indicators

Fitting index	χ^2	χ^2/DF	NFI	RMSEA	GFI	CFI	IFI	TLI	AGFI	R^2
Indicator value	392.219	2.113	0.929	0.048	0.969	0.959	0.957	0.950	0.932	0.413

satisfaction of the flipped classroom in social work courses quality does not directly affect the satisfaction of learning, but indirectly affects the satisfaction of learning with the perceived value of the flipped classroom as a mediating variable (Table 3).

6 Research Conclusions

Students' individual needs directly affect perceived quality, perceived value and learning satisfaction. Based on this research finding, this paper believes that in order to expand the flipped classroom teaching model to other professional course teaching activities, it is necessary to investigate students' personalized expectations in the preparation stage. On the one hand, an appropriate course introduction should be given before the teaching preparation stage, and a systematic survey and positioning should be carried out in combination with the individual needs of students, including understanding the expectations of students' self-learning time length, content and form requirements, and progress settings, etc. It provides an important reference for the setting of the syllabus, teaching progress and content distribution of the flipped classroom teaching mode. On the other hand, in the course of teaching, teachers should supervise the correlation between students' individual needs and actual performance, and make appropriate adjustments to teaching arrangements to adapt to the changes in learners' individual needs.

The perceived quality of students does not directly affect the satisfaction, but affects the satisfaction of students through the mediating factors of perceived quality, which means that in the exploration of the flipped classroom teaching mode, improving learning efficiency should be the core. For students, spending less time and internalizing more knowledge are still core focus variables. The improvement of learning efficiency is not the shortening of learning time or the increase in the density of knowledge transfer, but the use of the interactive platform of flipped classroom and online courses to allow learners to make full use of fragmented learning time for learning, so as to improve the internalization efficiency of knowledge. Therefore, this paper believes that in order to further improve the perceived value of students, it is necessary to optimize the online learning environment, optimize teaching resources and facilities, improve the construction of online course platforms and the fluency of network use, and reasonably adjust the length and tradition of online assignments and micro-classes. The frequency of group discussions in the classroom.

7 Conclusion

Higher education teaching in the information environment has undergone profound changes, and information technology has injected fresh blood into the reform of classroom teaching, bringing new vitality and vigor. Teaching evaluation is an important measure to guarantee teaching quality, and education informatization has entered the era of "2.0", so it is necessary to build a comprehensive, objective and effective classroom teaching evaluation system in line with the characteristics and development trend of modern classrooms to complete the collection of information on the whole process of teaching and learning [3]. The assessment and evaluation will be conducted to see whether teachers are using information technology, information technology facilities and equipment, and high-quality teaching resources to organize teaching, whether they are adjusting teaching in time through learning feedback, implementing the student-centered concept of teaching according to students' abilities, and whether they are able to meet the requirements of students' learning ability, information literacy, and professionalism, so as to effectively promote "student-centered, teacher-led" effective information technology teaching. "The teachers should be aware of the importance of using information technology in teaching and learning. Teachers should actively recognize the necessity of applying information technology in classroom teaching, explore diversified classroom evaluation methods, and make good use of new methods and technologies, so as to build an effective teaching evaluation model based on information technology and continuously improve the quality and efficiency of classroom teaching.

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