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SATISFACTION OF ONLINE INSTRUCTION IN LOCAL UNIVERSITIES IN CHINA DURING THE COVID-19 PANDEMIC

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Abstract

Although large-scale COVID-19 outbreaks are rare in China now, online teaching in local universities still inevitably become more systematic and normalized in the post-pandemic era. Therefore, it is of great significance to explore the factors affecting the online learning of students during the pandemic period for improving the effectiveness of online teaching. Taking Hunan University of Technology as an example, this paper quantitatively studied the factors influencing learners' online learning status and satisfaction through a questionnaire survey. Obtained results showed that there were significant differences in online learning status and satisfaction among different groups. Additionally, teaching platforms, teaching styles, and teaching interactions had a significant impact on students' satisfaction with online learning. Based on this quantitative analysis, suggestions were put forward to improve and enhance students' online learning effectiveness.

Keywords: Satisfaction; Online instruction; Local university; Learning ability; Learning behavior

Introduction

Since the outbreak of the COVID-19 pandemic, local universities in China have had to resort to online teaching. After years of experience with online teaching during the pandemic, university teachers have gained the basic ability to complete online teaching tasks using various digital technologies. Especially in the current context of accelerating educational modernization and meeting practical needs, it is imperative to explore online teaching reform based on the "Internet + Education" model. Studies have shown that during the pandemic, the number of students engaged in online learning worldwide reached 90%, with an annual growth rate of 35.6%, indicating that online learning has entered a golden period of development (Zhao 2016; Sun et.al. 2008; Bidwell 2014). Compared with traditional classroom teaching, online teaching has the ability to gather educational resources and teaching methods. However, students have complained that online learning is far less effective than offline learning, with low course completion rates, persistent learning intentions and satisfaction levels (Liu and Xu 2018).

To better complete teaching tasks through online teaching models, many scholars have conducted a series of studies on the factors affecting online learning among university students. These include studies on the relevant factors affecting learning content, interaction, motivation and learning stickiness (Miao et.al. 2021), the support of teachers for students' online learning and the experience of online learning platforms (Wan et.al. 2021), as well as studies on online learning willingness and learning environment (Jiang et.al. 2019). However, there are not many studies that focus on the learning data of students from various majors at local comprehensive universities during the pandemic.

Based on the learning data of students at Hunan University of Technology, this paper conducts an

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investigation on the online learning status and satisfaction of learners, explores the factors influencing learners' satisfaction and willingness to continue learning online, and proposes relevant strategies to promote online teaching reform and development based on the empirical research results.

Research Methodology

Research objects

This study conducted a questionnaire survey on 1,126 undergraduate students from Hunan University of Technology who participated in online courses using random sampling. A total of 1,039 valid questionnaires were collected, with male students accounting for 43.1% and female students accounting for 56.9%. Urban students accounted for 37.7%, while students from suburban and rural areas accounted for 28.1% and 34.2%, respectively. The distribution of grades was relatively balanced, with first-year students accounting for 25.1%, second-year students accounting for 26.4%, third-year students accounting for 24.6%, and fourth-year students accounting for 23.9%. The distribution of disciplines showed some differences, with engineering accounting for 38.1%, science accounting for 32.9%, liberal arts accounting for 25.5%, and other disciplines (arts and management) accounting for only 3.5%.

Study tool

The questionnaire used in this study was divided into three parts. The first part contained basic information, including seven factors such as gender, grade, source and major. The second part was a self-compiled online learning status questionnaire, consisting of two dimensions - online learning ability and behavior - and 11 factors. The third part was a self-compiled online learning satisfaction questionnaire, consisting of four dimensions--- course design, teacher instruction, interaction, and teaching platform. The questionnaire used a Likert five-point scoring method (Preedy & Watson 2010), with higher scores reflecting more significant student performance in that dimension. SPSS 22.0 was used for statistical analysis.

Results Analysis

Analysis of differences in students' online learning status

I. Comparison of different student sources

According to the survey data, students were divided into three categories based on their sources: urban, suburban and rural. Table 1 shows the differences in online learning abilities and behaviors among students from different sources.

Table 1 *Differences in learning ability and learning behavior among students of different backgrounds.*

		Focused listening	Ample interaction	Diligent note-taking	Active problem-solving.
Learning Ability	Urban	3.62	3.21	3.57	3.52
	Suburban	3.43	3.15	3.36	3.44
	Rural	3.40	3.02	3.31	3.24

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		Sustaining a positive attitude	Mastering the taught knowledge	Attending online classes on time	Submitting assignments on time
Learning Behavior	Urban	3.51	3.44	3.35	3.69
	Suburban	3.38	3.26	3.33	3.54
	Rural	3.31	3.21	3.19	3.55

From Table 1, it can be seen that students from urban areas have the highest evaluation of online learning ability and behavior, with an average score of 3.48 and 3.50, followed by students from suburban areas, with an average score of 3.35 and 3.38, and students from rural areas have the lowest evaluation, with an average score of 3.24 and 3.32. Regarding online learning ability, the trend among students from different areas remains consistent. Students generally believe that they can complete offline assignments given in online classes on time, but have a lower completion rate in mastering all the knowledge points taught in the online classes, which may be related to the network environment during class. Regarding online learning behavior, the scores for the four indicators are generally consistent, with a maximum standard deviation of only 0.03, and the trend of perception among students from different areas also remains consistent.

Table 2 *Differences in learning ability and behavior among students in different Disciplines.*

		Focused listening	Ample Interaction	Diligent note-taking	Active problem-solving.
Learning Ability	Engineering	3.52	3.31	3.37	3.48
	Science	3.43	3.27	3.36	3.44
	Liberal Arts	3.68	3.58	3.55	3.62
	Other	3.59	3.51	3.46	3.52
		Sustaining a positive attitude	Mastering the taught knowledge	Attending online classes on time	Submitting assignments on time
Learning Behavior	Engineering	3.54	3.22	3.40	3.53
	Science	3.44	3.13	3.38	3.48
	Liberal Arts	3.63	3.41	3.59	3.78
	Other	3.60	3.33	3.41	3.71

II. Comparison of different disciplines

According to the current settings, students in the university are divided into four categories: engineering, science, liberal and arts, and other majors, with "other majors" referring to art and management. Table 2 shows the comparison of online learning ability and learning behavior among students in different disciplines.

From Table 2, it can be seen that students in the liberal and arts have the highest evaluation of online learning ability and behavior, with average scores of 3.61 and 3.42, followed by the other majors (art and management), with average scores of 3.52 and 3.51, and then the engineering class, with an average score of 3.42 for both, while students in the science have the lowest evaluation, with average scores between 3.38 and 3.36. This may be related to the fact that science students need to engage in theoretical reasoning and calculations in class.

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III. Differentiation of students with different learning durations

Students are divided into four categories according to their average daily online learning duration: 2-3 hours, 3-4 hours, 4-5 hours, and over 5 hours. The differences in online learning ability and behavior are shown in Table 3.

Table 3 *Differences in online learning abilities and behaviors among students with different study durations*

		Focused listening	Ample interaction	Diligent note-taking	Active problem-solving
Learning Ability	2-3 hours	2.87	2.94	2.14	2.24
	3-4 hours	3.32	3.14	3.25	3.28
	4-5 hours	3.45	3.49	3.46	3.42
	≥5 hours	3.52	3.57	3.56	3.58
		Sustaining a positive attitude	Mastering the taught knowledge	Attending online classes on time	Submitting assignments on time
Learning Behavior	2-3 hours	2.04	2.15	2.52	2.53
	3-4 hours	3.22	3.16	3.31	3.44
	4-5 hours	3.63	3.41	3.59	3.62
	≥5 hours	3.60	3.52	3.61	3.70

From Table 3, it can be seen that students' online learning ability and behavior are positively correlated with their daily study time. When the study time reaches 5 hours or more, the highest scores for learning ability and behavior are 3.58 and 3.61, respectively. When the study time is less than 2 hours, the lowest scores are 2.55 and 2.31, respectively, and the decline is significant.

Analysis of students' online learning satisfaction

Online learning satisfaction is an important factor affecting students' online learning effectiveness. We have listed the survey results in Table 4.

Table 4 *Student satisfaction survey results for online learning*

Satisfaction factors		Average Score	Average Value
First degree	Second degree		
Course design	Public foundational courses	3.70	3.63
	major-specific courses	3.56	
Teacher instruction	teaching style	3.68	3.64
	teaching content	3.59	
Interactions	Teacher-student interaction	3.58	3.54
	Student-student interaction	3.50	
Teaching platform	Various teaching platforms	3.61	3.61

From the table, it can be seen that the overall satisfaction of students with the online teaching

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conducted by the school is 3.61, while the overall satisfaction with their own online learning status and efficiency is only 3.31, which is significantly lower than the former. This indicates that the influence of personal factors on students' online learning effectiveness is much greater than that of external objective factors. Specifically, at the level of course design, students' satisfaction with online learning in basic courses (3.70) is higher than that in professional courses (3.56). At the level of teacher instruction, whether it is teaching methods or teaching content, students' satisfaction is slightly lower, with an average score of 3.64. At the level of interaction behavior, satisfaction is the lowest. Regarding interactive communication among different groups, students are more satisfied with teacher-student interaction than with peer-to-peer interaction. Students' satisfaction with the online teaching platform is 3.61.

Regression analysis of factors influencing students' overall satisfaction with online learning

In order to understand the factors that affect students' overall satisfaction with online learning, this study conducted a regression analysis with students' overall satisfaction with online learning as the dependent variable and 8 factors related to the implementation process of online learning as independent variables. The results of the regression analysis after removal can be found in Table 5.

Table 5 *Regression analysis of factors affecting student satisfaction with online learning*

Factors		Parameters	Sum
First degree	Second degree		
Course design	Public foundational courses	0.076	0.136
	major-specific courses	0.060	
Teacher instruction	teaching style	0.307	0.368
	teaching content	0.061	
Interactions	Teacher-student interaction	0.071	0.122
	Student-student interaction	0.051	
Teaching platform	Various teaching platforms	0.374	0.374

From Table 5, it can be seen that the maximum parameter value for each type of teaching platform in the impact factor is 0.374, indicating that students' satisfaction with online teaching platforms is the most significant factor affecting their overall satisfaction with online learning, followed by their satisfaction with teachers' online teaching styles. The parameter value for online learning peer interaction in the impact factor is 0.051, indicating that this factor has the least impact on students' overall satisfaction with online learning.

Analysis of Differences in Students' Overall Satisfaction with Online Learning

Independent sample t-tests were conducted using SPSS 22.0 software to analyze the differences in online learning satisfaction among students of different genders. One-way analysis of variance (ANOVA) was used to analyze the differences in online learning satisfaction among students of different grades, origins, subjects, and learning durations. The inter-group significance results are shown in Table 6.

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Table 6 *Significances of online learning satisfaction among students of different categories*

ANOVA	Students from different categories				
	gender	grade	Source	discipline	Duration
P-value	0.001**	0.001**	0.001**	0.002**	0.001**
F-value	69.684	11.806	47.011	6.758	105.984

Note: **p<0.01; *p<0.05

From Table 6, it can be seen that the differences in gender, grade, source, discipline, and learning duration have a significant impact on students' online learning satisfaction. Female students have a higher overall satisfaction with online learning than male students; freshmen have the highest overall satisfaction, while seniors have the lowest; urban-origin students are significantly more satisfied than rural-origin students, while students from towns tend to be in between the two; students majoring in liberal arts have significantly higher satisfaction than those majoring in science and engineering, while students in engineering and other majors tend to be in between; the distribution of students' online learning satisfaction with their learning duration peaks at around 6 hours of learning.

Feedback on students' willingness for online learning

In this study, three questions were set up to gather feedback on students' willingness to continue online learning: "Compared to traditional classroom teaching, how effective do you think online learning is?", "Which type of online instruction do you prefer?", and "In future course studies, which teaching style do you prefer to use?" The statistical results are shown in Table 7.

Table 7 *Online learning willingness among students*

students of different categories				
Strongly willing	Willing	Neutral	Unwilling	Strongly unwilling
6.25%	9.45%	24.5%	45.8%	14%

Platform + MOOC	Shared PPT + Recorder	Shared PPT + Live
18.02%	28.47%	53.51%
On-Line + Off-Line	On-Line	Off-Line
49.12%	12.64%	38.24%

From Table 7, it can be seen that only 6.25% of students are strongly willing to learn online, while the largest proportion, 45.8%, are not very willing. Among the online teaching methods, using "shared PPT + live" is the most popular among students, while "platform + MOOC platform" is the least favorite. As for future teaching format, only 12.64% of students accept a single online lecture, and nearly 50% of students hope to use a combination of online and offline instruction.

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Discussions and Suggestions

In the context of the COVID-19 pandemic, this paper analyzed the online learning experience and satisfaction from the perspective of students, and found significant differences in online learning effectiveness among different groups of students. Specifically, urban students showed the best online learning performance, indicating that the impact of external objective factors such as online academic hardware equipment on online teaching effectiveness cannot be ignored. First-year and liberal arts and other majors (art and management) students performed better in online learning than engineering and science majors. In addition, student learning duration is positively correlated with online learning performance, providing useful references for future online teaching course design and content optimization.

Furthermore, overall student satisfaction with this long-term online learning experience was low, but satisfaction with teacher instruction was better than other factors. Multiple linear regression analysis found that, in terms of learning dimension, teacher instruction, course design, interaction behavior, and teaching platform quality can significantly predict university students' satisfaction with online learning, but with varying degrees of influence, with teaching platform quality having the highest impact and classroom interaction behavior having the lowest. Significant differences in online learning satisfaction were found among different student groups, consistent with the differences in students' online learning experiences. This suggests that improving students' online learning satisfaction level is an important means of ensuring online learning effectiveness.

Finally, feedback on students' continued willingness to learn online shows that students understand the online teaching methods adopted by schools during the pandemic, but hold a negative attitude towards long-term use of a single online learning format. They hope to return to traditional classrooms as soon as possible or adopt a combination of online and offline teaching to enrich teaching activities and improve teaching quality.

According to the above research conclusions and in light of the current development of online courses in China, the following suggestions are proposed:

● *Integration of online course resources and optimization of online course design.*

In addition to teaching resources created by teachers themselves, high-quality online courses and virtual simulation teaching resources should be introduced into the classroom. This will not only help to ensure the progress and quality of online teaching, but also reduce the burden of teachers recording courses, allowing them to focus more on course design and reflection on teaching effectiveness. Moreover, there are significant differences in online learning status and satisfaction among different student groups. To avoid negative emotions such as fatigue and exhaustion in students due to long-term online learning, teachers can adopt a teaching philosophy based on design thinking, based on the analysis of teaching goals, student group characteristics, and teaching content, and accommodate students' habits and preferences in the selection of teaching platforms, setting of class duration, and arrangement of homework. During the teaching process, according to the characteristics of different disciplines, reasonable methods such as flipping the classroom, interactive response, and in-class questioning should be used to attract students' attention to the online classroom, enhance students' interest in online learning, and improve students' satisfaction with online learning. After class, a tracking and feedback mechanism should be established, and process evaluation should be carried out regularly. Based on feedback and evaluation results, course design plans should be adjusted in a timely manner.

● *Optimization of online platform design and innovation of teaching methods.*

The development of online education during the COVID-19 epidemic has provided an opportunity for the reform and development of higher education teaching in universities, and has also provided

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the possibility of promoting normalized online teaching and exploring long-term mechanisms for blended online and offline teaching. Traditional classroom teaching should be used as the basis and guarantee for online teaching, while fully leveraging the advantages of online teaching such as no time and space limitations and abundant resources, making it a powerful supplement to traditional classroom teaching. In order to innovate online teaching, firstly, existing online teaching platforms should be further integrated and optimized to improve their operability, enrich their supervision, interaction, storage, and course evaluation functions, and further improve the exam system to provide direct support services for students. Secondly, appropriate online courses with rich content and moderate difficulty should be added, using the online teaching method of " shared PPT + live" to increase learning communication and interaction between "teachers" and "students". A course communication and Q&A module should be set up in the forum area to enhance students' online learning experience. Thirdly, the duration of online classroom learning should be controlled, and the length of each course video should be around 30 minutes, with a total daily blended teaching time of about 6 hours, in order to improve students' learning efficiency.

● *Attention and guidance for "difficult students" and full humanistic care*.

For students with financial difficulties, in addition to individual learning ability, attention should also be paid to issues such as the hardware equipment, network conditions, and familiarity with electronic devices used by these students. In order to ensure relatively balanced teaching effectiveness, the school should pay more attention, care, and love to these students, provide certain difficulty subsidies, network technology guidance, and other support to help them overcome the challenges brought by online teaching.

In summary, under the background of the internet era, online teaching has its drawbacks but still has its advantages. Local universities in China should start with improving learners' satisfaction with online courses, improve the quality of platform courses, enrich the types of courses, improve teaching forms, and enhance the functionality of course platforms, continuously explore and innovate, and make online teaching and offline teaching effectively combined. This not only leverages the advantages of online teaching but also enhances the main role of offline teaching, and improves the satisfaction of teachers in class.

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