



RESEARCH ON THE EFFECTIVENESS OF ONLINE LEARNING FOR
UNIVERSITY STUDENTS UNDER THE NEW CROWN EPIDEMIC -
TAKING A UNIVERSITY IN SICHUAN PROVINCE AS AN EXAMPLE

BY
PENGJIE LI

AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF EDUCATION
IN EDUCATIONAL ADMINISTRATION (INTERNATIONAL PROGRAM)

SOUTHEAST ASIA UNIVERSITY

ACADEMIC YEAR 2022

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Independent Study Title	Research on the effectiveness of online learning for university students under the new crown epidemic - Taking a University in Sichuan Province as an Example
Author	Pengjie Li
Program	Master of Education in Educational Administration (International Program)
Advisor(s)	Laibing Liu, Ph.D.

Graduate School, Southeast Asia University, was approved as partial fulfillment of the requirements for the degree of Master of Education in Educational Administration. (International Program)



..... Dean, Graduate School
(Puttithorn Jirayus, Ph.D.)



..... Director, Master of Education in Educational
(Assoc.Prof. Smithirak Jantarak, Ph.D.) Administration (International Program)

Independent Study Committees



..... Chairman, Independent Study Committees
(Prof. Narin Sungrugsa, Ph.D.)



..... Committee
(Asst.Prof.Smithirak Jantarak, Ph.D.)



..... Advisor
(Laibing Liu, Ph.D.)

Independent Study Title	Research on the effectiveness of online learning for university students under the new crown epidemic - Taking a University in Sichuan Province as an Example
Number of pages	74 pages
Author	Penjie Li
Program	Master of Education in Educational Administration (International Program)
Advisor	Laibing Liu, Ph.D.
Academic Year	2022

Abstract

The objectives to analyses the current situation of the education and management of art students in the new media environment, the use of new media for student management, pointing out that the new media has brought a series of positive and negative impacts on the management of university students; in-depth analysis of the problems of the education and management of art students in the new media environment and their problems. From the results, the influence of positive factors slightly outweighs the influence of negative factors, especially under the influence of the new crown epidemic, online teaching through new media has an irreplaceable role; finally, the current situation of art education management in the new media era is analysed, and art educators are encouraged to use new media software to assist in teaching. In the new media environment, we should take a positive attitude towards the new media information platform and carry out good education and management of art students in universities in the new media environment. The innovative work path of art education management in the new media era proposed in this paper is conducive to colleges and universities taking corresponding measures in accordance with their actual situation, so as to improve the efficiency and effectiveness of management, promote the sustainable development of colleges and universities, and promote social harmony and progress.

Keywords: New Media Arts Education Management

Acknowledgement

Without the help of several educators, this thesis would not have been achievable. I'd like to thank my advisor, educational administration program, for their advice throughout this thesis, who read my multiple modifications and helped me make sense of it all.

I'd like to express my gratitude to my chairman and committee members of the independent study, who provided guidance and support.

Thank you to Southeast Asia University, Graduate School, and International Program for offering me an independent study completion fellowship, which enabled me to attend the International Conference and finish this business administration degree. Finally, I'd like to thank my parents and numerous friends who supported and loved me throughout this long journey.

Pengjie Li

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Chapter 1

Introduction

1.1 Statement of the Research Problem

1.1.1 The Rise of Online Education

The impact of the New Crown Pneumonia epidemic in 2020 forced most Chinese universities to postpone the start of classes, which had a major impact on normal teaching activities. The Ministry of Education issued a series of documents promoting online education and opened a large number of free online courses, and teachers and students from all universities responded, leading to the rapid development of online education. During the epidemic, 17.75 million university students participated in online learning in China, a total of 2.3 billion people; more than one million teachers offered more than one million courses online. Online learning is driving the development of China's education sector with unprecedented intensity and speed. From the perspective of building educational resources, educational resources based on the Internet+ tend to be shared and globalised, with educational resources spanning campuses, regions and countries, interconnected in the form of web pages, and no longer limited by time and space. The number of higher education institutions using the Internet to share knowledge and information is increasing, and educational resources are gradually becoming big data. From the perspective of educational model reform, the rise of online learning

is also an important opportunity to change traditional thinking about education and teaching, and to promote a shift from a 'learner-centred' to a 'teacher-centred' approach to higher education in the future. For example, the 'dual-teacher model' and the 'flipped classroom' are examples of diverse and multi-role approaches to teaching, and 'blended learning' is an innovative learning model.

1.1.2 The evolution of online education

Online learning for university students did not happen overnight, but has been building up over many years, both at home and abroad. 2010 Sloan Institute study on online learning showed that more than 30% of university students in the US had taken one or more online courses. 2011 Stanford University's Introduction to Artificial Intelligence course in open online format attracted more than 160,000 students from around the world to register for the course, which for the first time brought online teaching into the spotlight on a large scale. This was followed by the arrival of three major US online course platforms, Udacity, Coursera and edX, which have partnered with over a dozen of the world's top universities, including Harvard University. The staggering number of students and the addition of top university teachers has pushed online learning for university students into a mini-peak. It is obvious that with the development of network technology and Internet technology, online learning with the Internet as a tool carrier has brought new ideas to global education and teaching activities, with the advantages of teaching without time and space restrictions, the ability to provide and use educational resources efficiently,

and the ability to provide learners with more diverse choices.

1.1.3 Problems of online education

However, the basic purpose of education is to achieve the goal of training talents and cultivating high quality talents, and in this particular context, online learning has changed from the previous way of more active student choice to passive compulsory participation; the mode of student participation in school has changed more to home learning; teachers have changed from the previous full preparation to emergency lectures in unexpected situations; the curriculum design has not had time to be fully targeted. There has been a dramatic increase in the number of views and online viewing on various platforms overnight. These sudden changes are still a major challenge. The effectiveness of online learning has also been a major concern. Some studies have pointed out that current online learning is still "teacher teaches, student listens", with no increase in student-teacher interaction, and that this method of delivery is no different from traditional "duck and filler" lectures. This mode of delivery is no different from the traditional 'duck and filler' lecture, from 'teacher speaks' to 'computer speaks', its 'instructional' nature has not changed. Therefore, the question remains whether online learning has really achieved its original purpose of "enhancing learning skills" and whether it has really brought about a major change in the way teaching and learning takes place and an improvement in the quality of education. In online education, learners lack control over time, self-monitoring, planning, distraction and completion rates.

Some parents have also pointed out that most university students study online while chatting online and that some students unconsciously click into games. A significant number of voices have also questioned the impact of online learning on student learning outcomes, arguing that it is not outstanding. As online learning for university students goes like clockwork under the New Crown Epidemic, it is important to explore and analyse answers to questions about the state of online learning for university students, the state of student learning gains, and the relationship between the two.

As the epidemic has improved, online teaching has gradually shifted to offline teaching, but due to the recurrence of the epidemic in some areas, some universities also frequently teach online or combine online and offline teaching. Although online teaching has taken the form of virtual simulations and video interactions, online learning inputs and the effectiveness of student schools still need to be studied.

1.1.4 Research questions

In response to the above background and current situation, the research questions for this study are as follows

Question 1: How do university students feel about online learning?

Question 2: Is there a gap between the effect of online learning and the expected effect among university students?

Question 3: What are the advantages and disadvantages of online learning

compared to offline learning and how can it be improved?

1.2 The Research Objectives

The convenience, sharing and adaptability of online learning have made it one of the most popular and widespread ways of learning in today's society. With the new epidemic, higher education institutions across the country and the world are starting to go online, and university students are generally adopting online learning mode for their studies. With such a large scale of online learning, there is a lot of room for research on the implementation of different dimensions of this form of learning, the quality of learning, whether and how it affects students' learning gains, what problems exist and strategies to address these problems.

This study aims to investigate how the implementation of the dimensions of online learning under the new crown epidemic and how online learning has an impact on the learning gains of university students by investigating the status of online learning and learning gains of some university students. The conclusions drawn are applied to improve the quality of online education at each university by improving the status of the dimensions of online learning for university students in a reasonable way to increase their gains. In order to achieve this general objective, this paper has the following three specific objectives

Objective 1: To investigate and understand the online learning and learning gains of university students in the context of the prevention and control of the new crown epidemic.

Objective 2: To explore the effectiveness of online learning by comparing and analysing the effectiveness of online learning and the learning expectations of university students based on data.

Objective 3: To analyse the problems of online learning and to propose measures for improvement.

1.3 The Research Hypotheses

The time and effort that students invest in the learning process can have a significant impact on their learning outcomes. The learner dimension of online learning for university students consists of three main factors: the motivation of online learners, the amount of time spent studying and the perceived effectiveness of online learners. Therefore, this study proposes the following hypotheses:

Hypothesis 1: University students have the same motivation to learn in online learning as in offline learning.

Hypothesis 2: There is a significant gap in the duration of study of learners in online learning among university students.

Hypothesis 3: There is a significant difference in the sense of efficiency of learners in online learning among university students.

1.4 Limitation and Scope of the study

The scope of this study is all students in a public university in Sichuan Province, China. This university has a history of 100 years and is relatively well established in terms of teaching philosophy, teaching ideology, teaching management and teaching

mode. The study relied on the school's academic affairs office and used a questionnaire distributed through the school's dedicated research platform. Students were informed before the distribution of the questionnaire, which was anonymous, and the main objective was to understand and improve the effectiveness of online learning.

Due to objective factors and time constraints in writing the thesis, there were limitations to the scope and quantity of this study. For example, when this research questionnaire was distributed, students were studying online at home and there was no adequate explanation or clarification for students to complete the research. Secondly, as the universities studied were mainly in the medical and health sector, there were limitations in terms of professions, and the majority of students were female due to their professions, making the data less convincing and reliable. In the future, the study needs to be taken to a deeper level by expanding the questionnaire collection channels to more universities and conducting more extensive preliminary data collection work to complete a more credible research on the topic.

1.5 Research Terminology

1.5.1 New coronavirus outbreak

In December 2019, a never-before-seen coronavirus, named 2019-nCoV, was exposed to the public by unbiased sequencing of samples from the first patient with unexplained pneumonia in Wuhan, China. On February 11, 2020, the World

Health Organization announced that the new coronavirus pneumonia, referred to as "New Coronavirus Pneumonia", was named "COVID-19" (Corona Virus Disease 2019). 2020 China Ministry of Education The Ministry of Education (MOE) of China has defined "New Coronavirus Epidemic" as the epidemic and development of a new outbreak of coronavirus pneumonia, also known as "New Coronavirus Pneumonia Epidemic" in the Top 10 New Words of the Year. The 2020 outbreak poses a serious threat to the lives of people worldwide. The new coronavirus epidemic has profoundly changed people's habits and changed teaching philosophy.

1.5.2 University students

According to the definition in the Dictionary of Education, university students are the collective term for students studying in general higher education in China. It usually refers to college students and undergraduates, and sometimes also includes graduate students". In view of the scope and purpose of this study, university students in this study only refer to undergraduates.

1.5.3 Online learning & E-learning

The concept of online learning was first proposed by Shields, who believed that online learning refers to placing the homepage and related materials of a course in the Web, forming a shared virtual learning space, in order to achieve a face-to-face learning effect. A kind of face-to-face learning effect of the network application". Subsequently, many foreign scholars have elaborated on the meaning of online learning, among which the more commonly used definition of online learning today

is that proposed by iNACOL. iNACOL points out that online learning refers to education in which teaching activities and teaching contents are delivered mainly through the Internet, including web-based resources, media, tools, interactive activities, courses, teaching methods, etc."

1.5.4 Learning outcomes

Learning effectiveness is the core of this study, and the concept of learning gain must be clearly sorted out and defined in order to conduct the study more smoothly. E.W. Eisner argues that learning gains are the results of students' deliberate or unconscious participation in educational activities. J. Fulks states that learning gains are specific, measurable goals and outcomes that learners should achieve as a result of their learning, and Moon explains learning gains in depth in the Handbook of Educational Module and Curriculum Development, where the concept is developed to effectively assess and examine the achievement of educational goals with the learner's self-generation at the core, while K. Schoep defines learning gains as Kuh) et al. argue that the quality of university students' training can be assessed in terms of learning gains, as reflected in the improvement of students' knowledge, skills, and values at the end of the training activities. Huang, on the other hand, pointed out that in addition to the improvement in knowledge and skills, learning outcomes should include the enhancement of attitudes, emotions and acquired competencies. In this study, the learning gain measures were divided into three dimensions: ability expansion included all ability improvement;

knowledge gain included all knowledge improvement; and self-perception improvement included affective and value improvement.

1.6 The Benefits of the Research

Due to the development of the information age, current technologies such as network technology, computers, multimedia technology and cloud intelligence have brought radical changes to all aspects of our production life. The combination of technology and education represented by online learning has made the traditional higher education model face no small impact and challenge. In particular, online learning has become one of the mainstream learning methods for college students under the new epidemic. Therefore, it is of theoretical and practical significance to conduct an empirical study on the online learning situation and learning gains of college students under the New Crown epidemic.

1.6.1 Theoretical significance

With the development of education informatization, online teaching format is gradually known to the public, and the research on online learning experience of college students at home and abroad is increasing. However, most of the previous studies only focus on some dimensions of online learning experience or a certain factor that affects college students' online learning experience. This study will investigate the dimensions and influencing factors of online learning experience of college students more systematically, and compare the online learning experience of college students with offline learning experience. The results of this study can

enrich the research results of online learning and contribute new knowledge to the development of learning experience theory to a certain extent.

It helps to improve and enrich the guiding ideology of online teaching platform development, and provides reference for the formation of new concepts of teaching and learning in the "Internet+" environment. The learning input of online teaching is more affirmative of "learner-centeredness", and it is considered that learners are extremely important in teaching activities, i.e., the key is students' "learning", and more emphasis is placed on learners' initiative and the improvement of relevant evaluation standards system, which provide a focus for the improvement of the platform. These provide the focus for the improvement of the platform.

1.6.2 Relevance

Students are the main body of learning, and education and teaching activities need to take into account students' feelings and experiences. Online teaching is a booming new form of teaching that needs to pay more attention to students' learning effect, and students' experience of online courses is an important feedback information about the quality of online teaching. The findings of this study can help teachers and teaching administrators to better understand students' online learning effects and the influencing factors, to identify problems and find the causes in time, and to make timely adjustments to online teaching according to students' conditions, so as to improve the quality of online teaching.

Chapter 2

Theory and Literature Reviews

2.1 Concepts and Theories

2.1.1 Elementary theory of the teaching and learning system

The elemental theory of teaching and learning system states that teaching and learning is a large and complex system composed of multiple, multi-subjects and elements. Broadly speaking, it can be divided into two types: dynamic and relatively static. Dynamic elements are mainly human elements, such as teachers, students and the psychological environment. The "golden keys" to a smooth and efficient teaching system are teachers and students. The relatively static elements refer to the physical elements represented by the teaching platform, the media and the physical environment that support communication and interaction in the teaching process. Of these two categories. The psychological environment acts as a human and physical 'bridge', providing cultural and emotional support for the effective operation of the system.

There are many different opinions on how many elements are essential to a teaching system. From three to seven elements, there are a hundred different opinions. The less controversial and generally accepted theory is the four elements of the teaching system, which states that the teaching system is based on four fundamental elements: the pedagogue, the learner, the learning content and the

learning medium. By extension, the process of teaching and learning in online learning is now largely the same as in offline learning. In terms of objectives, content, curriculum and activity design, online learning is not very different from traditional teaching and learning. However, the two are very different in terms of environment. Online learning is mainly a virtual environment based on one or more online learning platforms. This paper therefore argues that online teaching and learning is also based on four basic elements: students, teachers, online course content and online platforms.

2.1.2 Behavioural learning theories

Behavioural learning theory is one of the mainstream representative schools of learning. It states that human thinking is the result of mutual stimulation with the external environment to form a 'stimulus-response' link. Some behaviourists believe that the external environment is the stimulus and the accompanying organic behaviour is the response, and that all behaviour can be learned. As a result, the theory is reflected in the educational practices of schools, where teachers are expected to shape and correct pupils' behaviour through specific teaching practices, to create a positive learning environment, and to maximise appropriate behaviour and eliminate inappropriate behaviour. At the forefront of behaviourist learning theory was Skinner, who developed a 'process teaching' theory of learning. The theory advocates the principle of small steps, which suggests that learning content should be broken down into small units, with learners setting their own pace, i.e. In

the organisation of the course, specific learning objectives and deadlines should be set on a weekly basis so that learners' work can be more visually observed; in the assessment of teaching, teacher assessment and peer assessment are set up to help learners get timely feedback on their learning outcomes. In the assessment, teacher assessment and peer assessment are set up to help learners get feedback on their learning outcomes and move on to the next stage of learning in time to complete the whole task. Later, the famous scientist Bandura proposed the behavioural learning theory based on the summary of learning observation. He believed that learners have two types of learning behaviour: one is that learners gain indirect learning experience by observing the behaviour of others, and the other is that learners gain direct learning experience through their own practice.

The theory emphasises that stimuli evoke responses where the environment determines learning, that procedural teaching follows the principle of small steps, that teacher and peer assessment is set up to help learners get timely feedback on learning outcomes, and that the focus is on learner-centredness. It can be seen that the learner environment, the design of the learning programme, the associated learning objectives, the assessment of learning outcomes and the learners themselves are important influences on the level of learner engagement. In particular, these factors play a more important role in online learning activities conducted under epidemic conditions, due to the particularities of time and place and the organisation of learning. This provides an idea and a theoretical basis for the

preparation of the questionnaire on the factors influencing undergraduate students' learning engagement in online teaching, and a reference perspective for the formulation of relevant recommendations.

2.1.3 Constructivist learning theory

Constructivism is a theory of knowledge and learning that emphasises the learner's initiative and sees learning as a process in which the learner generates meaning and constructs understanding based on prior knowledge and experience, often in the context of social and cultural interaction. Constructivism has deep intellectual origins and is very different from traditional learning theories and teaching ideas, and has important guiding values for teaching design.

Constructivism believes that knowledge is not acquired through transmission by teachers, but through the construction of meaning by learners with the help of others (including teachers and learning partners) and the necessary learning materials in a certain context, i.e. social and cultural background. Since learning is a process of constructing meaning in a certain context, i.e. a socio-cultural context, with the help of other people, i.e. through interpersonal collaboration, constructivist learning theory considers 'context', 'collaboration', 'conversation' and 'learning' to be the most important elements of learning. "Context", 'collaboration', 'conversation' and 'meaning making' are the four main elements or attributes of a learning environment. "Context": The context of the learning environment must be conducive to the construction of meaning in the content being learned. In other

words, in a constructivist learning environment, instructional design must consider not only the analysis of teaching objectives, but also the creation of contexts that are conducive to students' construction of meaning, and consider context creation as one of the most important elements of instructional design. "Collaboration": Collaboration occurs throughout the learning process. Collaboration plays an important role in the collection and analysis of learning materials, the formulation and testing of hypotheses, the evaluation of learning outcomes and the final construction of meaning. "Conversation": Conversation is an integral part of the collaborative process. In addition, the collaborative learning process is also a conversational process in which the results of each learner's thinking (wisdom) are shared by the whole learning community, making conversation an important means of achieving meaning construction. "Constructing meaning": this is the ultimate goal of the whole learning process. The meaning to be constructed refers to: the nature of things, the laws and the internal connections between things. Helping students to construct meaning in the learning process means helping them to achieve a deeper understanding of the nature and laws of the thing they are currently learning about and the internal connections between that thing and other things. The long-term storage of this understanding in the brain takes the form of the aforementioned 'schema', the cognitive structure of what is being learned. It is clear from the meaning of 'learning' described above that the quality of learning is a function of the learner's ability to construct meaning, rather than a function of the learner's ability

to reproduce the teacher's thought processes. In other words, the amount of knowledge acquired depends on the learner's ability to construct meaning from his or her own experience, rather than on the learner's ability to memorise and recite what the teacher has taught him or her.

2.2 Literature reviews

2.2.1 Domestic research on online learning satisfaction

The first scholar to study online learning satisfaction in China was Wang Liyan, Nan Xuguang and Liu Wanrong (2007), who used the American customer satisfaction model and also drew on other models to construct a customer satisfaction measurement model suitable for distance learning in China. Later, Li Li and Li Feng (2009) adapted the ACSI to China's distance learning situation, proposed a model suitable for China's distance learning student satisfaction index, and conducted a model validation analysis on a sample of 310 students.

Taking a blended online course as an example, Hu Yong (2013) analysed the impact of individual and group characteristics on learning satisfaction and found that factors such as social presence, daily online time, individual attitude towards collaborative learning, learning style and intra-group conflict had a significant impact on satisfaction. Taking an online course case study as an example, Wang Chun (2014) analysed the current situation of learning satisfaction from four dimensions: platform, resources, interaction and course, addressed the problems and proposed countermeasures. Cheng Yaling (2018) constructed a model of online open course

satisfaction from five dimensions: perceived quality, perceived value, learning interaction, learner expectation and learning satisfaction, proposed hypotheses and tested the hypotheses through empirical analysis. The test results showed that: perceived quality, perceived value, learning interaction and learner expectation directly or indirectly affect satisfaction.

Zeng Jialing et al. (2016) constructed a structural equation model of distance learning satisfaction from five aspects: learning ability, learning difficulty, learning process, learning motivation and learning satisfaction, and analysed the degree of association between the first four aspects and learning satisfaction, and the study showed that: the experience of learning process was significantly correlated with satisfaction, while learning ability and learning motivation influenced each other through the learning process, so learning ability and learning motivation indirectly affect learning satisfaction. Xu et al. (2017) constructed a regression equation model of online learning satisfaction from three aspects: interaction (teacher-student interaction, student-student interaction, learner-learning content interaction), online self-efficacy and self-regulated learning, and analysed the degree of correlation between these three aspects and satisfaction. According to the empirical study, interaction, self-efficacy and self-regulated learning had a significant effect on online learning satisfaction. Based on the customer satisfaction model, Xu Ke (2018) constructed a satisfaction model suitable for the study of this article in terms of learner expectations, perceived quality, perceived value, learner satisfaction and

learner willingness to continue learning, and analysed the relevance of these five aspects. The study shows that: perceived quality has a stronger influence on learning satisfaction, learner expectations have an indirect influence on learning satisfaction through perceived quality, perceived quality has a positive influence on learner satisfaction, learner expectations have an indirect influence on learning satisfaction through perceived quality, perceived quality has a positive influence on learner satisfaction and learner satisfaction has a direct influence on willingness to continue learning.

Based on the perspective of communication theory, Jiang Zhihui and Li Hongxia et al. (2017) constructed a model of satisfaction influencing factors in terms of teachers, students and technology from the perspective of live and recorded classes. The results showed that: regardless of live or recorded classes, teacher expertise is the most important factor, online learning platform is the key to guarantee satisfaction, and teacher expertise and learning mode are the engines of learning satisfaction. Jiang Zhihui et al. (2017) explored the connotation and characteristics of online learning satisfaction from a management perspective, analysed the formation and development of satisfaction, and sorted out the influencing factors of satisfaction. They also explored strategies to improve the satisfaction of online education learners from four dimensions: learners, teachers, courses and environment. Zhou Fengling (2018) used teachers as a perspective to construct a model of factors influencing learner satisfaction from six dimensions:

teacher image, learner expectations, perceived quality, perceived value, learner satisfaction, and willingness to continue learning. It was found that: the better the teacher image, the more students' expectations of teachers were met; perceived quality had a significant positive relationship with perceived value; perceived quality had a positive influence on learning satisfaction; and learner satisfaction had a positive influence on willingness to continue learning.

Chen Yufen (2018) used the four dimensions of students' basic attributes platform, resources and interaction, around the seven aspects of course content, course resources, platform design, platform technology, teacher-student interaction, student-student interaction and interaction mode as the research content. The author put forward the hypothesis, through empirical analysis to test the hypothesis of factors affecting students' online learning satisfaction, the study found that: Male students' satisfaction was higher than female students' satisfaction; course content and platform technology had no effect on students' satisfaction; platform design and course resources had a significant effect on students' satisfaction. Han Meng (2019) constructed a model of factors influencing satisfaction from four dimensions: interaction with media interface dimension, teacher-student interaction dimension, student-student interaction dimension, and interaction with learning resources. The results of the study found that learner expectations and perceived quality were the factors most influencing satisfaction. Wang Chenglin (2020) studied the current situation of online learning satisfaction and analysed its influencing factors from four

dimensions: teacher, course, environment and overall satisfaction, taking university students as the perspective. The results of the study showed that: students are generally more satisfied with online learning, but there is a low degree of student gain. In response to this phenomenon, the author analysed the reasons and gave countermeasures from three aspects: universities, platforms and learning.

In summary, it can be seen that scholars' research has largely analysed the situation of online learning satisfaction from different perspectives, different dimensions, relevance and influencing factors. However, as scholars continue to study, we can see that the breadth and depth of research continues to change, providing valuable implications for the latter's research on online learning satisfaction.

2.2.2 Research on online learning satisfaction abroad

Yukselturk and Yildirim (2008) state that a study of the whole learning process from the perspective of Turkish online learners found that learner interactions with peers all decreased, but learner interactions with teachers remained the same. It was also noted that student satisfaction should be researched in order to increase the number of international students and international students. There is also the fact that student satisfaction allows institutions to target areas for improvement and facilitates the development of specific strategic plans for online learners. We can see that researchers have focused on the study satisfaction of international students, in addition, there are scholars who have shifted their research perspective

to disadvantaged groups, JaMee Kim, WonGyu Lee (2011) took the subject perspective of 1043 students and 915 disadvantaged students. By analysing the factors influencing online learning satisfaction among disadvantaged students, the study found that disadvantaged students were more satisfied with online learning than online students. Sang Joon Lee et al (2011) conducted a survey to analyse students' perceptions of support and course satisfaction in an online undergraduate course. The results showed that perceptions of support were significantly related to overall satisfaction with the online course. The findings of this study suggest that: teachers should communicate the type of support provided to students and provide an easy way to access and use it.

Eric Bray, Kumiko Aoki, Larry Dlugosh (2005) conducted a questionnaire survey among 424 Japanese university students and pointed out five factors affecting students' satisfaction with distance learning, including teacher-student interaction, student-student interaction, student-learning content interaction, student-learning interface interaction, and Sun (2008) studied the factors affecting learner satisfaction along six dimensions: Teacher, learner, environment, design, curriculum and technology, and found that teacher's attitude towards teaching, course quality, learner's perceived usefulness of the course, learner's computer anxiety and platform usability had a significant positive impact on learner satisfaction. (2008) analysed the factors affecting learner satisfaction in online learning environments in terms of the technical environment in which the platform was built, learner

perceived usefulness, perceived ease of use, perceived behavioural control and individual characteristics.

2.2.3 Research on satisfaction with online learning during the epidemic

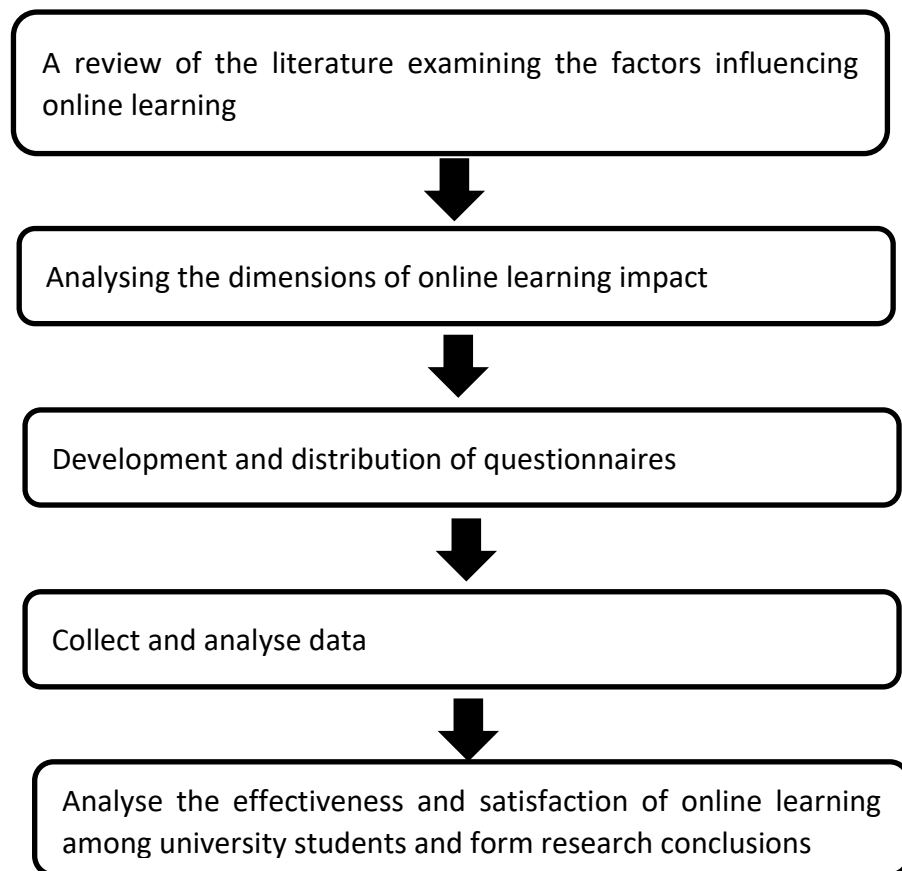
Cao Jianlu et al. (2020) conducted an empirical study from the perspective of online learning resources and found that there was a significant positive correlation between the presence or absence of online learning experience, online course content, learning resources and college students' learning satisfaction, with course learning resources having a significant impact on college students' learning outcomes. Fan Gensheng et al. (2020) used a mixed research approach to analyse the differences in online learning satisfaction among college students with different characteristics in terms of daily online learning hours, number of online learning courses per day, the way teaching resources help, effective ways of teacher-student interaction, platform choice, learning style choice, learning resistance problems, satisfaction with learning resources, satisfaction with interactive question and answer, and satisfaction with course guidance. Based on constructivist learning theory, Shen and Wu (2020) analysed the effects and pathways of online learning effectiveness and satisfaction in three dimensions: knowledge construction, teacher-student interaction and information processing, and four aspects: learning resources, independent learning, learning engagement, communication and interaction, teacher feedback, teaching sessions, technical support, online skills, teaching strategies and tutoring support. The study found that the most significant influence on student

satisfaction was teacher-student interaction, followed by information processing and finally knowledge construction. Zhang Sheng et al. (2020) focused on the relationship between students' self-directed learning ability and satisfaction, and found that learning satisfaction showed an inverted U-shaped curve trend with increasing grade level. They also found that gender, marital status, and online learning experience of primary and secondary students affected online learning satisfaction.

Based on customer satisfaction theory, learning conditions theory and teaching system elements theory, Chen Huihui (2020) constructs a theoretical model of university students' online learning satisfaction from four dimensions: students' own characteristics, teachers' teaching elements, online course characteristics and social support guarantee, to comprehensively explore university students' online learning satisfaction and influencing factors during the epidemic, and propose strategies to address the shortcomings. Guo Juan (2020) focused on the factors influencing students' satisfaction with online teaching from the aspects of teaching time, teaching interactivity, teaching quality, teaching software and teaching environment, and proposed strategies and suggestions. Zhu Liancai et al. (2020) investigated the factors affecting satisfaction with online teaching in the context of expectancy confirmation theory, and analysed the factors affecting satisfaction with online teaching in terms of learning engagement, learning experience and satisfaction. The study found that students' overall satisfaction with online learning

was good, and the underlying factors affecting satisfaction were factors such as learning objectives, teacher-student interaction, and teachers' attention to students' progress.

2.3 Conceptual Framework



Chapter 3

Research Methodology

3.1 Population/Sampling Methods/Variables

This study adopts the questionnaire method, which means that the researcher issues a questionnaire to the respondents in the form of questions posed through the learning platform, which the respondents must answer truthfully in order to truly understand the facts and opinions of the matter. Through the steps of questionnaire creation and design, testing, distribution, return and analysis, the required information is collected and collated, and a research survey is conducted on all the sample individuals of the study. The main target group for this study was the students of a university in Sichuan Province, including all students of all years from freshman to junior year.

The survey was therefore conducted 'online', i.e. using the school's learning platform to form a link to fill in the questions, and the Academic Office issued the tasks to the students and invited them to fill them in. Each question was set as a 'mandatory' question when creating the survey, i.e. there were no problems with students forgetting to fill in the question or deliberately leaving it blank to improve the completeness of the data as much as possible. Once the data has been collected, the data is filtered. The platform's background can monitor the time spent by each student to fill out the questionnaire, so in the process of data

collation the researcher can make a preliminary screening based on the time spent, due to the large number of questionnaire questions, it took at least five minutes to complete the questionnaire, so the data that took less than five minutes was removed; a total of 6435 research questionnaires were distributed and finally 4477 valid data were obtained for this study.

3.2 Data Collection

The sample of this study came from X University in Sichuan Province, and a total of 4477 valid samples were obtained through questionnaire surveys. In terms of gender distribution, 680 male students, accounting for 15.2% of the total sample, and 3797 female students, accounting for 84.8% of the total sample, although the number of male students was relatively small, but in line with the nature of the sample medical institutions; in terms of grade distribution, 1745 freshmen, accounting for 39.0% of the total sample, 1533 sophomores, accounting for 34.2% of the total sample, 1199 juniors, accounting for 26.8% of the total sample; in terms of student origin, there were 1092 students in cities, accounting for 24.4% of the total sample, 27.7% in counties, and 2147 students in towns and cities, accounting for 48.0% of the total sample. The population of this study covers different grades and types, which is representative and to some extent increases the scientific validity and authenticity of the study.

3.3 Instruments/Research Design

This study is a statistical analysis of the data based on the research. Statistical analysis is an analytical method in which the researcher uses - certain statistical methods or tools - to analyse the quantitative characteristics of things in order to uncover the deeper patterns and characteristics embodied and embedded behind the quantities. This study is based on a theoretical framework of analysis. Based on the theoretical analysis framework, this study uses statistical methods such as correlation analysis and regression analysis to explore the relationship between independent variables and dependent variables in order to test the research hypothesis and answer the questions raised in the study.

3.4 Statistics and Data Analysis

In this study, the results of the "Online Learning Questionnaire for College Students" were used to conduct statistical analysis. Using SPSS21.0 software, descriptive statistics was used to analyse the distribution status and numerical characteristics of the data obtained from the survey regarding learner dimensions and learning gains in online learning among university students in the context of the new crown epidemic. Subsequently, based on the reliability and validity tests of the questionnaire, the factor analysis of the questionnaire and the descriptive statistical analysis, the impact of online learning on learning gains and the impact of different learning factors on online learning gains of university students were tested using the testing tools. The study provides objective data to support suggestions for improving online learning for university students to increase their learning gains.

Chapter 4

Data Analysis Result

4.1 Questionnaire design and analysis

4.1.1 Questionnaire content and structure

The questionnaire was divided into two parts. The first part was basic information, including students' gender, year, major, etc.

The second part is the students' evaluation of online learning. There are two aspects in this part, one is the expectation and actuality of online learning, which reflects students' evaluation of online learning by comparing their expectation of online learning before coming into contact with it and their actual feeling of online learning after experiencing it. There are fifteen questions in this area, divided into four dimensions: self-efficacy, interaction, learning outcomes and competence enhancement, and scored on a Likert5 scale: 1 = very unlikely to be true5 = very likely to be true. The self-efficacy dimension includes more selectivity, stimulating or improving interest in learning, improving learning efficiency, and maintaining and improving attention span; the interaction dimension includes more interaction with teachers, more participation in class, and improving interpersonal relationships. The learning outcome level includes learning more, improving academic performance, achieving learning goals and satisfying learning needs, while the competence level includes learning independently, improving problem solving, practising oral

expression and improving written expression.

4.1.2 Reliability analysis

In this study, the reliability of the measurement results was tested using Cronbach's reliability coefficient method. The scale reliability index values were judged as follows: reliability coefficients of 0.900 and above indicate very good; between 0.800 and 0.899 indicate very good; between 0.700 and 0.799 indicate good reliability; between 0.600 and 0.699 indicate fair; between 0.500 and 0.599 indicate okay but low; below 0.500, it is better to If the questionnaire is below 0.500, it is better to delete the questionnaire and reformulate it.

In this study, the reliability of the second part of the scale, "Satisfaction Measure", was analysed as a whole and for each dimension separately. The reliability of the scale is very good.

Table 4-1 Confidence Analysis

Variables		Confidence analysis	
Expectations and results	Effectiveness	0.938	Average: 0.982
	Interaction	0.895	
	Achievements	0.949	
	Competence	0.941	

4.2 Results

Satisfaction with learning is the evaluation of students' satisfaction or dissatisfaction resulting from the comparison between their actual experience and their expectations. Therefore, this study divides university students' satisfaction with online learning into two parts: on the one hand, the four aspects of online learning, such as interactive communication, self-efficacy, skill enhancement, and learning outcomes, are examined from the perspective of comparing expectations and actuals, which reflects university students' satisfaction with online learning from the perspective of learning process and outcomes. On the other hand, online learning is not self-learning, it is still a learning activity based on teachers' teaching, and teachers' teaching and students' learning play an equally important role in students' learning outcomes; therefore, students' satisfaction with teachers' online teaching and satisfaction with their own online learning status are measured separately, reflecting students' satisfaction with online learning from the perspective of teaching and learning.

4.2.1 University students' actual evaluation of online learning is at a medium-high level

According to the statistics of the actual evaluation of online learning by university students, the mean value of the actual evaluation of online learning by university students is 3.58, which reaches the moderate to high level, indicating that university students are satisfied with the actual effect of online learning (Table 4-

1).However, the mean value is between 3.49 and 3.71, which is more than 4, indicating that there are still some problems in online learning. Specifically, the highest mean value (3.71) was for 'improving independent learning' and the lowest mean value (3.49) was for 'improving interpersonal relationships'.

Table 4-2 Student Online School Evaluation Form

Question	Number of people	Min	Max	Mean
Have more interaction with the teacher	4477	1	5	3.52
Be able to participate more in the classroom	4477	1	5	3.57
Be able to improve interpersonal skills	4477	1	5	3.49
Have more choices	4477	1	5	3.70
Be able to stimulate or increase interest in learning	4477	1	5	3.61
Can improve learning efficiency	4477	1	5	3.56
Good for concentration retention	4477	1	5	3.52
Learn more	4477	1	5	3.61
Improves grades	4477	1	5	3.55
Can improve problem solving skills	4477	1	5	3.66
Ability to develop verbal skills	4477	1	5	3.52
Ability to improve written expression	4477	1	5	3.58
Can improve independent learning skills	4477	1	5	3.71
Contribute to the achievement of learning	4477	1	5	3.56

goals				
Able to meet one's own learning needs	4477	1	5	3.60
Total	4477	1	5	3.58

The highest mean value for "improving independent learning" indicates that online learning is conducive to improving students' independent learning skills, although online learning also relies on teacher instruction, due to the increased spatial distance between teachers and students, teachers are unable to provide guidance to students up close and see the learning status of each student, and can only do so by asking questions in class or occasionally tapping on a student's picture. The only way to determine a student's learning status is by asking questions in class or occasionally tapping on a student's picture. This requires students to be independent learners and to rely on self-monitoring to complete learning tasks with reduced teacher supervision. In addition to classroom learning, students also need to study before or after school. Due to the limited duration of lessons, teachers are restricted in the amount of content they can provide for students, and students who want to gain more knowledge need to study independently, either by finding information themselves or by studying supplementary information provided by the teacher, thereby developing their independent learning skills.

However, the lowest mean score for 'improving interpersonal relationships' indicates that there are certain problems with online learning in terms of improving

interpersonal relationships. Unlike in traditional offline classrooms, teachers are unable to adjust their teaching according to real-time feedback from students, and have few opportunities to communicate with students, resulting in less teacher-student interaction in class. Students say: "In the past, even if some students were not active in school, at least they were there and they would say a few words in the communication process, but now in online discussions, some students just don't talk, no matter how others call them, they just don't show up, they always 'dive' ". In addition to classroom interaction, interaction outside the classroom is also an important part of interpersonal communication, but students say, "During the epidemic, if you want to communicate with your teacher about some issues, you can only do so by phone, WeChat, QQ, etc. You want to call your teacher, but you don't know what time is appropriate and whether you will disturb your teacher's work and life, so you are torn"; also some students said: "In the past, when I was at school, I rarely went to my teacher on purpose, but sometimes I chatted with him or her by chance, and now I don't send messages to my teacher on purpose at home unless it is very urgent. "It can be seen that students have less interaction with teachers and classmates outside of class, and the reason for this is that students believe that "not being able to meet face-to-face is an important reason for the decrease in communication".

Overall, students rate online learning as moderately positive, meaning that they see both advantages and disadvantages. The advantages and disadvantages are

related to the increased distance between teacher and student, which means that students have to take more initiative and be more self-motivated to improve their skills, but also that they face problems in many areas due to the increased distance.

4.2.2 The largest gap between expected and actual learning outcomes overall

At the level of "learning outcomes" (Table 4-2), the overall difference between expected and actual is the largest (0.21), and there is a significant difference between expected and actual for all four subscales, indicating that the online learning outcomes of university students are not at the expected level. Specifically, the largest difference (0.24) was in the area of 'improving academic performance' and the smallest difference (0.19) was in the area of 'meeting one's own learning needs'.

Table 4-2 Comparison of online learning outcomes with expectations

	Number of people	Expected	Actual	Variance	T-value
Learn more	4477	3.81	3.61	0.20	19.633
Improve academic performance	4477	3.79	3.55	0.24	22.455
Achievement of learning goals	4477	3.78	3.56	0.22	20.455
Satisfy their learning needs	4477	3.79	3.60	0.19	18.757
Overall	4477	3.79	3.58	0.21	24.655

Firstly, the largest difference (0.24) was found for 'improving academic performance', which is related to students' own ability and teachers' teaching. "It is

clear that there is a gap between students' perceptions of online learning and their actual feelings, and that they have high expectations of their own abilities; some students say that "the teacher is teaching online for the first time, so they can't grasp the pace and rhythm of teaching, which is sometimes fast and sometimes slow, so the learning effect is not good". "There is a gap between students' expectations of online teaching and teachers' actual teaching. Therefore, when students do not learn efficiently and teachers do not adapt their teaching to the format, academic performance does not reach the expected level.

Secondly, in terms of "learning more", the reason why this is lower than expected is that students believe that online learning is convenient in terms of access to resources and that teachers can provide them with a large number of learning resources to enable them to gain more knowledge; however, in reality, not all learning resources are available for teaching and learning. In addition, teachers are not familiar with online teaching and cannot flexibly change the teaching content according to the changes in teaching format, so they are limited by the format and cannot maximise the function of online teaching, and can only lower their standards to seek If teachers are not familiar with online teaching, they will not be able to make the most of online teaching, and will have to lower their standards to achieve "no mistakes", which will reduce the effectiveness and quality of teaching, and lead to discrepancies between students' actual feelings and expectations. In addition to the knowledge imparted by teachers in the classroom,

some of the students' knowledge acquisition also comes from independent learning, but some of the knowledge students understand on their own is different from the effect produced by teachers' processing and re-learning, and there is a gap in students' ability to find and process information compared to teachers. This can lead to the phenomenon that although there are a large number of learning resources, the learning effect is not good, and it can also be said that this can also mean that students do not have a good assessment of their own abilities in terms of expectations, and as a result their actual experience is lower than expected.

4.2.3 The Lowest Overall Expected and Actual Ratings for the Effectiveness of Interactive Communication

In the 'interaction' dimension (Table 4-3), the overall expected and actual ratings were the lowest of the four dimensions, and the actual ratings were lower than expected; the largest variance (0.21) was for 'improving interpersonal relationships' and the smallest variance (0.14) was for 'interacting more with teachers'. "The difference between actual and expected ratings was significant for all three items.

Table 4-3 Comparison of Expected and Actual Online Learning Interaction

Communication

	Number of people	Expected	Actual	Variance	T-value
More interaction with teachers	4477	3.66	3.52	0.14	12.243
Participation in the subject	4477	3.72	3.57	0.15	14.012
Interpersonal relationships	4477	3.70	3.49	0.21	18.477
Overall	4477	3.69	3.53	0.16	18.635

First, although the smallest difference was found in the category 'more interaction with the teacher', there is a significant difference between the expected and actual scores, indicating that there is less interaction between students and the teacher during the learning process. This is due to the fact that during the online teaching process, although students can 'turn on the voice' or 'type on the public screen' to ask questions of the teacher, they say that they 'do not interrupt the teacher's teaching without permission and send messages on the public screen just to respond to questions such as whether there is sound or if the screen is stuck'. However, during the survey, students said that "teachers only ask questions to get answers from individual students, and the number of questions is limited", and it is difficult for teachers to organise their teaching by observing students' actual learning status. This, coupled with the fact that it is difficult for teachers to organise their teaching by observing students' actual learning states, results in a more one-way output from teachers. As a result, the limited opportunities and forms of teacher-

student interaction lead to less communication between teachers and students and a discrepancy between what they do and what they actually do.

Secondly, in terms of 'more participation in the classroom', students want to increase their participation in the classroom through the teacher's questions, but according to the previous analysis, there is less interaction between the teacher and the students and therefore less opportunity to participate in the classroom. In addition to actively answering the teacher's questions and actively questioning the teacher, students are also active in completing group tasks, but group work and discussion are not effectively implemented online. Some students said that "even if some students were not active in school, at least they were there and would say a few words during the communication process, but now when discussing online, some students just don't talk, no matter how much they are called, they just don't show up and keep 'diving'": some students also said that "the inability to meet face to face makes communication very inconvenient". Thus, the lack of opportunities for teacher-student interaction and the ineffectiveness of communication within the group led to a significant difference between the expected and actual rating of "more participation in class".

The largest difference between expected and actual ratings was found in the 'Interaction' dimension (0.21), indicating that students' interpersonal relationships did not improve during the live online course, which is significantly different from their

expectations. Many students said: "I see a lot of people every day at school and I have to talk to everyone out of courtesy, but now I don't see everyone at home and I don't have much interaction with them, so naturally I have less interaction with them. "At school I was involved in different clubs, so I had a lot to talk about, but now I hardly have anything to talk about, so I have less contact. It can be seen that improving human-machine relationships needs to be supported by real activities, and that online chat alone is not enough to achieve results. In addition to teacher-student and student-student relationships, online learning also extends the scope of interpersonal relationships to students' relationships with their families. As a result of the epidemic, students' places of learning have changed from schools and classrooms to their homes and bedrooms, and the people they interact with on a daily basis have changed from teachers and classmates to family members. Many students say that "after staying at home for too long, they and their families 'look at each other with disgust', argue a lot and become irritable". Many students said that "they spend too much time at home and their family members are 'disgusted' with them". Some students also said that 'I get angry when my family always comes to bother me during class'. It seems that students' interpersonal relationships with all parties are improved.

Overall, the lowest overall expected and actual ratings for the interactive communication dimension suggest that students perceive some problems with the interactive communication aspect of online learning and, after actual experience,

feel that online learning has a negative impact on interactive communication, with lower-than-expected interactive communication scores. The majority of students have experience of studying online for qualification exams such as Levels 4 and 6, and most of these courses are recorded and taught by teachers who are completely new to them. As a result, students had low expectations of interaction in online learning. Although online learning was taught by their own teachers and their learning peers were their own classmates, the previous analysis showed that teacher-student and student-student communication was limited and that students' interpersonal relationships were not enhanced. Students only perceived that there were few opportunities for communication in their expectations, but in reality there were not only few, but also low quality, which led to even lower ratings of actual student interaction.

4.2.4 Performance was lower than expected

At the 'self-efficacy' level (Table 4-4), the three dimensions of 'maintaining and improving attention to learning', 'improving learning efficiency', and 'stimulating or improving interest in learning' have large variances. The difference between the three dimensions of 'retention and improvement of attention to learning' is large, with 'retention and improvement of attention to learning' not only having the largest difference in this dimension, but also the largest difference between the expected and actual values (0.26) of the four dimensions.

Table 4-4 Online learning student self-efficacy versus expectations

	Number of people	Expected	Actual	Variance	T-value
More independent choices	4477	3.79	3.70	0.09	9.485
Inspire or increase interest in learning	4477	3.80	3.61	0.19	17.946
Improves learning efficiency	4477	3.79	3.56	0.23	20.291
Contributes to improved concentration	4477	3.78	3.52	0.26	21.988
Overall	4477	3.79	3.60	0.19	22.789

Firstly, the largest difference was found in the area of 'Attention retention and improvement', indicating that students believe that their attention is easily distracted during the online learning process. This is because, on the one hand, online learning is collaborative learning based on the Internet, and the Internet is a constant distraction for students. It is understood that students often have several programmes running in the background at the same time during online learning, including websites, social media, games, etc., or have several tools open at the same time to facilitate operations. "I always want to check for new messages while I am learning", "I use my computer for lessons and my phone for web pages", etc. On the other hand, online learning does not require students to study in a place of their choice, which can lead to differences in their learning status. If the learning environment is noisy, students can be easily influenced; students also say that "at home there are too many uncontrollable factors, all kinds of sounds, family actions, etc. can distract them and there is no way to keep their attention"; "in school

classes there is both teacher supervision and students around you create a learning atmosphere, so it is easier to concentrate, but at home you want to lie down after sitting for a while, very relaxed, and only when the teacher asks a question do you get a little nervous". It is clear that online learning requires a certain level of independence and self-control, and that students can easily leave the classroom without external supervision, even if they are physically and mentally mature, self-directed university students.

Second, the expected mean is high for "stimulates or increases interest in learning" because students believe that the new form of online learning is different from traditional offline classroom learning in terms of learning methods, learning content and learning efficiency, and that the teaching methods available to teachers have become more diverse and, based on the functionality of the learning platform, teachers have more opportunities to use. However, after the actual experience, students said: "When I first started live classes, I felt very new and took it very seriously, but after I got used to the format, everything just fell flat", "Teachers' teaching is still very boring and dull, and there is almost no difference with offline teaching There was little difference between classroom teaching", which resulted in lower actual student ratings and a significant difference between the expected ratings. It is clear that the learning format has a temporary effect on students' interest in learning and that it is the teacher's teaching that has a lasting effect on students' interest.

When students' attention is difficult to maintain and improve and their interest in learning is low, their learning efficiency is naturally affected, resulting in a larger difference in the value of "improving learning efficiency" (0.23). It is clear that teachers are aware that students' attention is easily distracted and their interest in learning is low, so they try to improve students' attention by checking their notes, for example, to discipline students, which allows them to pay more attention to the content, but some students mentioned that "the teacher asks me to upload my notes immediately after the day's lesson, and in the limited time I have, I can only work on my notes. In the limited time available, I had to choose between listening and taking notes and ignore the teacher's explanations, putting the cart before the horse". As a result, the teacher's demands can sometimes actually reduce the student's learning efficiency.

On the whole, this mass online learning is taught by our teachers, the content is consistent with the curriculum of the major, and at the end of the course, the school has a standardised assessment and examination that is closely linked to the students' own academic performance, and the requirements are the same as those of school-based learning, except for the different format. This is a new experience for both students and teachers, but the unfamiliarity of the online learning process has also led to problems in teaching and learning. The discrepancy between actual and expected data shows that online learning did not stimulate interest in the learning process and that it was difficult to maintain and improve attention span,

which in turn did not improve learning efficiency.

4.2.5 Competence enhancement was not at the expected level

At the level of "improved competence" (Tables 4-5), the actual scores were lower than expected, with the highest variance value for "developing verbal skills" (0.21) and the smallest variance value for "improving independent learning skills" (0.12). (0.21) and "improve independent learning" (0.12), while "improve problem-solving skills" had a higher expected value and a higher actual value (0.16). This is clearly related to the decrease in interactive communication, both in classroom interaction and offline communication, where students have less and less opportunity to speak up.

Table 4-5 Comparison of expected and actual improvement of online learning ability

	Number of people	Expected	Actual	Variance	T-value
Improving independent learning skills	4477	3.83	3.71	0.12	13.376
Improving problem solving skills	4477	3.82	3.66	0.16	16.826
Improving verbal skills	4477	3.74	3.53	0.21	18.643
Improving written expression skills	4477	3.76	3.58	0.18	17.977
Overall	4477	3.79	3.62	0.17	21.361

Firstly, the smallest difference was found in the area of 'improving independent learning skills'. The analysis of the actual scores in the previous section

shows that online learning helped students to improve their independent learning skills, but there is still a significant difference between the expected and actual scores, i.e. students' independent learning skills did not develop as expected and did not meet expectations. Online learning requires a high level of independent learning ability, so in students' expectations, this form of learning is conducive to the development of independent thinking and independent learning ability, but in the actual learning process, students said that "their independent learning ability is weak, although the teacher will send us some study materials in advance for pre-study, but the effect of pre-study is not good, only read the materials once, and can not take In addition, independent learning requires students' self-management ability. In the online learning process, each student is an independent individual, and the tangible constraints of external supervision and the invisible constraints of the environment are reduced. If students' self-control is weak, independent learning cannot be achieved. Therefore, the development of independent learning skills is a long-term process that cannot be achieved by simply changing the form of learning, but requires the guidance of the teacher as well as the self-change of the student. This has led to an increase in independent learning skills, but they still fall short of expectations.

Second, the higher expectation of 'improved problem solving skills' is related to independent learning skills, which students believe will lead to improved problem solving skills, but in reality the improvement in independent learning skills

is limited: at the same time, improving problem solving skills requires a lot of experience and requires students to do a lot of work, which is not something that can be achieved in a short period of time by changing the learning format. Under the influence of many years of traditional offline learning, students rely more on external support, especially from teachers, to gain indirect experience and solve problems quickly, and have less experience in solving problems independently. This explains the large and significant difference between expectations and reality ($t=16.826$).

Finally, the largest discrepancy was found for 'practising verbal skills', which is strongly related to the reduction of interaction, both in class and offline, as students have fewer opportunities to speak up and the improvement of their verbal skills has diminished.

4.2.6 Students' satisfaction with online learning is low

A statistical analysis of the number of students who were satisfied with their learning status (Tables 4-6) showed that 34.1% of students were clearly dissatisfied, while only 15.9% of students chose "satisfied" and "very satisfied", clearly indicating satisfaction. Nearly half (49.9%) of the remaining students chose "average" and considered their online learning status to be at an average level, i.e. they were able to complete their learning tasks on time according to the teaching schedule.

Table 4-6 Satisfaction with the state of learning

	Number of people	Percentage (%)
Very dissatisfied	437	9.8
Dissatisfied	1089	24.3
Fair	2236	49.9
Satisfied	611	13.6
Very Satisfied	104	2.3
Total	4477	100

Online learning is independent learning without the continuous attention of a teacher or direct reference from peers, and this kind of self-directed learning requires a high degree of autonomy from students, which is an important condition for quality online learning. The use of independent learning ability is influenced by specific contextual factors, and the embodiment of independent learning ability also requires the cooperation of self-management ability, which means that the prerequisite for students' independent learning ability is that they must take the initiative to enter the classroom and stimulate deeper learning to take place, when simply giving students autonomy is not enough or even wrong. It is also clear from the students' feedback that their independent learning skills are not strong and much of their learning remains superficial: at the same time, the students' self-management skills are not high and they are easily influenced by other things that divert their attention, which greatly reduces the effectiveness of their learning.

In short, it is difficult for students to concentrate during online learning, their learning efficiency is low, and their initiative and autonomy are not strong, leading to

an overall low level of satisfaction with online learning for most students.

4.2.7 Most Students Satisfied with Teachers

A statistical analysis of the number of students who were satisfied with online teaching (Table 4-7) shows that only 8.6% of students were explicitly dissatisfied, a total of 42.7% of students chose 'satisfied' and 'very satisfied' and were explicitly satisfied, and almost half (48.7%) of students were 'fair', i.e. they found the teachers' online teaching to be moderate and generally acceptable, but there were still problems.

Table 4-7 Student satisfaction with teachers in online teaching

	Number of people	Percentage (%)
Very dissatisfied	117	2.6
Dissatisfied	269	6.0
Fair	2179	48.7
Satisfied	1613	36.0
Very Satisfied	299	6.7
Total	4477	100

According to the previous studies, it has been understood that the interactive communication of online learning is ineffective, leaving teachers and students, who should form a learning community, isolated and emotionally detached from each other due to the lack of social communication. Although teachers use a variety of tools to enhance teacher-student interaction, teacher interactions and connections are not generative, not real-time interactions generated by a strong teaching

atmosphere, and most interactions are designed to achieve the integrity of the teaching process and the diversity of teaching methods. At the same time, teachers are not familiar with online teaching and their teaching skills are limited by the teaching format. Of course, teachers' teaching has several components, each more problematic than the other.

Although there are some problems with teachers' online teaching, almost half of the students are clearly satisfied with their teachers' online teaching, with students stating that "Some teachers are not quick to adapt to the online teaching format, but most teachers are very careful in preparing lessons and providing us with learning materials". "During the teaching process, teachers tried their best to stimulate our interest in learning, to attract our attention, to study the features of the learning platform and to increase the richness of the classroom" "Teachers did not pay less attention to us because of the inconvenience of online teaching, Instead of paying less attention to us because of the inconvenience of online teaching, teachers pay more attention to whether we can adapt to the new way of learning and take our actual situation into consideration when designing the teaching" "Teachers often pay attention to our psychological state and alleviate our anxiety about learning at home", etc. It can be seen that teachers put a lot of effort into online teaching and provide students with a good learning experience as much as possible.

In conclusion, whether students' overall evaluation of online learning is at a

moderate to high level, or specifically in terms of interaction and communication, ability enhancement, learning efficiency and learning outcomes the actual ratings are lower than expected and there are significant differences; whether one third of students say they are not satisfied with their online learning status, or half of students say they are satisfied with the teachers' online teaching; it can reflect that the current online education. However, it also shows that the quality of online education still needs to be improved and that teachers' teaching needs to be flexible and adapted to the teaching format, and that students' learning ability still needs to be improved to meet the requirements of online learning. Although the large-scale online education during the epidemic was an emergency, it was not a sudden idea, but rather a foundation for the development of online education in the context of China's long-standing emphasis on education informatization and the in-depth promotion of "Internet + education". Many problems have not been highlighted. Some researchers have argued that large-scale, all-encompassing, over-the-top, single-handed online teaching is bound to have a negative effect, exposing the shortcomings of online teaching, which in turn leads to negative social experiences beyond the curriculum and teaching, making students, parents and teachers resistant to online learning". But on the other hand, problems can only be solved when problems are identified. The development of things is always spiralling, and people's understanding is not static. Regardless of the future development of online education, the quality of education will always be the focus of all sectors of

society. Researchers must study online education from the perspective of improving the quality of online education; teachers must change their mindset and intentionally cultivate students' independent learning and self-management skills to lay the foundation for deeper blended learning in the future, while teachers must also improve their understanding of online education. They must also improve their knowledge of online education and their ability to teach online in order to prepare for high levels of teaching later on.

4.2.8 Most students are willing to use online learning

Through the statistics on the choice of learning methods, 3.5% of students chose a single "online learning", 10.2% chose a single "offline learning", and the remaining students chose blended learning, of which 59.6% of students chose "offline as the main learning method, online as a supplement", 17.4% chose "online as the main learning method, offline as a supplement" and 9.3% chose "online half, offline half". It can be seen that almost 90% of students are willing to use online learning (online and blended learning combined) in their future studies.

Chapter 5

Conclusions and Discussion

5.1 Summary of research findings

This study has provided a preliminary understanding of the current situation of online learning among university students through two types of evaluation: satisfaction surveys and willingness to use in the future. Overall, the students' evaluation of online learning is at a moderate to high level, but there are still some problems, such as online learning creates barriers to interactive communication and its role in skills development still needs to be strengthened; in addition, most students are satisfied with their teachers' online teaching, but the dissatisfaction expressed by a few students also deserves attention; One-third of students are dissatisfied with their online learning status, and one-third of students are not satisfied with their online learning status, believing that their concentration is difficult, their learning efficiency is low, and their ability to learn independently and manage themselves needs to be strengthened, etc. Although there is a gap between expectations and reality, students are more willing to continue using it and hope to engage in blended learning in the future, combining offline learning with online learning, bringing together the convenience of online learning and the depth of offline learning to jointly improve the quality of teaching and learning.

5.2 Discussion

The popularity of information technology has provided university students with a wealth of learning resources, new ways of acquiring knowledge and the ability to make independent choices, and classroom learning is no longer the only way to learn. However, students' ability to access resources and learn online depends on the maintenance and improvement of their information literacy. From the research results, the overall effect of online learning is still significantly different from offline learning, but the convenience of online learning is irreplaceable for offline learning, and the future direction of development must be a combination of online and offline learning.

5.3 Recommendations

5.3.1 Strengthening the teaching design

The research results show that the interaction effect of college students in the process of online learning is poor, teacher-student interaction, student-student interaction, student interaction with learning content and so on all have certain problems, affecting the effect of students' online learning; and the teacher's teaching design and organization directly affect the interaction effect of all parties, and the teacher plays the role of a guide in the whole teaching interaction, therefore, the teacher must improve the teaching design and enhance the interaction of all parties.

First, in terms of teacher-student interaction, although teachers have designed

interactive content in the teaching process, much of the interaction is for the sake of interaction, and the interaction is simply asking questions with fixed answers, which does not lead to deeper learning, creativity and critical thinking. Therefore, teachers must adopt the understanding that "online learning is more about developing students' skills" and not directly transfer traditional offline classroom teaching to online. For example, teachers can upload basic learning materials to the public area before class, and after students have studied the learning materials on their own, they can enter the classroom with a certain knowledge base, and teachers can use cases, cutting-edge research results or research designs to provide students with more collisions of ideas in the classroom, where deeper learning occurs based on more teacher-student interactions based on generative questions. Of course, the teacher's interaction design should also take into account the receptivity of different students. First of all, teachers can use the features of the learning platform to increase and diversify the opportunities for interaction, to develop students' awareness of questions and initiative, and to move students from habitual to active interaction; for example, teachers can use the platform's voice tool to get students to answer questions orally, or they can use the voting tool to get students to answer written questions, as well as screen sharing, whiteboard sharing, public screen speaking and other features that allow students to share their understanding and summaries or ask questions, and teachers to evaluate or solve puzzles. In short, enhancing teacher-student interaction requires teachers to first

recognise the characteristics of online learning, change traditional teaching concepts and improve lesson design to optimise the effectiveness of teacher-student interaction.

Secondly, in terms of student-student interaction, the increased distance between students in online learning leads to a lack of presence, a less binding environment and thus a fragmentation of responsibility. Therefore, teachers need to create a discussion environment where students can feel the binding force of the organisation even though they are in different places; for example, competing in groups can strengthen students' group membership, increase their sense of responsibility and reduce the fragmentation of responsibility, while competition can also stimulate students' desire to discuss and contribute to better interaction. However, it is also important to consider rule setting; even if competition is initiated, some students will still not participate, which requires the teacher to add leverage to the evaluation process, for example by providing screenshots of the chat if the group discussion is a text chat, or a recorded video screen if it is a video chat, so that the teacher can judge the motivation and contribution of the group members. In addition to setting up mechanisms, teachers should also be careful to design discussion questions that are engaging and interesting to students when initiating discussions.

Finally, the most common way in which students interact with learning content is by taking notes. Students take notes during the learning process, which is

the process of processing and constructing knowledge, and the process of interacting with the learning content is conducive to forming new ideas and stimulating deeper learning. However, taking screenshots and copying PPT content to complete the teacher's checking tasks and not reviewing them afterwards is not conducive to students' knowledge construction. Therefore, when setting tasks, teachers should consider the real impact they will have. Students interact with the content again and develop a deeper understanding and a stronger connection to the knowledge.

5.3.2 Concept change, innovative teaching reform

Online teaching and offline teaching are different in the transmission of knowledge, but the fundamental difference between online teaching and offline teaching is not here, not simply to move the course online, but to use "Internet thinking" to design "student-centred". This is not a case of simply moving the course online, but to use "Internet thinking" to design a "student-centred" systematic online learning programme that truly integrates "Internet + education". Although this online teaching was an emergency, teachers need to recognise that online learning is with the changing times and that it will work in tandem with offline learning in the future. Therefore, teachers must change their mindset, not only to adapt to technological innovation, but also to change their teaching philosophy, to establish the concept of "Internet + education" in line with the development of the times, to change their teaching methods, to carry out "online teaching" in the true sense of the word, and

to play the real role of online teaching. The new concept of "Internet + Education" is in line with the times. In addition, the results of a survey on future learning options showed that more than 80% of students believe that blended learning is a better way to meet their learning needs, so teachers must try to reform their teaching by combining online and offline to provide students with a better learning experience and develop their independent learning and innovation skills.

5.3.3 Guiding students towards self-improvement

The increased distance between students and teachers due to the separation of students and teachers on both sides of the screen in online learning, coupled with the attraction inherent in the Internet itself, have challenged students to learn effectively and qualitatively online. This study shows that the lack of self-management and self-directed learning skills among university students has led to a tendency to lose focus and efficiency during online learning, and that one third of students are dissatisfied with their learning status. Therefore, it is particularly important to effectively guide students to self-regulate their learning and to develop their self-monitoring, self-control and self-management skills in the online learning process. Research shows that the clarity of teaching objectives has an impact on the effectiveness of students' online learning. Similarly, students need to clarify their learning objectives and set reasonable learning goals, and learning goals are not only about what grades they can obtain or what ranking they are in. Exam results are only an external label that to some extent provides feedback on students'

knowledge and learning outcomes, but they do not fully reflect students' abilities, especially those that are implicit, such as the ability to innovate, to learn independently, and to monitor and manage themselves. At the same time, research shows that students' current learning abilities do not meet the requirements of online learning, and lead to a lack of self-efficacy. Therefore, when setting learning goals, students should set requirements for their own ability to improve, such as improving their ability to retrieve information and be able to sift through the many materials to find what they need; also, such as being able to identify problems and ask questions, and this semester, they should ask several questions in class or outside of class to develop their own problem awareness; and develop their own problem awareness. These are all goals that can be set, but of course, when setting goals, we should pay attention to the reasonableness of the goals and progress step by step, not to be greedy for the whole.

The greater flexibility that learners have in the online learning process is accompanied by a gradual reduction in the power of external supervision. Much of the responsibility for monitoring and managing the learning process shifts from the teacher to the learners themselves, and learners cannot rely on teachers or others in the same way as in offline classrooms. Research has shown that learners' attention is easily distracted during the online learning process, so learners who want to learn more effectively online need to overcome the impact of the Internet and the environment on their learning efficiency during the online learning process,

which requires them to strengthen their own self-control and self-management. This requires students to strengthen their self-control and self-management skills. For example, students can set goals and then evaluate them, summarise their recent learning, reflect on whether they have slacked off and which goals they have not completed well, thus stimulating their internal motivation to learn. Students can still use their own initiative, isolate themselves from their mobile phones during the learning process and hand over their mobile phones and other smart devices to their teachers for safekeeping to improve the efficiency and quality of their learning.

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Biography

Name- surname	Pengjie Li
Date of birth	July 6, 1984
Place of birth	SiChuan Province, China
Address	Ziliujing District, Zigong, China
Workplace	Sichuan Vocational College of Health and Rehabilitation
Position	Teachers, teaching administration
Education	Bachelor of Science in Pharmacy, Chongqing Medical University



CERTIFICATE

Multidisciplinary Challenges in Business, Education, Innovation and Advanced Social Intelligence Forward Era 6.0 in 3rd IC-RMUTK INTERNATIONAL CONFERENCE 2023 held on 30 April – 1 May 2023 at Rajamangala University of Technology, Bangkok, Thailand.

THIS IS TO CERTIFY THAT

Pengjie Li

PRESENTED PAPER ID : S6446B740021

TITLE OF PRESENTATION : **RESEARCH ON THE EFFECTIVENESS OF ONLINE LEARNING FOR UNIVERSITY STUDENTS UNDER THE NEW CROWN EPIDEMIC -TAKING A UNIVERSITY IN SICHUAN PROVINCE AS AN EXAMPLE**

ASSOC.PROF.ARUS KONGRUNGCHOK, Ph.D.

Dean, International College RMUTK

SUPOT RATTANAPUN, Ph.D.

Vice Dean for Academic Affairs,
International College, RMUTK