

## **International Students' Satisfaction with Online Learning and Faculty Engagement during the COVID-19 Pandemic in Northwestern Chinese Universities**

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### **Abstract**

International students in China had not anticipated the unprecedented disruption to their educational experiences caused by the COVID-19 pandemic. In China, COVID-19 movement control on campus was managed solely by university authorities. Online teaching and learning following multilevel procedures were implemented for centralized emergency response, decision-making, and information dissemination. This study examined international students' academic and non-academic experiences in northwestern Chinese universities during the pandemic. Kuh's engagement theory of learning and the Keaveney and Young's Satisfaction Model were adapted and employed for insights into student satisfaction. The study was informed by Creswell's "exploratory sequential" mixed methods research design. The in-depth interviews with selected students from three universities with the highest international student intakes in northwest China yielded four factors affecting students' satisfaction, namely, online learning experience,

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in class-interaction, out-of-class faculty-students engagement, and out-of-class student initiative. A validated questionnaire was distributed following the interviews at three universities. 410 international students completed the questionnaire. The analysis revealed a moderate level of satisfaction with both online learning and the faculty-students engagement during the pandemic. However, international students' expectations differed according to their respective backgrounds and disciplines. Undergraduates yearned for more interpersonal communication, while postgraduate students desired academic engagement during online learning and fulfilment of graduation criteria. These findings should help the universities in Northwest China with strategic planning and the formulation of management policies pertaining to international student satisfaction.

**Keywords:** *International Students in China, Pandemic, Online Learning, Faculty-student Engagement, Students' Satisfaction*

## 1. Introduction

The internationalization of higher education in China has progressed considerably and helped turn the Chinese education system into one of the biggest and potentially most ambitious globally (Yang, 2014; Li, 2016). As a result, China is not only a major "sending" country but has recently become a significant "receiving" country for international education in the global education market (Lin & Tian, L., & Liu, N. C., 2020). Since the early 2010s, the number of students admitted into higher education programs has increased (from 265,090 in 2010 to 520,000 in 2020), albeit at a lower rate than the increased enrollment allocations available across Chinese universities (Chen, 2017).

To ensure the quality of education development, the policies relating to international students' education have undergone three changes: Its purpose has shifted from diplomacy to education, its orientation reframed from scale expansion to quality improvement, and the management regulations have moved from fragmented to systematic. Table 1 highlights the changes in policy documents circulated by the Ministry of Education of the People's Republic of China (PRC), and to a certain extent, could be used as a source to project foreseeable development in the internationalization of higher education in China.

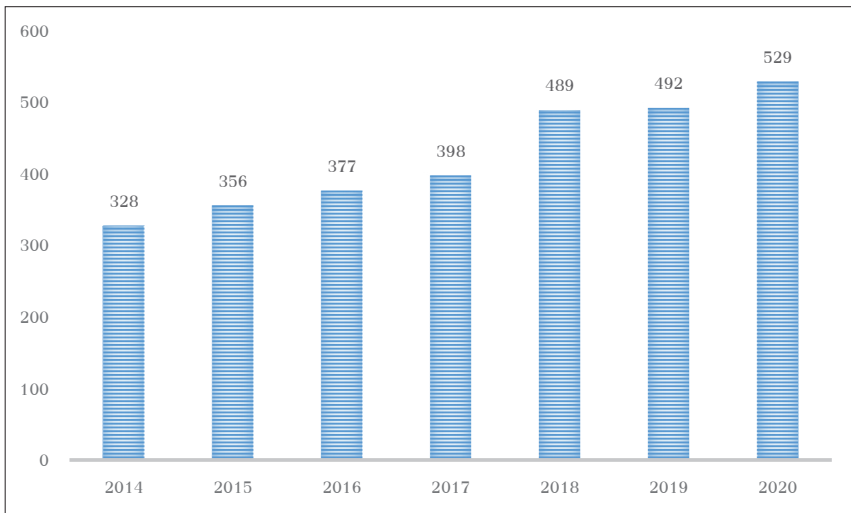
**Table 1. China's National Policy Documents for International Students**

<b>2010-2023 International Students Policy and Core Content</b>		
<b>Year</b>	<b>Policy Documents</b>	<b>Primary Contents</b>
2010	Outline of the National Medium- and Long-term Education Reform and Development Plan (2010-2020)	Clear indicatives on increased financial assistance, scholarship quotas and program diversity for international students.
	“Study in China Program”	Emphasis on policy support, inter-agency collaboration and oversight, student-oriented communication, and admission standards.
2011	Guidelines from the Ministry of Education of the PRC's General Office on Improving Online Registration and Academic Certificate Management for Foreign Students	Adjustments on educational credentials verification for academic certificates of international students and online registration process of students' records and qualifications.
2015	Action Plan for Studying Abroad, 2015-2017	Emphasis on creating a global brand name for China's higher education through transforming it into an effective, integrated, open system.
	Notification on Enhancing the Funding System for Chinese Government Scholarships and Increasing the Funding Criteria	Comprehensive guidelines on the scholarship, management system, and standardization of the subsidies.
2016	Some Perspectives on Enhancing Educational Openness in the Current Times	Emphasis on the “Studying in China” program, offering Chinese government sponsored “Silk Road” scholarship, and enhancement of the supplementary education system for international students.
	Encourage Collaborative Efforts in Implementing The Educational Initiatives of The “Silk Road” scholarship program.	Execution of the study abroad promotion plan alongside the “Silk Road” scholarship program and enhancement of the overall standards of personnel education in China.
	Opinions on Strengthening The Administration of Permanent Residence Services for Foreigners	Outlines on system and mechanisms, flexibility and practicality in international students' application criteria, optimisation of the acceptance and approval procedures, qualifications and benefits, daily management, and reinforcement of national security.
2017	Announcement regarding the Pertinent Issues related to Enabling Outstanding Foreign Graduates to Secure Employment Opportunities in China.	Outlines for the employment provisions for outstanding foreign university graduates in China with reference to the “Regulations on the Administration of Employment of Foreigners in China” issued in 1996.
	Criteria for the Admission and Education of International Students at Universities	Standardized procedures for overseeing the international students' enrollment, education, campus life, scholarships, and students' welfare.

2010-2023 International Students Policy and Core Content		
Year	Policy Documents	Primary Contents
2018	Standard of Excellence in Higher Education for International Students.	Systematic goal setting for training, admission, education, instruction, administration, and support services for international students.
2019	2035 Vision for the Advancement of Chinese Education	Execution of plans to support international students studying in China, and establishment of a mechanism to ensure the quality of education.
2020	Notice Regarding Regulations for University Employment Opportunities Available to International Students	Changes to the application process for international students
2021	President Xi Replies to International Students at Peking University ( <i>XinHua</i> , 2021)	Presidential address on the acceptance of international students' opinions and assurance of services by the Chinese universities.
2021	Notification regarding the Enrollment Plan for International Students Majoring in Clinical Medicine (taught in English) for the 2021 and 2022 academic years	Guidelines on registering for information updates, program duration, vaccine requirements, and application processes for the 2021 Intake.
2022	Study International 2022 ( <a href="https://www.studyinternational.com/news/return-to-china-for-students/">https://www.studyinternational.com/news/return-to-china-for-students/</a> )	Execution of Zero-COVID policy and withholding foreign students visa issuance from March 2020 until November 2022.
	"Report on the Development of Studying Abroad in China (2022)"	Commitment to send more China students to study in Europe and Asia.
	2023 Policy Document	Gazetting the on-campus learning requirements for international students (February 2023), demanding all international students to return to physical classrooms in China rather than continuing the online learning mode.
2023	A Notification regarding the Management and Service for the (Re-)entry of International Students.	<ol style="list-style-type: none"> <li>1. Permission for issuance of visa application by international students (January 8, 2023), resuming the pre-epidemic policy.</li> <li>2. Requirements on improved international student governance, such as maintaining satisfactory staffing ratio of university counsellors over international students.</li> <li>3. Emphasis on open communication with international students, front-line retention management cadres, pastoral care, psychological counselling, and monitoring of the mental health of staff and students.</li> </ol>

In the last decade, the open-door policy has remained. However, as a result of the implementation of the 2010 policy to encourage international students' enrollment, China has been attracting more international students from various countries. Besides the commitment to ensure high quality education, students' welfare and financial support, China also enhanced cross-border collaboration with other countries along the "Silk Road" scholarship program, which has boosted students' mobility and exchange since 2013. In addition, various policies continued to be implemented, and China announced new measures for universities on the management of international students, such as "Notification on Enhancing the Funding System for Chinese Government Scholarships and Increasing the Funding Criteria" in 2015. However, in the process of development, China also faced some challenges in fulfilling international students' expectations in terms of academic development, such as providing adequate support and guidance. To address these issues, the Chinese universities have been continually revising their policies and systems. Nonetheless, the enhancement of international student satisfaction is one of the key emphases across institutes of higher learning in China.

**Figure 1. IEE Prospective Industry Research Institute, 2020**



The Ministry of Education of PRC published statistics in 2018 that showed China as having international students from 196 countries. The number of international students grew steadily from 2014 to 2018 and reached its highest point in 2019. China was the third most popular destination for international students after the United States and the United Kingdom. A favorable outcome of the policy (OECD Data, 2019) was that the number of international students rapidly increased from 328,330 (2014) to over 500,000 (China's Ministry of Education, 2021).

During the COVID-19 pandemic, online learning for international students was implemented in many universities. With its large number of international students, China faced many challenges in ensuring the safety and satisfaction of its international student population. Meng, & Du's (2021) research documents the challenges faced by international students in China during the pandemic, such as travel restrictions, online learning, and mental health issues. The impact of the pandemic on international student mobility, and how it may affect China's position as a participant in the global knowledge economy became a burning issue across Chinese universities, especially in the northwestern provinces. In response to these challenges, the present study investigated international students' satisfaction during the COVID-19 pandemic in three universities in northwest China. Qualitative and quantitative data collection methods were employed to identify and investigate factors that contributed to the satisfaction of international students at these three universities during the pandemic. In addition, the measures that the universities undertook to control the spread of the virus and how these measures affected international students were also examined.

## **2. Literature Review**

### ***2.1 The Satisfaction of International Students***

The satisfaction of international students is a crucial aspect of higher education, and it has been a subject of study for decades. However, the entire international students' education scene saw a sudden and massive change after the COVID-19 pandemic was declared. One of the latest research reports titled "COVID-19 and International Student Mobility: Implications for China's Position in the Global Knowledge Economy" highlights necessary attention on international students' satisfaction, in particular, concerns regarding the choice of study destination, international

students' learning experiences and identity formation, and the effectiveness of national policies on international education programs (Liu; Wang; Li; Javed; Qadeer; Kashif Javed; Manzoor; Wu; Zaman August, 2021). Tian and Lu (2022) provide insights into China's emergency online education from the perspectives of international students. The findings draw attention to the importance of online learning satisfaction and factors relating to international students' satisfaction.

## ***2.2 Documents and Studies on China's Policies Learning During and After the Pandemic***

The Chinese education policy on online learning during the epidemic was a response to the COVID-19 outbreak. To ensure that students could continue their education during school closures, the Chinese government rapidly expanded the use of online learning platforms. In February 2020, The Ministry of Education of PRC issued guidelines on the use of online platforms and remote teaching, which schools and universities quickly adopted. China's national college network developed an educational guideline on international students in response to the COVID-19 pandemic. Among other items, the guideline emphasized the urgency of implementing online courses at colleges and universities to safeguard the continuity and the quality of course programs. The guideline included suggestions for online instruction, such as using digital platforms and tools, communicating effectively with students, and assessing student learning. In addition, it highlighted the significance of maintaining a supportive and inclusive learning environment, even in an online setting (The Ministry of Education of PRC, 2020). In addition to teaching strategies, this guideline provided information on health and safety measures that colleges and universities should implement to protect students against COVID-19. The measures included temperature checks, social distancing, and the provision of protective equipment. The comprehensive teaching guide for international students during the COVID-19 pandemic assisted colleges and universities in China in adapting to the challenges of the pandemic and providing international students with a high-quality education in a safe and supportive environment (The Ministry of Education of PRC, 2020).

### **2.3 *Online Teaching Guidelines and International Student Policies of Three Universities with The Highest Number of International Students in China***

University E (a pseudonym to ensure confidentiality), one of the universities in this study, provided online learning opportunities for international students who were unable to attend classes on campus during the pandemic through the comprehensive COVID-19 prevention and control plan, which included measures such as health screening, quarantine, and regular testing for both students and staff. These measurements complied with the guidelines of the Ministry of Education of PRC. Furthermore, it laid down provisions to safeguard the mental health and well-being of international students during the pandemic with strategies such as creating peer support groups, providing access to counselling services, and encouraging social activities that could be conducted safely in accordance with public health guidelines. In addition, the Chinese government issued policies aimed at supporting international students such as providing financial support for students who were unable to return to their home countries, extending visa deadlines, and allowing international students to take online courses from their home countries (*Training program for international students during the epidemic of University E*, 2020).

University M (pseudonym), another university included in this study, implemented strict infection prevention and control measures through screening measures, personal protective equipment, and disinfection protocols. It also guided the safe delivery of clinical and laboratory teaching and the use of online learning platforms to supplement in-person instruction. Moreover, to abide by the Chinese government's policies to support international students, the university took extra measures to provide medical assistance to international students during the pandemic. Financial schemes and assistance were also offered to international students who were unable to return to their home countries by extending visa deadlines, implementing special measures for clinical teaching and rotations, setting up dedicated quarantine areas and psychological counseling services (*Guidelines for management of international students of University M*, 2020).

University S (pseudonym), the third university in this study, supported international students in the arts and social sciences during the pandemic by providing financial assistance for students unable to return to their home countries, visa extensions, and making available online learning opportunities. Other arts and social science universities in China also

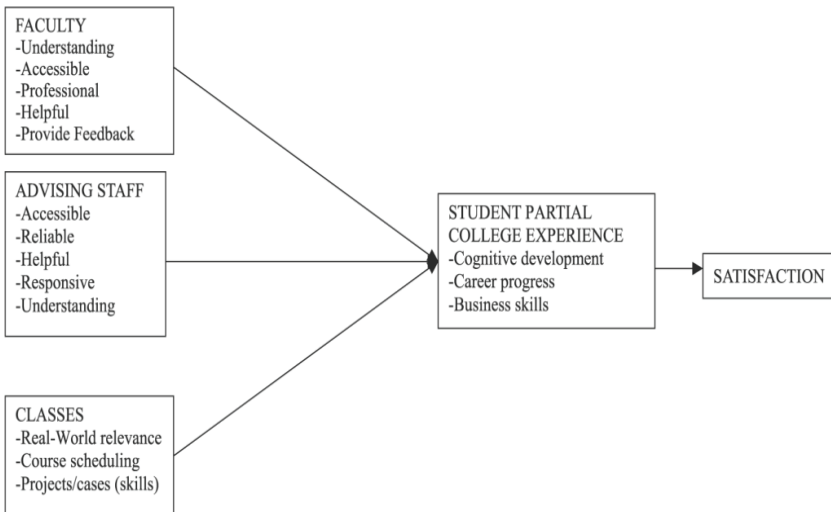


established special policies and support services for international students, such as creating dedicated quarantine areas and providing counseling services (*International Student Handbook of University S*, 2020).

#### **2.4 Kuh's Engagement Theory of Learning and The Keaveney and Young (1997) Satisfaction Model**

George Kuh (2009) defines academic success in terms of excellent academic achievement, active engagement in educationally purposeful activities, high satisfaction, keen acquisition of desired knowledge, skills, and potencies, persistence, attainment of educational objectives, as well as continuous post-college performance (Kuh et al., 2007) while Keaveney and Young's (1997) Satisfaction Model, depicted in Figure 2, assesses how teaching programs, guidance, and class type affect student satisfaction. It asserts that positive student experiences, which include understanding, accessibility, professionalism, helpful faculty, reliable and responsive advising staff, real-world relevance, and well-scheduled classes, can spur higher student satisfaction. In the absence of good faculty and advising staff, students' output and performance tend to deteriorate, leading to great dissatisfaction among them. Students often project their expected outcomes from their

**Figure 2. Keaveney and Young's Satisfaction Model (2007)**



college experience (Keaveney & Young, 1997). Therefore, students' rapport with faculty members, the administrative staff, and online learning experiences result in measurable student satisfaction levels, as students' satisfaction is invariably linked to their positive college experiences and retention rate in that institution (Hameed, 2011).

Using Kuh's (2007) engagement theory of learning and Keaveney and Young's Satisfaction Model (1997), this research investigated international students' satisfaction with online learning and faculty-student engagement during the COVID-19 Pandemic in China. The positive and negative aspects of online classes were examined. Faculty members and advising staff were interviewed for valuable insights into international students' perspectives and learning experiences during the COVID-19 pandemic. The study explored the following aspects:

- 1) The satisfaction level of the online learning experiences of international students during the COVID-19 pandemic.
- 2) The satisfaction level of the outside-the-class faculty-student engagement of international students during the COVID-19 pandemic.
- 3) Recommendations for improving international student satisfaction in the academic and non-academic domains in northwest China after the COVID-19 pandemic.

### **3. Research Methodology**

The dimensions of the student satisfaction model were first identified and measured through interviews with nine participants using semi-structured questions based on their experiences of online classes and faculty-student engagement during the pandemic. Following that, themes extracted from the thematic analysis of the qualitative data were compared and used for the construction of a questionnaire employed in the quantitative study, which involved 410 international students on site. These participants were enrolled at three universities with the highest international student intakes in northwest China. The exploratory sequential mixed methods design was deemed the most appropriate for the study for the following reasons:

- 1) Previous literature has not identified influencing factors for international students' satisfaction during a prolonged crisis in their higher learning experiences abroad. In addition, none of the previous

satisfaction questionnaires covered a nationwide pandemic. An exploratory sequential mixed methods began with the collection of qualitative data, followed by the analysis of the qualitative data to yield findings for the development of the quantitative instrument.

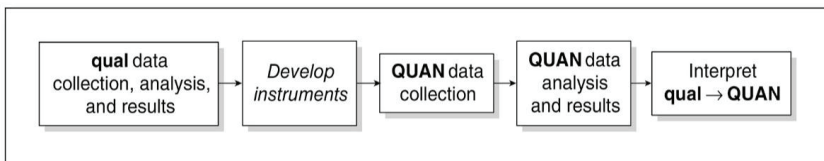
- 2) The total population of international students was rather difficult to ascertain due to the delay of student visa renewals during and after the pandemic. Many international students had left China and returned to their home countries. Some even became uncontactable by the universities. The situation became complicated when the G-to-G relationship between some countries and China was affected, resulting in the discontinued services of WeChat for international students who had returned to their countries of origin. It was therefore viable to begin with qualitative data collection in the situation described.

#### **4. Data Analysis**

##### ***4.1 Exploratory Sequential Research Design (Creswell, 2013)***

The exploratory sequential research design can help to develop a more nuanced understanding of international students' satisfaction by integrating qualitative and quantitative data collection and analysis methods. By first exploring the experiences and perceptions of international students in the qualitative phase, researchers can develop hypotheses and identify variables to be tested in the quantitative phase, leading to a comprehensive understanding of the factors that contribute to international students' satisfaction. The diagram below illustrates the exploratory sequential design employed for the study.

**Figure 3. An Exploratory Sequential Design for the Study**



*(Fetters, Curry, & Creswell, 2013)*

#### 4.2 *Qualitative Data Collection and Analysis*

The objective was to document the experiences of international students when they participated in online courses, including students' survival measures, beliefs, and behaviors in studying during the pandemic. The interviews using semi-structured questions were conducted with three focus groups. Each group contained three international students. The interviews explored three questions: "What problems do you face with online learning during the lockdown?"; "How do you cope with your learning needs during the lockdown?"; and "Are you happy with all that have been done by the university to support your learning experiences during the pandemic?". The interviews were recorded, transcribed, and analysed.

Table 2 shows the international students' backgrounds and provides vital demographic information. These students were selected based on the principle of maximal variation, according to their respective university and three broad disciplines of learning, namely, arts and humanity sciences, engineering, and medical studies. The intakes of international students before the pandemic, namely, 2019 and 2020 were the largest, and there were no new intakes between 2020 to 2021. Therefore, respondents for this study were selected from the 2019 and/or 2020 intakes. Selected interviewees possessed Chinese proficiency of HSK4 and HSK5 levels and were considered proficient in expressing their opinions during the interview conducted in Chinese.

**Table 2. Interviewees' Backgrounds**

	<b>Intake*</b>	<b>Gender</b>	<b>Mandarin levels</b>	<b>Nationality</b>
A1	2019	Female	HSK4	Pakistani
A2	2019	Female	HSK4	Moroccan
A3	2019	Male	HSK5	Moroccan
E6	2019	Male	HSK5	Pakistani
E5	2019	Male	HSK5	Moroccan
E4	2019	Female	HSK4	Moroccan
M7	2020	Female	HSK4	Pakistani
M8	2020	Male	HSK4	Korean
M9	2020	Male	HSK5	Korean

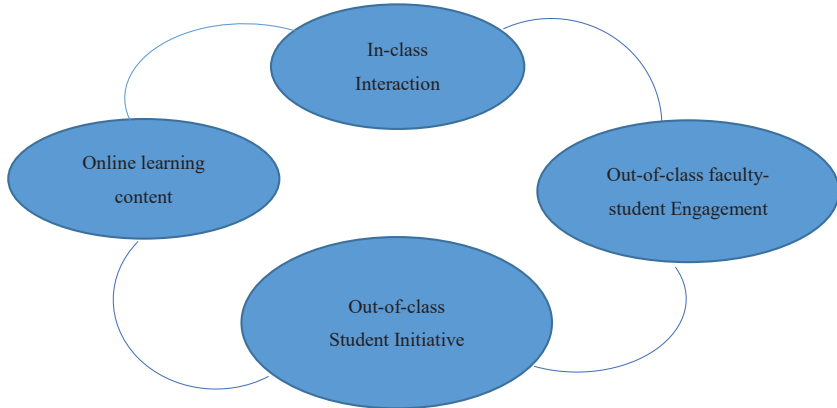
\* *Note: Enrolment of international students at the three universities with the highest student number in northwest China fell dramatically in 2020, 2021 and 2022 due to the stringent movement control policies and border closure.*

The interviews conducted with the nine foreign students yielded several core categories and themes. A sample of thematic analysis is attached in APPENDIX (A). The core categories or sub-themes from the thematic analysis were the following: Network Technology, learning Environment, Advising Staff and Faculty Members, Online Platforms, Grading Systems, Assessment Options, Training Workshops, Online Technical Support, Class Activities, and Off Class Feedback.

A deductive strategy was chosen to develop the themes. Key themes from the merger of four core categories comprised the following: (a) Online learning content, (b) In-class Interaction, (c) Out-of-class faculty-student Engagement, and (d) Out-of-class Student Initiative.

These four main categories or themes were converted into two key constructs, namely, Online Learning Experience, and Faculty-students Engagement. They were the factors investigated in the subsequent research phase, namely, a quantitative study with a larger sample size.

**Figure 4. Key Themes Derived from the Qualitative Data**



The analysis of the interview data revealed that higher education in the three universities with the highest student number was significantly affected by the COVID-19 pandemic, and international students' university learning experiences were impacted. Although many universities had developed novel techniques for online education platforms and virtual campuses, most students, particularly international students, preferred to live on physical campuses. The interviews also revealed that the non-science majors, such as

the Arts and Sciences students (A1, A2, A3), had high expectations of online courses and interaction, while sciences students, especially the Engineering (E4, E5, E6) and Medicine majors (M7, M8, M9) had different perspectives and experiences of online classes. Overall, all interviewees - from the Engineering, Medical, and even the Arts and Sciences groups - wanted free accessibility and use of campus facilities such as the library and laboratory. However, access and facilities were limited during the lockdown. In addition, the international students yearned for active classroom engagement, which was moderately addressed during the lockdown.

Compared with faculty-student engagement, the learning content delivery by the faculty members in online teaching activities fell below expectations as the engagement was deemed far from satisfactory. For example, some students recalled that faculties adopted active approaches throughout online teaching but did little to generate class activities. Students' participation in classes was therefore compromised. The lack of engagement caused some students to suffer from emotional imbalance and experience dissatisfaction. Lack of online and offline interaction with the faculty members and feelings of isolation marred online learning. For example, the interviewees reported that they lacked opportunities to communicate with classmates online and could not meet them face-to-face. They felt isolated as they were unable to interact with their classmates in virtual learning environments, unlike in physical classrooms.

In terms of online content, Arts and Social Sciences students (A1 and A3) said that online interaction failed to proportionately develop students' language skills compared with offline physical classes. For example, students in elementary language classes said that they had too little time to practice Chinese characters, so they could not write them. A2 pointed out that writing and extensive reading are vital to improving Chinese, but there were no specific writing and extensive reading classes in the online courses.

Student A1 drew attention to the negative experience of interaction, while some students said that they had difficulty following the classes. Comments included the following:

*“I can't keep up with the content..., I was unable to absorb... the teacher can't really keep track of the discussion... on all the students' comments and feedback.”*

It was clear that online classroom management left much to be desired. Among the medical students, online learning provided limited access to clinical settings, making it challenging for them to acquire the necessary clinical skills and experiences required for medical practice. M2 recalled,

*“We are studying medicine. Although we can enter the school’s library and laboratory, it is still not very convenient; I can’t follow the teacher’s steps like before”.*

Like students pursuing the arts and the sciences, medical students experienced technical issues such as internet connectivity problems, which affected their ability to participate in online classes and complete assignments. For example, M3 said,

*“I normally finish my homework in the afternoon, but that is if I time myself well. I need a lot of self-control to keep up with the class... Sometimes the Internet is not good”.*

Online learning provides limited access to practical experiences and hands-on learning, particularly for disciplines that require hands-on experiences, such as science and engineering. Engineering education requires students to work collaboratively and interact with their peers and instructors regularly. However, online learning reduced opportunities for such interaction and collaboration, which negatively impacted international students’ motivation. Much-needed support, especially for students learning in isolation, was also reported to be lacking. Clearly, it affected efficiency in learning. E2 explained,

*“There are databases and thesis libraries purchased by the school for reference. However, it often takes a long time to use them if the teachers do not guide us on how to use them.”*

Student satisfaction with faculty communication varied, based on how teachers conducted online learning. Online classes may lack the face-to-face interaction that is present in traditional classroom settings, which can make it more difficult for faculty members to establish rapport with students. Common issues that hindered faculty-student engagement in the context of

online classes were highlighted:

Student A1 claimed that *“My instructor tried to assist me, but she was stopped and couldn’t leave or call the hotline. ... There is little emotional communication with my faculties.”*

Online classes limited opportunities for informal interactions between faculty members and students, such as before or after class or during breaks. Notwithstanding these many challenges, international students who were in China during the pandemic, remained optimistic about studying and living in China. It was clear that the foreign students could appreciate the advantages and the necessity of online classes. For example,

M2 explained: *“Online classes have kept us safe during the pandemic.”*

E3: *“Online courses, in my view, offer an advantage in that you may see course replays, which is especially useful for international students like me.”*

The interviewees acknowledged that online learning and living provided international students with flexibility, allowing them to study and live from anywhere in the world. Besides, online learning and living encouraged international students to become more independent, taking responsibility for their own learning and living. International students had apparently got accustomed to their lives in China and expressed the desire to continue living in China, for specific reasons. For example, A1 said,

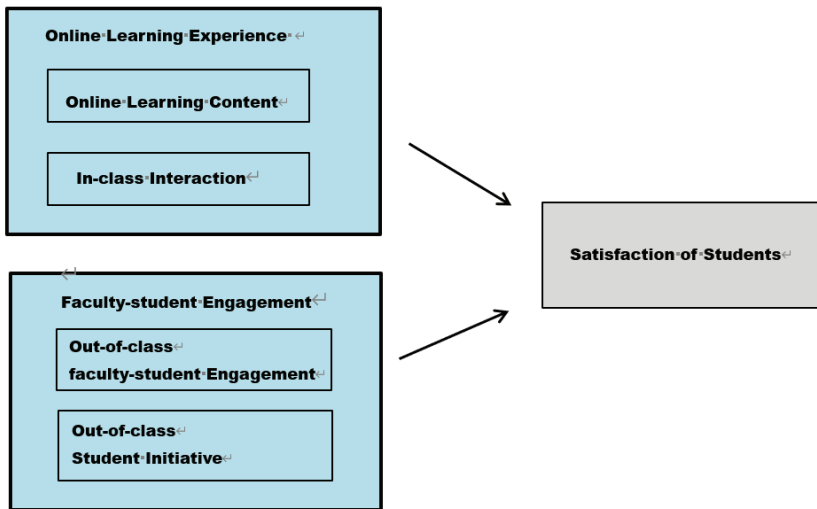
*“I wish to graduate early and find work in northwest China, as I believe it is a wonderful place to live.”*

Other international students wanted to learn more about Chinese culture and language, travel to different parts of the country and meet up with other international students from all over the world.

The themes coded and derived from the interviews informed the framework of this study, depicted as follows:



**Figure 5. Conceptual Framework of the Study**



### 4.3 Quantitative Data Collection and Analysis

The quantitative instrument for this study was developed from the themes derived from the qualitative data. They were then turned into factors which had been cross-checked against similar items listed in the Student Experience in the Research University (SERU) Survey, which investigated students' academic and civic engagement, learning and development, and students' participation in other areas of campus. The University of California system (2002) and Noel-Levitz (2016)'s Students Satisfaction Questionnaire (SSQ) were also referred. Only items applicable for this study were incorporated and listed in the final draft version of the questionnaire for validation by experts. It consisted of sections investigating the following aspects: (i) Online learning content; (ii) In-class Interaction; (iii) Out-of-class Faculty Engagement; and (iv) Out-of-class Students Initiative.

The draft of the questionnaire was subsequently validated by two experts in the field, comprising a senior lecturer with more than 30 years' experience in educational management and leadership, and an educational psychology lecturer with five years' professional experience. Both were well-versed with quantitative data analysis tools. The validated questionnaire was subsequently disseminated through an online platform to all accessible

international students in the databases of three participating universities in northwest of China. Permission was obtained from the universities' governing bodies. A consent statement was included in the questionnaire for respondents. The online questionnaire was delivered through *Wenjuanxin*, a Chinese survey platform, to the WeChat phone apps of the international students in the databases.

The intended sample included randomly selected international students who were listed on the databases of the three participating universities in northwest of China. The names were taken from three disciplines, namely, the Arts & Social Sciences, Engineering, and Medical Sciences. 410 respondents answered the questionnaire. The data were categorized according to cluster sampling.

**Table 3. Reliability Test of Dimensions**

Dimensions	Cronbach' Alpha	No. of Items
Online Learning Content	0.865	5
In-class Interaction	0.864	5
Out-of-Class Faculty Engagement	0.900	5
Out-of-Class Students Initiative	0.924	4
Students satisfaction	0.969	16

Table 3 shows that the reliability of each dimension was >0.708, indicating that the reliability of each dimension was of high reliability.

**Table 4. Results of Confirming Factor Analysis Model Fitting**

$\chi^2$	<i>df</i>	$\chi^2 / df$	RMSEA	GFI	NFI	TLI	IFI	CFI
1976.00	610	3.239	0.074	0.779	0.886	0.911	0.919	0.918

It can be seen from Table 4 that RMSEA was lower than 0.08, except that GFI was close to 0.8, NFI was close to 0.9, TLI, IFI and CFI all exceeded 0.9, and the ratio to degrees of freedom was less than 5, close to 3. Therefore, from the result of CFA, the data indicated that the measurement tool had high construct validity.

**Table 5. Convergent Validity**

<b>Dimension</b>	<b>Question NO.</b>	<b>Normalized factor loadings</b>	<b>CR</b>	<b>AVE</b>
OLC	Q9	0.644	0.859	0.555
	Q10	0.706		
	Q11	0.784		
	Q12	0.626		
	Q13	0.924		
ICI	Q14	0.685	0.865	0.569
	Q15	0.710		
	Q16	0.809		
	Q17	0.583		
	Q18	0.936		
SOL	Q19	0.786	0.965	0.712
	Q20	0.856		
	Q21	0.840		
	Q22	0.863		
	Q23	0.841		
	Q24	0.899		
	Q25	0.859		
	Q26	0.867		
	Q27	0.858		
	Q28	0.885		
	Q29	0.715		
OCSI	Q30	0.902	0.925	0.755
	Q31	0.861		
	Q32	0.830		
	Q33	0.880		
OCFE	Q34	0.666	0.902	0.651
	Q35	0.844		
	Q36	0.865		
	Q37	0.819		
	Q38	0.824		
SFE	Q39	0.871	0.941	0.695
	Q40	0.862		
	Q41	0.859		
	Q42	0.863		
	Q43	0.704		
	Q44	0.790		
	Q45	0.871		

Table 5 shows that the composite reliability CR value was  $>0.7$ , and the AVE was  $>0.5$ , indicating that the questionnaire had good convergent validity.

**Table 6. Discriminant Validity**

	<b>OLC</b>	<b>ICI</b>	<b>OCSI</b>	<b>FE</b>	<b>SOL</b>	<b>SFE</b>
OLC	<b>0.745</b>					
ICI	.970**	<b>0.754</b>				
OCSI	.465**	.468**	<b>0.869</b>			
OCFE	.755**	.751**	.563**	<b>0.807</b>		
SOL	.871**	.877**	.568**	.844**	<b>0.844</b>	
SFE	.754**	.757**	.565**	.905**	.840**	<b>0.833</b>

It can be seen from the table 6 that the root value of AVE was larger than the correlation coefficient of each dimension, indicating that the questionnaire had good discriminant validity.

**Table 7. Descriptive Statistics on Students' Satisfaction**

<b>Dimension</b>	<b>N</b>	<b>Mean</b>	<b>Std. Deviation</b>
OLC	410	3.8444	0.87557
ICI	410	3.8532	0.87542
OCFE	410	3.8712	0.92104
OCSI	410	3.9171	0.99701
Satisfaction	410	3.893	0.85719

A descriptive statistical analysis was conducted on the standard deviation. The study revealed that the satisfaction ratings for OLC, ICI, OCFE, and OCSI were 3.8444, 3.8532, 3.8712, and 3.9171, respectively. The overall satisfaction level for international students was determined to be 3.893. These findings suggest that during the pandemic, international students attending northwestern universities in China were moderately satisfied with online learning and faculty-student engagement. Furthermore, the OCSI factor appeared to be the most influential factor for their satisfaction.

**Table 8. Statistical Analysis of Satisfaction Correlation**

<b>Correlations</b>	<b>OLC</b>	<b>ICI</b>	<b>FE</b>	<b>OCSI</b>	<b>Satisfaction</b>
OLC	1				
ICI	.970**				
OCFE	.755**	.751**			
OCSI	.465**	.468**	.563**		
Satisfaction	.857**	.862**	.904**	.590**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis was performed to determine whether there was a certain dependent relationship between the items and whether there was a dependent relationship between the specific variables. In order to study the correlation among OLC, ICI, OCFE, OCSI, and student satisfaction, a multivariate Pearson correlation analysis was carried out. The variables were all positively correlated, and the interaction between OLC and ICI was the strongest ( $r=0.970$ ), followed by OCFE ( $r=0.904$ ) and ICI ( $r=0.862$ ), which had the strongest impact on satisfaction. The weakest among the factors was OCSI ( $r=0.590$ ). Nonetheless, the OLC, ICI, OCFE, and OCSI were all influencing factors to explain the online learning satisfaction of international students, that is, all of these four factors can be used to analyse online learning satisfaction.

**Table 9. Regression Analysis of Satisfaction**

<b>Model Summary<sup>b</sup></b>						
<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>		
1	.949a	0.9	0.899	0.27191		
a. Predictors: (Constant), OLC, ICI, OCFE, OCSI						
b. Dependent Variable: Satisfaction						
<b>ANOVA<sup>a</sup></b>						
<b>Model</b>		<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	270.581	4	67.645	446.95	.000b
	Residual	29.943	405			
	Total	300.524	410			
a. Dependent Variable: Satisfaction						
b. Predictors: (Constant), OLC, ICI, OCFE, OCSI						

$p < 0.05$  means that at least one independent variable significantly affected the dependent variable. This condition is defined to some extent by the original variable of R square fitting degree, the effect of the dependent variable by the variable, and the four dimensions of OLC/ICI/OCFE/OCSI may reflect 89% of the degree of satisfaction change.

**Table 10. Regression Analysis Coefficients of Satisfaction**

Model		Coefficients <sup>a</sup>						
		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	0.07	0.068		1.034	0.003	0.358	2.219
	OLC	0.094	0.064	0.096	1.47	0.000	0.359	2.008
	ICI	0.315	0.063	0.322	4.979	0.000	0.369	2.711
	OCFE	0.501	0.024	0.539	20.852	0.000	0.678	1.474
	OCSI	0.079	0.016	0.091	4.797	0.000	0.358	2.219

a. Dependent Variable: Satisfaction

The p values of OCL, ICI, FE, OCSI  $< 0.05$ , indicating their significance in probability, the  $\beta$  value regression coefficient were 0.096, 0.322, 0.539 and 0.091, indicating a positive impact; VIF was less than 5, indicating that there was no significant collinearity. Among the Online Learning (OLE) dimensions, In-class Interaction (ICI) was the better predictor ( $\beta = 0.322$ ). Among the Faculty-student Engagement (FE) dimensions, Outside-the Class Faculty Engagement (OCFE) was the better predictor ( $\beta = 0.539$ ).

In the fitting test results, the multiple correlation coefficient  $R = 0.949$ ,  $R^2 = 0.9$ , and the adjusted  $R^2$  determination coefficient value was 0.89, indicating that the fitting degree of the model was good, and the results were credible. The VIF value equaled 1.816, indicating no multicollinearity problem between variables. After stepwise linear regression analysis, the regression coefficient results on the overall satisfaction were derived and they are displayed in Table 4.21: OLC, ICI, OCFE, OCSI. These four variables ( $P < 0.05$ ) were entered into the regression equation to explain 89% of the variation in satisfaction quantity. According to the standard coefficients, OLC was 0.094, ICI was 0.315, OCFE was 0.501, and OCSI was 0.079, indicating that these four dimensions had a positive impact on

international students' online learning satisfaction during the epidemic. Therefore, the regression equation could be summarized as:

$$\text{Satisfaction} = 0.07 + 0.094 * \text{OLC} + 0.315 * \text{ICI} + 0.501 * \text{OCFE} + 0.079 * \text{OCSI}.$$

This study, using SPSS 22.0, performed descriptive analysis to explore the international student participants' responses fit with the satisfaction conceptual models. The research calculated Cronbach's  $\alpha$  coefficient values to assess the reliability of the scales. Descriptive statistics were computed. The results in Table 7 showed the international students in northwestern universities were at a moderate level of satisfaction with online learning and the faculty-students engagement during the pandemic.

Pearson's correlations were calculated between all variables, employed to study the correlation between OLC, ICI, OCFE, OCSI. Student satisfaction was positive directed, while correlation degree was strong and significant. Therefore, OLC, ICI, OCFE, and OCSI could be used as influencing factors to explain the online learning satisfaction of international students.

Multiple regression analysis was also performed to explore the predictive power of OLC, ICI, OCFE, and OCSI for international students' online learning satisfaction. All of these were influencing factors to explain the satisfaction of international students, that is, the four factors above can be used to analyse online learning satisfaction. The above four factors are presented in the form of formulas according to the results of model regression analysis, and they affect student satisfaction in different proportions.

## **5. Discussion and Conclusion**

This study explored the satisfaction of international students learning online during the COVID-19 pandemic in China. By conducting in-depth interviews with nine international students from different countries and academic backgrounds, the study sought to understand their experiences, challenges and obtain their perceptions of online learning. Four categories were derived from thematic analysis: (a) Online learning Content, (b) In-class Interaction, (c) Out-of-class Faculty-student Engagement, and (d) Out-of-class Student Initiative.

Through mixed methods combining qualitative and quantitative approaches, a fairly in-depth understanding of the level of contentment among international students throughout the pandemic was obtained. A limitation during the qualitative data collection was that only a relatively small sample of respondents was available on campus during the COVID-19 pandemic. It was the reason why only nine interviews from three disciplines at three universities with the highest international student number were included in this study. Nonetheless, the findings were very informative and insightful. It was rather clear that despite experiencing the COVID-19 lockdown, online learning allowed international students to continue their in-class learning routines and activities. Besides, despite travel restrictions and campus closures, all three universities in the study provided international students with flexibility in learning arrangements, allowing them to study remotely at their home countries during the pandemic and the first-year post-pandemic. Nevertheless, unavoidable problems, for example, Internet connectivity and software compatibility issues were reported. Some interviewees felt that the online learning environment led to reduced engagement with course material and their instructors, affecting the quality of education received. All in all, however, the international students in the study acknowledged that online learning conferred benefits, while the contributions of the faculty members and university staff to international student satisfaction were also highlighted.

As for the quantitative data, the responses to the questionnaire disseminated through a digital apps named *Wenjuanxing* were quite encouraging as the international students in China were generally familiar with the apps. Findings from the questionnaire revealed that students' satisfaction was affected by four dimensions that reinforced online learning and faculty-student engagement as the influencing factors to international student satisfaction during and post-pandemic.

Although exploratory as it was conducted at only three universities with the highest student number in northwest China, the findings of the study have further illuminated online learning experiences among international students in China. These findings somewhat concur with those of Huang et al. (2021), who investigated the relationship between faculty engagement and the mental health of international students during the COVID-19 epidemic in China, which reported that faculty engagement positively influenced the mental health of international students, particularly in the areas of emotional



support and communication. Faculty members who actively engage with their international students can provide valuable support and guidance, which can help students navigate the challenges they face. Engaged faculty members can also create a sense of belonging and community for international students, which can enhance their overall satisfaction with their academic experiences. During the pandemic, faculty engagement became even more critical, as international students faced unprecedented challenges related to online learning, travel restrictions, and social isolation. Hence, it is vital for universities in China to prioritize faculty engagement and provide adequate training and support to ensure that faculty members are equipped to meet the unique needs of international students during challenging times such as in a pandemic.

Since China's educational context varies across regions and considering that this study only provided findings from the northwest region, the results may not represent the entire population of international students in China. Future studies could contribute to a better understanding of the challenges and opportunities presented by online learning and living for international students' satisfaction in other provinces in China. In addition, a larger sample size which includes a larger coverage of the nation may further inform the development of effective strategies and policies in line with China's government policy that supports international education and places much importance on the well-being of international students.

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**APPENDIX (A)**

A Sample of the Coding of Interview Transcripts of This Study

Student No.	What are some of the problems you faced in online learning?	Coding		
		Descriptive Labeling (Level 1 Coding)	Conceptual Labeling (Level 2 Coding)	Thematic Labeling (Level 3 Coding)
A1	Some online courses may rely solely on one-way communication, the course only involves listening to pre-recorded lectures and submitting assignments, we may miss out on the valuable insights and perspectives that their faculties can bring to the discussion.	One-way communication, pre-recorded lectures and submission of assignments (online)	The passive learning approach	In-class interaction
A2	The professor presents a concept and asks us to brainstorm ideas for a project related to the concept. We can use a chat feature or a virtual whiteboard to write our ideas. Sometimes the professor waited for a response, but no student may volunteer to answer. We can tell that the professor was frustrated and disappointed.	No volunteer to offer answers (to the professor).	A lack of participation or engagement	In-class interaction
A3	I loss interest to talk to my lecturers, I also loss interest to discuss things with my classmates when it is online.	Loss of interest to communicate online	Lack of motivation for class interaction	In-class interaction

Student No.	What are some of the problems you faced in online learning?	Coding		
		Descriptive Labeling (Level 1 Coding)	Conceptual Labeling (Level 2 Coding)	Thematic Labeling (Level 3 Coding)
E1	Sometimes, it is hard to focus on the content of the courses during the online classes. It's unlike in traditional classroom setting that we can comfortably raise the key points which we don't understand.	Cannot comfortably raise questions in online classes.	Unease to raise questions during online learning	In-class interaction
E2	The videos assigned by the professors are in Chinese and hard to understand. We are not native Chinese speakers. My classmates and I find it difficult to understand its content.	Videos in Chinese is hard to understand.	Videos unfit for learning	Online learning content
E3	Chinese language learning needs to communicate with more people, ... there is limited time to interact that during the online learning.	Limited time to interact during online learning	Limited interaction time	In-class interaction
M1	When classes become online, just depending on chats or virtual lectures, everything becomes monotonous and uninteresting. We have to learn things without any practical involvement.	Online and virtual lectures are monotonous. No practical involvement	Online learning lacks practical component	Online learning content
M2	Medical subjects require hands-on practice and lab work, but online courses may not provide such opportunities, which could affect students' learning outcomes and interest.	Lack of hands-on practice and lab work in online courses	Limitations in online learning	Online learning content
M3	I don't have my teacher's close supervision during online classes; I feel sleepy and bored sometimes.	Lack of teacher's close supervision in online classes	Distant feeling in online classes	In-class interaction