

Article

A Study on Technology Use for Sustainable Graduate Education Internationalization at Home: Chinese Teachers' Experiences and Perspectives

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Abstract: Diverse innovative strategies for achieving sustainable internationalization have emerged as a consequence of the continuing development of education and technology. Several academic institutions in China have made the pursuit of international recognition a central policy objective in an effort to achieve global prominence in the coming decades. This study aimed to explore the use of technology in promoting the sustainable internationalization of graduate education in China using teachers' experiences and perspectives. In this regard, an assessment was conducted of the teachers' experiences and perspectives on the aspects involved in the use of technology-based education for sustainable internationalization as well as the effect of these aspects on the internationalization of graduate education. The sample consisted of 806 teachers from different universities in China. A questionnaire was used to collect the data. The data analysis was carried out using SPSS 22, JASP and SmartPLS 4. The results showed that Chinese teachers had satisfactory experiences regarding the use of technology in internationalizing graduate education. Furthermore, teachers were highly satisfied with using technology to support collaborative online international learning, research cooperation, intercultural competence development and virtual mobility. The results also revealed that teachers were less likely to be satisfied with using technology to support open exchange programs and the internationalization of the curriculum. In addition, the results demonstrated that collaborative online international learning, research cooperation and intercultural competence development had a direct effect on the internationalization of graduate education. Based on the findings, it was concluded that the situation regarding graduate education in China is acceptable, while at the same time, support and more effort from the government and teachers are required.

Keywords: experience; graduate education; perspectives; sustainable internationalization; technology

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1. Introduction

The sustainable internationalization of graduate education has been the focus of many universities around the world, especially in China. China is among the largest economies in the world [1,2]. Hence, investment in the lifelong internationalization of graduate education is necessary for China to improve and sustain scientific investigations and instruction cooperation. Academic institutions that actively engage in internationalization are more inclined to implement the requisite pedagogical and didactical modifications to adapt to the evolving nature of content delivery and learning tools [1,3]. The continuous progress of society and education has supported domestic internationalization [3]. For instance, the collaboration that has been supported by society and education has led to the development of interactive and collaborative learning and the intercultural competence that teachers and parents encourage students to acquire has resulted in the establishment of open virtual mobility [1,3]. The establishment of a completely internationalized domestic economy necessitates not only a contemporary pedagogical methodology but also an all-encompassing educational setting for every student [1–3]. According to Robson et al.

(2018) [3], the emergence of digital learning provides a platform for students to interact with instructors and classmates from diverse cultures, thereby enhancing and promoting their “global mindsets”. In 2018, the Chinese government released data indicating that 9.4 million students participated in a college entrance exam in China during the year 2017. Nonetheless, the total number of Chinese students enrolled in foreign educational institutions amounted to 608,400, which accounts for a mere 6% of the overall student populace. To clarify, due to the increased interconnectivity of the global economy, a majority of students have chosen to pursue their higher education at a domestic university, instead of registering as an “international” student. Under such conditions, the opportunities for students to cultivate their advanced cognitive and intercultural abilities are severely restricted. In this respect, officials in China’s government are eager to strengthen the steps that have already been put in place to boost the diversity of the country’s academic institutions [4]. Internationalization has become a strategic policy priority for many Chinese universities that are aspiring to become world-class in the upcoming decades [5].

There are a number of federal programs that offer financial assistance in the form of grants to colleges that are attempting to broaden their international presence [4–6]. The government “places a high premium on subversive technological developments” and “encourages Chinese research organizations to undertake cutting-edge research”, according to the Communist Party of China’s (CPC) Five-Year Plan. Government officials have also stated that they intend to “implement the Internet+ Action Plan in order to establish application technologies for the Internet of Things” [7]. One particularly intriguing proposal is to provide universities and research institutes with the opportunity to become innovation leaders, with expanded decision-making control over research spending and globalizing the universities for an extended period of time. The Internet of Things (Internet+) already has a significant impact on the internationalization of graduate education in China and around the world and this trend is expected to increase over time [7,8]. The development of new technologies has allowed for the rise of online universities like the Open University, which provide courses at a distance [9]. Technology may guarantee that all students have equal access to internationalization possibilities [10]. The world’s universities have experienced a transition from isolation to interdependence and from connectivity to hyperconnectivity. In this regard, the use of technology enables the sustainable internationalization of graduate education. This issue requires the attention of academics and researchers. However, as evidenced by the examination of existing research, little is known about teachers’ perspectives on the use of technology for the sustainable internationalization of graduate education in China [4,9]. This study set out to fill that void, aiming to better understand teachers’ experiences and perspectives on using technology in the sustainable internationalization of graduate education in China, the aspects that are supported by technology as part of the internationalization of graduate education in China and which aspects have a direct effect on the internationalization of graduate education. In this regard, this study aims to investigate teachers’ experiences and perspectives on using technology in the sustainable internationalization of graduate education in China, identify which aspects are supported by technology as part of the internationalization of graduate education in China and determine the aspects that affect the internationalization of graduate education. The objective of this study was to enhance the sustainable internationalization of graduate education by providing guidance to policymakers on the allocation of resources to facilitate technology adoption. The study aimed to support informed decision-making for the promotion of sustainable internationalization in graduate education. This research has the potential to assist policymakers and educators in other countries in enhancing the degree of internationalization within their institutions. China, a highly developed nation, can serve as a model and exemplar for achieving this objective. Emulating a highly developed nation can aid other countries in identifying their deficiencies, vulnerabilities and necessities, while also facilitating their replication. Moreover, the current investigation has the potential to offer innovative research on the pressing issue of the sustainability and globalization of education, which hold substantial importance for educators, institutions of higher learn-

ing and governmental bodies worldwide. The current study's findings have contributed to the comprehension of educators' perspectives on the utilization of technology to promote sustainable internationalization in postgraduate education. The aforementioned has far-reaching ramifications for the field of education.

The present research paper comprises various sections aimed at providing a comprehensive elucidation of the study. The document comprises various sections, namely an introduction, literature review, present study, methodology, results, discussion, conclusion, implications and limitations and future research directions. In order to enhance the clarity of the presentation of the ideas and content, certain sections such as the literature review and methodology were subdivided into smaller sections.

2. Literature Review

2.1. *Internationalization at Home*

Knight (2006) [11] distinguished internationalization at home as one of two interdependent, rather than independent, internationalization streams in his subsequent treatment of key concepts, elements and justifications. He claimed that all worldwide educational initiatives, courses and projects, as well as the movement of students, instructors, scholars, programs and curricula across borders, fall under the umbrella term of "Internationalization Abroad". On the other hand, "internationalization at home" refers to initiatives that help students gain intercultural skills and a global perspective. Internationalization at home does not necessitate the enrollment of students from other countries, despite the fact that doing so may be advantageous [1,2,11]. Internationalization at home (IaH) may be viewed as a somewhat limited idea, which refers to the introduction of an international and intercultural dimension into the curriculum studied in a local setting, whether it is a formal or an informal curriculum [10]. In this regard, internationalization at home is about the combination of international content with the national curriculum content in the local environment, which aims to prepare students for performance in an international and multicultural setting [10,12,13]. Internationalization at home is neither an end in and of itself nor a pedagogical concept, but rather a set of "at-home" resources and activities with the goal of developing students' international and intercultural competencies [13]. It is important to note that IaH, like internationalizing the curriculum as a whole, is context- and discipline-specific [14].

2.2. *Internationalization at Home and Technology*

The expansion of "internationalization at home" opportunities has been greatly facilitated by the widespread use of social media platforms and flexible educational technology [15]. Mittelmeier et al. (2019) [16] showed the support that technology provides for the internationalization of higher education at home. They revealed that students are able to study "through institutions established in a culture or country distant from their own, while remaining in their own country", [16] and they perceived this as a third kind of internationalization that is made possible by distance learning in all of its manifestations because currently, many students use technology for learning. In this way, it is also knowledge, teaching and learning that have become mobile due to the availability of technology, and time and distance are more easily navigated [16,17]. The internationalization of a Chinese university from the students' perspectives was studied by Guo et al. (2022) [5]. The research found that students saw internationalization via a Westernization lens, raised concerns about uneven access to internationalization and questioned the use of English in the university's official and informal internationalization initiatives [5]. Deardorff et al. (2012) [18] revealed that recent advancements in the internationalization of higher education in one region seem to be widely and rapidly available in almost any other location with Internet access. There are now more opportunities for domestic internationalization thanks to the exponential growth of technology. Therefore, students from all over the world may now more easily network with their counterparts in classrooms and universities situated in faraway nations [7–9]. With the help of modern technological advancements,

it is possible now for universities, teachers and students to work together and engage in mutually beneficial learning with peers from all over the globe [16,19], expanding their horizons and enriching their understanding of and appreciation for different cultures.

The literature has advocated some dimensions and aspects of internationalization at home. However, Knight (2006) [11] considered the international/intercultural dimension of the curriculum along with research cooperation and local and foreign language studies (liaison with local cultural/ethnic groups) as factors of internationalization at home. The international/intercultural dimension of the curriculum undervalues the importance of the curriculum in the endeavor of internationalization at home, since it is not an “associated aspect” nor an “activity” but is at the core of the idea [11]. The use of technology has allowed for a plethora of programs that include curricula tailored to the improvement of skills and knowledge, including foreign language skills [11,20], and boosting the implementation of joint or double degrees [11,16,18]. Thanks to technological advances in the field of pedagogy, educational interventions designed to assist students in acquiring skills and knowledge can now be broadly disseminated via a unified curriculum [11,19]. Still, technology has made it simpler for multicultural teams to collaborate, increasing the likelihood that they will be able to evaluate and enhance educational programs and courses as a whole [7,9,11,20]. The Organization for Economic Co-operation and Development states “A curriculum with an international orientation in content and/or form, aimed at preparing students for performing (professionally/socially) in an international and multicultural context and designed for domestic and/or foreign students” [20]. The internationalization of the curriculum aims for “the incorporation of international, intercultural and/or global dimensions into the content of the curriculum as well as the learning outcomes, assessment tasks, teaching methods and support services of a program of study” [21]. Educators all across the world may work together more efficiently using digital tools to identify and address any problems that may arise for students as they go through the curriculum [7,20,21]. Moreover, teachers and students may connect with each other and with program material from across the world using social media [19,20].

The integration of technology into the field of education holds promise for improving communication and enabling a more inclusive and cost-effective online learning environment that can cater to a broader student population, rather than being restricted to a select few with privileged access [17,22]. Collaborative online international learning is another dimension of internationalization at home and is an educational strategy that has the potential to augment the acquisition of a wider range of skills while affording students the chance to engage with peers from various parts of the world [22]. The effects of collaborative online international learning on students’ cross-cultural communications were investigated by Pouromid (2019) [23], comparing institutions in Japan and Taiwan. The data are utilized to shed light on the under-researched potentials of collaborative online international learning in internationalizing English-as-a-foreign-language classrooms and providing students with cross-cultural communication opportunities in a virtual and multilingual setting. Students who felt their English skills were insufficient employed a wide range of multimodal strategies to continue interacting with classmates from diverse cultural backgrounds. Therefore, as part of the process of internationalizing higher education, Collaborative Online International Learning was found to be effective in facilitating communication between students in the two countries. Here, it can be estimated that the integration of technology facilitates the opportunity for both students and teachers to actively participate in global communication and collaboration with fellow peers through various online platforms [17,19,22]. This may lead to enhancing their sense of ownership over their academic pursuits and ability to initiate and produce innovative ideas during the various stages of research, interpretation, dissemination and adjustment [19,20]. The case study by Wihlborg et al. (2018) [19] elucidated the practical application of collaborative and transformative learning in the context of “internationalization at home”. The research was conducted by utilizing a cocreated initiative that implemented a digital global partnership between educators and learners through the utilization of a course administration platform

(MOODLE) and unrestricted technological resources (Adobe CONNECT). The study was conducted with the participation of two research universities located in Sweden and the United States. Ninety nursing students from each university per semester were involved in the study over multiple semesters. The findings indicate that potential solutions were generated to address the obstacles and devise tactics for a forthcoming tertiary education framework that fosters global communication. The integration of technology enables the implementation of collaborative learning strategies, aiming to cultivate a collective sense of accountability among students from different countries, thereby shifting the responsibility of learning onto the students themselves [17,19,20]. Virtual international exchanges provide novel opportunities for cross-cultural communication and learning across different countries and societies. Garcia et al. (2023) [24] analyzed a case illustration of two partner institutions and a business faculty who employed a collaborative online international learning experience amid the peak of the COVID-19 pandemic and shift to online learning. The aim was to globalize an undergraduate business class and leverage pre-existing technology to provide a case study project that would enhance students' global mindsets. The study analyzed qualitative feedback obtained from students enrolled in an international business course, originating from both an American college and a Peruvian university, to identify significant themes related to a virtual-collaborative-online-international-learning-based learning experience. The efficacy of the learning experience and the benefits of collaborating with peers and faculty in a virtual environment were confirmed by the feedback provided by the students in both nations' end-of-course evaluations.

Woicolesco et al. (2022) [25] considered academic mobility and collaborative online international learning as some of the "internationalization at home" dimensions at Brazilian institutions. Virtual mobility has been emphasized in the literature as an important element of the "internationalization at home" aspect. Rajagopal et al. (2020) [26] explored the learners' skills and knowledge that underpin open virtual mobility (OpenVM)—a recent development in online education that brings together these two concepts. The results showed that a group concept mapping study, which included contributions from experts in both virtual mobility and open education, identified the following contributing factors: intercultural skills and attitudes; networked learning; active self-regulated learner skills; media and digital literacy; autonomy-driven learning; interactive and collaborative learning in an authentic international environment; and open-mindedness. Similarly, Tereviciene et al. (2013) [27] studied how virtual mobility might assist the internationalization of higher education. Results have shown that virtual mobility contributes positively to intercultural understanding, language learning and the globalization of higher education. In addition, virtual internationalization efforts at Ukraine's Sumy National Agricultural University (SNAU) were evaluated by Kobzhev et al. (2020) [28]. The results indicate that the Sumy National Agricultural University is emphasizing the use of digital tools in its global activities and that its involvement in virtual international programs has enhanced academic mobility, guaranteed international standards for the quality of educational services and provided students with opportunities to gain international experience in the area of agrobusiness and research. In this regard, it can be said that technology has made virtual mobility a more environmentally sustainable alternative and suitable for students [4,16,17]. This relevance may be apparent in the facilitating of collaboration between students across borders through online means [19,22], thereby enhancing the dissemination of knowledge and hence enabling them to reach various platforms available at other academic institutions [20,21,28].

The role of online exchange programs was highlighted by researchers as a dimension of internationalization at home. The advent of technology has facilitated the rapid exchange of programs, in which a collaboration of groups of program designers was facilitated in order to ascertain the specific requirements of each university's curriculum. The effects of online exchange programs on the growth in students' intercultural competency were studied by Zilberberg Oviedo and Krimphove (2022) [29]. The study's most noteworthy conclusion is that Brazilian international office managers see virtual exchanges as a key com-

ponent of internationalization at home and, by extension, a means toward a more equitable internationalization framework. The negative aspects of virtual exchanges include major technical issues, low levels of language proficiency among faculty and students, a lack of commitment and the disadvantages arising from a lack of deeper and more intense cultural immersion when compared to real-world experiences; however, there is still general agreement that they help students develop intercultural competence. In a qualitative research study, Ganassin et al. (2021) [1] looked at how 15 educators and school leaders see the role of virtual exchange (VE) within their institution's "internationalization at home" aspects. The participants expressed that virtual exchange has the potential to enhance globalization by giving more people the opportunity to participate in international and multicultural encounters. The internationalization and global participation of Chinese universities might benefit from VE (HEIs). Nevertheless, effective preparations and strategies are necessary to address the challenges of its application. Among them are the unique power dynamics among different types of students and the technological and political barriers they face. Technology facilitated the organization of seminars among teachers to critically analyze program deficiencies and replicate them through the exchange of experiences.

In addition, research cooperation that is supported by technology has a significant role. When researchers from various nations work together, they establish international research teams [30,31]. Teachers and students from all around the world may work together on research projects thanks to technological advancements, opening the door to potential collaborations that will benefit all parties involved as well as solutions to pressing global issues [30,31]. For instance, teachers and students may now attend international conferences all around the world thanks to technological advancements that allow them to network with professionals from other fields [31,32]. These groups conduct studies and share their results to advance scholarship and promote useful reforms in practice [31,32]. Teachers' use of digital tools for research and sharing findings boosts the quality of academic inquiry and lays the path for more tangible changes to be put into practice. Hence, research fields have potentially increased the impact and greater significance of this via doing thorough cross-national studies [31–33]. Research that spans national boundaries can more easily be applied to a wide range of people and cultures [30,31]. Additionally, participating in international collaborative research provides opportunities to develop win-win partnerships and address global issues in education [30,31]. The internationalization of education, the platform through which joint efforts yield greater results than those of their component parts, is one of the primary reasons why collaborations in research are so crucial [4,30,34]. It is possible that breakthroughs in problem-solving and new ideas will emerge from the interactions between scientists and individuals from other nationalities and cultures [1,4,35]. In other words, online conversations between people from different cultures and backgrounds can spark the development of novel perspectives and methods for approaching problems [4,35].

Furthermore, intercultural competence is often defined as "the ability to communicate effectively and appropriately in intercultural situations" [36]. Safipour et al. (2017) [37] note that teachers working in a global context may need to help their pupils adjust to both new academic and cultural challenges. Ultimately, internationalization at schools aims to provide students with the intercultural competence they will need to thrive in today's increasingly heterogeneous workplace [38,39]. Intercultural competence is increasingly recognized as a source of competitive advantage as schools that teach their students to work effectively across cultural boundaries produce more employable graduates [40,41]. The "integration of culture" in the classroom refers to incorporating international and intercultural perspectives into course content and the teaching–learning process [42–44]. One possible approach is for participants in groups to adopt a more international outlook. Furthermore, some teachers might not feel ready for, or at ease with, this duty [45]. Teachers often complain about the time commitment of their job because they are passionate about their subjects [4,46]. Although lectures, group work and projects have always been part of programs, recent developments in information and communication technology have

opened up exciting new possibilities for implementing these strategies on a global scale [4]. The utilization of technology has extended the scope of what is now possible in terms of transnational and intercultural education and this is why students felt the need to adopt technology to ameliorate the level of their intercultural competence [4,43,45]. In addition, one advantage of using technology is that students may engage in academic endeavors without having to be sidetracked by cultural differences, i.e., technology has promoted worldwide collaboration among students [9,36,42] and made it possible for them to break up cultural differences, be proficient in interactions and conduct themselves in intercultural circumstances [41,45,46]. Still, the incorporation of technology allows students to easily pursue and involve multiple elements and activities, including the incorporation of information from various cultures [42,46]. Technology has allowed students from all over the world to work together without having to take a break from their studies [9]. The incorporation of a global perspective into virtual teams provides a useful setting for the cultivation of intercultural communication and competence, both of which are crucial in modern education [36,40,41]. The prevalence of virtual teams reflects the way students operate presently [9].

3. The Present Study

The current study aimed to investigate teachers' experiences and perspectives on using technology in the sustainable internationalization of graduate education in China, identify which aspects are supported by technology as part of the internationalization of graduate education in China and determine the aspects that affect the internationalization of graduate education. China was selected for this study as it presents one of the best models for the internationalization of education in the world. The success that China has attained in internationalizing its universities is reflected in its success in attracting foreign professors, teachers and students from many countries. In addition, the collaboration between Chinese universities and international universities is demonstrated by the instigation of online events and conferences, the exchange of programs and the exchange of teachers and students before, during and after the COVID-19 pandemic, despite the difficult situations and scenarios that the world endured. This study focused on collecting the experiences and perspectives of teachers from Chinese universities in Wuhan, without referring to the perspectives of international universities about the local context in China and in the city from which COVID-19 emerged. Based on a review of previous studies, the following research questions were developed to guide the study:

- A. How do teachers perceive their experiences of using technology in supporting sustainable internationalization of graduate education in China?
- B. What aspects do teachers find more supported by technology to achieve sustainable internationalization of graduate education in China?
- C. What aspects affect the internationalization of graduate education?

4. Methods

4.1. Research Design

This research focuses on the use of technology for the sustainable internationalization of graduate education in China, which the researcher refers to as "home". The methodological approach used in this study is quantitative. This is exploratory research, which is described as investigating an issue that has not been well clarified, has been under-investigated or is otherwise poorly understood. Exploratory research was used because it facilitates the collection of data from a large number of participants, which in turn makes it possible to conduct an in-depth investigation into teachers' experiences and perspectives on using technology for the sustainable internationalization of graduate education at home, in China. A questionnaire was used to collect data from participants.

4.2. Participants

The participants are teachers with expertise and a high level of familiarity regarding the present state of internationalization in graduate education within China. Therefore, their responses carry greater significance than would those of students and they have made valuable contributions to this research. The final sample of participants comprised 806 teachers from different universities in Wuhan, Hubei province, China, during the 2022–2023 academic year. The choice of Wuhan as the research site was based on the researcher’s objective to identify the features of graduate education in one of China’s most significant cities. As shown in Table 1, of the 806 teachers, 341 were male and 465 were female; 409 were assistant professors, 203 were associate professors and 194 were full professors. The ages of the teachers were categorized as follows: 385 teachers were between 29 and 34 years old, 137 teachers were between 35 and 40 years old, 77 teachers were between 41 and 45 years old and 207 teachers were 46 or older, making a total of five categories.

Table 1. Participants’ profiles.

Demographic Variables	Frequency	Percentage	M
Gender	806	100	
Male	341	41.50	1.58
Female	465	56.6	
Level	806	100	
Assistant professor	409	49.80	1.73
Associate professor	203	24.70	
Professor	194	23.60	
Age	806	100	
29–34	385	46.80	2.13
35–40	137	16.70	
41–45	77	9.4	
46 and older	207	25.2	

4.3. The Research Instrument

The questionnaire used in the current study consisted of three main sections (Appendix A). The first section collected participants’ demographic data. The second section inquired into teachers’ experiences of using technology for the internationalization of graduate education based on the user experience scale developed by Schrepp and Thomaschewski [47], encompassing six scales with twenty-six items that aim to get quick and immediate measurements of the user experience. The six scales are: attractiveness, efficiency, perspicuity, dependability, stimulation and novelty. The third section collected data about participants’ perspectives regarding the use of technology in internationalizing graduate education in seven different areas or dimensions. These seven dimensions, incorporated according to the results of previous studies that investigated the virtual internationalization of education, included: online exchange programs; virtual mobility; collaborative online international learning; internationalization of curriculum; research cooperation; intercultural competence development; and internationalization of graduate education [1,5,6,16,18,19,21,36,39,43]. This third section utilized a five-point Likert scale (strongly disagree; disagree; neutral; agree; and strongly agree) asking teachers to rate their agreement with statements within the different dimensions. The study also included items from the literature on internationalization at home [1,2,5,6,16,18,21,30,31,33,36,39,42–44] and, initially, utilized 37 different items for improving the efficacy of the research tool. Thereafter, a group of seven educators and specialists verified the face validity of the study instrument. Several items were improved, replaced and altered after the panel’s recommendations were implemented and two were taken out entirely. Some examples of these additions and adjustments are the following: “capability to diagnose learning competencies using specific applications (use applications to accurately diagnose learning competencies as part of evaluation and assess-

ment)”; “capability to transition from a local program’s content to a non-local program’s content using social media and videos (use technology to bridge the gap between local and non-local program content)”. This questionnaire was developed in Chinese considering that the participants’ native language is Chinese. Thereafter, a pilot test was conducted to verify the basic psychometric properties of the instrument and the panel’s opinions (validity and reliability). Cronbach’s Alpha = 0.818, as noted by AL-Qadri et al. (2023) [48], suggests that the reliability and validity values are above average. At its peak, the questionnaire had sixty items. All of the required permissions were obtained from the participating professors and their participation was entirely voluntary.

The study’s validity and reliability were evaluated after the questionnaire had been sent to participants and data had been collected. In addition, the factorial validity of the study instrument was examined. This research yielded a higher KMO value (0.955) than has been previously reported in the literature [49,50]. Data with multiple variables were normally distributed, as shown by the significance of the Chi-square statistics obtained at the end of the BST. There is conclusive evidence that the BST is significant ($X_2 = 33476.905$, $df = 703$, $p < 0.001$). As the KMO value is more than 0.60, these findings confirmed the instrument’s suitability for factor analysis [48–50]. With this data set, six variables seem to be the most likely choice. The first exploratory factor analysis (EFA) using Eigenvalues for items found a thirteen-factor structure. Thirteen factors were identified by the analysis and factor loads ranged between 0.90 and 0.52. The values of the items’ communalities varied from 0.54 to 0.96. All items in the study instrument had loading values of more than 0.50 and all factor loading were statistically significant at $p < 0.01$ [49,50].

To emphasize the validity of the measured questionnaire, the CFA was accomplished to evaluate the measurement model while retaining the same factor and items. The measurement model was assessed using multiple fit indices, including the Chi-square value (4043.672; $p < 0.001$), the root mean square error of approximation (RMSEA) = 0.073, the comparative fit index (CFI) = 0.920, the goodness of fit index (GFI) = 0.924, the Tucker–Lewis index (TLI) = 0.913 and the standardized root mean square residual (SRMR) = 0.047. The guidelines for evaluating the adequacy of fit are as follows: CFI and TLI values equal to or greater than 0.90; RMSEA values with the upper bound at or less than 0.08; and SRMR values equal to or less than 0.06. All fitted indices’ values were appropriate for using these instrument factor models for measuring the study aspects [48,49]. The Cronbach’s Alpha for the individual subscales of the instrument was between 0.40 and 0.86. In this respect, the research instrument had sufficient validity to warrant deployment [48–50].

4.4. Data Collection Procedures

The researchers were aware of the importance of resolving the questionnaire’s validity and reliability to ensure accurate and reliable results. Norms of ethics in data collection are essential for achieving this objective [51,52]. In light of this, sanction from the College of Humanities Research Ethics Committee at the Wuhan University of Engineering Science was obtained to collect data for research purposes. Teachers from a number of universities in Wuhan, China, were selected using the purposive sampling strategy. During a purposive sample, units are selected based on essential and pertinent criteria determined to be essential to the research. Throughout the selection procedure, teachers’ track records of employing technology to internationalize education for more than three years were considered. Teachers with more than a few years of experience were sought out specifically for inclusion in the study; therefore, professors with three years of experience were the appropriate benchmark. The researchers initiated their search for teachers with at least three years of experience in their respective disciplines by contacting the faculty deans and department chairs, which disclosed that many teachers were recruited recently, i.e., they are novices in their schools. Some faculty leaders and department heads required anonymity to prevent teachers from expressing misleading ideas or opinions. The researchers explained the study and assured the participants that their institutions’ names, faculty names and teacher names would remain confidential. The researchers presented the study to the

department chiefs and faculty members. The majority of teachers were contacted personally in their offices by the researchers or the department chiefs. In addition, the researchers sought the help of other teachers to distribute the questionnaire among their colleagues who had more than three years of teaching experience. The researchers explained the study to the teachers and reassured them that their information would be kept private. Participant consent entailed signing a paper consent form. The current study included 806 instructors from numerous universities in Wuhan, China. The questionnaire was distributed to 806 teachers. Some teachers responded immediately, while others required several days. Even after gathering all the questionnaires, many questions remained unanswered. Therefore, only complete questionnaires were included in the results and this provided the total of the 806 teachers in the present study.

4.5. Data Analysis

Statistical Product and Service Solutions (SPSS) Software (Version 22.0), JASP and SmartPLS 4 were used for data input. After receiving the questionnaire sheets from the participants, the researcher coded the data manually and inserted each participant's answers into SPSS software using numbers. For example, the Likert scale was coded as follows: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree. The age of participants was coded as follows: 1 = 29–34 years old; 2 = 35–40 years old; 3 = 41–45 years old; and 4 = 46 years old and older. Although data input was one of the most important steps in this research, special care was taken to ensure accurate findings. Finally, the analysis and interpretation of the results were performed. Subsequently, an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were conducted using both SPSS 22 and JASP, whereas the relationship between variables was tested using SmartPLS 4. In addition, teachers' experiences and perspectives were analyzed using SPSS 22.

5. Results

Teachers' experiences of using technology to help internationalize graduate education were examined. The results show that the use of technology in internationalizing graduate education received a positive evaluation from teachers, with scores between excellent and good, according to the benchmark data set. As shown in Table 2, attractiveness, efficiency and dependability belonged to the excellent category. This means that using technology for internationalizing graduate education is attractive, enjoyable, friendly, pleasant and helped in performing tasks quickly and efficiently. In addition, the participants' interaction with technology is predictable, secure and meets their expectations. However, stimulation, novelty and perspicuity were classified as good. This implied that teachers are satisfied with using technology in internationalizing graduate education.

Table 2. The questionnaire results of teachers' experiences of using technology for the sustainable internationalization of graduate education.

Aspects	Average Score	Compared to Benchmark
Attractiveness	3.20	Excellent
Perspicuity	1.81	Good
Efficiency	3.11	Excellent
Dependability	3.09	Excellent
Stimulation	1.79	Good
Novelty	1.61	Good

Table 3 shows the descriptive statistics of the level of each of the six dimensions related to "internationalization at home" using technology. The analyses revealed that using collaborative online international learning is the most dominant aspect ($M = 4.705$). The results also indicate that research cooperation ($M = 4.019$), intercultural competence development ($M = 4.007$) and virtual mobility ($M = 4.001$) are also frequently used aspects.

However, the results demonstrate that the use of technology to support online exchange programs ($M = 2.112$) and the internationalization of the curriculum ($M = 2.012$) are less frequent.

Table 3. Aspects supported by technology for the “internationalization at home” of graduate education.

Dimensions	SD (%)	D (%)	N (%)	A (%)	SA (%)	Mean
Online exchange programs	15	21	6	30	28	2.112
Virtual mobility	21	27	1	22	29	4.001
Collaborative online international learning	3.3	4	9.1	46.2	34.7	4.705
Internationalization of curriculum	22	34	0	27	17	2.012
Research cooperation	17	24	9	28	22	4.019
Intercultural competence development	25.2	35	1.8	23.1	14.9	4.007

Structural Model

The data were analyzed using the partial least squares structural equation modeling (PLS-SEM) technique with the aid of the Smart PLS 4.0 software package, as described by Ringle et al. (2005) [53]. The model’s goodness was assessed using various fit indices, as recommended by Hair (2014) [54]. The results indicated that the model was of good quality, with an SRMR of 0.264, d_ULS of 48.951, d_G of 3.148, Chi-Square (χ^2) of 12,272.147 and NFI of 0.633. These findings provided confirmation of the validation of the measurement model. Table 4 presents the results pertaining to the construct validity, discriminant validity and reliability. The adequacy of all values was confirmed, indicating the quality of the model [55].

Table 4. The construct validity, discriminant validity and reliability of the structural model.

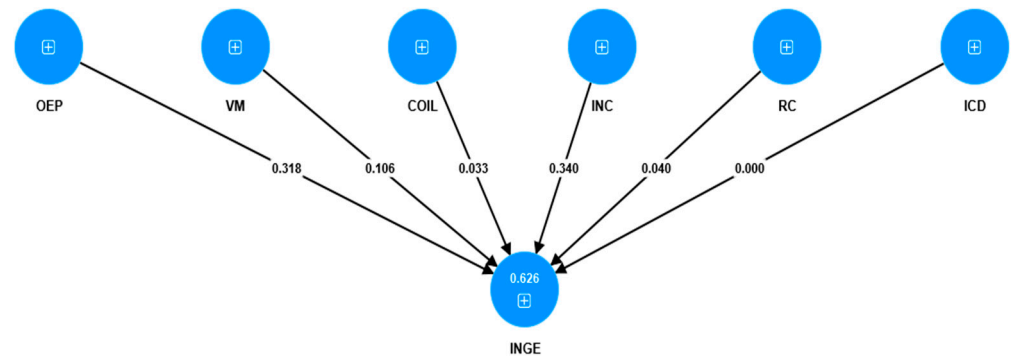
Variables	α	rho_A	CR	AVE	Discriminant Validity					
					1	2	3	4	5	6
Collaborative online international learning	0.936	0.993	0.943	0.734						
Intercultural competence Development	0.691	0.949	0.938	0.722	0.135					
Internationalization of curriculum	0.942	0.961	0.952	0.739	0.923	0.139				
Internationalization of graduate education	0.554	0.928	0.765	0.621	0.124	0.941	0.187			
Online exchange programs	0.834	0.452	0.243	0.296	0.732	0.138	0.708	0.238		
Research cooperation	0.756	0.874	0.836	0.553	0.632	0.215	0.648	0.393	0.888	
Virtual mobility	0.878	0.571	0.799	0.523	0.862	0.126	0.812	0.207	0.969	0.711

Note: α = Cronbach’s Alpha, CR = composite reliability, AVE = average variance extracted.

The hypotheses were tested. Direct path significance was measured and standard errors were estimated using the Bootstrap resampling approach with 5000 resamples [53]. Table 5 and Figure 1 illustrate the findings. It was found that there was not a significant positive and direct effect of online exchange programs on the internationalization of graduate education ($\beta = -0.072$, $t = 1.000$, $p = 0.318$) and so H1 had not been accepted. Virtual mobility did not have a direct significant effect on the internationalization of graduate education ($\beta = 0.087$, $t = 1.617$, $p = 0.106$) and so H2 had not been accepted. Collaborative online international learning had a direct effect on the internationalization of graduate education ($\beta = 0.114$, $t = 2.135$, $p = 0.033$) and so H3 had been accepted. Internationalization of curriculum did not have a direct effect on the internationalization of graduate education ($\beta = 0.045$, $t = 0.954$, $p = 0.340$) and hence H4 had not been accepted. Research cooperation had a direct effect on the internationalization of graduate education ($\beta = 0.090$, $t = 2.053$, $p = 0.04$), so H5 had been accepted. Furthermore, intercultural competence development had a direct effect on the internationalization of graduate education ($\beta = 0.759$, $t = 23.138$, $p = 0.00$) and so H6 had been accepted.

Table 5. The hypotheses results.

Hypotheses	β	M	SD	T Values	p Values
OEP \rightarrow INGE	−0.072	−0.021	0.072	1.000	0.318
VM \rightarrow INGE	0.087	0.073	0.054	1.617	0.106
COIL \rightarrow INGE	0.114	0.098	0.053	2.135	0.033
INC \rightarrow INGE	0.045	0.041	0.047	0.954	0.340
RC \rightarrow INGE	0.090	0.095	0.044	2.053	0.040
ICD \rightarrow INGE	0.759	0.758	0.033	23.138	0.000

**Figure 1.** The research model results.

6. Discussion

Concerning the first research question, which pertains to the experiences of teachers in utilizing technology to facilitate the internationalization of graduate-level education, the results of the present study reveal that Chinese teachers have a satisfactory experience regarding the use of technology in internationalizing graduate education. The excellent category for attractiveness, efficiency and dependability, as well as the good category for stimulation, novelty and perspicuity, demonstrated that teachers have a strong belief in the role that technology plays in facilitating the internationalization of graduate education. This is due to the fact that teachers perceive technology as highly efficacious, capable of capturing students' focus and engagement, while concurrently enhancing their academic performance. According to teachers, the utilization of technology facilitated students' access to diverse global platforms and websites, hastened their learning process through collaboration with international peers and provided them with enjoyable opportunities to apply their knowledge alongside others. Technology facilitated the opportunity for students to engage in the exploration of novel subject matters and enhanced their comprehension of intricate concepts through cooperative efforts with diverse teachers and peers across the globe. In addition to teachers' ability to actively involve students during instructional sessions, students can also engage in cross-cultural communication with peers from various international universities. By means of web-based instructional sessions and educational activities, students collaborate in order to resolve academic challenges. Collaborative activities provide a platform for students to exchange their thoughts and ideas while extending support to one another. Simultaneously, technology facilitates individualized engagement between educators and their colleagues overseas. Students have the opportunity to inquire about topics pertaining to the classroom and obtain supplementary assistance on complex subject matters. Teachers possess specialized knowledge and express contentment with technological tools, as they have found them to be more straightforward and efficient in facilitating the sustainable global expansion of graduate instruction. These results are consistent with the study of Malcolm and Roll (2016) [15], who found that students were satisfied with using assistive technology as they found it supportive of their academic success and they referred to their continuing intention to use technology for post-graduate studies. Ganassin et al. (2022) [1] also revealed that teachers think that virtual exchange may help to maintain internationalization, leading to good

international and intercultural experiences for universities in China and improving their global engagement. These results confirm the conclusions from Amankwah-Amoah et al. (2021) [17] that many of the new applications of digital technologies in universities are here to stay because of the benefits they provide. This may refer to faculty staff and students being satisfied that the digital internationalization of education is useful. The focus on internationalization may be developed via the virtualization of internationalization, which has the ability to boost internationalization at home and support the development of international and intercultural capabilities for all students in the setting of local higher education institutions [25,28,56]. By contrast, other researchers have noticed that the usefulness of the digital internationalization of education is more effective when it is merged with in-person education [57]. At the present time, college and university students want to learn more than simply the technical skills they will need to find employment; they also want to learn how to be successful learners by interacting with peers from other contexts and countries, how to communicate with people locally and globally and how to be active, adaptable members of society. A potential reason for this is that the integration of technology into teaching has become a commonplace occurrence, leading teachers to believe that technology can facilitate the sustainable internationalization of graduate education. This, in turn, is intended to foster measurable rates of achievement and growth among students.

Moreover, the internationalization dimensions, or aspects, that teachers feel are supported by technology were investigated. The findings indicated that teachers expressed a high level of contentment with the utilization of technology to facilitate collaborative online international learning, research cooperation, intercultural competence development and virtual mobility. The findings showed that teachers exhibited lower levels of contentment in utilizing technology as a means of facilitating online exchange programs and promoting the internationalization of the curriculum. This demonstrates that the online learning mode has credibility among teachers and is implemented widely as a valuable source of international learning and this is, of course, supported by technology, which is the available supportive material. Furthermore, the findings pertaining to the third question of the study unveiled that certain factors exert a direct effect on the internationalization of graduate education, whereas other factors do not. The findings indicated that the internationalization of graduate education was positively affected by collaborative online international learning, research cooperation and the development of intercultural competence. Notwithstanding the implementation of virtual mobility, online exchange programs and the internationalization of the curriculum, the internationalization of graduate education was not affected directly. It appears that the aforementioned findings substantiated and validated the conclusions derived from the study pertaining to the second research question, with the exception of virtual mobility. The aforementioned findings may show that collaborative online international learning, research cooperation and intercultural competence development had a greater impact compared to virtual mobility, online exchange programs and the internationalization of the curriculum. Chinese universities may be renowned for their efforts in establishing a superior environment that encompasses all six aspects. However, it appears that the impact varies across these aspects. The efficacy of the internationalization of graduate education in China cannot be ascertained. However, it may be of benefit to contemplate the adoption of suitable tactics to guarantee that the influence of the six facets and other variables are relatively commensurate, thereby augmenting the degree of the internationalization of graduate education. Based on the findings, it seems that the efforts to internationalize Chinese graduate education may contribute to a new phase of development, one that has been facilitated mostly by collaborative online international learning, research cooperation and intercultural competence development. These results support the study of Bruhn-Zass (2021) [55], which revealed that virtual internationalization incorporates online and distance education (ODE) as an extra category. She also showed that including stakeholders in collaborative partnerships is essential for the successful digitalization of international education, alongside structural and curricular growth. These results support the study of Rajagopal et al. (2020) [26], which showed that

open virtual mobility supports learners' skills and competencies, which are intercultural skills and attitudes; networked learning; active self-regulated learner skills; media and digital literacy; autonomy-driven learning, interactive and collaborative learning in an authentic international environment and open-mindedness. Bruhn (2020) [58] outlined a model for virtual internationalization that considers curricula, international cooperation and distance learning as well as the roles of the university strategy, administration, management and teaching staff. Similarly, Woicolesco et al. (2022) [25] found that most universities in Brazil had hosted webinars, live streams, congresses, seminars or other online academic activities throughout the COVID-19 pandemic, many of which included academics and researchers from across the world. It can be posited that China is currently experiencing a comparable trend towards the internationalization of graduate education, akin to other nations and, undoubtedly, with heightened endeavors to optimize this process.

7. Conclusions and Implications

This study aimed to better understand teachers' experiences and perspectives toward using technology in the sustainable internationalization of graduate education in China and the aspects that are supported by technology as a part of the internationalization of graduate education in China. Regarding the sampling methodology employed in this study, it adhered to a systematic approach of selecting a subset of individuals or elements from a larger population with the intention of conducting research. Specifically, participants were chosen from universities situated in Wuhan City, the epicenter from which the COVID-19 outbreak originated. In this context, the results obtained from this study could potentially serve as a representation of the circumstances observed in other educational establishments within China. Based on the findings, the situation regarding graduate education internationalization in China is acceptable, while at the same time, support and more effort from the government and teachers are required. Chinese teachers have had a positive experience with the use of technology in internationalizing graduate education and they were extremely satisfied with the use of technology to facilitate online international collaboration, online exchange programs and research cooperation. In addition, teachers were less satisfied with the use of technology to promote virtual mobility, the internationalization of the curriculum and intercultural competence. This research provides a novel perspective on the role of technology in the internationalization of graduate education in China, which was previously unclear. This study has the potential to provide Chinese policymakers with insights into the efficacy of technology and the necessary steps for Chinese universities to achieve greater internationalization. This may enable policymakers to make better-informed decisions regarding the allocation of resources aimed at promoting the utilization of technology for enhancing the sustainable internationalization of graduate education. Additionally, the current investigation has contributed advanced research on the pressing subjects of education's sustainability and internationalization, which hold substantial importance for teachers, universities and governments globally. The findings of the current research may augment the comprehension of policymakers and educators regarding teachers' perspectives on the utilization of technology to achieve sustainable internationalization of graduate education. The suggestion was made that policymakers ought to incorporate the experiences and perspectives of teachers in their assessment of the state of internationalization in Chinese universities. This is because teachers possess a deep familiarity with universities and education and are therefore well-positioned to offer insightful and valuable recommendations for the advancement of universities and education. It is recommended to enhance the integration of technology in higher education institutions through inter-university partnerships on a global scale. Additionally, the development of standardized technology-based courses is suggested to facilitate their delivery. It is possible for the government to endorse cooperation between Chinese universities and their international counterparts as a means of augmenting student engagement in such endeavors, overseen by seasoned teachers. The aforementioned results indicated that there may be diverse approaches to designing policies and implementing practices for sustain-

able internationalization in graduate education through technology in the future. In order to enhance the interest and motivation of teachers, it is recommended that the government prioritize the development of sustainable internationalization training programs that are technology-based. Moreover, it is recommended that teachers enhance their involvement with technological applications, recognize their limitations and inadequacies in utilizing technology to promote sustainable global education at the graduate level and furnish the government with this knowledge to enable the government to streamline and administer the internationalization of graduate education more effectively.

8. Limitations and Future Research Directions

There were numerous limitations to this study. This research concentrated on a single user experience scale containing several items. These items may not provide an accurate or exhaustive portrayal of teachers' experiences with technology in internationalizing graduate education. To investigate additional experiences, future research could examine a wide variety of other measures or conduct qualitative investigations. This study also concentrated on the dimensions of the internationalization of graduate education, as derived from the literature. These dimensions may not provide a comprehensive picture of the internationalization activities, which are based on technology. Future research could entail additional aspects employing distinct scales or a qualitative investigation. The current investigation employed SPSS, JASP and SmartPLS 4 as tools for data analysis. However, it should be noted that SWOT analysis was not included in this study. Subsequent studies may utilize SWOT analysis as a means to facilitate a thorough investigation and augment comprehension of the topic at hand. In Wuhan, 806 university professors responded to the survey but this demographic does not reflect that of the professors at other Chinese universities. Therefore, caution must be exercised when extrapolating these results to the entirety of the teaching staff in Chinese universities. It is strongly recommended that future research include the recruitment of teachers and students from a wide range of institutions, given that the primary focus of this study was on teachers and students. The use of a singular research methodology throughout the survey did not contribute to the study's credibility. Divergent opinions exist regarding whether or not it completely and accurately represents the opinions of the participants. Future investigations on this subject would be more persuasive if they included interview data.

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Institutional Review Board Statement: This study was conducted in accordance with all the required ethical considerations and practices. The study was approved by the Research Ethics Committee of the College of Humanities, Wuhan University of Engineering Science.

Informed Consent Statement: Informed consent was gathered from all participating teachers. Confidentiality was maintained by not requesting names or any other information that would identify the participants involved and they were informed of their right to withdraw from the investigation at any time.

Data Availability Statement: Data will be made available on request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Questionnaire
Dear teachers,

This questionnaire is meant to collect information about your views and perceptions about using technology to internationalize graduate education at your university. Each item has some options. Please put a tick mark (✓) in the column that best represents your answer or response. The information you provide will be confidential and will strictly be used for the research purpose. I would be extremely grateful if you would give me some of your time by filling it out. Thank you very much for your help and cooperation.

Section One: Teachers' Experiences

According to your experience, do you think that using technology to internationalize graduate education at your university is:

	1	2	3	4	5	6	7	
annoying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable
not understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	understandable
creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	dull
easy to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	difficult to learn
valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	inferior
boring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	exciting
not interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting
unpredictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	predictable
fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	slow
inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	conventional
obstructive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	supportive
good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bad
complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy
unlikable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasing
usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cutting edge
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant
secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	not secure
motivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	demotivating
meets expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	does not meet expectations
inefficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	efficient
clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	confusing
impractical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	practical
organized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cluttered
attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unattractive
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unfriendly
conservative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	innovative

Section Two: Teachers' Perspectives

Dimension	Items	SD	D	N	A	SA
Online exchange programs	1. I think the exchange of programs with other institutions throughout the globe was performed well.					
	2. Technology enabled us to share material with program creators.					
	3. Technology made it possible to exchange programs quickly.					
	4. Technology assisted groups of program designers in determining the demands of each university's curriculum.					
	5. Technology helped arrange seminars with other teachers to examine program flaws and reproduce them by sharing experiences.					
Virtual mobility	6. Technology allows for cross-border online student cooperation that improves knowledge sharing.					
	7. Technology has increased students' access to platforms at other colleges.					
	8. Technology increases access for all students to other institutions' platforms and courses.					
	9. Virtual mobility is a more ecologically friendly option thanks to technology.					
Collaborative online international learning	10. By using technology, virtual mobility is more environmentally sustainable.					
	11. The utilization of technology enables both my students and myself to engage in international communication and collaboration with peers via online platforms.					
	12. The utilization of technology offers supplementary educational opportunities for students from China and other nations to engage in interactive and collaborative learning experiences, thereby fostering a sense of ownership over their academic pursuits.					
	13. The utilization of technology facilitates collaborative learning, which seeks to foster a sense of shared responsibility among students from China and other nations, thereby placing the onus of learning on the students themselves.					
	14. The utilization of technology enables students to engage in collaborative work with their peers, facilitating their role as the initiator and generator of novel insights throughout the iterative stages of research, interpretation, dissemination and adjustment.					
	15. The implementation of technology in education has the potential to enhance communication and facilitate a sustainable and affordable online learning experience that is accessible to a wider range of students, rather than being limited to a privileged few.					
	16. Students can use technology to accurately diagnose learning competencies as part of evaluation and assessment.					

Dimension	Items	SD	D	N	A	SA
Internationalization of curriculum	17. Technology enabled the sharing of pedagogical practices and educational exercises that encompass interventions aimed at facilitating the acquisition of competencies and understanding among students.					
	18. The utilization of technology facilitates a systematic collaboration with international educators to analyze potential challenges within the academic program for students.					
	19. The utilization of technology has facilitated the collaboration of culturally heterogeneous course/program teams, providing them with the chance to jointly assess and enhance educational curricula.					
	20. The utilization of technology has facilitated a diverse array of educational endeavors, including foreign language curricula.					
	21. The utilization of technology has facilitated a diverse array of initiatives that encompass curricula designed to specifically address the development of knowledge and competencies.					
	22. Teachers and students use social media to bridge the gap between local and nonlocal program content.					
	23. The utilization of technology has facilitated a wide array of initiatives, including curricula that result in joint or double degrees.					
Research cooperation	24. The utilization of technology enables academic personnel to participate in global conferences, encompassing cross-disciplinary and inter-professional gatherings.					
	25. The utilization of technology enables educators to conduct research and disseminate their findings, thereby facilitating the progress of academic inquiry and the implementation of practical reforms.					
	26. The utilization of technology enables individuals to engage in collaborative research endeavors on an international level, thereby creating prospects for mutually beneficial partnerships and the resolution of global challenges.					
	27. The online interactions between scientists and individuals from diverse nationalities and cultures are likely to yield novel ideas and advancements in problem-solving.					
	28. Technology supports research that spans national boundaries to be applied to a wide range of people and cultures.					
Intercultural competence development	29. The utilization of technology has expanded the possibilities for intercultural and transnational education.					
	30. The employment of technology has enabled a broad spectrum of endeavors that particularly target the cultivation of cross-cultural and intercultural proficiencies.					
	31. The integration of technology has facilitated global collaboration among students, enabling them to engage in academic pursuits without the need for cultural differences interruption.					
	32. Technology enables students to effectively and appropriately communicate and behave in intercultural situations.					
	33. The integration of technology has enabled a broad spectrum of endeavors that encompass a variety of components and actions, such as the assimilation of content from diverse cultures.					
	34. The integration of technology enables substantial communication among my students, myself and colleagues located in remote areas and possessing varying linguistic and cultural heritages.					

Dimension	Items	SD	D	N	A	SA
Internationalization of graduate education	35. It is easy for students to network with their counterparts in classrooms and universities situated in faraway nations					
	36. I have experienced a transition from isolation to interdependence and from connectivity to hyperconnectivity.					
	37. I am more involved in cooperation and networking with other teachers from other countries					

Gender: Male Female

Level: Assistant professor Associate professor Professor

Age:

29–34 years old

35–40 years old

41–45 years old

46 years and older

Thank you

References

- Ganassin, S.; Satar, M.; Regan, A. Virtual exchange for internationalization at home in China: Staff perspectives. *J. Virtual Exch.* **2021**, *4*, 95–116. [\[CrossRef\]](#)
- Lyu, T. Internationalization at Home: Implications for Promoting Intercultural Competence of Domestic Students in Chinese Universities. *Int. J. Educ. Cult. Soc.* **2022**, *7*, 95–99. [\[CrossRef\]](#)
- Robson, S.; Almeida, J.; Schartner, A. Internationalization at home: Time for review and development. *Eur. J. High. Educ.* **2018**, *8*, 19–35. [\[CrossRef\]](#)
- Xie, Y.; Boudouaia, A.; Xu, J.; AL-Qadri, A.H.; Khattala, A.; Li, Y.; Aung, Y.M. A Study on Teachers' Continuance Intention to Use Technology in English Instruction in Western China Junior Secondary Schools. *Sustainability* **2023**, *15*, 4307. [\[CrossRef\]](#)
- Guo, Y.; Guo, S.; Yochim, L.; Liu, X. Internationalization of Chinese Higher Education: Is It Westernization? *J. Stud. Int. Educ.* **2022**, *26*, 436–453. [\[CrossRef\]](#)
- Ke, H.; Junfeng, D.; Xiaojing, L. International students' university choice to study abroad in higher education and influencing factors analysis. *Front. Psychol.* **2022**, *13*, 1036569. [\[CrossRef\]](#)
- Chai, Y.; Huangfu, W.; Ning, H.; Zhao, D. A review of internet of things major education in china. In *Communications in Computer and Information Science*; Springer: Berlin/Heidelberg, Germany, 2019; Volume 1138. [\[CrossRef\]](#)
- Dai, Z.; Zhang, Q.; Zhu, X.; Zhao, L. A Comparative Study of Chinese and Foreign Research on the Internet of Things in Education: Bibliometric Analysis and Visualization. *IEEE Access* **2021**, *9*, 130127–130140. [\[CrossRef\]](#)
- Oda Abunamous, M.; Boudouaia, A.; Jebril, M.; Diafi, S.; Zreik, M. The decay of traditional education: A case study under COVID-19. *Cogent Educ.* **2022**, *9*, 2082116. [\[CrossRef\]](#)
- Beelen, J.; Jones, E. Redefining Internationalization at Home. In *The European Higher Education Area*; Springer: Berlin/Heidelberg, Germany, 2015. [\[CrossRef\]](#)
- Knight, J. *Internationalization of Higher Education: New Directions, New Challenges*; IAU: Paris, France, 2006.
- Tjulin, Å.; MacEachen, E.; Vinberg, S.; Selander, J.; Bigelow, P.; Larsson, R. Virtual Internationalization—We did it our way. *Högrel Utbild.* **2021**, *11*, 1–13. [\[CrossRef\]](#)
- Beelen, J.; Leask, B. *Internationalization at Home on the Move*; Dr. Josef Raabe: Berlin, Germany, 2011.
- Leask, B. *Internationalization of the Curriculum in Action: A Guide*; University of South Australia: Adelaide, Australia, 2012.
- Malcolm, M.P.; Roll, M.C. The impact of assistive technology services in post-secondary education for students with disabilities: Intervention outcomes, use-profiles, and user-experiences. *Assist. Technol.* **2016**, *29*, 91–98. [\[CrossRef\]](#)
- Mittelmeier, J.; Rienties, B.; Rogaten, J.; Gunter, A.; Raghuram, P. Internationalisation at a Distance and at Home: Academic and social adjustment in a South African distance learning context. *Int. J. Intercult. Relat.* **2019**, *72*, 1–12. [\[CrossRef\]](#)
- Amankwah-Amoah, J.; Khan, Z.; Wood, G.; Knight, G. COVID-19 and digitalization: The great acceleration. *J. Bus. Res.* **2021**, *136*, 602–611. [\[CrossRef\]](#)
- Deardorff, D.K.; Wit, H.D.; Heyl, J.D.; Adams, T. *The Sage Handbook of International Higher Education*; Sage: London, UK, 2012.
- Wihlborg, M.; Friberg, E.E.; Rose, K.M.; Eastham, L. Facilitating learning through an international virtual collaborative practice: A case study. *Nurse Educ. Today* **2018**, *61*, 3–8. [\[CrossRef\]](#)
- OECD. *Internationalizing the Curriculum in Higher Education*; OECD: Paris, France, 1996.
- Leask, B. *Internationalizing the Curriculum*; Routledge: Oxfordshire, UK, 2015.
- Simões, A.V.; Sangiamchit, C. Internationalization at Home: Enhancing Global Competencies in the EFL Classroom through International Online Collaboration. *Educ. Sci.* **2023**, *13*, 264. [\[CrossRef\]](#)

23. Pouromid, S. Towards multimodal interactions in the multilingual EFL classroom: Lessons from a COIL experience. *Indones. J. Appl. Linguist.* **2019**, *8*, 627–637. [\[CrossRef\]](#)
24. Garcia, F.; Smith, S.R.; Burger, A.; Helms, M. Increasing global mindset through collaborative online international learning (COIL): Internationalizing the undergraduate international business class. *J. Int. Educ. Bus.* **2023**, *16*, 184–203. [\[CrossRef\]](#)
25. Woicolesco, V.G.; Cassol-Silva, C.C.; Morosini, M. Internationalization at Home and Virtual: A Sustainable Model for Brazilian Higher Education. *J. Stud. Int. Educ.* **2022**, *26*, 222–239. [\[CrossRef\]](#)
26. Rajagopal, K.; Firsova, O.; de Beeck, I.O.; van der Stappen, E.; Stoyanov, S.; Henderikx, P.; Buchem, I. Learner skills in open virtual mobility. *Res. Learn. Technol.* **2020**, *28*, 2254. [\[CrossRef\]](#)
27. Tereseviciene, M.; Volungeviciene, A.; Dauksiene, E. Fostering Internationalisation in Higher Education by Virtual Mobility. *Acta Technol. Dubnicae* **2013**, *3*, 1–15. [\[CrossRef\]](#)
28. Kobzhev, A.; Bilotserkovets, M.; Fomenko, T.; Gubina, O.; Berestok, O.; Shcherbyna, Y. Measurement and Assessment of Virtual Internationalization Outcomes in Higher Agrarian Education. *Postmod. Open.* **2020**, *11* (Suppl. 1), 78–92. [\[CrossRef\]](#)
29. Zilberberg Oviedo, L.E.; Krimphove, J. Virtual exchange contributions to the development of intercultural competence: A Brazilian higher education institutions' perspective. *Actual. Investig. Educ.* **2022**, *22*, 312–336. [\[CrossRef\]](#)
30. Li, J.; Sun, X.; Dai, X.; Zhang, J.; Liu, B. Knowledge Map Analysis of Industry–University Research Cooperation Policy Research Based on CNKI and WOS Visualization in China. *Sustainability* **2022**, *14*, 7862. [\[CrossRef\]](#)
31. Li, J.; Xue, E. Exploring High-Quality Institutional Internationalization for Higher Education Sustainability in China: Evidence from Stakeholders. *Sustainability* **2022**, *14*, 7572. [\[CrossRef\]](#)
32. Guo, X.R.; Li, X.; Guo, Y.M. Mapping knowledge domain analysis in smart education research. *Sustainability* **2021**, *13*, 13234. [\[CrossRef\]](#)
33. Li, T.T.; Wang, K.; Sueyoshi, T.; Wang, D.D. Esg: Research progress and future prospects. *Sustainability* **2021**, *13*, 11663. [\[CrossRef\]](#)
34. Khmeleva, G.A.; Kurnikova, M.V.; Nedelka, E.; Tóth, B.I. Determinants of Sustainable Cross-Border Cooperation: A Structural Model for the Hungarian Context Using the PLS-SEM Methodology. *Sustainability* **2022**, *14*, 893. [\[CrossRef\]](#)
35. Yao, B. International Research Collaboration: Challenges and Opportunities. *J. Diagn. Med. Sonogr.* **2021**, *37*, 107–108. [\[CrossRef\]](#)
36. Deardorff, D. Identification and assessment of intercultural competence as a student outcome of internationalisation. *J. Stud. Int. Educ.* **2006**, *10*, 241–266. [\[CrossRef\]](#)
37. Safipour, J.; Wenneberg, S.; Hadziabdic, E. Experience of education in the international classroom—A systematic literature review. *J. Int. Stud.* **2017**, *7*, 806–824. [\[CrossRef\]](#)
38. Cheney, R.S. Intercultural business communication, international students, and experiential learning. *Bus. Commun. Q.* **2001**, *64*, 90–104.
39. Montgomery, C. A decade of internationalisation: Has it influenced students' views of cross-cultural group work at university? *J. Stud. Int. Educ.* **2009**, *13*, 256–270. [\[CrossRef\]](#)
40. Ng, K.Y.; Van Dyne, L.; Ang, S. From experience to experiential learning: Cultural intelligence as a learning capability for global leader development. *Acad. Manag. Learn. Educ.* **2009**, *8*, 511–526. [\[CrossRef\]](#)
41. Ghose, N. Enhancing global competitiveness through experiential learning: Insights into successful programming. *Am. J. Bus. Educ.* **2010**, *3*, 1–6. [\[CrossRef\]](#)
42. Leask, B. Using formal and informal curricula to improve interactions between home and international students. *J. Stud. Int. Educ.* **2009**, *13*, 205–221. [\[CrossRef\]](#)
43. Luxon, T.; Peelo, M. Internationalisation: Its implications for curriculum design and course development in UK higher education. *Innov. Educ. Teach. Int.* **2009**, *46*, 51–60. [\[CrossRef\]](#)
44. Bodycott, P.; Mak, A.S.; Ramburuth, P. Utilising an internationalised curriculum to enhance students' intercultural interaction, engagement and adaptation. *Asia Pac. Educ. Res.* **2014**, *23*, 635–643. [\[CrossRef\]](#)
45. Sanderson, G. A foundation for the internationalization of the academic self. *J. Stud. Int. Educ.* **2008**, *12*, 276–307. [\[CrossRef\]](#)
46. Hawanini, G. The internationalisation of higher education institutes. In *A Critical Review and a Radical Proposal (INSEAD Working Paper)*; Center for Management Resources: Paris, France, 2011.
47. Schrepp, M.; Thomaschewski, J. Design and Validation of a Framework for the Creation of User Experience Questionnaires. *Int. J. Interact. Multimed. Artif. Intell.* **2019**, *5*, 88. [\[CrossRef\]](#)
48. AL-Qadri, A.H.; Al-khresheh, M.H.; Boudouaia, A.; Bouflih, A. Language anxiety in an Algerian multilingual tertiary context. *Humanit. Soc. Sci. Commun.* **2023**, *10*, 90. [\[CrossRef\]](#)
49. AL-Qadri, A.H.; Zhao, W.; Li, M.; Al-khresheh, M.; Boudouaia, A. Emotional Intelligence Scale for International Students: A Proposal for a Developed Version. *Front. Educ.* **2022**, *7*, 853303. [\[CrossRef\]](#)
50. AL-Qadri, A.H.; Zhao, W.; Li, M.; Al-khresheh, M.H.; Boudouaia, A. The prevalence of the academic learning difficulties: An observation tool. *Heliyon* **2021**, *7*, E08164. [\[CrossRef\]](#) [\[PubMed\]](#)
51. Ličen, S.; Cassar, M.; Filomeno, L.; Yeratziotis, A.; Prosen, M. Development and Validation of an Evaluation Toolkit to Appraise eLearning Courses in Higher Education: A Pilot Study. *Sustainability* **2023**, *15*, 6361. [\[CrossRef\]](#)
52. Pan, H.-L.W. Learner-Centered Teaching Catalyzed by Teacher Learning Communities: The Mediating Role of Teacher Self-Efficacy and Collaborative Professional Learning. *Sustainability* **2023**, *15*, 4850. [\[CrossRef\]](#)
53. Ringle, C.M.; Wende, S.; Will, A. *SmartPLS 2.0 (M3) Beta*; University of Hamburg: Hamburg, Germany, 2005.
54. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E. *Multivariate Data Analysis*, 7th ed.; Pearson: Harlow, UK, 2014.

55. Heale, R.; Twycross, A. Validity and reliability in quantitative studies. *Evid. Based Nurs.* **2015**, *18*, 66–67. [[CrossRef](#)]
56. Leask, B.; Green, W. Is the Pandemic a Watershed for Internationalisation? University World News. 2020. Available online: <https://www.universityworldnews.com/post.php?story=20200501141641136> (accessed on 30 April 2023).
57. Guppy, N.; Verpoorten, D.; Boud, D.; Lin, L.; Tai, J.; Bartolic, S. The post-COVID-19 future of digital learning in higher education: Views from educators, students, and other professionals in six countries. *Br. J. Educ. Technol.* **2022**, *53*, 1750–1765. [[CrossRef](#)]
58. Bruhn, E. *Virtual Internationalization in Higher Education*. *Innovative University: Digital–International–Transformative*; Online Submission; Institute of Education Sciences: Washington, DC, USA, 2020.

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