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Students' Perceptions of Online Learning in the Post-COVID Era: A Focused Case from the Universities of Applied Sciences in China

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Abstract: Currently, while most universities around the world have returned to offline teaching, most universities in China are still using online teaching. In the current educational context, Chinese universities switch between online and offline teaching modes at any time depending on the epidemic situation in their city. This paper discusses students' perceptions of online learning in the post-COVID era in China. Based on the data collected from student questionnaires, the teaching and learning situation in the post-COVID era and student preferences for online learning are discussed. In addition to this, the statistics program JMP was used to perform the data analysis. The correlations among study characteristics, socio-economic factors, organisational and didactic design, and the acceptance and use of online learning are analysed. The results show that students spend more time in university courses in the post-COVID era than in previous academic years. Students prefer to study alone and at individual times that are set by themselves. Study characteristics and the socio-economic situation of the students are not related to the acceptance and usage behaviour of online learning. The organisational and didactic design of online learning is correlated with its acceptance. In the end, the reflection on opportunities for online learning in the post-COVID era is concluded.

Keywords: online learning; emergency remote teaching; post-COVID era; universities of applied sciences; student preference; China

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1. Introduction

For several decades, online learning has not received enough attention, especially at universities [1,2]. Although numerous virtual universities, such as open universities and distance teaching universities, already offer online learning, most ordinary universities prefer to offer face-to-face courses [3]. Since the 1990s, the widespread use of the internet has greatly promoted the development of online education and has had a potential impact on university teaching methods, resource allocation, and development strategies [4,5]. Since 2013, there has been an explosive growth of large-scale online courses [6].

In early 2020, various industries and sectors were affected by the massive global spread of COVID-19 [7]. For example, total urban traffic has seen a significant drop due to the impact of travel controls. The home quarantine policy has led to high growth in the size of transactions in the new retail industry. The rapid changes in the epidemic have led to large fluctuations in the psychological situation of the population [6]. Similarly, universities around the world have struggled to return to normal teaching and learning in the wake of the epidemic due to the excessive range of movement of people. This situation forced all universities to operate remotely and to put emergency remote teaching into practice [8]. University students and teachers have to use online learning as a supplement to traditional face-to-face teaching and learning [9]. To ensure the safety of students, the education authorities in each country have taken measures to ensure the normal teaching and learning process at universities, requiring them to rely on various online course

platforms and online learning spaces during the COVID-19 pandemic [10]. Universities have also asked students to postpone their return to university and engage with online teaching. In this case, students are studying online off-campus through platforms such as Zoom, Tencent Meeting, etc. [11]. As learning styles and learning environments change, so do students' choices of courses and attitudes towards learning. Students and faculty often found themselves logging onto Zoom or other platforms for the first time, with little knowledge of how to use virtual learning. As the COVID-19 pandemic eases, many universities are realising that well-planned online platforms will allow them to better serve students [12,13].

Online learning became the default in 2020. Nevertheless, remote learning via Zoom and Tencent Meeting is now used by the majority of universities [14]. However, a variety of new platforms and technologies have emerged in recent years, grounded in machine learning, artificial intelligence, etc. MOOC platforms such as Coursera and EdX use machine learning to automatically grade assignments and deliver adaptive content and exams by combining data from billions of course datapoints and tens of millions of students [15].

The need for online education is enormous and expanding quickly during the epidemic [16]. From 2016 to 2023, the online education industry is anticipated to expand at a 16.4% CAGR. In ten to fifteen years, it is possible that the teaching style in schools may alter due to the internet's rapid development. More and more students are favouring online learning [17]. However, few studies have involved the influencing factors of students' perceptions of the online learning situation during COVID-19, especially the students of universities of applied sciences. Higher education that emphasises applications is essential for a nation's development since it fosters employment and raises competitiveness [16]. Its potential to enhance learners' capacity to gain knowledge, develop skills, and express creativity is what gives it its distinctive worth [18–20].

In order to improve the understanding of the overall evaluation of online learning in the post-COVID era from the perspective of students of universities of applied sciences in China, it is necessary to identify which implicit and explicit factors are present in the research on online learning. This is a necessary first step towards having a robust debate about the influencing factors in online learning.

2. Theoretical Frameworks

Just as COVID-19 spread to many countries in 2020, the COVID-19 pandemic affected universities in these countries around the world. During lockdowns, university teachers have almost exclusively used digital tools to ensure the continuation of teaching and learning [7]. However, not all countries, universities, and students were equally affected. At this point, central aspects from the educational, sociological, and economical perspectives that influence online learning are presented. This includes various forms of the digital divide and other factors. The digital divide is a fundamental problem for online learning [21]. This approach is, in turn, influenced by other aspects such as socio-economic factors. At the beginning of the research on the digital divide, the focus was on access to the internet and digital media. Internet skills are addressed as a second digital divide [22,23].

2.1. The Expectation Confirmation Theory (ECT)

In 1980, Oliver proposed the expectancy disconfirmation theory (EDT). Before purchasing a product or service, users have certain expectations of it. After the product or service is actually used, the difference between the user's perceived performance and their expectations is known as expectation disconfirmation [24]. Expectancy confirmation theory (ECT) was developed based on EDT and provides an important basis for the study of sustained use by users [25]. Patterson et al. [26] were the first to apply ECT to information systems. Bhattacherjee [27] proposed the expectation confirmation model (ECM), which includes four main variables: expectation confirmation, perceived usefulness, satisfaction, and repurchase intention. After ECM was proposed, many academics confirmed the validity of the ECM. For example, Larsen et al. [28] examined mobile commerce us-

ing the ECM, Tang and Chiang [29] verifies the effectiveness of the ECM by examining blogs, Doong and Lai [30] examined knowledge sharing using the ECM, and Kim [31] explored the effectiveness of the ECM by examining mobile data services. Moreover, many academics have combined online learning with the ECM. Wang et al. [32] determined if online learning helps students accomplish learning activities during the pandemic and increases their motivation to continue utilising online learning in the future. In order to investigate the potential drivers of continuous learning willingness in a Massive Open Online Course (MOOC) environment, Hai et al. [33] developed and extended the ECM by including cognitive and emotional variables (including intrinsic motivation, attitude, and curiosity). Based on the foregoing literature, the ECM can be utilised to describe the impact of online learning on students' learning experiences.

2.2. The First and Second Digital Divides

The digital divide is also called Digital Gap or Digital Division; that is, the gap between the information-rich and the information-poor [34]. It was first proposed by the National Telecommunications and Information Administration (NTIA) in 1999 in a report titled "Falling Through the Net: Defining the Digital Divide Lost in the Network: Defining the Digital Divide". Subsequently, the digital divide was first formally proposed in a report entitled "Filling the Digital Divide", published by the United States in July 1999. In July 2000, the World Economic Forum (WEF) submitted a special report, "From the Global Digital Divide to the Global Digital Opportunity", to the G8 summit. As time goes by, the digital divide has received more and more attention [35–38].

In all countries, there are always some people who have better information technology provided by society. They have computers, good telephone services, and fast internet services. There are also some people who, for various reasons, cannot access the latest computers, reliable telephone services, or fast and convenient internet services. The difference between these two groups of people is the digital divide [39]. Being on the negative side of this divide means that they have few opportunities to participate in the new information-based economy and there are few opportunities to participate in online education, training, shopping, entertainment, and communication. The differences caused by the digital divide are mainly reflected in different classes, races, industries, ages, genders, generations, and educational backgrounds [40].

The first digital divide is related to computer ownership and internet access [41]. In the 1990s, many poor people could not afford computers and had no access to the internet at home. As time goes by, computer prices decreased gradually and most families bought computers. Therefore, the first digital divide became smaller than before.

The second digital divide is about computer use. Many studies show that not all students have equal computer use at university and at home [42]. There are differences between urban and rural students. Different income levels and educational backgrounds are causes of the second digital divide, too. The second digital divide was first proposed by Hargittai [20]. He emphasised that online skills play an important role in the digital divide. It is not only important to gain access to digital media, but also the ability to find and process useful information. Recent studies expand the approach of Hargittai and argue that not only is access to digital media unevenly distributed but that there are differences in the quality and intensity of use [43]. They conclude that the use of digital media is strongly related to the initial conditions of the users and their social context in real life [23].

By now many studies have illuminated the consequences of digital inequalities for many different offline activities [44]. To date, the recent developments in online learning have been seen as potentially positive disruptions to higher education, but have failed to move higher education away from business as usual [21]. Online learning was thought to be a game-changer for higher education, especially regarding access to knowledge. At universities, taking a course online is now normal. The digital divide between rich and poor is an expression of class inequality. Online learning has failed to nudge elite universities in

a direction that will ultimately narrow global wealth gaps. Thus, the matter of the digital divide is very crucial.

2.3. Online Learning at Universities of Applied Sciences

Online learning is defined as the provision and use of learning material by using electronic media and is a collective term for all forms of media-based learning that integrate multimedia and communicative technologies [45,46]. The phrase "online learning" was originally used in 1995 when Web CT, the first Learning Management System (LMS), subsequently known as Blackboard, was created. Online learning then meant using LMS or posting text and PDF files online. Since then, there have been numerous names associated with online learning, including e-learning, blended learning, online education, online courses, etc. Students learn in a traditional classroom by listening to the teacher and conversing with their classmates. These classes are normally scheduled at a specified time and place. However, with online learning, students may be anywhere in the world and still receive the same high-quality instruction as if they were in the classroom [5]. Online learning is usually done via the internet as a series of courses that students can access at any time and from any location [47]. Students who desire to gain new skills or educate themselves can benefit from online learning. Although many people still believe that traditional institutions are the better method for learning, online learning has been shown to be an excellent substitute or supplement [48].

The following are some advantages of online learning: (i) The total costs are lower. Online programs might be less expensive than traditional learning institutions. (ii) Students learning online already have access to a wide range of courses and instructors from which to choose. Students can discover online learning courses or programs in a variety of subjects. (iii) Commuting or relocating can be avoided. By learning online, students can save money on travel and living expenditures, as well as commute time. (iv) Convenience and flexibility. Students have access to all resources at any time, allowing them to learn wherever they are and at their own pace. (v) Instant feedback and outcomes. (vi) Access to good teachers. In any field of study, there are only a few professionals. If the constraints of geography are removed, expertise can travel to any location. This shift makes highly specialised material more accessible to a wider audience [49].

However, the majority of students continue to take traditional classes. As opposed to traditional classroom education, there are still a few disadvantages to online learning. The students need to be self-disciplined. Because online courses are inexpensive, students are less motivated to complete them, and only a small percentage of students complete them. Aside from the cost, few of these online courses are accredited, which further reduces the incentive to complete them. Online courses require good time-management skills to complete the course and lack the social aspect of regular classes [47,50].

Online learning is considered a central component and essential key for innovative university teaching [51,52]. For this reason, universities are increasingly relying on digital formats for learning as part of their training and further education. Many studies showed that online learning is available at a large number of universities, but these can vary considerably depending on the type, sponsorship, and size of the universities [53,54]. In recent years, online learning has been developed, tested, and used many times at universities of applied sciences [55]. In the last few decades, attempts have been made to promote the growth of online learning through a series of funding programs [56,57]. The advantages of using new educational technologies in university teaching are seen primarily in the development of new student groups through increased student flexibility in terms of time and space, financial savings, increased international competitiveness, and improved quality of university teaching [57]. Nevertheless, it must be pointed out that until today, the widespread use of media-based teaching in universities has not come true [52,58]. The dissemination of online learning in university teaching continues to face challenges, including in the areas of technological equipment, acceptance and willingness to innovate, legal management, and curricular integration [55,59].

Due to the COVID-19 pandemic, all educational institutions, including universities, were forced to switch to online teaching [11]. Previous teaching and learning formats had to be implemented exclusively online at short notice, which posed hurdles for many universities, teachers, and students [60]. Instead of a well-planned digital transformation, both students and teachers were confronted with many innovations and requirements within a very short period [61].

In recent years, universities of applied sciences have become a significant part of higher education. Unlike academic universities, universities of applied sciences generally have subjects in engineering, technology, agriculture and forestry, economics, finance, business administration, design, and nursing. The subjects are derived from the practice and there are usually no humanities subjects. The curriculum and its contents, apart from the necessary basic theories, are mostly application-oriented, with a fine classification of professions and a compact teaching schedule, focusing on training and improving students' independent learning and practical hands-on skills [61]. Therefore, online learning at universities of applied sciences faces even greater challenges [60].

The teaching aim of universities of applied sciences is to meet the special needs of the industry, and set up subjects and courses mainly for the industry. It needs cooperation between universities of applied sciences and industry. One aim of this study is to sketch a picture of teaching and learning during the 2021–2022 academic year, from the perspective of the students of universities of applied sciences, and to identify factors that influence studying. Above all, currently relevant needs and recommendations for action for the design of university teaching are to be derived. It is therefore important to uncover relevant criteria for a successful and sustainable anchoring of online teaching and learning in universities of applied sciences. It is of interest to what extent the students of universities of applied sciences accepted and used online teaching and learning formats during the 2021–2022 academic year and which factors influenced them.

3. Methodology

3.1. Research Questions and Hypotheses

From the perspective of the students of universities of applied sciences, central conditions are to be identified that are necessary for the success of online learning [41,42]. Knowledge of such conditions for success is currently of enormous importance to enable all students to study in classes that can only take place online and to design them to be of high quality. It is important to research the background of a lack of student acceptance and low usage rates of online learning in universities of applied sciences [62,63]. In summary, it can be said that the use of online learning as an innovation in the field of education is confronted with various hurdles.

The aim of this paper is, therefore, firstly to provide a description of the teaching and learning situation in the post-COVID era in China. The investigated question is whether the COVID-19 pandemic has already caused changes in university teaching at this point. Second, the paper tries to understand the willingness, acceptance, and use of online learning from the perspective of the students of universities of applied sciences in China. As a result, the following research questions were examined in more detail in this study. How did the students evaluate the post-COVID era, which was still influenced by the COVID-19 pandemic? What are the conditions for the success of online learning from the students' perspectives? What suggestions can be made for universities of applied sciences in China?

A hypothesis is a statement of fact, or a concept that is made for the sake of debate and then evaluated to see if it is correct [64]. Apart from a basic background assessment, the hypothesis is established using the scientific method before any relevant research is conducted [65]. The following hypotheses result from the literature review [48,66,67] and research questions: During the post-COVID era, more time was spent on university courses than in previous academic years (H1). Students prefer asynchronous online learning formats over synchronous ones (H2). Students prefer to study at specific times set by the teacher than at individual times set by themselves (H3). Students prefer to study

alone than in groups (H4). Study characteristics are related to the acceptance and usage behaviour of online learning formats (H5). The socio-economic situation of students is related to the acceptance and usage behaviour of online learning formats (H6). The better the organisational design of online learning, the higher the acceptance and use by students (H7). The better the didactic design of online learning, the higher the acceptance and use by students (H8).

3.2. Quantitative Analysis

Quantitative methods were used to test the hypotheses of the study [68–72]. Students of a university of applied sciences in China were asked to fill out an online questionnaire and the questionnaire is anonymous. The reason to choose this university is that this is one of the top universities of applied sciences in China and during and after COVID-19, student engagement in online learning and student performance at this university are typical in comparison with other universities. The survey was delivered at a university of applied sciences in China from January to March 2022. In this study, a sample of students from three major fields (Natural Sciences, Social Sciences, and Humanities) was selected for the survey using a random-type sampling method. The questionnaires consisted of closed and open questions with different response formats. In addition to descriptive features, the teaching and learning situation in the post-COVID era and student preference for online learning were examined. In addition, the extent to which there are connections between the aspects of the socio-economic situation of the students, didactic design, organisational design as well as study characteristics, and student acceptance and usage behaviour of online learning were examined. The response format for this questionnaire was a five-point Likert scale from strongly disagree to strongly agree. In this study, a self-administered questionnaire was developed to investigate the students' evaluation (see Appendix A). It consists of 11 items. All items were measured by using a five-point Likert scale ranging from 1—very dissatisfied to 5—very satisfied. We developed the five-point Likert-type scale based on Jashapara and Liaw's scales [73,74]. The name of the five-point Likert-type scale applied is "Students' perceptions of online learning in the post-COVID era". The reliability of variables is evaluated using Cronbach's alpha test. This study used the statistics program JMP (SAS JMP Statistical Discovery Pro 16) for data processing and obtained Cronbach's alpha of the questionnaire as 0.864, indicating that the questionnaire had good reliability. Validity is the degree to which a measurement instrument or tool accurately reflects the characteristics or function of a thing, and reflects the validity of the measurement instrument. It is divided into three types, content validity, structural validity, and validity associated with validity criteria. This study used a structural validity test, and the method used for structural validity analysis was factor analysis. The examination of the exploratory factor analysis revealed that the self-efficacy subscales contained questions that loaded between 0.625 and 0.832 on each factor for each dimension, with an explanatory variance of 71.3%. Therefore, the scales in this study all have good structural validity.

4. Results

In this part, the descriptive parameters of the sample are first described. The teaching and learning situation and the student preference for online learning in the post-COVID era are then presented. At the end, the assumed relationships between the acceptance and use of online learning and various influential factors are discussed.

4.1. Characteristics of the Sample

A survey conducted by UNESCO on the impact of the COVID-19 epidemic on higher education shows that the main impact of the COVID-19 pandemic on teaching and learning has been the increase in online education, with blended learning models having become the most popular format. The case study university is one of the top universities of applied sciences in China. It is located in East China. With around 13,000 students enrolled at this university, a total of 480 questionnaires were distributed, 476 of which were returned. Before

the pandemic, this university adopted face-to-face teaching and learning and sometimes used blended learning. With the massive global spread of COVID-19, the case study university had to fully adopt online learning by using platforms such as Zoom, Tencent Meeting, etc.

In this study, 476 students completed the questionnaires. A total of 72.7% of the students are male and 27.3% female, which is the usual gender distribution in universities of applied sciences; 33.2% of the respondents were sophomores, 28.6% juniors, 21.0% seniors, and 17.2% freshmen. Most of the respondents major in Natural Sciences (68.1%), while only 14.3% of the respondents major in Social Sciences and 17.6% in Humanities (see Table 1).

Table 1. Characteristics of the sample.

Characteristic	Group	*F*	%
Gender	1—Male	346	72.7
	2—Female	130	27.3
Grade	1—Freshman	82	17.2
	2—Sophomore	158	33.2
	3—Junior	136	28.6
	4—Senior	100	21.0
Major field	1—Natural Sciences	324	68.1
	2—Social Sciences	68	14.3
	3—Humanities	84	17.6

4.2. The Teaching and Learning Situation in the Post-COVID Era

Student evaluations of the teaching and learning situation in the post-COVID era were analysed. It was hardly possible to calculate inferential statistical methods to adequately test the hypotheses. Therefore, the following part of the results is limited to descriptive frequencies.

Many students found that their learning processes were more self-directed and flexible than in previous academic years. The teaching often took place asynchronously. H1 postulated that more time was spent on university courses than in the previous academic years. A total of 61% of the respondents stated that they had spent more time than usual, 28% said no, and another 11% could not assess this. The results show that more time was spent on university courses than in the previous academic years ($r = 0.42$, $p = 0.02$). Therefore, H1 is true (see Table 2).

Table 2. Summary of the hypothesis tests.

Hypothesis	Correlation Coefficient	*p*	Results
H1	0.42	0.02	Accepted
H2	0.05	0.19	Rejected
H3	0.04	0.22	Rejected
H4	0.49	0.03	Accepted
H5	0.03	0.21	Rejected
H6	0.59	0.02	Accepted
H7	0.63	0.01	Accepted
H8	0.51	0.04	Accepted

It was also criticised that students have fewer interactive behaviours than usual because of online learning. Online learning can be understood as the process of using the internet to obtain learning materials, interact with learning content, teachers, and other learners, gain knowledge, obtain support, and grow from the learning experience [69]. The study of learning behaviours helps to distinguish the commonalities and differences between learner groups and individuals. Interactive behaviour is a very important part of the teaching process. Arbaugh [72] found that the higher the degree of student–student

interaction and teacher–student interaction in online teaching, the better the student's academic performance. According to the students' opinions, virtual communication only worked perfectly for 4%, predominantly for 15%, partially for 29%, hardly at all for 41%, and not at all as well for 11% as it usually did when present. In addition, new digital tools have been used by students. This particularly includes video conference tools, whereby Zoom seems to have convinced the most. Overall, 59% of the respondents are completely or predominantly of the opinion that digital tools support them in learning, 38% partially, and 3% hardly or not at all.

4.3. Student Preference for Online Learning

It was assumed that students prefer asynchronous online learning formats over synchronous ones (H2). While 21% consider synchronous online learning to be more effective, a further 17% prefer asynchronous online learning and 62% consider both to be equally effective. It was assumed that students prefer to study at specific times than at individual times (H3). In this regard, 32% report preferring to learn at specific times set by the teachers, while 68% prefer to study at individual times that are set by themselves. A total of 79% of students prefer to study alone, while 21% said they prefer to study in groups. Students prefer to study alone rather than in groups ($r = 0.49$, $p = 0.03$).

The relationship between the acceptance and use of online learning was also calculated. There is a significantly positive correlation between the acceptance and the frequency of the use of online learning ($r = 0.51$, $p = 0.03$). Students who have a positive view of online learning use such formats more frequently.

4.4. Study Characteristics and Socio-Economic Factors

In this study, the assumed relationship between study characteristics and the acceptance and use of online learning could not be confirmed ($r = 0.03$, $p = 0.21$). Neither of the variables shows a significant correlation with the acceptance of online learning.

Also, hardly any significant correlations could be found between parameters of the socio-economic situation of the surveyed students and the acceptance and usage behaviour of online learning. On the other hand, access to stable internet seems to play a decisive role. Those who have a stable internet connection are more likely to accept online learning ($r = 0.59$, $p = 0.02$).

4.5. Organisational and Didactic Design

The organisation and implementation of online learning is a fundamental tool to guarantee maximum learning outcomes in the limited time available to students in these special times. Based on the teacher's perspective, improving teachers' teaching methods, adjusting teaching status, stimulating students' independent learning, organising and implementing online teaching, and achieving efficient teaching could help students to learn effectively online with clear objectives, reduce students' learning pressure, improve the effectiveness of online learning, and enhance the quality of learning.

The better the organisational design of online learning, the higher its acceptance ($r = 0.63$, $p = 0.01$). Problem-oriented support and the absence of technical difficulties are consequently related to increased acceptance. If there was a need for support, 13% of the respondents felt the support was complete, 39% predominantly, 26% partially, and 21% thought it was hardly as competent. A total of 59% of the respondents hardly have technical difficulties, 30% partially, and 11% have more technical difficulties.

The didactic design of online learning is also correlated with its acceptance ($r = 0.51$, $p = 0.04$). The better the didactic design of online learning, the higher its acceptance. A total of 29% of the respondents rated the teaching and learning content as completely didactically well-prepared and understandable, 26% as predominantly, 43% as partially, and 2% as hardly. Exercises were completely available for 37%, predominantly for 23%, partially for 31%, and barely sufficient for 9%. Constructive feedback from teachers was

complete for 18%, predominant for 23%, partial for 35%, hardly at all for 18%, and not at all for 6%.

In addition, there is a positive relationship between the organisational and didactic design itself with high significance (r = 0.69, p = 0.01). If the organisational design is successful, the didactic design is just as well thought out and rated positively.

5. Discussion

The massive disruption to education triggered by the COVID-19 epidemic has exposed the vulnerability of education systems and the lack of preparedness for the future on a global scale. As universities close and reopen, millions of students are being excluded from education systems due to the significant digital divide. With approximately half of the world's population (around 3.6 billion) still without access to the internet, due to reasons such as the lack of online learning policies or the equipment needed to connect to the internet at home, connectivity has become a key factor in guaranteeing students' right to education. From the findings of this study, it is clear that online learning can not only help universities of applied sciences in China to complement the courses they cannot offer, but also meet the needs of students to study at home or to take or retake certain courses. However, it is worth noting that online learning in the context of the epidemic has also revealed some issues of concern, such as the fact that online learning is less likely to guarantee student motivation than offline classes, and that the effectiveness of teaching and learning needs to be improved.

This study aimed to outline the current teaching and learning situation at universities of applied sciences in China, which was influenced by the COVID-19 pandemic. Some students were asked to fill out the online questionnaire. It can be seen from the findings that most students have mobile devices, especially smartphones. Two-thirds of students have a stable internet connection in their place of residence. Technically, they almost have no problems studying online.

In addition, the post-COVID era seems to have presented a challenge from students' perspectives. This assumption is confirmed by the finding that 61% stated that they had spent more time on university courses than usual. Furthermore, the students seem to lack exchanges with other students and teachers. Communication and cooperation were therefore presumably not entirely successful in the post-COVID era. In subsequent academic years, teachers should create more impetus for discussion and cooperation. In this regard, teachers should be familiar with suitable digital methods and tools, and be willing to participate and innovate in online teaching and learning. Students seem to be able to get used to digital tools well.

This study also analysed student preference for online learning. Most students consider both synchronous online learning and asynchronous online learning to be equally effective. Students prefer to study alone and at individual times that are set by themselves. There are many known inter-individual differences in learning behaviour between students. However, the COVID-19 pandemic forced teachers to digitise their teaching [11]. The aim of imparting the same learning content to students and achieving the same teaching and learning goals as in the previous academic years was mostly the focus of teachers. The difficulties faced by students were ignored. In the future, different requirements and needs for online learning should be identified on an individual basis and appropriate measures should be established.

Another aim of this study was the analysis of factors that influence the acceptance and use of online learning by students. This study showed hardly any connections between socio-economic factors and study characteristics with the acceptance and use of online learning. Only access to stable internet correlated positively with student acceptance. Significant positive relationships could be demonstrated between acceptance and organisational and didactic design. Based on this finding, teachers should take organisational and didactic design into account and improve online teaching skills.

In addition, we can see from the findings that the education system, in general, is unprepared for online learning. As a response to the global education crisis, emergency remote teaching (ERT) has been put into practice [75]. Courses delivered online in reaction to a catastrophe or tragedy are significantly different from well-planned online learning experiences. When analysing this emergency remote teaching, universities attempting to preserve education during and after the COVID-19 pandemic should be aware of the differences. For decades, researchers have researched online education, including online teaching and learning. Quality online learning, online teaching, and online course design are the subject of numerous research papers, theories, models, standards, and evaluation criteria. According to studies, efficient online learning is the result of meticulous instructional design and planning, as well as the use of a systematic design and development process. The quality of the teaching is influenced by the design process and the thorough evaluation of various design options. In most circumstances, during these emergency shifts, this meticulous design process will be missing.

6. Conclusions

This study discusses online learning in the post-COVID era in China. According to the data analysis results, students spent more time in university courses in the post-COVID era than in the previous academic years. Students prefer to study alone and at individual times that are set by themselves. Study characteristics and the socio-economic situation of the students are not related to the acceptance and usage behaviour of online learning. The organisational and didactic design of online learning is correlated with its acceptance.

Emergency remote teaching is a temporary change in instructional delivery to an alternate delivery channel owing to crisis conditions, as opposed to experiences that are planned from the start and designed to be online. It entails the use of entirely remote teaching solutions for instruction or education that would ordinarily be offered face-to-face or as blended or hybrid courses, with the intention of returning to that format after the crisis or emergency has passed. The major goal in these situations is to give temporary access to instruction and instructional aids in a way that is easy to put up and reliable during an emergency or crisis, rather than to re-create a comprehensive educational ecosystem. Online emergency remote teaching involves more than uploading educational content; rather, it is a learning process that provides learners flexibility and choice [8]. In post-COVID higher education, online learning under the circumstance of emergency remote teaching will play a significant role in universities of applied sciences.

The process of change that has picked up speed due to the COVID-19 pandemic can only succeed in the long term through the cooperation of students, teachers, and universities. If universities of applied sciences in China hope to have sustainable teaching and learning, it requires active cooperation and willingness to innovate. Online learning would not only be a supplement to face-to-face teaching and learning but also be equally important.

7. Limitations and Future Research Directions

COVID-19 has posed some particular issues for higher education institutions in China. Everyone involved in the university's sudden shift to online learning must recognise that these crises also cause disturbances in the lives of students, staff, and teachers. Online teaching and learning are complex educational activities. To effectively integrate information technology into the teaching process requires the creation of universities, teachers, and students. The main purpose of this study is not to prove that online and offline learning are homogenous and equivalent, but to provide suggestions for continuous improvement from good to better learning. It needs to be pointed out that the questionnaire determines that its data comes from student evaluation. In terms of judging the learning effect, more evidence, such as process management, needs to be considered. In follow-up research, it is necessary to further integrate subjective and objective data and conduct more comprehensive investigations.

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Appendix A. Evaluation Questionnaire (Likert-Type Survey)

Item	Definition
Q1	Gender
Q2	Grade
Q3	Major field
Q4	I spent more time on university courses than in the previous academic years.
Q5	I prefer asynchronous online learning formats over synchronous ones.
Q6	I prefer to study at specific times set by the teacher than at individual times that are set by myself.
Q7	I prefer to study alone than in groups.
Q8	Study characteristics are related to the acceptance and usage behaviour of online learning formats.
Q9	The socio-economic situation of students is related to the acceptance and usage behaviour of online learning formats.
Q10	The better the organisational design of online learning, the higher the acceptance and use by students.
Q11	The better the didactic design of online learning, the higher the acceptance and use by students.

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