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Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Journal of Hospitality, Leisure, Sport & Tourism Education

journal homepage: www.elsevier.com/locate/jhlste

Determining the attributes that influence students' online learning satisfaction during COVID-19 pandemic

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ARTICLE INFO

Keywords:

Tourism and hospitality students
Online learning
COVID-19 disruptions
Attributes
Satisfaction
Macau

ABSTRACT

The inevitable disruptions caused by COVID-19 in the hospitality and tourism education sector have made online learning a necessity rather than an option. This study employs the user experience questionnaire (UEQ) to examine students' online learning experiences specifically in the context of COVID-19. Data collection involved a Qualtrics online survey with a convenience sample of 216 tourism and hospitality students in Macau. Overall, results point to a generally positive appraisal of online attributes, but satisfaction is marginal. Initial principal component analysis generated three orthogonal factors of online learning attributes: "Perspicuity and dependability"; "Stimulation and attractiveness"; and "Usability and innovation". Further regression analysis reveals that "Stimulation and attractiveness" is the strongest predictor of the students' satisfaction regarding online learning during the COVID-19 disruptions. This novel finding points to the need for hospitality and tourism education institutions to develop an attractive and motivating visual environment for online course delivery since a stimulating online learning atmosphere is crucial in the context of the pedagogical disruptions caused by COVID-19. Nonetheless, these findings are specific to Chinese students and reflect their learning satisfaction which may differ in other contexts.

1. Introduction

The COVID-19 outbreak has disrupted the global educational system and hospitality and tourism education is no exception (Rapanta, Botturi, Goodyear, Guàrdia, & Koole, 2020; Tavitiyaman, Ren, & Fung, 2021). With the continuous rise of cases (Worldometer, 2020), its attendant impact of shutting down of schools coupled with several quarantines and social distancing measures to slow down the outbreak, it became an urgent imperative to "move online" (WHO, 2020). Such movement has forced global higher education into "non-traditional" learning settings including online teaching and learning as a response to the pandemic crisis. As a Special Administrative Region of the People's Republic of China, Macau higher educational institutions moved online to ensure the continuance of their educational activities and to reduce the negative impacts of closures (Muthuprasad, Aiswarya, Aditya, & Jha, 2021). Nonetheless, questions about the specific online attributes such as ease of use, attractiveness, practicality, and efficiency that

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<https://doi.org/10.1016/j.jhlste.2021.100364>

Received 19 March 2021; Received in revised form 19 November 2021; Accepted 22 November 2021

Available online 24 November 2021

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have a significant impact on their learning satisfaction have received limited academic inquiry particularly in hospitality and tourism education where theory and practice remains an important component of student's learning experience and satisfaction (Chen, Peng, Yin, Rong, Yang, & Cong, 2020; Dhawan, 2020; Wang, Liu, & Su, 2021).

Online teaching and learning are designed with specific pedagogical content attributes which students who deliberately choose ahead of time are oriented to know what to expect in the online classroom (Fortune, Spielman, & Pangelinan, 2011; Gopal, Singh, & Aggarwal, 2021, pp. 1–25; Muthuprasad et al., 2021). Nonetheless, given the unexpected and unpreparedness of many higher educational institutions, many students were forced to adapt to this sudden change (Rapanta et al., 2020). The unexpected change from the traditional pedagogical approach to non-traditional approaches as a response to COVID-19 meant many students did not know what to expect (Chen et al., 2020), and as a result, improving their satisfaction would require understanding their evaluation of experiences with the online learning platform. For the most part, since online learning environments are characterized by a myriad of pedagogical practice that involves active student-centered techniques (Keengwe & Kidd, 2010), students' cognitive and affective experiences are critical to improving learning performance. Given the unprecedented nature of COVID-19 (Sigala, 2020), it is surprising, however, that current research has given limited attention to attributes that influence students' online learning satisfaction.

Recent online teaching and learning studies during the pandemic point to the growing research interest in instructional strategies of online teaching (Bao, 2020b), teaching facilitation (Rapanta et al., 2020), educational resources, practices, and policies (Huang, Tili, Chang, Zhang, Nascimbeni et al., 2020; Zhang, Wang, Yang, & Wang, 2020) and COVID-19 lockdown impact on student learning (Kapasia et al., 2020). But, relatively few studies have been conducted to assess the attribute of an online learning experience (Dziuban et al., 2015; Mejia, 2020; Sciarini, Beck, & Seaman, 2012) and satisfaction (Bao, 2020; Elshami et al., 2021; Elumalai et al., 2021, p. 189; Ho, Cheong, & Weldon, 2021). For the most part, even fewer studies have attempted to identify the dimensions that contribute to hospitality and tourism students' satisfaction with online learning before COVID-19 (Andalecio et al., 2020; Goh & Wen, 2020; Hsu, Xiao, & Chen, 2017) and the failure to determine student online satisfaction among tourism and hospitality students during COVID-19 pandemic is omnipresent. For example, Wang et al. (2021) argue that the success of students' willingness to use and accept online learning is key to their continuous intention. Hence, they employed both expectation confirmation theory, and an extended task-technology fit to investigate the continuance intention to demonstrate that confirmation and perceived usefulness influenced satisfaction and continuous intention among Chinese college students. Similarly, studies among agricultural students' preference and perception of online classes show a high preference for online learning as a means of coping with COVID-19 lock-down. While these studies tangentially address students' satisfaction, they do not explain what attributes matter to hospitality and tourism education students whose needs and experiences differ from those of general college students (Patiar et al., 2021; Hussien & La Lopa, 2018).

Meanwhile, Gopal et al. (2021) argue that scant research attention exists on students' satisfaction and performance of online learning during COVID-19. This lack of attention extends to the current hospitality and tourism literature as a result of two plausible reasons. First, due to the "growth-obsession" of the tourism and hospitality industry (Higgins-Desbiolles, 2018), there has been a lack of research interest in the educational sector in comparison to the business sector which emphasizes financial losses and survival strategies during the COVID-19 pandemic (e.g., Chang, McAleer, & Wong, 2020; Nepal, 2020). Second, along with such business sector orientation, immense attention is given to the impact of COVID-19 on tourism and hospitality firms, customers, and the workforce (e.g., Alonso et al., 2020; Filimonau, Derqui, & Matute, 2020; Hao, Xiao, & Chon, 2020; Huang, Makridis, Baker, Medeiros, & Guo, 2020). The bulk of thematic areas that were advertised for journal calls for papers and research give further evidence to the neglect of the education sector (see *Travel & Tourism Transformed*, 2020). A recent stream of limited studies during the pandemic period identifies the pros and cons of Massive Open Online Course, Small Private Online Course and live broadcasting as responsive measures taken by Nankai University to address the negative impacts of the COVID-19 pandemic on hospitality, and tourism education (Qiu, Li, & Li, 2020, p. 100288). Additional studies among hospitality and tourism management students enrolled in online studies in Hong Kong suggest that a lower level of learning and financial anxiety enhances students perceived online learning and subsequently improves their satisfaction (Tavitiyaman et al., 2021). However, the specific attributes of the e-learning that trigger satisfaction during an emotionally challenging time such as COVID-19 remain unknown. This leads to our research question of interest: What online attributes determine students' satisfaction among hospitality and tourism students during COVID-19? We set out two main objectives for this study: (1) To identify the factors that influence online learning satisfaction; and (2) To examine the relationship between the identified factors and online learning satisfaction among hospitality and tourism students during the COVID-19 pandemic.

This study is based on Chinese students' online learning experiences at the Macau University of Sciences and Technology (MUST). It targets both undergraduates and post-graduate students at the Faculty of Hospitality and Tourism Management studying different subjects via Zoom online learning platforms during the COVID-19 pandemic based on the user experience questionnaire (UEQ). A quantitative approach is used to survey students via Qualtrics. Results point to three main factors that determine students' online learning satisfaction which is different from those identified in previous studies (e.g., Elshami et al., 2021; Elumalai et al., 2021, p. 189; Ho et al., 2021). The rest of the paper reviews the literature on COVID-19 disruptions in hospitality and tourism education with further discussion of existing studies on online learning attributes and satisfaction. The review is followed by the study methods which provide a reflexive account of the quantitative approach employed and data collection methods. The method section is followed by the results and discussion where both theoretical and practical implications are drawn.

2. Literature review

This section discusses thematic issues on COVID-19 as well as online learning and satisfaction in hospitality and tourism education. An initial focus is placed on the disruptive nature of COVID-19 on hospitality and tourism education, and this sets the stage for a thorough examination of the literature on the attributes that inform online learning and satisfaction. Further details on these topics are

discussed below.

2.1. COVID-19 disruptions in hospitality, and tourism education

A strain of pneumonia-like cases emanating from an unidentified etiology was reported by health authorities in Wuhan, China in December 2019. Since then, medical examinations have identified this strain of disease as the novel coronavirus or COVID-19. Given its lethal and rapid-spreading nature, the World Health Organization (WHO) declared COVID-19 as a public health concern in January and subsequently a pandemic in March 2020. Since the outbreak of this pandemic, many sectors of the global economy have seen a massive decline in their performance (Fetzer, Hensel, Hermle, & Roth, 2020; Nicola et al., 2020). In particular, the hospitality and tourism industry as well as the global education sector, have arguably been the hardest hit as many educational institutions have been made to close down to flatten the curve and reduce the spread of COVID-19 (Burgess & Sievertsen, 2020).

Indeed, figures from the United Nations Educational, Scientific, and Cultural Organization [UNESCO] (2021) show that as of March 2021 more than 220 million tertiary-level students around the world had been affected by the disruptions of the COVID-19 and for institutions of higher learning, this signaled a closure of on-campus classes, suspension of practicum, tests and examination, and temporary closure of universities in some countries. For some jurisdictions, this disruption manifested in students learning remotely with teachers and facilitators adopting online platforms to teach (Lei & So, 2021). For instance, in the local context of Macau, the Macau University of Science and Technology had to move its teaching, learning, and examinations online via Zoom in February 2020, to ensure the safety of its students, teachers, and non-teaching staff.

Many scholars concur that hospitality and tourism education has been principally impacted due to the challenges posed by this new global norm of teaching and learning (Edelheim, 2020; Rapanta et al., 2020). First, many hospitality and tourism students are unable to fully acquire the practical skills needed to enhance their classroom learning. The experience of being in the classroom practicing wine mixing, food, and beverage practical task, or a front office task has been diminished to a virtual format (Kaushal & Srivastava, 2020; Sharma, 2020). Second, hospitality and tourism students are currently unable to take up the opportunity of industry placements and internships as these have been suspended in many institutions and countries. Physical contact between students and lecturers has also been curtailed with practical examinations especially for final year hospitality students being canceled or suspended. Third, the urgent switch to online formats means that teaching staff have had to prepare and deliver lectures from home and had to deal with the associated practical and technical challenges of the virtual format (Hodges, Moore, Lockee, Trust, & Bond, 2020). While COVID-19 stimulated the introduction of innovative technological efforts for teachers to enhance teaching experience (Qiu et al., 2020, p. 100288), a significant challenge for some hospitality and tourism lecturers (especially those who are not technology savvy) has been an inadequate knowledge of the pedagogical content knowledge required for teaching online (Rapanta et al., 2020).

Notwithstanding the devastating impact of COVID-19 on global education and on hospitality and tourism education, in particular, scholars and other stakeholders are foreseeing a paradigm shift in the nature and component of tourism and hospitality education in the immediate-to-long term future. Kumar (2020), for instance, asserts that as with the macro level, tourism and hospitality institutions would have to institute and quickly adapt to technological innovations and use virtual formats even after COVID-19. At best, the hybrid format (i.e. both traditional and non-traditional) is envisioned as a lasting approach to facilitate tourism and hospitality education (Kim & Jeong, 2021). Transforming tourism and hospitality education with technology and combining traditional and online formats will facilitate students' creative learning (Lei & So, 2021). This is anticipated to ensure that hospitality and tourism students do not lose their studies, but their progress would be monitored simultaneously and with timely evaluation (Bilsland, Nagy, & Smith, 2020; Elumalai et al., 2021, p. 189; Joshi & Gupta, 2021). Furthermore, providing Artificial Intelligence (AI)-enabled learning by universities and hospitality and tourism institutes as they offer diverse courses can provide a springboard to envision a new tomorrow for the industry (Adeyinka-Ojo, Lee, Abdullah, & Teo, 2020). For instance, tourism and hospitality students can engage in interactive sessions to discuss practical issues with lecturers and industry players. Another opportunity could be to institute virtual internships which can allow tourism and hospitality students to go beyond their curriculum and learn about the practicality of their professions (Joshi & Gupta, 2021; Park & Jones, 2021). However, amid these propositions, there is a failure to examine how students appraise their online experiences and their affective responses towards those experiences. Understanding students' evaluation of their experiences is pertinent to promoting meaningful learning experiences of a globally affected industry by the pandemic.

2.2. Online learning attributes and satisfaction

While online learning may have different meanings, it involves "learning that is mediated by the Internet" which differs from traditional face to face which takes place in a classroom setting (Rapanta et al., 2020, p. 2). As a subset of distance education that embraces a wide set of technology applications and learning processes, online learning is used synonymously with terms such as e-learning, web-based training, virtual learning, or net-based learning or cyberlearning (Urdan & Weggen, 2000). Online learning implies that both the teacher and students converge in a virtual classroom environment to participate in educational activities from different places and at different times through an internet connection (Gomezelj & Ćivre, 2012). While its implementation can be synchronous or asynchronous (Sisson & Kwon, 2020), the pedagogical model of online learning emphasizes the learner's role and ability to be responsible for their learning (Sigala, 2002). Accordingly, online learning in higher education seeks to develop meta-cognitive as well as reflective and collaborative learning among students (Campbell, 2004). Many scholars have alluded to the benefits of online learning as being flexible and student-centered as classroom discussions are passing through which allow students enough time to think before responding to questions (Gomezelj & Ćivre, 2012). Nevertheless, online learning can be undermined by poor internet connection, lack of technical expertise, inadequate hardware and software, and insufficient learner orientation (Keengwe &

Kidd, 2010).

Previous research has revealed that the asynchronous method of interaction including the use of social platforms such as Blackboard and other microblogging multimedia-based platforms, has been the main method of teaching and learning in distance education programs over the past years (Grosbeck & Holotescu, 2010; Huang & Hsiao, 2012; Watts, 2016). Grosbeck and Holotescu (2010) opined that microblogging as a form of asynchronous learning enhances learning as it offers more flexibility and continuous learning after the classes are over. The advancement in technology has made it possible for students to attend classes in real-time using platforms for video conferencing such as Zoom, Blackboard Collaborate, and Attendify. The wake of COVID-19 further necessitates the use of the synchronous form of teaching and learning for studies where sessions are scheduled for the original class time and are conducted in real-time where distance becomes irrelevant. As the COVID-19 situation improves, the idea of hybrid/blended and flipped classroom learning, made up of a combination of online and face-to-face learning integrated with problem-centered learning and the practice of activities is becoming popular (Love, Hodge, Grandgenett, & Swift, 2014; Tang et al., 2020).

The over-reliance on technology in online learning implies that certain attributes of the virtual classroom can impede or facilitate learning (Kapasia et al., 2020; Rapanta et al., 2020). Online learning attributes connote the features of the virtual classroom that facilitate interaction between the instructor and the learner (Kuo, Chang, & Lai, 2011). These attributes may include flexibility, usefulness, structure and organization, perceived usability of online platforms, and instructor quality (Gomezelj & Ćivre, 2012; Gudmundsdottir & Hatlevik, 2018; Wilkins & Huisman, 2013). However, these attributes in previous online learning research are less comprehensive as they touch a limited set of attributes of online learning (Table 1). Addressing this weakness, we employ the user experience questionnaire which assesses the subjective experiences of interactive products based on 26 attributes. These items are

Table 1
Summary of attributes from selected studies on online learning.

No.	Author	Year	Attributes found
1	Chen, Peng, Yin, Rong, Yang, & Cong	2020	Quality of interaction Quality of service Platform availability User personal factors
2	Goh & Wen	2020	Perceived usefulness Perceived ease of use
3	Hew, Hu, Qiao, & Tang	2020	Learners' sentiments about course instructor Content and resources Assessment Schedule
4	Abdous	2019	Online learning experience Online student preparedness
5	Botelho, Machado, Proença, Rua, Delgado, & João Mendes	2019	Perceived usefulness Ease of learning Ease of use
6	Gudmundsdottir & Hatlevik	2018	Competence development Perceived distraction of ICT
7	Dziuban, Moskal, Thompson, Kramer, DeCantis, & Hermsdorfer	2015	Engaged learning Agency Assessment
8	Ke & Kwak	2013	Learner relevance, Active learning, Authentic learning, Learner autonomy, Computer technology competence Instructor-student interaction Peer interaction
9	Lin & Wang	2012	Perceived usefulness Confirmation of system acceptance
10	Gomezelj & Ćivre	2012	Personality of student E-learning properties E-classroom properties
11	Kuo, Chang, & Lai	2011	Teaching Reward and response Organizational trust Student-teacher interaction
12	Roca, Chiu, & Martínez	2006	Teaching equipment Perceived usefulness Information quality Confirmation service quality System quality Cognitive absorption Perceived ease of use
13	Drennan, Kennedy and Pisarski	2005	Perceived usefulness of flexible learning Learner's locus control

organized into six dimensions of *attractiveness* - overall product impression; *perspicuity*-ease of familiarity; *efficiency* – fastness and user effort; *dependability* – user control and confidence; *stimulation* - degree of motivating; and *novelty* - the extent of product creativity (Schrepp, Hinderks, & Thomaschewski, 2017a, 2017b).

Within the online learning classroom, students' evaluation of such attributes will certainly impact their satisfaction with their experience, yet research in tourism and hospitality has given limited attention to this relationship (Gomezelj & Ćivre, 2012). Satisfaction connotes online users' emotional assessment of their experience and the intrinsic positive outcome emanating from behavior that fulfills their expectations (Ryan & Deci, 2000). Such emotions are mostly triggered by diverse attributes which when understood can facilitate strategies to improve students' performance and online learning quality. Evidence from a previous study suggests that e-learning attributes are important in stimulating students' satisfaction about e-learning in a university. Particularly, e-learning system quality, which involves attributes such as usefulness, informative, good visual appeal, and ease of navigating the learning platform, contribute significantly to student satisfaction (Pham, Limbu, Bui, Nguyen, & Pham, 2019).

In a different context, Drennan, Kennedy, and Pisarski (2005) used the technology acceptance model (TAM) to examine the online satisfaction of first-year students (average age 20 years) who undertook an online management course using two-time points (at the beginning and end of the course). They found that the perceived usefulness of flexible online learning significantly enhanced students' satisfaction in both time points. Conversely, perceived ease of use of flexible online learning did not influence course satisfaction. Rani, Suradi, & Yusoff (2014) examined learner management system attributes using the TAM and found perceived ease of use and perceived enjoyment ($\beta = 0.172$ and $\beta = 0.444$ respectively) impact students' e-satisfaction.

Asarbahsh and Sandars (2013) argue that "usability" has received limited attention in medical education despite its influence on online learner satisfaction. Similarly, within a blended learning context, the perceived usefulness of technology has been found to influence system satisfaction (Lin & Wang, 2012). Using the expectancy disconfirmation theory to propose a decomposed technology acceptance model for e-learning, Roca, Chiu, and Martínez (2006) found that user satisfaction is determined by perceived usefulness, information quality, confirmation, service quality, system quality, perceived ease of use, and cognitive absorption. A recent study within the COVID-19 pandemic period suggests that platform availability has the greatest impact on user satisfaction while personal factor does not influence satisfaction (Chen et al., 2020). While studies within hospitality and tourism education are limited, the few studies over a decade ago suggest e-learning properties, students' personality, and e-classroom properties have a significant impact on users' satisfaction (Gomezelj & Ćivre, 2012).

Importantly, during this COVID-19 pandemic period, online education is mainly focused on class-based teaching as an extension of traditional education. This suggests that certain attributes that were previously ignored may be relevant as many learners are concerned about the ease of use and practicality of online learning during the pandemic (Chen et al., 2020). This study focuses on those attributes that determine student satisfaction in the online learning platform experience within a higher education context at the Macau University of Science and Technology.

3. Methods

This section presents the methods of the paper. It begins with a reflexive account and justification of the quantitative approach chosen followed by a description of the research setting and participants targeted in this study. The section further discusses the measures used in accordance with existing literature followed by the data analysis techniques employed.

3.1. Reflexivity and justification for quantitative research approach

Kingdon (2005) asserts that reflexive accounts should not be limited to qualitative methods only but quantitative research as well. Reflexivity "is the ongoing process of self-awareness adopted by researchers in an attempt to demonstrate the trustworthiness of their findings" (Kingdon, 2005, p. 622). Such a self-awareness allows deeper reflection and refinement of the research process based on the recognition of researchers as inevitably existing in the social world they are investigating (Hammersley & Atkinson, 2007). The researchers in this study chose a quantitative approach after a thorough reflection of the COVID-19 situation in their current University, the Macau University of Science and Technology where two of the authors are professors. The researchers realized through casual teaching interaction with students that many complained about online learning and were hoping for school to resume. Given the unpredictability of the situation, it was important to assess their experiences of online learning and how the attributes of learning online impact their satisfaction. In this way, their engagement and continuous usage could be managed (Wang et al., 2021). Nonetheless, the situation of studying online at the time of data collection meant that a quantitative approach would be feasible for students of the researchers to participate via Qualtrics.

Consequently, to answer the research question, the quantitative research method is an appropriate approach. A quantitative survey enables the study to reach a higher sample size and address the research question through quantitative variables. It provides meaningful and representative information of the phenomena investigated and the population targeted (Queirós, Faria & Almeida, 2017). As a deductive approach, quantitative researchers observe the objective reality to further test associated relationships among the observed variables (Almalki, 2016). Specifically, quantitative research allows this study to collect a wide range of students' opinions of their online learning attributes, which can subsequently be examined to understand the relationship between these attributes and satisfaction.

3.2. Research setting and participants

This study was conducted in Macau, the Special Administrative Region of the People's Republic of China (SAR), and at the Macau University of Science and Technology in particular. With a population of 649, 023 people (World Population Review, 2020), Macau has 10 reputable institutions of higher education (Higher Education Bureau, 2020) and boasts of academic staff and student population (both local and non-local) with different backgrounds (Shao, 2020; Teo, Zhou, Fan, & Huang, 2019). This notwithstanding, the outbreak of COVID-19 has had a significant impact on the local economy as well as educational institutions with face-to-face teaching and learning activities being suspended at the early stages of the COVID-19 outbreak and subsequently switching to virtual platforms such as Zoom, Skype, Google Hangouts among others (Pao, 2020). By the first half of February 2020, local universities in Macau had started teaching courses online for the safety of the students and staff (Macau Daily Times, 2020).

We targeted undergraduate and post-graduate students (Deale & Lee, 2018) at the Macau University of Science and Technology (MUST). MUST is among the higher educational institutions that took an active step towards such online learning via Zoom (MUST, 2020a) given that most of its students are from Mainland China and could not travel during the early stages of the pandemic. As Macau serves as a bridge between a fully domestic and fully international experience for many Mainland students (Hao, 2018), MUST has the largest Mainland Chinese students with 86% of the students within the 2017/2018 academic year being Mainland Chinese students while only 13% were local students (Moura, 2019). We chose MUST as a study site because of its standing as a reputable institution of higher learning within the Greater Bay Area and in the Asian region. Importantly, it also has a strong Faculty of Hospitality and Tourism with a diverse academic faculty and student population [official figures stood at 2071 students in 2018] (MUST, 2020b). Since MUST was among the first universities to adopt the online approach to teaching and learning in the wake of the COVID-19; it provides a suitable setting to examine the attributes that affect hospitality and tourism students' satisfaction with the online learning experience.

Specifically, the research participants are the students from the Faculty of Hospitality and Tourism Management (FHTM) and enrolled in one of the following programs: *International Tourism Management, Hotel Management, and Food and Beverage Management*. Students in the FHTM learn in a multi-cultural environment as the teachers are from various cultural backgrounds (MUST, 2020b). FHTM students generally demonstrated a high level of English ability since all the materials used for teaching are in English. Moreover, recruited students for this research are all equipped with multiple electronic devices for them to engage in online learning.

3.3. Measures

A structured questionnaire was designed to measure three core issues including online attribute performance, satisfaction with online learning, and demographics. Consequently, the instrument was categorized into three main parts with the first part capturing items on attributes of online learning from the longer version of the UEQ due to its comprehensiveness (Schrepp et al., 2017a). In the first section on attributes, we chose only 25 positive-worded items out of the 26 proposed polar items to avoid confusion. Examples of the positive items include enjoyable, understandable, efficient, practical, and so forth. This scale has been applied in the educational field and demonstrated adaptability and effectiveness in the areas of English learning multimedia (Devy, Wibirama, & Santosa, 2017) and e-learning environment (Santoso, Schrepp, Isal, Utomo, & Priyogi, 2016). However, the last positive attributes "Pleasant" and "Pleasing" when translated in Chinese had the same meaning after expert and students' evaluation. Hence, we chose one of the items (i. e., pleasing) reducing the items to 25. The survey focused on only positive items for ease of understanding by the respondents such that respondents that choose lower values imply a lower assessment of those attributes (Schrepp et al., 2017a; 2017b, p.104). The 25-attribute performance was measured on a 5-point Likert-type scale ranging from 1 = Poor; 2 = Fair; 3 = Average; 4 = Good; and 5 = Excellent. For example, we asked students to evaluate their online learning experience during the COVID-19 pandemic as enjoyable, understandable, easy to learn, innovative, among others. The survey stated for instance that, "*My online learning during COVID-19 Pandemic via Zoom is enjoyable.*"

The second section examined students' satisfaction with online learning based on literature from tourism that measures consumer satisfaction (Agyeiwaah, Adongo, Dimache, & Wondirad, 2016; Agyeiwaah, Otoo, Suntikul, & Huang, 2019; Song, Li, van der Veen, & Chen, 2011). Satisfaction had four items and was measured on a 5-point Likert-type scale (1 = Strongly disagree, 2 = Disagree, 3 = Neither Agree nor disagree, 4 = Agree, and 5 = Strongly agree). For example, respondents evaluated statements such as "I am sure it was the right thing to participate in the online study course this semester" and "I am satisfied with the decision to study online." The third section examined respondents' sociodemographic characteristics such as gender, age, level of education, and nationality (Otoo, Agyeiwaah, Dayour, & Wireko-Gyebi, 2016; Agyeiwaah, 2020). Following clear design and measurement, data collection procedures were followed.

3.4. Data collection procedure

This study followed two important data collection procedures to ensure reliable and valid results. First, before data collection, ethical issues were an important part of the research process, and we followed the five suggested ethical procedures of online surveys suggested by Ritter and Sue (2007). The first step of this procedure is to ensure that participants make informed decisions. Hence, we provided a brief purpose of the survey to participants. We stated that the purpose was to examine the online experiences and satisfaction during COVID-19. This was followed by providing our identity for any further clarification. The third aspect involved explaining how the researchers will use that data. We explained in the survey that the data was for academic publication purposes only. The fourth aspect was to indicate the average length of time for the survey. In this study, we stated that the survey will take an average of 15 min to complete. The fifth aspect of the ethical procedures involved explaining if there is any risk in participating in the survey. In

this section, the introduction of the survey included a section assuring them of the confidentiality and anonymity of their responses to the survey. For example, students were informed that this survey was voluntary and irrelevant to their grades in that semester and all the information will remain confidential. Additionally, informed consent was sought from all participants and they were free to withdraw at any time without providing any reasons.

Second, following the ethical procedures of the online survey, an initial evaluation to check the clarity and comprehension of the instrument was conducted by a master and doctoral students in Macau. At this stage, thorough checks were made by bilingual speakers to ensure that statements made in the Chinese language were translated into the English language to carry the same meaning. A pre-test was, thus, conducted online with 30 respondents to further verify the comprehensibility of the items and this further enabled a final improvement of the instrument. The use of the online method is justified given the nature of the current pandemic which resulted in many people staying at home and universities utilizing the online platforms to facilitate teaching and learning. More so, the use of both Chinese and English languages is appropriate given the nature of the student population which is predominantly Chinese and English speakers. The main data collection for this study commenced in May and ended in July 2020 and it included screening questions via Qualtrics (Machado, 2012) to ensure that first, the respondent was a hospitality and tourism student of MUST, and second, the student has experience with using the online teaching and learning platform. The convenience sampling approach was used to sample the respondents. The online survey data collection method provided an easy reach of respondents through their emails and social media platforms such as WeChat. After inspection and cleaning of the data, a total of 216 questionnaires [representing 10.4% of the total population of tourism and hospitality students] were used for the analysis based on completeness. This total useable questionnaire of 216 respondents was chosen after no additional surveys were included for about two weeks justifying the need to truncate the survey. The 216 questionnaires fit the acceptable statistical criteria suggesting at least 200 for the factor analysis and 15–20 observations for each predictor variable in multiple regression analysis (three predictor variables are involved in this study) (Siddiqui, 2013).

3.5. Data analysis

The current study employed quantitative data analytical approaches and data presentation (Pallant, 2020). Data analysis proceeded after inspection of the completed data showed no missing or incomplete responses. The data was then analyzed using SPSS version 21. The study employed three main quantitative analytical techniques. First, we employed a principal component analysis (PCA) to identify orthogonal factors of attributes of online learning given the novel nature of the pandemic situation (Pallant, 2020). PCA is a common method to summarize a larger set of correlated variables into smaller and more easily interpretable axes of variation (Björklund, 2019, p. 2151). As would be presented later, the analysis using PCA yielded three factors that are different from the original six factors. One possible explanation for differences in number of factors could be the different settings within which the study was carried out (i.e., Chinese context and COVID-19 pandemic season). Second, a correlation was used to confirm the association among the variables after which further causal analysis followed. Third, regression analysis was performed to examine the predictive effect of online learning attributes on overall satisfaction (Nunkoo & Ramkissoon, 2012). A descriptive statistical exploration was also made to profile the respondents for the study. The results of these analyses are presented subsequently after a transparent description of data collection and analysis as well as reliability and content validity checks of the data are completed (Vanhove, 2021).

4. Results

4.1. Student demographics

The results of the demographic analysis reveal that there were more females (64.4%) than males (35.6%). The age groups of the

Table 2
Demographic profile.

Profile	Frequency	Percent (%)
Sex		
Male	77	35.6
Female	139	64.4
Age (Years)		
15-24	208	96.3
25-34	8	3.7
Education		
Undergraduate students	203	94.0
Postgraduate students	13	6.0
Nationality		
Mainland China	140	64.8
Macau	64	29.6
Hong Kong	2	0.9
Taiwan	2	0.9
USA	1	0.5
Europe	2	0.9
Other	5	2.3

surveyed students were youthful and corresponded to the typical university age range: 15–24years (96.3%) and 25–34years (3.7%). The bulk of the students who participated in the current study were undergraduate students (94.0%) with a few postgraduate students (6.0%). More than half (64.8%) of the students are from Mainland China which reflects the typical MUST demographics (Moura, 2019) as well as suggests that Macau is an important destination for higher education among many Mainland Chinese students seeking international experience (Hao, 2018). Other students were from Macau (29.6%), Hong Kong (0.9%), Taiwan (0.9%), USA (0.5%), Europe (0.9%) and Others (2.3%) (Table 2).

4.2. Identifying the attributes of online learning

To identify the relevant attributes from the existing UEQ items, the principal component analysis (PCA) was used. PCA enables the identification of new orthogonal factors called principal components by transforming manifest items to demonstrate the pattern of similarity of the observations in the data set (Abdi & Williams, 2010). The analysis involved subjecting 25 items of user experience of online learning to PCA (Pallant, 2020). Based on this procedure, PCA with varimax rotation identified three factors following a suitability test with the Kaiser-Meyer-Olkin Measure of Sampling Adequacy value of 0.959 which demonstrated significance for factoring (Significant = $p < 0.000$; $X^2 = 40099.637$; $df = 300$). The three factors identified explained 64.05 percent of the total variance considered acceptable with Eigenvalues not less than 1 (Factor 1 = 13.79, Factor 2 = 1.17, and Factor 3 = 1.04). Further inspection of the items led to the naming of the factors as Factor 1: “**Perspicuity and dependability**” since it comprises items that explain the clarity, understandability, and safety of online learning. The second factor, Factor 2, was named “**Stimulation and attractiveness**” since it comprises items that explain how the online learning classroom is motivating, exciting, and attractive to students. The third factor, Factor 3, was named “**Usability and innovation**” to denote how students find their new online learning classroom user-friendly and innovative (Table 3).

A more detailed inspection of each factor revealed that Factor 1 explained 33.64% of the total variance with Factors 2 and 3 explaining 21.1% and 9.3% respectively. The rotated items of each factor were above the minimum cut-off recommended value of 0.40 (Blunch, 2008). The descriptive mean statistics of each factor revealed an average to a good performance of the 25 items ranging from 3.31 to 3.88 while the standard deviation ranged from 0.9 to 1.1. Each factor was consistent with Cronbach’s alpha values ranging from 0.65 to 0.9 implying the measurement items are reliable (Pallant, 2020). In general, when items indicate a mean score from 3.0 to

Table 3
Results of principal component analysis (PCA).

Item number	Online learning experience attributes	PCA			
		Loadings	Mean	Standard deviation	Cronbach α
	Factor 1: Perspicuity and dependability		3.489	1.045	0.946
	My online learning during COVID-19 Pandemic via Zoom is:				
1	Enjoyable	0.813	3.88	.965	
2	Understandable	0.777	3.54	1.095	
3	Creative	0.771	3.52	1.043	
4	Easy to learn	0.749	3.66	.998	
5	Valuable	0.744	3.31	1.092	
6	Exciting	0.714	3.38	1.063	
7	Interesting	0.677	3.43	1.018	
8	Predictable	0.658	3.42	1.062	
9	Fast	0.653	3.46	1.103	
10	Inventive	0.647	3.72	1.056	
11	Supportive	0.616	3.50	1.083	
12	Good	0.613	3.38	.972	
13	Easy	0.610	3.40	1.025	
14	Pleasing	0.609	3.41	1.021	
15	Leading-edge	0.538	3.32	1.036	
16	Secure	0.525	3.49	1.095	
	Factor 2: Stimulation and attractiveness		3.536	1.049	0.916
	My online learning during COVID-19 Pandemic via Zoom is:				
17	Motivating	0.473	3.40	1.133	
18	Meets my expectation	0.721	3.41	1.057	
19	Efficient	0.695	3.52	1.069	
20	Clear	0.695	3.64	1.029	
21	Practical	0.652	3.67	.988	
22	Organized	0.632	3.69	1.038	
23	Attractive	0.489	3.42	1.035	
	Factor 3: Usability and innovation		3.705	1.011	0.651
	My online learning during COVID-19 Pandemic via Zoom is:				
24	User-Friendly	0.824	3.75	1.018	
25	Innovative	0.768	3.66	1.004	

Note: $KMO = 0.959$; $X^2 = 40099.637$; $df = 300$; Sig. 0.000.

4.0, it means the level of performance is from average to good performance whereas scores higher than 4.0 suggest the excellent performance of online learning classrooms. Mean scores below 3.0 denote lower levels of performance (Table 3).

In terms of the first factor, “Perspicuity and dependability”, there was a consensus that the online learning classroom is “Enjoyable” ($M = 3.88$), “Inventive” ($M = 3.72$), and “Easy to learn” ($M = 3.66$) as these attributes were appraised with good performance. The second factor, “Stimulation and attractiveness” reveals the good performance of items such as “Clear” ($M = 3.64$), “Organized” ($M = 3.69$), and “Practical” ($M = 3.67$). The third factor, “Usability and innovation”, suggests a good performance in terms of “User-friendly” ($M = 3.75$) and “Innovative” ($M = 3.66$). Importantly, the three factors represented the independent variables of the study, while satisfaction was the dependent variable of interest.

Further examination of satisfaction which represents the dependent variable in this study is shown in Table 4. For satisfaction statements, items with a mean score from 3.5 to 4.0 suggest agreement whereas scores higher than 4.0 suggest strongly agree with the satisfaction statements of online learning classrooms. Mean scores ranging between 3.0 and 3.4 denote neutral position while those lower than 3.0 denote disagreement with these statements. Two items revealed agreement while the remaining two items were completely neutral regarding satisfaction with the new online learning classroom. Yet, the items overall are consistent in their measure of affective responses of students’ experiences with online learning ($\alpha = 0.915$). Following these analyses, a further test of how the three identified factors predict satisfaction was conducted.

4.3. Determining the influence of attributes on satisfaction

An initial correlation analysis revealed a significant association between the dependent and independent variables with the second factor, “Stimulation and attractiveness” demonstrating a stronger association with satisfaction (Table 5). A scatter matrix revealed normally distributed data for satisfaction responses. Importantly, a strong association was found between satisfaction and the three identified factors as a positive linear slope was detected. Further regression analysis confirmed the influence of the three identified factors on satisfaction with online learning (Table 6).

For example, we found that the regression model explained 42% variance. For the most part, while all the attribute factors were important predictors, the second factor, “Stimulation and attractiveness” ($\beta = 0.431$; $p = 0.000$) was the strongest among the three followed by “Perspicuity and dependability” ($\beta = 0.367$; $p = 0.000$) and “Usability and innovation” ($\beta = 0.121$) $p = 0.010$). Further diagnostics tests revealed no multicollinearity with VIF values less than 10 (Pallant, 2020). These findings of attributes and their impact on student online satisfaction in the context of COVID-19 disruptions on hospitality and tourism have been discussed with implications for educational stakeholders.

5. Discussion: Online learning in the context of COVID-19 disruptions

The unprecedented disruptions caused by COVID-19 made it critical for the hospitality and tourism education sector to move online as a necessity rather than an option. Such disruptions meant that both teachers and students have to engage in teaching and learning from a new unconventional environment. Understanding students’ appraisal of this new form of environment and the impact on their learning satisfaction offers a rare contribution to developing strategies to trigger continuous engagement and attractiveness of online learning. Moreover, identifying mechanisms to alleviate COVID-19 disruptions to stimulate learning requires understanding students’ thoughts and feelings regarding the online learning experience. This study examined specific attributes of online learning and investigated how those identified attribute factors influence learners’ satisfaction with online classrooms among hospitality and tourism students.

This study offers valuable insights into the research question of this paper. Our findings demonstrate that while all three factors predict satisfaction, some factors are stronger than others. The strengths of both factors namely “Perspicuity and dependability” and “Usability and innovation were a little lower than “Stimulation and attractiveness”. However, previous studies both before COVID-19 and during COVID-19 suggest that attributes of perceived usefulness and ease of use are some of the strongest determiners of online learning satisfaction. Goh and Wen (2020) found that perceived usefulness and ease of use influence students’ engagement of online learning due to the ability to post comments on discussion boards which ultimately impact satisfaction. Asarbakhsh and Sanders (2013) assert that the ease with which students can use technology in the online classroom is key to effective learning. Contrary to much emphasis on perceived usefulness’s impact on satisfaction, this study found “Stimulation and attractiveness” as the highest driving factor of satisfaction. Two plausible explanations are that COVID-19 presents different subjective emotions to different people such that what matters in one context may not matter in another context (Ahorsu et al., 2020). Second, different schools employ

Table 4
Satisfaction items.

Statements	Mean	Standard deviation	Cronbach α
Satisfaction	3.45	0.976	0.915
I am sure it was the right thing to participate in the online study course this semester.	3.58	.931	
I am satisfied with the decision to study online.	3.40	.997	
I truly enjoy the experience of studying via the online learning platform.	3.24	1.051	
I feel good about the decision to study via the online learning platform.	3.58	.931	

Table 5
Correlation matrix.

Correlations		Satisfaction	Perspicuity and dependability	Stimulation and attractiveness	Usability and innovation
Pearson Correlation	Satisfaction	1.000			
	Perspicuity and dependability	.411***	1.000		
	Stimulation and attractiveness	.482***	.000	1.000	
	Usability and innovation	.136*	.000	.000	1.000

Note: ***Significant at $p < 0.001$; * Significant at $p < 0.05$.

Table 6
Regression analysis.

Constructs/variables	Regression analysis
(Constant)	3.384 (72.623) ***
Factor 1: Perspicuity and dependability	.367 (7.858) ***
Factor 2: Stimulation and attractiveness	.431 (9.224) ***
Factor 3: Usability and innovation	.121 (2.596) *
R ²	.420
Adjusted R ²	.412
Durbin-Watson (DW)	2.115
F-test	51.192
Tolerance	1.00
VIF	1.00

Note: Dependent variable is satisfaction; *SD*= *Standard Deviation*, *t-value in parenthesis*.

***Significant at $p < 0.001$; * Significant at $p < 0.05$.

different online learning mediums (e.g., Zoom or MOOC) which means the experiences of attributes are different (Lei & So, 2021; Qiu et al., 2020, p. 100288; Hew, Hu, Qiao, & Tang, 2020). For example, recent studies that focused on factors affecting quality e-learning during COVID-19 among Indian and Saudi Arabians found all seven attributes impacted e-learning quality with different strengths while those examining students at the Medical and Health Sciences Colleges, the University of Sharjah in the United Arab Emirates found that the highest components of student satisfaction were communication and flexibility (Elshami et al., 2021; Elumalai et al., 2021, p. 189). These contrasting attributes imply that there is no “one-size-fits-all” strategy when it comes to promoting successful online learning experience within higher education institutions and each context require a specific understanding of students’ assessments of attributes for a suitable strategy to enhance online learning engagement.

Consequently, it was not surprising that “Stimulation and attractiveness” is the highest predictor of satisfaction. Indeed, previous studies have ignored the stimulating attributes of studying online and how they could be employed to encourage online learning engagement. For example, Chen et al. (2020) found “platform availability” to possess the greatest influence on user satisfaction in contrast to the current study findings. However, since online learning differs from face-to-face and is mediated by the Internet (Rapanta et al., 2020), the attractiveness and stimulating factors play a major role in shaping user satisfaction (David & Gloré, 2010). Particularly, in the context of the current study, COVID-19 has caused disruptions of where to learn, how to learn, and the content of learning. For example, many of the students surveyed in this paper mentioned qualitatively the difficulty of engaging in continuous learning from home due to the overwhelming interruptions. For this reason, the key factor that motivates one to engage is the degree of stimulating and attractiveness of the online learning environment including the clarity, practicality, and efficiency of the learning activity. Moreover, the inability of many students to undertake practical skills needed to enhance their classroom learning such as wine mixing, food, and beverage practical task, and front office tasks (Kaushal & Srivastava, 2020; Sharma, 2020) means that a motivating, practical, organized and clear virtual classroom must be designed for the online platform. This confirms David and Gloré’s (2010) assertion that students judge the usability and credibility of online learning based on its stimulating attributes.

5.1. Theoretical and practical implications

By examining the factors that determine students’ online learning satisfaction in a non-traditional learning platform, in a COVID-19 pandemic circumstance, we have responded to the clarion call to extend student satisfaction with e-learning research by adopting a comprehensive list of items (Gomezelj & Čivre, 2012). While previous studies provided some perspectives on students’ online satisfaction in different contexts (Elshami et al., 2021; Elumalai et al., 2021, p. 189; Ho et al., 2021), the present study goes a step further to examine the attributes of online learning and how those attributes inform students’ online learning satisfaction during the COVID-19 pandemic. This contributes to enhancing our understanding and serves as a benchmark in the hospitality and tourism education context on students’ evaluation of online learning platforms and their satisfaction or continuous engagement during a global health

crisis.

Theoretically, this study contributes to knowledge on what attributes matter to students' online learning satisfaction in the context of the COVID-19 and the three main factors that determine their satisfaction. This consequently informs the need to minimize the uncertainty and disruptions heightened by COVID-19 through the inclusion of visual content and aesthetic standards that motivates and attract students' attention to online learning and consequently create satisfaction. Second, it is noted that the overall satisfaction of online learning is marginal. This could be due to the increasing negative emotions and uncertainty brought about by the COVID-19 pandemic (Ahorsu et al., 2020), contributing to the disruption of hospitality and tourism education. This study provides theoretical insights on the need for hospitality and tourism educators to create a stimulating and attractive learning environment by providing clear and organized learning tools. Moreover, a sense of a less demanding atmosphere to stimulate low levels of learning anxiety is needed. As found in Hong Kong, a lower degree of learning anxiety improves students' online learning satisfaction (Tavitiyaman et al., 2021).

From the preceding theoretical insights, two practical implications can be deduced for hospitality and tourism educational institutions, teachers, and online service platform providers. First, improving students' satisfaction with online learning requires a conscious effort of ensuring an attractive and motivating online learning environment. Educational institutions must work in collaboration with online platform providers to develop practical, clear, and attractive virtual content that promotes satisfaction and continuous engagement in online learning to alleviate disruptions created during COVID-19. Second, suppliers of the online learning platforms must move beyond the traditional simple activities of the online classroom to include attributes that can enhance specific training for hospitality students whose courses require some practical skills. For example, platform attributes that allow students to garner virtual food, wine, and dining skills may be relevant to the industry at present and in the future. Teachers must choose visual content that stimulates learning and are practical to hospitality and tourism education given the disruptions caused by COVID-19.

At best, the hybrid format (i.e. both traditional and non-traditional) is envisioned as a lasting approach to facilitate tourism and hospitality education. The transformation of tourism and hospitality education with technology and forming a collaborative strategy by combining traditional and online formats will facilitate students' creative learning. This will ensure that hospitality and tourism students continue their studies while their progress is monitored simultaneously with timely evaluation. A further provision of Artificial Intelligence (AI)-enabled learning by universities and hospitality and tourism institutes as they offer diverse courses can provide a springboard to envision a new tomorrow for the industry (Adeyinka-Ojo et al., 2020). For instance, tourism and hospitality students can engage in interactive sessions to discuss practical issues with lecturers and industry players. Another opportunity could be to institute virtual internships which can allow tourism and hospitality students to go beyond their curriculum and learn about the practicality of their professions.

6. Conclusion, limitations, and future research

In an environment where higher educational institutions have been significantly transformed by the global crisis of COVID-19, educational institutions are keen to know how they can improve and manage students' performance and satisfaction with their online studies. One possible way to address this issue is to determine the attributes that influence students' satisfaction with online learning. Accordingly, this study has examined the factors that determine students' online learning satisfaction. Overall, online learning attributes have average to good performance accompanied by moderately satisfying opinions. Three main identified attributes significantly impacted students' satisfaction with online learning, but "Stimulation and attractiveness" is the highest predictor.

Three limitations of the study are worth acknowledging. First, our list of attributes consists of 25 items and other items can be included in future studies to expand the scope of factors predicting online learning. Second, being a student population means that the respondents are predominantly youthful and future studies can consider the views of older students. The study results are based on Chinese students' experiences which may differ from students with different cultural backgrounds. Third, this study did not examine the direct impact of COVID-19 on hospitality and tourism education but relies on the situational context of the period of the pandemic that necessitated the adoption of online or virtual teaching and learning for higher education.

Authorship statement

Elizabeth Agyeiwaah: Contributions include developing the conceptual idea, review of parts of the literature and the introduction and sections of the methodology. Frank Badu Baiden: Contributions include data analysis and results write-up, and writing sections of methodology. Emmanuel Gamor: Contributions include a review of relevant literature and writing the introduction. Hsu, Fu Chieh (Jay): Contributions include discussion of the results and implications of the findings.

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