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Doctoral Dissertation

Characterizing Online Teaching Innovations and Identifying Factors Enhancing Instructors' Innovative Behavior: Evidence from Hospitality and Tourism Education of Vietnam

by

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Acknowledgments

It is true that to pursue the doctoral research path, one must travel his or her own journey at his or her own pace. However, it does not necessarily mean that this journey is a lonely itinerary. Judging from my experience, climbing the Ph.D. mountain at Japan Advanced Institute of Science and Technology (JAIST) was totally an enjoyable adventure along which I have been wholeheartedly supported by marvelous individuals to whom I am forever in dept of gratitude.

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Abstract

Background Although numerous studies in the past few years have increasingly focused on how institutions adapt to and adopt the requirement of moving classes online, few researchers have mentioned the characteristics of online teaching innovations and factors responsible for instructors' innovative behavior in the online learning environment. Also, the literature on this discipline for a particular profession like hospitality and tourism is scant and based primarily on qualitative analysis of small samples. These studies could not be generalized to different contexts due to methodological limitations.

Originality/ Value This doctoral research combined both quantitative and qualitative approaches in defining online teaching innovations and identifying conditions influencing the innovative behavior of hospitality and tourism instructors in their online pedagogical practices. The models built from this thesis provide practical managerial implications for policy makers, institutions' leaders, and instructors in making resource allocation decisions to improve the efficiency and quality of online pedagogical innovations.

Research objectives The main research objective (**MRO**) of this thesis is to characterize the concept of *online teaching innovations* in the context of hospitality and tourism education in Vietnam and enhancing instructors' *innovative behavior* in the online pedagogical environment. Accordingly, this research has two sub-objectives: the first sub-objective (***SRO1***) is to characterize the concept of online teaching innovations. The second sub-objective (***SRO2***) is to develop a model for identifying factors influencing Vietnamese hospitality and tourism instructors' innovative behavior in initiating and implementing such online teaching innovations.

Design/methodology/approach The first study to fulfill ***SRO1***, namely ***Study 1***, presents a framework for characterizing online teaching innovation. The proposed innovation is in the form of a constructivist online training program for improving instructors' online teaching skills, which was evaluated by comparing the participants' self-evaluation ratings for skill improvement before and after the training program. The second study to achieve ***SRO2***, i.e., ***Study 2***, employs the Partial Least Squares Structural Equation Modeling (PLS-SEM) procedure to propose and evaluate three path models, among which the main model focuses on instructors' innovative behavior in online teaching. Each path model comprises the structural and measurement models. A pilot study was first implemented to determine the required minimum sample size. For the main study, after the quality of the measurement models was confirmed, the evaluation results of the structural model were presented to form a predictive model of factors influencing instructors' innovative behavior in online teaching.

Findings The findings of ***Study 1*** recommend that instructors conduct the following tasks when implementing online teaching innovations: (1) *selecting theoretical underpinnings for designing the innovations,* (2) *conducting user needs analysis,* (3) *determining educational objectives,* (4) *creating instructional design,* (5) *ensuring technological/administrative support, and* (6) *designing evaluation*

methods. The Principal Component Analysis (PCA) results also suggested that a training program for building teachers' self-confidence in conducting synchronous online teaching should enhance three essential categories of the knowledge dimension in the revised Bloom's taxonomy: factual, conceptual, and procedural knowledge.

Through the PLS-SEM analysis conducted in ***Study 2***, it is found that there are three primary factors that influence instructors' innovative behavior in online teaching: (1) organizational innovative climate, (2) instructors' attitudes towards online teaching, and (3) the perceived levels of skills required for online teaching, which only has an indirect influence on the target variable. Accordingly, to create an organizational innovative climate conducive to instructors' innovative behavior, three elements are necessary: a transformational leadership style, a collaborative partnership among instructors, and a supportive infrastructure essential for online teaching. Among these three variables, transformational leadership plays a central driver role. It directly influences the other two predictor constructs and contributes to creating an innovative climate essential for fostering instructors' innovative behavior in online teaching. Interestingly, it is found that instructors' attitudes are reflected primarily and specifically in their interests in acquiring knowledge and skills necessary for improving online teaching quality. In addition, what has been newly found is that having a high level of perceived skills needed for online teaching does not necessarily encourage more innovative behavior in online teaching, although it directly contributes to a more positive attitude towards teaching in the virtual environment. It is also empirically discovered that macro-environmental conditions such as political restraints, economic situations, learners' changing demographic characteristics, or governmental policies do not influence instructors' innovative behavior in online teaching.

Implications By translating constructivism into online pedagogy, ***Study 1*** characterized components of online teaching innovation. It also provided empirical evidence of how an innovative teachers' training program was designed and implemented to meet the need to shift from real-life to real-time classrooms in Vietnam during the COVID-19 pandemic. Accordingly, it contributes to the growing literature on methods of improving instructors' readiness in synchronous online teaching.

From ***Study 2,*** it is recommended that institutions' leaders and administrators create an innovative organizational climate by demonstrating an effective transformational leadership role in guiding and supporting instructors in shifting classes from the traditional face-to-face learning environment to the online virtual classrooms. In addition, to help instructors build a positive attitude towards online teaching, besides providing sufficient teacher training programs which enable instructors to understand the usefulness of online teaching technology, administrators need to ensure that organizational goals and visions about online education are communicated clearly and openly to instructors as a way to build instructors' desire to internalize organizational goals into their personal objectives.

Keywords educational innovations, online pedagogy, individual innovative behavior, organizational innovative climate, transformational leadership

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1. Introduction

1.1. Problem Statement

Before the COVID-19 pandemic spread across the globe, researchers warned that hospitality institutions' main challenge was to balance between ensuring academic quality standards and keeping up with the rapid development and new trends in the industry. Thus, institutions need to seek systematic and innovative methods to ensure that education responds to the industry's worldwide operations, the advances in technology development, and the changes in consumers' expectations. Exploring educational innovations in the new era of hospitality and tourism education has become essential. Since the pandemic, the need for innovations, particularly those related to online education, has become even more imperative as classrooms are required to be shifted to the virtual space. In the "new normal" of the post-COVID-19 era, balancing technology and pedagogy will not be merely emergency remote teaching to respond to the pandemic (Rapanta et al., 2021). Instead, the adoption of digital technologies in online education will become a long-term, carefully planned strategy for education providers to harness the power of flexibility and empowerment offered by online learning and teaching.

Nonetheless, although numerous studies in the past few years have increasingly focused on how institutions adapt to and adopt the requirement of moving classes online (Bauman et al., 2008; Beaven et al., 2010; Compton, 2009; Grenon et al., 2019; Lamy & Hampel, 2007; Wang et al., 2010), few researchers have conducted systematic investigations on the critical role of instructors in this transformation process (d'Eça & Gonzáles, 2006; Peachey, 2017; Rehn et al., 2018; Zemliansky, 2021). Specifically, previous studies have mentioned the characteristics of online teaching innovations and factors responsible for instructors' innovative behavior in the online learning environment, yet in a scant and fragmented manner. Such factors have not been either systematically combined or given an appropriate weight for evaluating how strongly each of them ultimately influences the key target variable, i.e., teachers' innovative behavior in implementing online pedagogical innovations. This is not to mention that the literature on this discipline for a particular profession like hospitality and tourism is scant and based primarily on qualitative analysis of small samples. Thus, these studies could not be generalized to different contexts due to methodological limitations.

1.2. Scope of the Research

The hospitality and tourism education system of Vietnam is chosen as the research context for this doctoral study because even before the outbreak of the COVID-19, major quality issues in this field of professional education had already been found in this developing country. The pandemic has worsened the situation by causing major decline in the number of students enrolled in hospitality and tourism academic programs in Vietnam (Anh, 2021; Thanh, 2021). The existing literature has highlighted that institutions in this country need to adopt more innovative approaches, particularly in the country's emerging online learning environment. It should be noted that online education has remained obscure in Vietnam (Dang, 2013; Ho et al., 2020) and has been given more attention only since the outbreak of the COVID-19 pandemic (Ha, 2020; Pham & Ho, 2020). In the field of hospitality and tourism education, where most training programs have been conducted in person before the pandemic, instructors who may have extensive teaching experience in hands-on training courses but possess limited online pedagogical knowledge, skills, and confidence for delivering virtual lessons are now facing enormous challenges. Despite already having expertise in both the subject matter and teaching strategies, in-service teachers still need professional development in teaching with technology (Downing & Dyment, 2013; Junaidia et al., 2020; Peachey, 2017). Therefore, this study focuses on providing a support system to in-service instructors so that they can produce more active, flexible, and meaningful online classes for their students, whose hope and confidence in their academic programs and future careers in this profession also need to be maintained.

1.3. Significance of the study

Failing to guide and motivate instructors' innovative behavior in online teaching means failing to retain students for an industry that is on the way to its recovery after being significantly damaged by the pandemic. Therefore, by characterizing online teaching innovations and proposing a model for enhancing instructors' innovative behavior in online teaching, this thesis offers practical guidelines to the transformation and development of online education for the educational system of this significant service sector. When instructors are enabled and motivated to successfully engage students in their online classroom and maintain students' interests, motivation, and hope, they can directly contribute to tackling the workforce problems of the hospitality and tourism industry in the post-COVID era.

To fill the current literature gaps, this doctoral research combines both quantitative and qualitative approaches in characterizing online teaching innovations and identifying conditions

influencing the innovative behavior of hospitality and tourism instructors in their online pedagogical practices. The models built from this thesis will provide practical managerial implications for policy makers, institutions' leaders, and instructors in making resource allocation decisions to improve the efficiency and quality of online pedagogical innovations.

1.4. Research objectives

The main research objective **(MRO)** of this thesis is to characterize and implement the concept of *online teaching innovations* in the context of hospitality and tourism education in Vietnam through enhancing instructors' *innovative behavior in online teaching*.

Accordingly, this research has two sub-objectives: the first sub-objective ***(SRO1)*** is to characterize the concept of *online teaching innovations*. The second sub-objective ***(SRO2)*** is to develop a model of factors influencing Vietnamese hospitality and tourism instructors' *innovative behavior in online teaching*. ***SRO1*** has a strong relationship with ***SRO2*** and vice versa. While achieving ***SRO2*** will generate a list of factors motivating online instructors to innovate in online teaching, the fulfillment of ***SRO1*** will provide a framework to characterize online teaching innovations and thus guide instructors through their process of initiating and implementing new online pedagogical practices. In essence, achieving these two sub-objectives will fulfill the **MRO**. Figure 1 demonstrates how the MRO is attained through the achievement of sub-objectives.

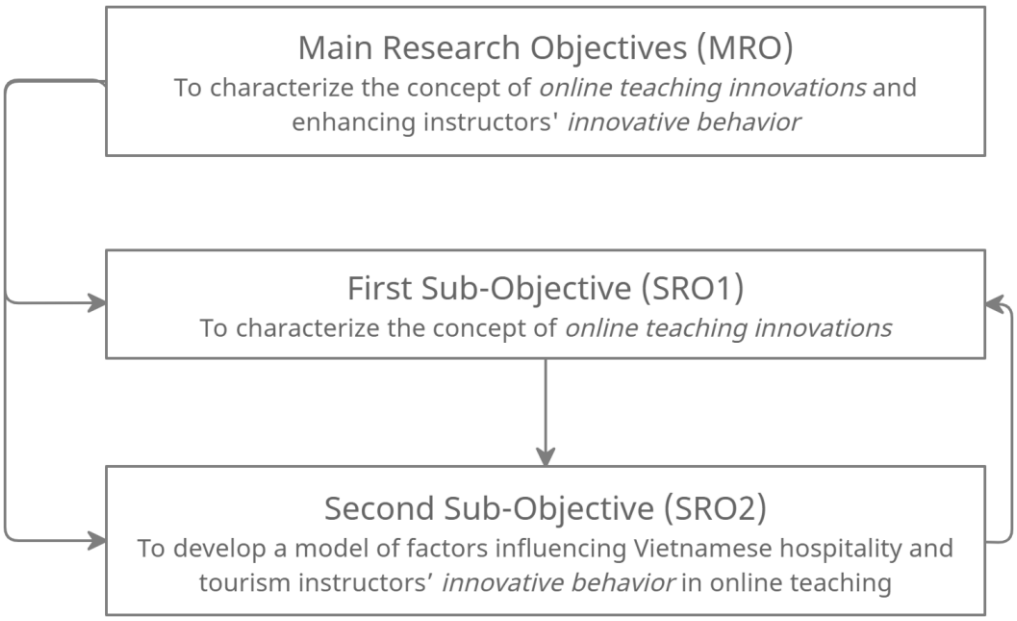


Figure 1. Research objectives of this thesis

1.5. Structure of the thesis

This thesis is comprised of the following six chapters:

Chapter 1 provides an overview of the research, the background of the research problem, the research objectives, and the significance of the study.

Chapter 2 (Literature Review) describes the contextual framework of the study and critically reviews the literature relating to the concept of online teaching innovations and teachers' innovative behavior in online teaching. This chapter also provides the theoretical background for a training course designed and implemented in this thesis. The training program was conducted to characterize the concept of *online teaching innovations*.

Chapter 3 (Research Methodology) outlines the mixed methods design used in this study and justifies the methods used to examine the research questions. Details of the research design, process, sampling, data collection, and analysis procedures are provided in this chapter.

Chapter 4 (Characterizing innovations in online teaching) presents the data analysis, using a pre-post research design to characterize the concept of innovations in online pedagogy for hospitality and tourism instructors in Vietnam. The proposed online teaching innovation is in the form of a constructivist training program for improving instructors' online teaching skills. Through designing, implementing, and evaluating this innovative training program, various components of innovations in online pedagogy for hospitality and tourism education are characterized.

Chapter 5 (Specifying and evaluating the path model for instructors' innovative behavior) proposes a hypothetical framework, i.e., a path model, for instructors' *innovative behavior in online teaching*. This framework is made up of two components: (1) the structural model describing the relationships between the identified factors, and (2) the measurement models, which show the relationships between each factor and its indicators. This chapter also presents the systematic procedure for applying Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the quality of the specified path models. First, results on the reliability and validity of the measurement models are reported. Then, after the quality of the measurement model is determined, the evaluation results of the structural model are provided to form a predictive model of factors influencing instructors' *innovative behavior in online teaching*. The explanatory and predictive power of the proposed model as well as interpretations of research results are addressed in this chapter.

Chapter 6 (Discussion and Conclusion) summarizes the must-have characteristics of online teaching innovation and discusses the model of factors that influence Vietnamese hospitality and tourism instructors' innovative behavior in implementing online teaching innovations. The chapter also states the study's contributions, recommendations, implications for stakeholders, and future research directions.

2. Literature review

2.1. Innovations in the online educational environment (for *SRO1*)

2.1.1. Educational innovations

Esteemed authors have attempted to construct definitions for innovation. For example, Machiba (2010) refers to innovation as "the overarching concept that provides direction and vision for pursuing the overall societal changes needed to achieve sustainable development". Innovation is also characterized as the purposed invention, initiation, and implementation of original ideas within a professional group or organization to bring advantages to the group or the organization (Klaeijsen et al., 2018). It can be either incremental, i.e., making minor improvements, or disruptive, i.e., developing a completely new product, service, or process (Dinçer et al., 2020). From the perspective of knowledge science, Nakamori (2020) asserts that innovation can be represented by a triad showing three different types of knowledge: rational knowledge, intuitive knowledge, and social knowledge. This author also believes that business managers who adopt the knowledge triad to create innovations will be able to achieve strategic goals.

In the educational field, changes and innovations are a significant priority in reputable institutions (Law et al., 2011; Levin, 2008; *Second International Handbook of Educational Change*, 2009). This is why researchers have focused more on defining and evaluating educational innovations in recent years. Foray and Raffo (2012) refer to educational innovations as new tools, practices, technologies, or systems developed and shared to improve academic quality. Generally speaking, educational innovations can be defined as the whole process of developing and implementing new ideas in the educational environment. Such ideas need to be formed through collaboration and accumulation to effectively respond to the envionmental changes that institutions are confronting nowadays (Leadbeater, 2012).

In the more specific context of hospitality and tourism education, Jayawardena (2019, p. 246) concluded that "innovation is the art of implementing new ideas to improve productivity, products, and services while enhancing customer satisfaction, revenues, and profitability". This author also emphasizes the relevance of innovation across macro- and micro-level perspectives of the hospitality and tourism industry. Noticeably, this author mentions the need to have innovations in hospitality pedagogy and how various national governments are attempting to fulfill this urgent requirement to foster a culture of innovation from both industry and professional education perspectives.

The importance of innovation in hospitality and tourism education is particularly emphasized by Oskam (2018b), who argues that globalization, digitization, and the development of platform-based business models have demanded educational institutions to be at a higher degree of readiness in designing long term strategies that are contrary to the traditional pedagogical strategies. Airey and Tribe (2001) also contend that only by creating new ideas and knowledge for better solutions can hospitality education "refresh itself and maintain its relevance, whether for the world of work or beyond". The increased complexity in the environment has urged institutions to seek systematic and innovative methods to ensure that education responds to the industry's worldwide operations, the advances in technology, and the changes in consumers' expectations (Oskam, 2018a). Similarly, by referring to the specific context of Dubai, a country known for its fast-growing hospitality and tourism, Nadkarni and Morris (2019) highlight that the sustainable development of this industry depends on human capital advancement, which requires education to be more innovative. It is evident that exploring educational innovations and finding factors fostering such innovations in the digital era of hospitality and tourism education is essential in many different areas of the world.

It should be noted that although the terms *creativity* and *innovation* are often used interchangeably, the fundamental distinction between them has been drawn by numerous researchers. While *creativity* refers to creating "novel and useful ideas," the concept of *innovation* centers more on how useful ideas are either produced or implemented (Scott & Bruce, 1994, p. 581). In other words, *creativity* is often connected to the creation of new knowledge, whereas *innovation* is broader since it includes various stages of idea production, adoption, adaptation, implementation, and evaluation. Thus, *creativity* is often viewed as the first stage, i.e., idea generation, of the whole *innovation* process (Janssen, 2000; Liu et al., 2019; Scott & Bruce, 1994). This multistage *innovation* process requires an individual or an organization to undertake various activities, starting from recognizing the problems and generating ideas or solutions to seeking support and sponsorship to implement and evaluate such ideas and eventually making these solutions mass-produced or institutionalized (Kanter, 1996).

2.1.2. Components of innovations in online teaching

Even before the outbreak of the COVID-19 pandemic, *online pedagogy* has emerged as an alternative form of teaching and has witnessed substantial growth in popularity in recent years (Scheg, 2014). This concept refers to the use of the Internet and communication technologies to operate online classrooms and deliver instructions. Noticeably, there are various terms regarding *web-based education*, e.g., online classes, hybrid or blended courses, and distance education. Such concepts are distinct yet often used interchangeably and thus might confuse educators and practitioners. Based on the study by Tallent-Runnels et al. (2006), the key concepts of these terms are summarized in Table 1. It should be noted that this doctoral study focuses only on the concept of *online teaching*, i.e., teaching in *online classes* where pedagogical instructions are delivered entirely via the Internet.

*Table 1. Key concepts related to web-based education (*Tallent-Runnels et al., 2006, p. 94*)*

Key terms	**Definitions**
Web-based education	The use of the Internet and communication technologies in researching or delivering online classes.
Online classes	Courses that are delivered completely via the Internet.
Hybrid or blended courses	Courses that combine online elements with traditional, face-to-face elements.
Distance education	Course delivered to students who are not (or can not) present in the same physical classroom, e.g., courses offered via interactive television or videotapes.
E-learning	Learning that is electronically mediated or facilitated by transaction softwares.

When shifting classes from a traditional face-to-face format to the online classrooms, most instructors appear to transfer all aspects of instructions to the new learning environment without considering whether the currently adopted instructional design, assessment techniques, or learning activities are still effective (Levin et al., 2014). In most cases, the traditional lecture format, when being transferred to the online teaching environment without being appropriately modified, often leads to a notable lack of interactions and meaningful communication necessary for the effectiveness of the classes. Therefore, innovations in instructional formats are required to accomplish the learning outcomes better and improve learners' satisfaction and motivation. In the existing literature, these online teaching innovations are often characterized by the following components:

Users' needs analysis

The first step in developing any educational innovation is needs analysis (Cook & Dupras, 2004). It should be noted that educational innovations are designed and implemented to serve the needs of various users, e.g., learners, instructors, or management staff. Therefore, understanding the preferences and characteristics of these target users is significant to the successful development of the new tools, practices, technologies, or systems in online classrooms (Bintoro et al., 2022; Hegazy et al., 2022). Nevertheless, numerous studies on online teaching innovations often lack a detailed description of users' profiles and an analysis of their needs prior to designing and implementing the innovation.

Educational objectives of the innovation

Educational innovations are designed to serve a variety of purposes. According to Stenhouse (1975), education should be understood in a comprehensive approach with a distinction between at least four different processes: *training, instruction, initiation,* and *induction*. Each of these processes is designed to bring about a particular educational aim, e.g., acquisition of skills (in the case of *training*) or retention of information (when it comes to *instruction*). These educational processes and aims are illustrated in Figure 2.

As shown in Figure 2, in training and instruction activities, the acquisition of skills and information are the learning outcomes, whereas, in induction and initiation processes, which provide the context for all other educational activities, students are inducted into the thought system and equipped with the abilities to understand and make judgments. Such capabilities should not be treated as merely skills or exit behaviors that are the same for all students.

Innovations in online teaching should be designed in accordance with these four distinct educational processes and their respective aims. According to Betts et al. (1993, p. 317), it is essential to seek appropriate answers to "why we teach what we do" before determining what and how to teach. Clear objectives and purposes constructed at the beginning of the innovation process help effectively design new tools, practices, technologies, or systems in online teaching. In addition, they are also essential guidelines for evaluating the innovation in the later stage of the process. Table 2 provides examples of educational objectives from which online teaching innovations have been designed, implemented, and evaluated.

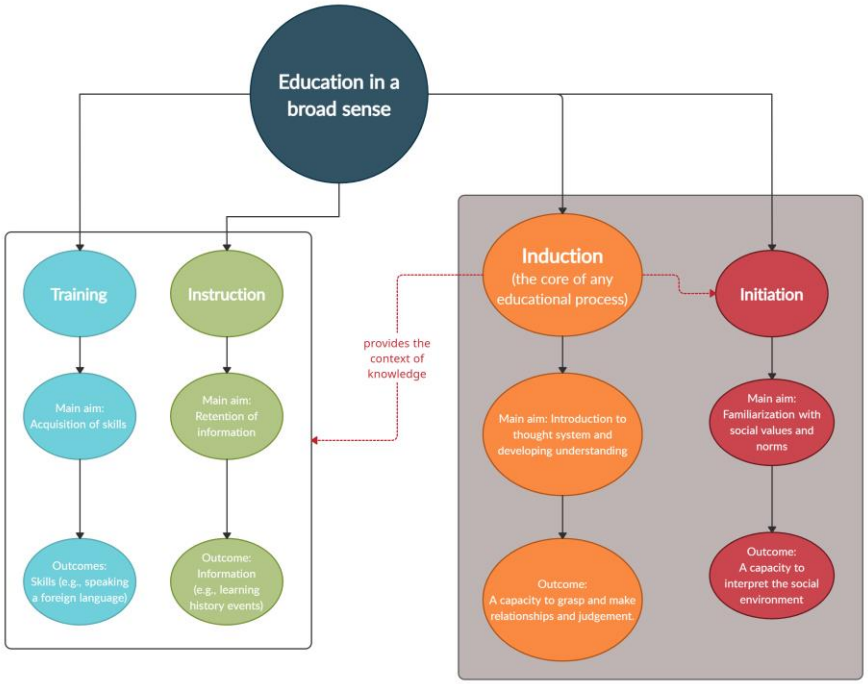


*Figure 2. Four distinct processes in education and their aims (*Elliott, 2001*;* Stenhouse, 1975*)*

Table 2. Examples of objectives for online teaching innovations

Studies	**Educational process**	**Examples of online teaching innovations**	**Educational objective**
Ibabe and Jauregizar (2010)	Induction	Development of a new online self-assessment tool for learners at the University of the Basque Country (Spain)	To improve students' academic performance and their metacognitive knowledge
Persico et al. (2014)	Training, Instruction	Development of a blended course called DID@STEEL	To make the university staff acquainted with the new platform for online learning at an Italian university
Rose et al. (2016)	Instruction	Development of a flipped classroom using online videos	To deliver instructions in pediatric emergency medicine
Foronda et al. (2014)	Training	Development of virtual clinical simulation exercises	To improve the communication skills of baccalaureate nursing students
Fidalgo-Blanco et al. (2017)	Induction	Development of a micro flip teaching model	To improve learners' attitudes and active engagement

Instructional mode: Synchronous or Asynchronous

The use of communication technologies for *online teaching* has recently centered around asynchronous and synchronous modes. While the former provides learners with convenience and flexibility in accessing a large variety of learning materials yet lacks scheduled interactions between teachers with students or students with their peers, the latter addresses the issues of low participation ratings by offering real-time spontaneous interactions and immediate feedback through chat rooms, instant messaging, or desktop video-conferencing systems (Grant & Cheon, 2007; Kear et al., 2012). Although both of these two online-learning media are claimed to bring similar academic results, numerous studies report students' lower satisfaction in online asynchronous text-based lectures than in courses delivered through synchronous web conferencing tools (Moridani, 2007; Skylar, 2009). These studies have highlighted that the insufficient interactions in online asynchronous classes make learners feel impersonal and that their communication throughout the course is not real enough. It is worth noticing that interaction has been identified as one of the essential factors contributing to the academic success of online learners since this learning component provides the opportunities for students to engage in meaningful discussions which support the processes of sharing ideas, thoughts, comments and feelings with peers and teachers (Asadi et al., 2019; Long et al., 2011). Henceforth, when designing online courses which place interaction among the top integral learning components, instructional designers tend to prefer selecting synchronous conferencing technology through which impromptu online communication and discussions can be mediated.

Instructional design and learning activities

Based on the needs analysis and educational objectives, specific learning activities are designed. In some situations, the development of these activities is the innovation itself since transferring aspects of traditional face-to-face instructions to a new online teaching environment requires innovative approaches to ensure that meaningful interaction and learning effectiveness are maintained or enhanced. An example of innovative instructional design for online teaching can be found in the study by Foronda et al. (2014), where a new virtual simulation was designed to improve the communication skills of baccalaureate nursing students. This research provided a detailed description of the newly developed pedagogical procedure to demonstrate this virtual simulation activity. Other similar examples of innovative online pedagogical practices are presented by Rose et al. (2016) and Fidalgo-Blanco et al. (2017). These studies show that online teaching innovations do not necessarily center only on technological aspects. Instead,

innovative online pedagogical procedures or pedagogical technological integration practices can also be considered innovations in online teaching. Indeed, there has been empirical support for the theoretical view that learners benefit more from putting the pedagogy, not the technology, at the focus of online teaching innovations (Draper & Brown, 2004; Fawns et al., 2022).

Technological and administrative support

The existing literature has repeatedly emphasized the importance of technological and administrative support for online teaching. According to Meyer and Barefield (2010), such support is often in the form of "funding, guidance, oversight, assistance" in confronting challenges of online teaching and is "the vital foundation to a sound online educational program" (p. 1). In terms of technological infrastructure needed for online teaching, elements such as a well-supported high-speed internet connection, an effective server system, or comprehensive online library services play a significant role in enhancing the enthusiastic buy-in from online instructors. Undoubtedly, the availability and quality of online instructional media and technological tools are an important component of instructors' readiness to implement online teaching innovations (Scherer et al., 2021).

Evaluation methods

The last component of online teaching innovations is the assessment techniques designed to evaluate the extent to which the innovation has delivered the educational objectives or outcomes. As mentioned earlier, unlike creativity, innovation is not only about generating novel ideas. It is a multistage process that starts from problem identification and often ends with idea evaluation (Janssen, 2000; Liu et al., 2019; Scott & Bruce, 1994). According to Levin et al. (2014), various techniques can be used to evaluate learning in the online environment. These include an assessment by peers, professors, instructors, self-assessment, or assessment by a larger audience. Such evaluation approaches can be based on learners' performance scores, e.g., Ibabe and Jauregizar (2010), or conducted through self-evaluation surveys like in the study by Foronda et al. (2014) or interviews as in the research by Fidalgo-Blanco et al. (2017). In essence, it should be noted that while educational innovations may be new, it is not equivalent to success or effectiveness (Díaz-Gibson et al., 2019). Developing educational innovations requires a methodological approach in which educational gaps must be diagnosed, and evaluating the effectiveness of such innovations in filling the gaps needs to take place.

Although the components mentioned above, i.e., users' needs analysis, educational objectives, instructional mode, instructional design, technological and administrative support, and evaluation methods, are often included in studies about developing online teaching innovations, they have not been presented systematically. In other words, they are currently presented in any particular order in certain research work about online pedagogy. Numerous studies even overlook the significance of some of these components, making the overall notion of *online teaching innovations* remain an ambiguous and incomplete concept. Thus, there is a need to develop a framework to incorporate all necessary components and place them in an order conducive to the production, implementation, and evaluation of online teaching innovations.

Besides the lack of a framework to define online teaching innovations, numerous studies on this discipline also see the absence of appropriate theoretical underpinnings for designing the innovations. Most research focuses merely on the components mentioned above yet misses an explanation of why or on which foundation was some particular innovative instructional design developed. Prominent learning theories, such as behaviorism, cognitivism, or constructivism, should be given a critical role in establishing a solid theoretical background for developing educational interventions. According to Ertmer and Newby (1993), "learning theories provide instructional designers with verified instructional strategies and techniques for facilitating learning as well as a foundation for intelligent strategy selection" (p. 50). As a vast amount of research has suggested that constructivism "has relevance in all educational settings" (Kosnik et al., 2018, p. 4) and is especially recommended in the field of online teaching and learning (Gratz & Looney, 2020; Lane, 2013), this doctoral study has adopted this learning theory to design and introduce an online teaching innovation which aims at improving instructors' skills required for conducting synchronous online teaching sessions. Therefore, the next sub-sections of this chapter will review the literature on constructivist approaches to designing online training programs for teachers.

2.1.3. Constructivist approaches to online teaching and learning

According to Biggs (1996), constructivism has a long history in cognitive psychology and has increasingly become a "dominant espoused theory" in higher education (p. 348). The literature on the adoption of constructivism in education has been voluminous. Most studies emphasize the pre-eminence of constructivism while comparing it with competing theories such as objectivism or positivism. This study selects three prevailing constructivist approaches, which

Kosnik et al. (2018) refer to as "knowledge is constructed by learners," "knowledge is experience-based" and "a strong class community is essential" (p. 105).

In cognitive constructivism, as learners are put front and center, their assumptions, motivations, purposes, and prior knowledge play a vital role in how they construct new knowledge. They thus acquire new meanings by actively engaging in and subjectively experiencing learning activities to create their own knowledge (Wang & Ha, 2012). This perspective explains why new knowledge needs to be based on experience to be formed. In the field of teacher education, several studies have suggested that if teachers experience constructivism as students, they may adopt such an approach in their teaching and may later attempt to replace their lecture-driven teaching method with a more learner-centered one (Gold, 2001; Kosnik et al., 2018).

Unlike the cognitive constructivist approach, social constructivism focuses on how cultural and environmental settings influence how individuals construct their knowledge (Wang & Ha, 2012). In other words, knowledge construction takes place when an individual communicates with others, such as instructors, experts, or peers, in an authentic environment that may be simulated from reality. Creating "a strong class community," according to Kosnik et al. (2018), means strengthening the professional relationships among the class participants through activities such as open discussions, collaboration, working together, experiencing each other's work, and offering constructive and supportive feedback to each other. Such a supportive learning community has enhanced teachers' confidence in teaching with new technology (Arbaugh & Benbunan-Fich, 2006; Kosnik et al., 2018; Saidalvi & Samad, 2019; Wang & Ha, 2012).

The learner-centered framework in constructivism has been adopted by numerous researchers on teacher education, especially in studies about online training programs for teachers (Gratz & Looney, 2020; Lane, 2013). According to Cornelius (2014), when adopted in a virtual classroom, constructivism may offer more opportunities for interaction and thus generate more engagement and ownership among participants. Eom and Ashill (2016) also assert that "the defining characteristics of e-learning are derived from the constructivist model of learning" (p. 188). This family of learning theories has been a sound theoretical framework for research on virtual learning settings.

2.1.4. Teachers' training programs to improve online teaching skills

Among very few studies that focus on designing, implementing, and evaluating teachers' training in using synchronous technology in teaching, Table 3 lists those whose objectives and approaches are similar to this thesis. In addition to their meaningful contribution to the field of teachers' training in synchronous online teaching, these studies also have significant limitations, which are briefly described in Table 4.

Table 3. Findings of studies on teachers' training in synchronous online teaching

Key conceptual words	Major findings	Studies
Teachers' training in synchronous online teaching	The need to provide training, both technically and pedagogically, to instructors who lack experience in teaching with synchronous conferencing technology was reiterated.	d'Eça and Gonzáles (2006); Grenon et al. (2019); Johnson et al. (2006); Kamlaskar and Killedar (2015); Kannan and Narayanan (2015); Kannan and Narayanan (2016); Peachey (2017); Rehn et al. (2018); Wang et al. (2010); Zemliansky (2021)
Constructivism as a compelling framework in synchronous online teaching	A translation of the constructivist theoretical framework into the practice of synchronous online teaching was conducted to enhance teachers' skills and confidence in synchronous online teaching.	Cornelius (2014); d'Eça and Gonzáles (2006); Johnson et al. (2006); Wang et al. (2010); Zemliansky (2021)
Course design to enhance teachers' self-confidence in synchronous online teaching	To give the necessary technical and psychological support to teachers who have to deliver synchronous online sessions, specific guidelines and detailed description of training activities were provided.	d'Eça and Gonzáles (2006); Kamlaskar and Killedar (2015); Khairi et al. (2021); Wang et al. (2010)

Table 4. Limitations of studies on teachers' training in synchronous online teaching

Content	Limitations	Studies
Theoretical framework	Insufficient details were given about the theoretical background.	d'Eça and Gonzáles (2006); Kannan and Narayanan (2015); Kannan and Narayanan (2016)
Selecting a synchronous platform	There were few details on and explanations of why and how the platform used in the study was chosen.	d'Eça and Gonzáles (2006); Kannan and Narayanan (2015); Kannan and Narayanan (2016); Grenon et al. (2019); Wang et al. (2010)
Course content	The details about the course objectives, structure, and content were insufficient.	Johnson et al. (2006); Kannan and Narayanan (2016); Grenon et al. (2019)
Implementation of the program	No details were given on how the training program was implemented.	d'Eça and Gonzáles (2006); Johnson et al. (2006); Grenon et al. (2019)
Program evaluation	Most of the studies claimed the success of the programs examined, but there were few details on how the evaluation methods employed in such studies were designed.	d'Eça and Gonzáles (2006); Kamlaskar and Killedar (2015); Wang et al. (2010)

There are missing pieces in the literature on teachers' training in synchronous online teaching. First, although constructivism has been claimed to be a sound theoretical framework for research on virtual learning settings, it is noteworthy that studies on how this compelling family of theories is adopted in online education are often conducted on a general basis. Few studies have attempted to translate these theories into specific real-time pedagogical practices to enhance the effectiveness of online teaching and learning activities. This study was thus conducted to provide meaningful guidelines for educators and teachers in this regard.

Second, regarding the professional areas where online pedagogy is currently being studied and practiced, the recent studies, such as those by Lamy and Hampel (2007), Bauman et al. (2008), Compton (2009), Beaven et al. (2010), Wang et al. (2010), and Ernest et al. (2013), have focused more on how the live video-conferencing technology can mediate learning in the field of language training than in any other professional areas. Consequently, more research is needed to instruct teachers in other fields or occupational sectors in making use of synchronous online conferencing tools. To fill such a literature gap, this study gathered empirical evidence from the field of hospitality and tourism education in Vietnam, where numerous instructors are facing challenges in changing their mode of instructional delivery, a requirement imposed by the current COVID-19 pandemic. However, the proposed training design can be delivered not only to hospitality and tourism instructors but also to instructors in other disciplines or regions because the training concentrates on technological pedagogical integration rather than on the domain knowledge of the hospitality and tourism sector.

Third, although teacher training programs are directed at the acquisition of knowledge and skills, there are psychological factors influencing the delivery of synchronous online lessons that are worth examining. In their study on the use of synchronous online tools to conduct teacher training, Wang et al. (2010) emphasized that the changes in teachers' attitudes, motivation, anxiety, and confidence during the process of learning new online teaching practices are often neglected. They claim that these psychological factors should be given more attention as cyber environments are different from face-to-face classrooms due to their "novelty, complexity, and synchronicity" (Wang et al., 2010, p. 278). Some researchers add that to support teachers who are new to teaching with web conferencing, there is a need to focus on their personal experiences as learners (Cornelius, 2014; d'Eça & Gonzáles, 2006; Peachey, 2017; Wang & Wiesemes, 2012). These authors particularly stress the lack of research exploring instructors' individual experiences in online teaching and the necessary levels of self-confidence in such mode of teaching. The innovative training program proposed in this study

will pay attention to teachers' self-confidence, one of the essential psychological factors influencing the effectiveness of virtual online classrooms.

Lastly, considering that pre-service teachers generally lack professional knowledge, experience, and expertise in online education, the current literature appears to focus more on them than on experienced teachers. Nevertheless, despite already having expertise in both the subject matter and teaching strategies, in-service teachers still need professional development in teaching with technology (Downing & Dyment, 2013; Junaidia et al., 2020; Peachey, 2017). Therefore, focusing less on the domain knowledge and paying more attention to supporting experienced teachers in technological pedagogical integration, the training program proposed by this study is expected to provide experienced teachers with the training that they need in online pedagogical practices so that they can grow in confidence and can become more efficient in their daily teaching tasks.

2.2. Instructors' innovative behavior in online teaching (for *SRO2*)

2.2.1. Definition of innovative behavior

While the concept of *innovation* is difficult to define and study (Asbari et al., 2021), the term *innovative behavior* appears to gain a more explicit recognition and definition. According to Liu et al. (2019, p. 774), *individual innovative behavior* is defined as "a complex set of actions" categorized into three different types: generating, promoting, and realizing ideas and solutions useful for the workplace. The first one, i.e., idea generation, refers to the creation and introduction of new or adapted methods for performing work tasks. The second group of actions is related to idea promotion, which involves the process of seeking support and sponsorship for implementing the proposed solutions. Finally, realizing ideas points to the application and convertion of new ideas into practical products, services, or operation procedures that help to improve work performance.

Other researchers also propose similar definitions for *individual innovative behavior*. For example, Dorenbosch et al. (2005), Kleysen and Street (2001), and Odoardi et al. (2015) characterize this concept as the purposeful introduction and application of ideas, processes, products, or procedures to bring benefits to stakeholders and others. Noticeably, while often being defined as "actions", the term can also be referred to as human competence or abilities to adopt and apply new and meaningful ideas into performing work tasks (Asbari et al., 2021). From this perspective, *innovative behavior* reflects a specific form of knowledge creation and

change-oriented activities, not only in the workplace context but also in other daily areas of human life.

The uncertain and competitive environment of today's workplace requires organizations to increasingly rely on employees' contributions of innovative ideas. Therefore, *individual innovative behavior* has become more and more significant to the process of preserving or enhancing the competitiveness and effectiveness needed for sustainable development (Odoardi et al., 2015). In online teaching and learning environment, instructors' innovative behavior plays a vital role. The long-standing importance of *innovative behavior* has led to extensive literature and generated various frameworks for this construct. In this study, three major factors influencing instructors' *innovative behavior* in online teaching will be reviewed and discussed in the next sub-chapters. These include psychological, organizational, and macro-environmental elements. Each of these groups is comprised of constructs that are adopted to specify the hypothetical path model whose target endogenous variable is *instructors' innovative behavior in online teaching*.

2.2.2. Psychological factors responsible for innovative behavior

Numerous psychological constructs have been empirically indicated to influence individual innovative behavior. However, most of them were identified in a general workplace context. In the online learning environment, studies appear to focus mainly on instructors' readiness in online pedagogy rather than drivers of their innovative behavior. Therefore, in this thesis, most psychological factors influencing innovative behavior are selected from the existing literature in a broad workplace environment and adapted to the context of online teaching. These factors are (1) *skills* required for conducting a specific task (Birdi et al., 2016), referred to as *skill complexes required for online teaching* in this study, (2) *self-confidence* (Dar et al., 2022; He, 2013; Pons et al., 2016; Yang et al., 2021), and (3) *employees' attitude towards the task* (Avsec & Savec, 2021; Ettlie & O'Keefe, 1982; Lee et al., 2007), specifically adapted in this study as *instructors' attitudes towards online teaching*. Their concepts and significance are reviewed as follows.

Skill complexes required for online teaching

Teaching in a virtual classroom can be more challenging than teaching in a face-to-face environment (Cornelius, 2014; Kear et al., 2012). Specifically, planning for lessons and preparing materials for teaching in the online environment usually take more time (Cornelius, 2014), not to mention the requirement of handling the cognitive overload caused by the need

to perform multiple teaching tasks simultaneously when teaching in the synchronous online sessions (Kear et al., 2012; Wang et al., 2010). In addition, problems such as poor internet connection causing teaching interruptions, low quality of images or videos used, and teacher skill-shortage matters appear to lower teachers' efficacy in delivering synchronous online lessons (Grant & Cheon, 2007; Kear et al., 2012). Instructors thus need to be provided more support and training to enhance their confidence in delivering their online courses.

Based on the current literature and textbooks that provide guidelines on online teaching, this study identifies the complex skills needed to facilitate online classes. These include developing an online presence, planning lessons, handling technology, adapting to learners' preferences, and classroom management. A list of studies mentioning these is provided in Table 5.

Table 5. Skill complexes required for online teaching

Skills	Description	Studies
Developing online presence	▪ Recognizing the importance of online presence, which has three components: social, teaching and cognitive presence	Bacon and Bloom (1995); Boettcher and Conrad (2016); Cornelius (2014); d'Eça and Gonzáles (2006); Després-Bedward et al. (2018); Eom and Ashill (2016) Ernest et al. (2013); Kear et al. (2012); Lee (2018); Wang et al. (2010)
	▪ Developing strategies to enhance the components of online presence	Boettcher and Conrad (2016); Goh (2020); Sharp et al. (2021); Wang (2015)
Planning lessons	▪ Preparing learners before the course starts and designing learning activities	Boettcher and Conrad (2016); Cornelius (2014); Grenon et al. (2019); Kannan and Narayanan (2016); Kear et al. (2012);
Handling technology	▪ Using the different functionalities of synchronous conferencing platforms to achieve the set learning outcomes	Alqurashi et al. (2017); Cornelius (2014); Ernest et al. (2013); Sharp et al. (2021)
Adapting to learners' preferences	▪ Recognizing varied learning preferences and learners' diverse backgrounds to identify supportive technological resources and tools	Boettcher and Conrad (2016); Bonk and Zhang (2008); Eom and Ashill (2016); Min et al. (2018)
Classroom management	▪ Developing strategies to respond to learners' behaviors and manage virtual classrooms	Boettcher and Conrad (2016); Cornelius (2014); Kaosaiyaporn et al. (2015); Pyke and Sherlock (2010)

Self-confidence in online teaching

Self-confidence refers to an individual's reflection of their perceived capabilities when attempting to complete a task or achieve a goal in a particular context (Hahn & Lee, 2017; Lindblom-Ylänne et al., 2006). Self-confidence is also discussed in relation to various self-concepts, such as self-efficacy, self-esteem, stability, and self-crystallization (Rosenberg & Kaplan, 1982). These constructs appear similar but are fundamentally different from each other. Table 6 introduces the definitions provided by well-known authors.

Although there are distinct theoretical definitions for the constructs, as mentioned earlier, such descriptions are insufficient to highlight their differences (Bong & Skaalvik, 2003). To illustrate, the concepts of self-efficacy and self-confidence have been used interchangeably to refer to an individual's self-perception of their capacity to attain a particular goal when performing a specific task (Hollenbeck & Hall, 2004; Kickul et al., 2008; Wilson et al., 2007). In the academic context, Landino and Owen (1988) define self-efficacy as "an estimate of confidence in one's ability to perform various tasks classified as research, service, and teaching in a university setting" (p. 2).

Table 6. Definitions of different constructs related to self-confidence

Constructs	Definitions	Authors
Self-efficacy	The belief in one's capacity to 'organize and execute the courses of action required to manage prospective situations' (p. 2)	Bandura (1995)
Self-confidence	'An individual's cognition of the probability of success in a task' (p. 567)	Hahn and Lee (2017)
Self-esteem	'The personal judgment of worthiness' (p. 4)	Coopersmith (1967)
Stability	'The ease or difficulty of changing the self-concept, and it depends on how crystalized or structured an individual's self-beliefs are' (p. 210)	Schunk (1991)
Self-crystallization	'Belief becomes crystallized with repeated similar experiences' (p. 210)	Schunk (1991)

Extensive research has proven that when teachers believe in their teaching capacity, their students' academic performance will improve. Notable evidence of this can be found in the study by Ashton and Webb (1986), where teachers' self-confidence was reported to be a predictor of students' learning achievement in an academic year. In another study about science, technology, engineering, and mathematics education, Scaradozzi et al. (2019) use self-confidence as one of the two essential criteria for evaluating the success of a training course equipping teachers with the skills needed for using technology in teaching. It is noteworthy

that for pre-service teachers, a significant goal in their professional development is to develop their confidence in selecting an educational framework and devising appropriate instructional strategies (Sadler, 2013). In-service teachers, despite having a reasonable degree of self-confidence as a result of their vast experience in teaching (Landino & Owen, 1988), are not always able to maintain such self-confidence when teaching online (Downing & Dyment, 2013; Junaidia et al., 2020). During the outbreak of the COVID-19 pandemic, although the development of educational technology has been accelerated dramatically, teachers' confidence and skills in using these technological advances have not been fully addressed.

According to Bong and Skaalvik (2003), the most popular method of measuring academic self-confidence is through self-evaluation reports, where participants are required to estimate their perceived ability to solve an actual specific problem successfully. Various questionnaires have been designed to measure an individual's self-confidence in the academic context. For example, the Teacher Efficacy Scale was developed by Gibson and Dembo (1984) to measure teachers' self-confidence in their abilities to instruct students. The questionnaire is a 30-item instrument, with each item scored on the basis of a six-point Likert scale (1 = "strongly disagree"; 6 = "strongly agree"). Another prominent example of self-report surveys for measuring instructors' self-confidence is the Measure of Self-Efficacy in Academic Tasks, which consists of three subscales: "research" (1 item), "service" (11 items), and "teaching" (10 items) (Landino & Owen, 1988, p. 5). Other similar instruments developed to focus more on measuring self-confidence in online teaching can be found in the studies by Downing and Dyment (2013) or Harrison et al. (2017). However, most of these questionnaires were designed merely for exploring instructors' confidence in delivering online courses. Apart from the study by Scaradozzi et al. (2019), there have been few studies that compared pre- and post-training teacher participant self-evaluation reports to understand the challenges in online teaching and assess educational interventions designed to enhance teachers' readiness to teach online. In this thesis, instructors' self-confidence plays two roles: (1) as a target learning outcome measured through a self-evaluation report to assess the effectiveness of the designed innovation in online teaching in ***Study 1***, and (2) as one of the exogenous constructs influencing the endogeneous target variable, i.e., instructors' innovative behavior in online teaching, in ***Study 2***.

Instructors' attitudes towards online teaching

According to Sangwan et al. (2021, p. 188), attitude is a psychological construct devised to explain "any phenomenon of interest" and is an essential feature of one's personality and behavior. In the online teaching environment, the success in delivering courses often depends mainly on the attitudes instructors hold towards the online teaching environment. Instructors with a positive attitude towards online teaching appear to be more willing to adopt technological web-based advances in their pedagogical practices than those with an unfavorable opinion of the online classroom environment (Uzunboylu, 2007). For this reason, when instructors believe in the strengths of online education, they may openly display their innovative behavior in online teaching.

There are various factors influencing instructors' attitudes towards online teaching. Among these factors, this thesis adapts the Technology Acceptance Model (Davis, 1989) and accordingly selects four widely-discussed variables to review and examine: (1) *perceived usefulness of online teaching technology* (Lai et al., 2016; Walker & Hong, 2017; Walker & Kim, 2015), (2) *perceived ease of use* (Kumar & Daniel, 2016; Lai et al., 2016; Walker & Hong, 2017; Walker & Kim, 2015), (3) *attitudes towards professional learning opportunities* (to enhance online teaching skills) (Flores, 2001; Geijsel et al., 2001), and (4) *internalization of organization goals into personal goals (regarding online teaching)* (Geijsel et al., 2003; Geijsel et al., 2009; Leithwood et al., 1999). Table 7 describes each of these constructs.

Table 7. Definitions of factors influencing instructors' attitudes towards online teaching

Factors	Definitions	Studies
Perceived usefulness of online teaching technology	"A person's expectation" that using online educational technology will result in improved teaching performance	Davis et al. (1992, p. 1112)
Perceived ease of use	The perceived "effort one experiences in the process of carrying out tasks using a given system"	Davis et al. (1992, p. 1115)
Attitude towards professional learning opportunities	The extent to which "teachers take responsibility for their own professional functioning and acquire the necessary knowledge and repertoire of activities to participate critically in the social and cultural practices" with regard to online teaching practices	Geijsel et al. (2001, p. 133); Geijsel et al. (2009, p. 408)
Internalization of organization goals into personal goals (regarding online teaching)	The degree of "belief in and acceptance of the organization's goals and values", the "willingness to exert considerable effort on behalf of the organization", and "a desire to maintain organizational membership".	Geijsel et al. (2009, p. 409)

2.2.3. Organizational innovative climate

Organizational innovative climate has been among the most significant antecedents of individual innovative behavior (Geijsel et al., 2009; Liu et al., 2019; Luo et al., 2018; Scott & Bruce, 1994; Zhang et al., 2018). This construct is characterized as "employees' experience and perception of the organization" (p. 774), which reflects environmental attributes conducive to innovations (Liu et al., 2019). In numerous studies, the organizational innovative climate is often treated as the perceived organizational conditions that support or motivate innovations necessary for enhancing organizational effectiveness and long-term development. Scott and Bruce (1994) explain that when an organization sends out specific signals that expose its values and expectation, organizational members will take such cues as guidelines for reacting or behaving in a manner that may lead to more satisfactory outcomes such as improved performance evaluation and recognition.

Organizational innovative climate has various dimensions (Chou, Shen, et al., 2010; He, 2013; Luo et al., 2018), among which four prominent factors are selected for the context of online teaching outlined in this thesis. These factors include *collaboration* (Chou, Hsiao, et al., 2010; He, 2013; Jing & Zhou, 2010), *transformational leadership* (Chou, Shen, et al., 2010; He, 2013; Jing & Zhou, 2010), *shared decision-making* (Jing & Zhou, 2010; Shamim et al., 2016), and *supportive infrastructure* (Chou, Hsiao, et al., 2010; He, 2013). Each is described as follows:

Collaboration among instructors

Research has indicated that when teachers have opportunities to work together or to exchange ideas in teaching, they will create positive changes in classroom practices and students' learning (Geijsel et al., 2001; Geijsel et al., 2009). One may wonder what fosters such collaboration practices since, in most cases, teachers often appear to work independently from each other, especially when they have to deliver distinct subject matters. In a general workplace context, Odoardi et al. (2015) note that employees' perceptions of management's emphasis on collaboration activities contribute indirectly to their motivations to initiate and implement new and effective methods of completing tasks. In the specific context of online pedagogy, however, few studies have examined the role of instructors' perception towards collaboration within their efforts to invent a new and helpful way of teaching in online classrooms.

Transformational leadership in implementing online teaching innovations

Bass (1985) has identified three groups of activities that characterize transformational leadership in educational settings: (1) building an organizational vision for the future, (2) providing support for each individual member of the organization, and (3) encouraging intellectual stimulation. Table 8 provides an overview of these three dimensions.

Table 8. Three dimensions of transformational leadership in educational settings

Dimensions	Definitions	Studies
Vision	The creation of organizational goals and directions for change necessary for workplace emotional connections, self-confidence, and willingness to internalize organizational goals and values into personal aspirations	Geijsel et al. (2009)
	"a mental image of a possible and desirable future state of the organization"	Bennis and Nanus (1985, p. 89)
Individual support	"an attempt to understand, recognize and satisfy" organization members' concerns and needs while treating each member as a unique individual	Geijsel et al. (2009, p. 411)
Intellectual stimulation	Through intellectual stimulation, leaders encourage teachers to improve problem-solving competencies and arouse teachers' awareness and recognition of their own beliefs and values as well as those of their peers.	Geijsel et al. (2009, p. 411)

Transformational leadership practices have been proved to significantly impact the innovation climate in numerous studies, e.g., in the construction industry (Zhang et al., 2018). Nevertheless, to the best of my knowledge, in the online educational settings, how large an impact these practices place on organizational innovative climate has not been fully examined. More empirical evidence is needed to explore to which extent organizational leaders should demonstrate their transformational leadership to create an environment in which online instructors can be motivated to innovate effectively in their virtual classrooms (Masry-Herzallah & Stavissky, 2021).

Shared decision making in online teaching

Online pedagogy has existed in the literature for a long time. However, the practical performance of this concept is still new to many regions and countries. Therefore, when delivering online lessons, instructors need to be given opportunities to participate in making decisions related to adopting new approaches or technology. According to Geijsel et al. (2009), such participative decision-making practices enhance instructors' self-efficacy and the internalization of organizational goals into individual goals. Since studies taking this factor into

consideration are scant, more research on how it influences instructors' perceived organizational climate is needed.

Supportive infrastructure for online teaching

When transitioning to the online teaching environment, instructors need to know that they receive strong infrastructure support from the organization. To employees, such perceived support indicates the organizational commitment to organizational goals, values, and the staff and thus motivates them to put more effort into performing their assigned tasks (Eisenberger et al., 1986). According to Meyer and Barefield (2010), instructors who realize that they have sufficient technological, financial, and emotional backing are often more willing to confront challenges in online teaching. Elements such as a well-supported high-speed internet connection, an effective server system, or comprehensive online library services play a significant role in enhancing the enthusiastic buy-in from online instructors. Therefore, the availability and quality of online instructional media and technological tools are an important antecedents of instructors' readiness in implementing online teaching innovations (Scherer et al., 2021).

2.2.4. Macro-environmental impact

For educational innovations to be fostered and implemented successfully, a mix of different factors in an environment wider than the organizational climate may also play an essential role (Lawrence, 2018; Nti, 2015). Every aspect in this larger setting appears to potentially impact instructors' motivation to design or adopt new methods or technology for teaching in virtual classrooms. For example, in some countries, e.g., Yemeni, access to the Internet or some particular websites is restricted due to political reasons (Tuparova et al., 2018). These restrictions may prohibit the distribution of certain materials necessary for online teaching and learning.

Besides political constraints upon internet access, governmental policies and economic conditions can either offer or limit the opportunities for institutions to innovate or be creative in the way educational products and services are provided. For example, in New Zealand, the governmental centralization of monitoring and reporting has created a less favorable environment for tertiary institutions to initiate and foster educational innovations (Crawford, 2016). Another example can be found in the context of Vietnam, where there is an urgent need for establishing a strong partnership between the government and educational institutions so that an integrated, holistic framework of policies and guidelines on integrating information and

communication technology (ICT) into pedagogical practices can be constructed (Peeraer & Van Petegem, 2012).

In professional education fields such as hospitality and tourism, instructors' perceptions on the importance of the industry-education linkage may also influence their innovative behavior in online teaching practices. In other words, it is essential to also consider the industry as a vital factor that may influence instructors' perceptions of the needs to be innovative in teaching practices. Catrett (2018) highlights that:

> "If asking the industry, academia, and current or former students what is needed in hospitality curriculum cannot yield reliable results, then perhaps the only way to approach the subject is to reflect on how the industry and education appear to be evolving." (p. 28)

The existing literature has asserted that a competitive professional education system should be able to respond to the needs and expectations of various stakeholders, e.g., students, employers, and educators (Barrows & Walsh, 2002; Goodman & Sprague, 1991; Le et al., 2018; Lewis, 1993). In other words, there is a need to enhance the partnership between the industry and institutions to ensure that educational processes offer genuine benefits to all stakeholders (Luong et al., 2022). Barrows and Walsh (2002) suggested that short- and long-term forms of collaboration between industry associations and hospitality institutions should be established because such interactions are beneficial to delivering hospitality programs and the professional development of managers working in hospitality organizations. Oskam (2018b) and Gupta et al. (2021) also stressed that the main challenge for hospitality institutions is to balance between ensuring academic quality standards and keeping up with the rapid development and new trends in the industry, particularly in the post-COVID-19 era. Ultimately, teaching still plays a significant role in maintaining such hopefulness and loyalty, and teaching innovations to ensure learning effectiveness need to be among the primary concerns of hospitality and tourism stakeholders (Zhong et al., 2021). However, to assess the degree to which online instructors have taken into account the significance of the industry evolution, there is a need for more empirical research since the existing literature does not have sufficient research-based evidence (Kim & Jeong, 2018; Starks & Carroll, 2018).

Lastly, how instructors perceive the changes in learners' demographic traits can also influence their innovative behavior in online teaching practices. To illustrate, learners belonging to Generation Z require instructors to be not only familiar with digital technology but also confident, creative, and innovative since this group of students is often referred to as

the “digital generation” or “internet generation”; therefore, there might be a pressure for online instructors to seek an optimal use of ICT in teaching practices for touching “the side of habits that are close to digital life” (Elmunsyah et al., 2020, p. 1). Nonetheless, the current literature has not empirically examined whether the perceived changes of learners’ demographic characteristics may influence instructors’ innovative behavior in online teaching practices.

2.3. Hospitality and tourism education in Vietnam

2.3.1. An overview

Vietnam is among the Association of Southeast Asian Nations (ASEAN), where tourism is an important source of foreign exchange income and employment opportunities (Rawat et al., 2015). Before the outbreak of the COVID-19 pandemic, Hampton et al. (2018) reported that tourism contributed significantly to Vietnam’s GDP and thus became a national strategic industry. In 2019, total international tourist arrivals to Vietnam reached a peak of over 18 million, increasing 16% over the same period in 2018, making the country the leading Best Asian destination for two consecutive years alongside with awards from international organizations for airlines, travel agencies, hotels and many other tourism hotspots (Huynh, 2020). However, according to numerous studies, the current pandemic has severely damaged the entire hospitality and tourism industry in Vietnam. Vu et al. (2022) contend that the overall economic efficiency of the industry has declined, making its role in the economy of Vietnam less substantial. The damage also has a considerable impact on students’ decision to pursue hospitality and tourism academic programs. The number of students enrolled in these programs has decreased substantially since the fourth wave of the pandemic hit the country in 2020 (Anh, 2021; Thanh, 2021). As a result, there is a pressing need to help hospitality and tourism students maintain their hope and confidence in their academic program and future career, as well as their commitment to them.

According to Buzinde et al. (2018), although Vietnam is “an increasingly formidable player in the regional tourism arena”, the country is still struggling to address its workforce issues, mainly in terms of education deficiencies leading to the lack of competent human resources for the hospitality and tourism industry. Many other esteemed authors also confirm that the current education system in Vietnam does not effectively equip graduates with sufficient skills and abilities to work successfully in the industry, especially in the international business context (Le, 2018; Le et al., 2018; Losekoot et al., 2019). Buzinde et al. (2018) suggest that students’ motivation to enroll in hospitality and tourism degrees appears to form a

hierarchy with knowledge at the top. This study implies that to achieve student retention, educational institutions need to adopt pedagogical approaches that can effectively provide students with the necessary knowledge and skills to succeed in the industry. Another study by Nghia and My Duyen (2018) also emphasizes that greater attention needs to be paid to engaging students in the hospitality and tourism profession. The authors claim that institutions need to seek innovative approaches to improve students' learning experience. Likewise, Le et al. (2018) believe that Vietnamese hospitality and tourism institutions lack effective responses to labor market needs. This deficiency is caused by insuffient policies that facilitate and support the partnership between industrial enterprises and educational institutions to construct curriculum pedagogical approaches.

In brief, Vietnam appears to be an example of an ASEAN country where the fast-growing hospitality and tourism industry poses numerous labor challenges, among which lacking quality training and education services have been empirically indicated (Hampton et al., 2018). To effectively contribute to human capacity building for the industry, institutions need to adopt more innovative approaches. Accordingly, educational curricula need to be progressively updated to respond to the rapid environmental changes in the industry, and innovative pedagogical practices are required to not only retain students but also equip them with the appropriate skills and attitudes needed to succeed in the workplace. Moreover, it is worth noticing that developing educational innovations requires systematic and methodical processes to identify the educational gap and verify whether the innovative practices fill in the gap. Therefore, any studies focusing on constructing and implementing innovations for hospitality and tourism education in Vietnam need such approaches to validate the innovations' success in achieving educational goals. Nonetheless, few studies have concentrated on building and testing innovations, especially for the hospitality and tourism education of an emerging country like Vietnam. We need more research on this discipline to guide teachers toward more effective pedagogical methodology and curriculum renewal to successfully address the workforce issues of the hospitality and tourism industry in this emerging country.

2.3.2. Current issues in online teaching

Although the government in Vietnam has placed a strong focus on setting ICT as an essential tool for innovating teaching methodology, the country is still one of the low and middle-income nations with uneven access to the internet connection, and online education thus continues to pose significant challenges to both instructors and learners. Dinh and Nguyen (2020) reported

numerous difficulties in online teaching and learning in Vietnam, particularly during the COVID-19 pandemic, when school closures forced the shift from the traditional face-to-face classrooms to the new online learning environment. These challenges lie in technological issues such as loss of connection or managing various platforms and in pedagogical practices where instructors are struggling to transform their teaching mode to maintain meaningful interactive communication for the online classrooms. This is not to mention that instructors in Vietnam have received very limited teacher training to prepare themselves for the shift to the online teaching environment (Le et al., 2022; Pham et al., 2021). Universities, particularly those in the public sector (Dao Thi Thu & Duong Hong, 2021), have created or adopted inconsistent guidelines for online teaching, and instructors have had to learn by themselves the skills for delivering online lessons.

Indeed, online teaching has not gained much attention from education providers in Vietnam (Hung, 2021; Maheshwari, 2021). The COVID-19 pandemic has motivated the country to focus more on establishing a long-term strategy and necessary infrastructure for online education. Various problems related to teaching and learning effectiveness are being addressed. Online teaching capacity is being reviewed, and national policies and legal frameworks are being formed to meet the requirements of developing online education to a more advanced level to deal with the uncertainties surrounding the modern world. Therefore, more research to guide these transformations is needed. Particularly, studies that focus on supporting and motivating hospitality and tourism instructors to innovate online teaching practices become more important than ever because teaching plays a significant role in maintaining students' hopefulness and loyalty to this profession in both the present and future of the industry (Zhong et al., 2021). It is time for hospitality and tourism instructors in Vietnam to construct and search for new online pedagogical approaches and practices for the sake of their teaching effectiveness, which may also contribute significantly to the recovery of the industry in the post-pandemic era.

2.4. Summary

This chapter has described the contextual framework of the study and critically reviewed the literature relating to the concept of online teaching innovations and teachers' innovative behavior in online teaching. The previous review highlighted the significance of a methodological approach in which educational gaps can be diagnosed and educational innovations, particularly those related to the online teaching environment, can be implemented

and evaluated. Specifically, there is a need to develop a framework to incorporate all necessary components of online pedagogical innovations, which have been found in the existing literature and place them in an order conducive to the production, implementation, and evaluation of such innovations. This study will proactively fulfill this requirement by constructing a framework for designing, implementing, and evaluating an online teaching innovation.

Providing guidance on creating online teaching innovations is just as important as motivating instructors to foster their innovative behavior in the online classroom environment. Numerous factors have been empirically indicated to influence individual innovative behavior through previous studies. However, most of them were identified in a general workplace context. In the online learning environment, studies appear to focus mainly on instructors' readiness in online pedagogy rather than drivers of their innovative behavior. Therefore, this thesis contributes to the literature by providing empirical evidence to explore factors enhancing instructors' innovative behavior in online teaching in hospitality and tourism education in Vietnam. In this context, new online pedagogical approaches and practices for teaching effectivenes have become urgent and signicant in recent times.

3. Methodology

3.1. A Summary of Research design

The main research objective **(MRO)** of this thesis is to characterize the concept of *online teaching innovations* in the context of hospitality and tourism education in Vietnam and enhancing instructors' *innovative behavior* in the online pedagogical environment.

To achieve **MRO**, this research has two sub-objectives (see Figure 1): the first sub-objective ***(SRO1)*** is to characterize the concept of *online teaching innovations*. The second sub-objective ***(SRO2)s*** is to develop a model of factors influencing Vietnamese hospitality and tourism instructors' *innovative behavior* in initiating and implementing such online teaching innovations. ***SRO1*** has a strong relationship with ***SRO2*** and vice versa. While achieving ***SRO2*** will generate a list of factors influencing instructors' innovative behavior in online teaching, the fulfillment of ***SRO1*** will provide a framework to characterize online teaching innovations and thus guide instructors through the process of initiating and implementing new online pedagogical practices. Achieving these two sub-objectives will fulfill the **MRO**.

Accordingly, there are two major studies conducted to fulfill ***SRO1*** and ***SRO2***. The first study to achieve ***SRO1***, referred to in this thesis as ***Study 1***, presents a framework for designing, implementing, and evaluating an online teaching innovation. It adopts a pre-post research design to characterize the concept of innovations in online pedagogy in the context of hospitality and tourism education in Vietnam. The proposed innovation is in the form of a constructivist online training program for improving instructors' online teaching skills. The innovative training program is then evaluated by comparing the participants' self-evaluation ratings for skill improvement before and after the training program. Evaluation results of this online teaching innovation are presented in chapter 4 of this thesis. Through designing, implementing, and evaluating this innovative training program, the concept of innovation in online teaching is characterized in sub-chapter 6.1. Accordingly, a framework for online teaching innovations is provided to characterize online pedagogy innovations.

The second study to achieve ***SRO2***, i.e., ***Study 2***, employs the partial least squares structural equation modeling (PLS-SEM) procedure suggested by Hair et al. (2022) as the primary approach to propose and evaluate a path model for instructors' innovative behavior in online teaching in the context of hospitality and tourism education in Vietnam. This path model comprises two components: (1) the structural model describing the relationships between the identified factors, and (2) the measurement models, which show the relationships between each

factor and its indicators. After specifying the model and the indicators in the questionnaire, data were collected, and the systematic procedure for applying PLS-SEM was conducted to assess the quality of the specified model. First, a pilot study was implemented to determine the required minimum sample size. The results of the pilot phase are reported and interpreted in sub-chapter 5.1. For the main study, after the quality of the measurement models is determined, the evaluation results of the structural model are provided to form a predictive model of factors influencing instructors' innovative behavior in implementing online teaching innovations. The explanatory and predictive power of the proposed model is shown in sub-chapter 5.2 - 5.4. The interpretation of these results are presented in sub-chapter 6.2.

Table 9 below demonstrates the overall research design, procedure, and respective outcomes of each research phase.

Table 9. Research design, process, and outcomes

Phases	Procedure	Details	Outcomes
1. Study 1: Characterizing an innovation in online teaching	Designing the research	Designing the training program; Designing the pre- and post-training survey;	A training program for improving instructors' self-confidence in online teaching was proposed.
	Collecting quantitative and qualitative data	Recruiting participants; Designing and conducting a training program for improving teachers' self-confidence in online teaching Conducting semi-structured interviews Administering pre- and post-training surveys to participants.	Qualitative and quantitative data about teachers' level of self-confidence in online teaching were collected.
	Analyzing quantitative and qualitative data	Computing Cronbach's alpha to evaluate surveys' reliability;	The reliability of the surveys was confirmed.
		Conducting paired-samples t-tests to compare the pre- and post-training mean scores;	The proposed training program to improve skills to teach online was effective.
		Calculating the effect size of the intervention; Running PCA to identify underlying elements of the participants' self-confidence levels after training;	Underlying factors contributing to participants' self-confidence improvement after training were identified.
		Conducting semi-structured interviews.	Insights into participants' learning experiences were explored and suggestions to improve the proposed course were provided.

2.	**Study 2: Identifying factors enhancing instructors' innovative behavior**	Specifying the structural models	Reviewing the current literature on factors influencing instructors' innovative behavior;	Measures (or indicators) of each identified factor were specified. The survey questionnaire (based on the hypothetical path model) was formed. Research hypotheses on relationships between the identified factors were formed and displayed in diagrams.
		Conducting the pilot study	Recruiting 30 participants; Administering online questionnaires to participants; Collecting and analyzing quantitative data for the pilot study;	Required sample size for the main study was determined (based on significance levels and the p_{min} values computed in the pilot study)
		Conducting the main study	Recruiting 76 participants; Administering online questionnaires to participants; Collecting and analyzing quantitative data for the pilot study;	
		Evaluating the measurement models	Using the SmartPLS 3 software to examine: ▪ Indicator reliablity; ▪ Internal consistency (Cronbach's alpha, composite reliability, reliability coefficient); ▪ Convergent validity (average variance extracted); ▪ Discriminant validity.	The reliability and validity of the reflective measurement models were confirmed.
		Evaluating the structural models	Using the SmartPLS 3 software to examine: ▪ The structural model for collinearity (VIF); ▪ Significance and relevance of the structural model relationships (path coefficients); ▪ Explanatory power (coefficients of determination, R2); ▪ Predictive power of the path model (by running the $PLS_{Predict}$ procedure).	Key constructs with highest relevance to explain the endogenous factors in the structural model were identified. The models' explanatory and predictive power were examined

3.2. *Study 1*: Sampling, data collection, and analysis

3.2.1. An overview of *Study 1*

As presented earlier, the aim of ***Study 1*** *(to achieve **SRO1**)* is to characterize the concept of *online teaching innovations.* ***Study 1*** adopts a pre-post research design to illustrate the concept of innovations in online pedagogy in the context of hospitality and tourism education in Vietnam. The proposed innovation is in the form of a constructivist online training program for improving instructors' online teaching skills. The innovative training program is then evaluated by comparing the participants' self-evaluation ratings for skill improvement before and after the training program.

To develop an effective instructor training program, it is necessary to select an appropriate theoretical background for designing the course. As a vast amount of research has suggested that constructivism "has relevance in all educational settings" (Kosnik et al., 2018) and is especially recommended in the field of teacher education (Bacon & Bloom, 1995; Johnson et al., 2006; Kosnik et al., 2018; Ledoux & McHenry, 2004; Lee, 2018), instructional designers of teacher education programs often consider selecting this learner-centered approach to design the training. In Vietnam, a developing Asian country, although the traditional Confucian educational values have prevailed and have contributed to the significant popularity of the teacher-centered model of teaching, the current research about its educational system has outlined the promising adoption of constructivist approaches in teaching methods (Nguyen, 2011). Endorsing the view of Ngo et al. (2015), who assert that "despite being culture-bound, teaching and learning are highly contextual, and learners are highly adaptive" (p. 687), this study was grounded in the theoretical underpinnings of compelling constructivist theories, including Piaget (1932)'s cognitive constructivism and Vygotsky (1978)'s social constructivist theory. Accordingly, ***Study 1*** adopted the three aspects of these constructivist theories, referred to as "knowledge is constructed by learners," "knowledge is experience-based", and "a strong class community is essential" (Kosnik et al., 2018, p. 105) to design a training course aimed at improving teachers' self-confidence in conducting synchronous online teaching in the context of a developing country in the Southeast Asian region.

As for the definition of training and its outcomes, in this study, training was mainly aimed at improving the trainees' self-confidence achieved in the post-training stage. This approach was inspired by Kraiger (2003), who defined training as involving not only activities aimed at advancing knowledge and skills but also activities embracing changes in attitudes.

3.2.2. Course design and content

A conceptual model for the proposed training program

The teacher training program proposed herein was designed to translate the three constructivist approaches of "knowledge is constructed by learners", "knowledge is based on experience", and "a strong class community is essential" (Kosnik et al., 2018, p. 105) into specific pedagogical practices. In this study, different types of learning activities are selected and designed for teachers (see Table 10) to help them acquire the complex skills required for synchronous online teaching (see Table 5).

Table 10. Constructivism-based learning activities designed for the proposed course

Three aspect of constructivist approaches	**Types of learning activities**	**How to conduct**
Knowledge is constructed by learners	Inquiry-based instruction	Participants' questions or problems drive the discussion to develop solutions.
	Modeling and unpacking	The facilitator models a designed activity to assist learning and then instructs participants to discuss the activity afterward.
	Self-reflection	After teaching-practice sessions, participants collect information for review purposes. Participants are given a self-reflective journal template where they can note down their feelings, observations, and questions.
Knowledge is experience-based	Role playing	Before role-playing, participants are required to research the topic and study their roles in the situation presented. Hence, group discussions are held to consolidate learning.
	Educational games	Online interactive quizzes, puzzles and games are designed to help participants learn about concepts.
	Teaching practice	Each participant designs learning activities and practices teaching.
A strong class community is essential	Online icebreaker	An online icebreaker is conducted in the first session to get participants to know each other and to stimulate conversations among them.
	Collaborative brainstorming	Participants are required to generate new ideas about and solutions to a specific issue.
	Group discussions	Each group discussion takes 10–15 minutes and is designed to make participants exchange ideas with each other.
	Peer feedback	During teaching-practice sessions, peer observations are facilitated, with a rubric developed to guide peer evaluations.

To better illustrate the assumptions of and expectations from the proposed training program, a conceptual model was built and shown in Figure 3. In this model, the constructivism-based training program acts as an intervention designed to enhance the teachers' self-confidence in synchronous online teaching. The current study explored the effect of this intervention to evaluate the perceived improvement of the instructors' self-confidence in the complex skills required for synchronous online teaching after the training.

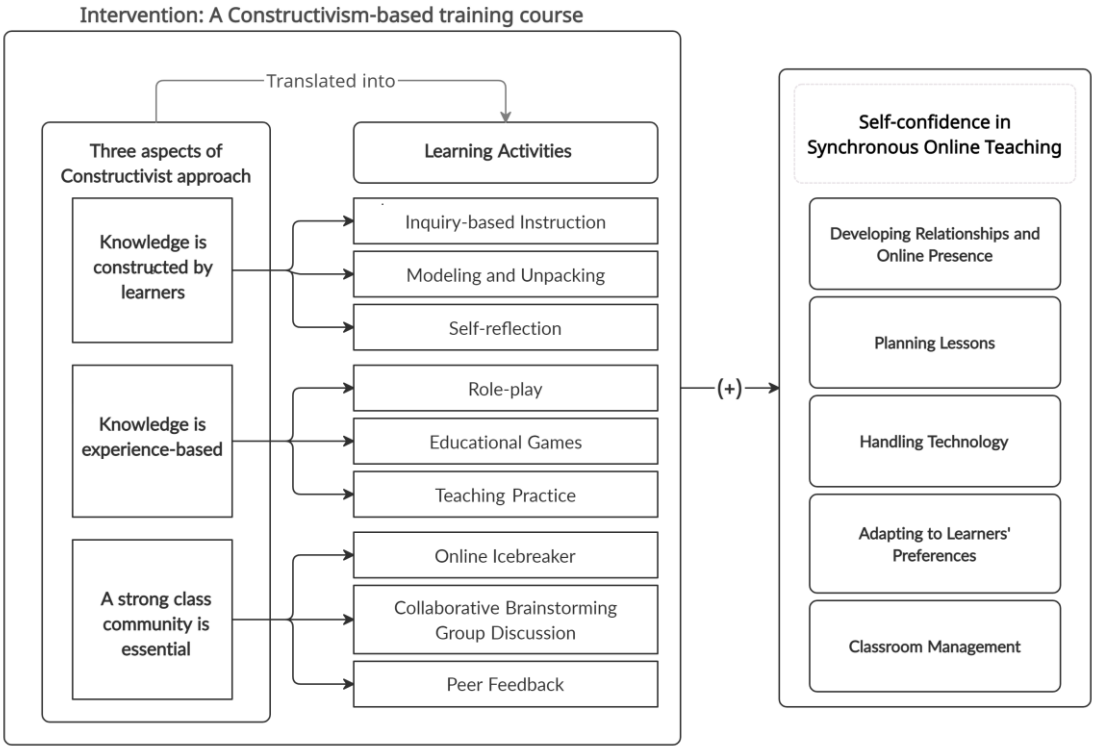


Figure 3. A conceptual model for the proposed training program

As shown in Figure 3 and Table 10, each learning activity was used to translate the constructivist theories into online pedagogical activities. For example, the aspect "knowledge constructed by learners" was translated into practice through inquiry-based pedagogical instruction. This activity allows the participants' questions to drive the learning process towards the target course outcomes. To illustrate, during the course session about "developing relationships and online presence," the participants take turns formulating questions about the concept of online presence and its related components, including cognitive, social, and teaching presence. Then these questions are responded to not only by the course facilitator but also by the other participants. The participants also brainstormed solutions for building an online presence by looking back at how they manage this concept in a traditional face-to-face classroom and how it will now be applied in the virtual online learning environment. This

active-learning process of asking questions and seeking the answers to them by oneself plays an essential role in helping the participants construct their knowledge proactively rather than passively listening to the facilitator or merely paying attention to how the course facilitator explains and demonstrates these concepts.

As this study focused on in-service teachers who already had expertise and experience in teaching, the constructivist aspect of "knowledge is based on experience" can bring the participants' rich background and accumulated knowledge to the training. Accordingly, teaching practice sessions, as an example of experienced-based learning activities, were designed to stimulate professional feedback and psychological encouragement during the course sessions.

To create "a strong class community," it is necessary to strengthen the participants' professional relationships through open discussions, collaborative activities, experiencing each other's work and providing constructive feedback. Accordingly, the primary responsibility of the instructor executing the proposed program is to create a collaborative atmosphere that is advantageous to the operation of this strong learning community.

Figure 4 demonstrates the frequency with which each type of learning activity is used in various course sessions and how all the learning activities contribute to the expected gained self-confidence in the five complex skills required for synchronous online teaching.

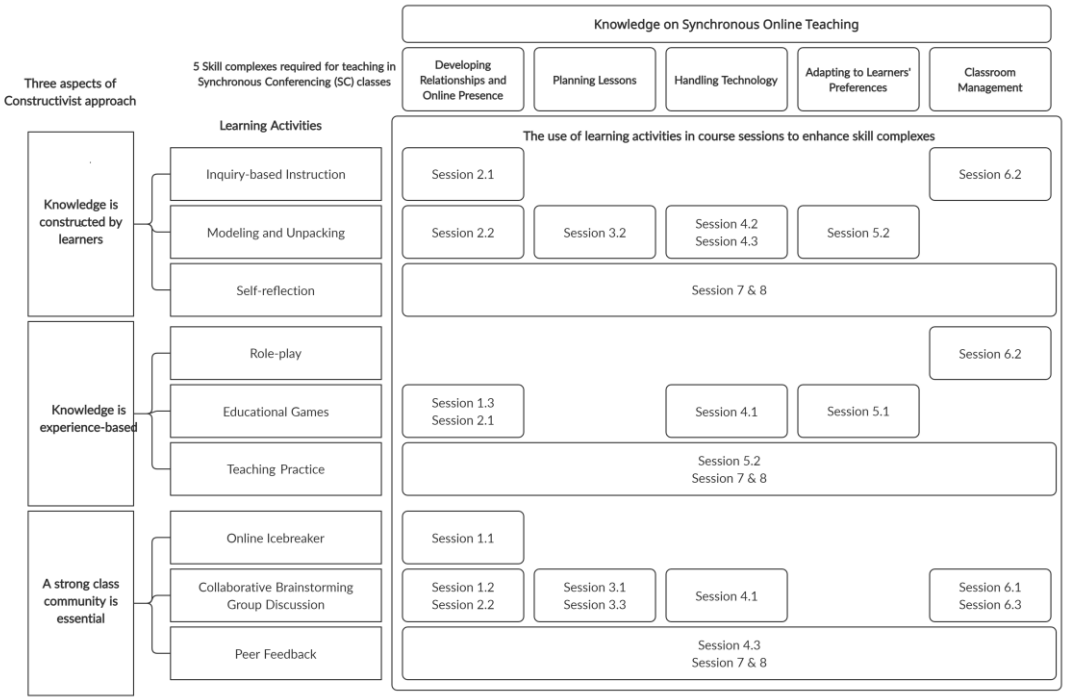


Figure 4. Course design framework and learning activities based on constructivist aspects

Selecting a synchronous platform and other technological tools

Study 1 proposes two dimensions for categorizing online classrooms conducted via synchronous online conferencing platforms. The first dimension is the epistemological approach to education, referring to the teacher- or learner-centered approach. The second is the classroom size or the number of learners in an online course. According to Jones (2007), the optimum number of students in a learner-centered language training class is 12, and the maximum size for such class is 30. The author of this study considers a class of 12–30 learners a small one, and a large one could be from more than 30–100 students. It should be noted that while the author uses the first dimension to determine which built-in features are required in a platform, e.g., a learner-centered class often needs more collaborative and interactive features such as Breakout Rooms and Polls, the second dimension is also deemed necessary as it influences the decision on platform capacity.

Figure 5 shows different types of synchronous online classrooms and which synchronous conferencing built-in features and capabilities are most needed for them. Accordingly, classes with more than 30–100 students and under the teacher-centered approach are named *live university lectures*, indicating that the instructors in these classes tend to adopt the passive format of lectures. Large classes following the learner-centered approach are *independent learning groups* (Scott et al., 1997). Courses with a smaller number of students where instructors tend to have students learn passively are named *online seminars*. Conducted with students actively engaged in knowledge construction, small classes are *online learner-centred classrooms*.

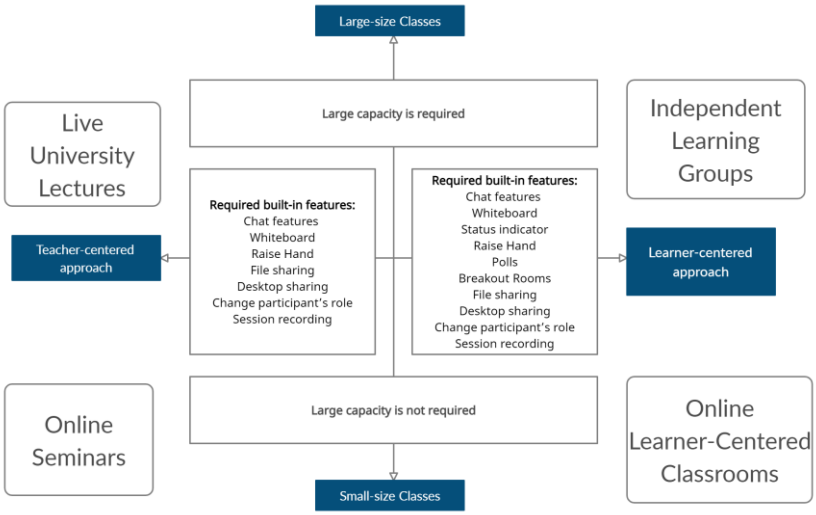


Figure 5. Synchronous conferencing platform features and capacity matching with different types of online classes

As Downing and Dyment (2013) recommend that constructivist online courses be conducted in small classrooms to be effective, the *online learner-centered classroom* model shown in Figure 5 appears to best match the purpose of this study. Accordingly, the author decided to use the classroom version of the Blackboard Collaborate platform because it has all the built-in features designed to best support the small learner-centered classes (Cheang, 2016).

Although this study focused mainly on synchronous online teaching, the author indeed adopted a blended mode for the training course and also used the Blackboard Coursesites' free version as a learning management system (LMS) to provide course materials, communicate with participants, encourage self-directed and asynchronous collaborative learning, monitor participants' performance and manage their attendance or performance. Despite a lack of built-in motivation tools such as gamification, the free Blackboard Coursesites LMS has sufficient features supporting all content formats.

Aside from the Blackboard Collaborate platform, the author also used numerous interactive and collaborative synchronous tools to motivate participants. Examples of these technological tools are the Miro real-time board, Kahoot, Google Form and Poll Everywhere. Figure 6 shows an example of the combination between the Blackboard Collaborate platform and the Miro real-time board to provide participants with a venue for interaction during a course session.

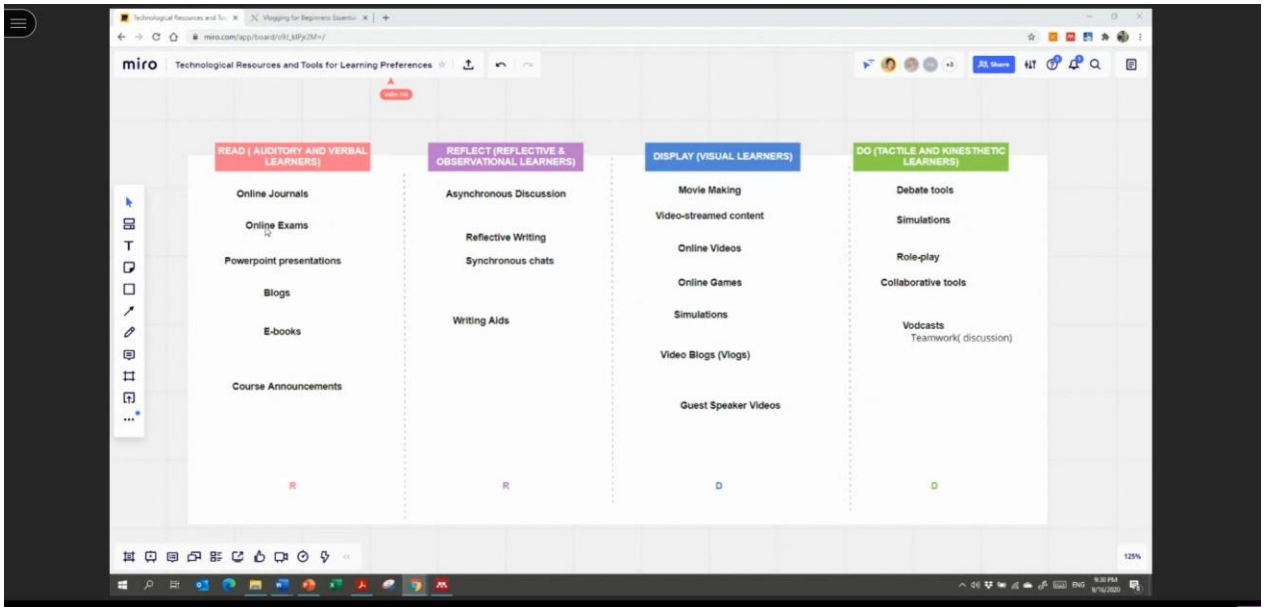


Figure 6. Blackboard Collaborate combined with Miro real-time board in Session 5

Course structure, tools, and content

The proposed course consists of eight online synchronous sessions, each lasting 90 min (this session duration is selected based on the author's personal experience as a student taking online courses). The first session introduces the course, its objectives and synchronous online teaching. The next five sessions aim to improve participants' confidence levels in the required complex skills. In sessions 7 and 8, participants are required to design learning outcomes and activities to practice online teaching. The details of the learning outcomes and activities are listed in Table 11 below.

Table 11. Proposed course structure, learning outcomes and activities

Session	**Learning outcomes (what participants can achieve in each session)**		**Learning activities**	**Duration (minutes)**
1. Course Introduction	1.1	Get to know each other and have an open atmosphere for learning and collaborating.	Online icebreaker	40
	1.2	Familiarize with the course structure and objectives.	Group discussion	20
	1.3–1.5	Familiarize with synchronous online learning.	Educational game (Kahoot)	30
2. Developing Online Presence	2.1	Define three types of online presence: social, teaching and cognitive presence.	Inquiry-based instruction, educational game (Kahoot)	45
	2.2	Develop methods of enhancing online presence.	Collaborative brainstorming, modelling and unpacking	45
3. Planning Lessons	3.1	Describe what constructs quality educational experience in online learning.	Group discussion, collaborative brainstorming	20
	3.2	Create steps to prepare learners before launching online courses.	Modelling and unpacking	30
	3.3	Design synchronous learning activities.	Group discussion, collaborative brainstorming	40

4. Handling Technology	4.1	List factors to consider when selecting an online platform.	Collaborative brainstorming, group discussion	20
	4.2	Use applications and tools for real-time teaching.	Modelling and unpacking	35
	4.3	Use different synchronous features to implement learning activities.	Modelling and unpacking, peer feedback	35
5. Adapting to Learners' Preferences	5.1	Address varied learning styles.	Educational quizzes (Google Form, Miro)	30
	5.2	Identify resources and tools for matching with different learning styles.	Modelling and unpacking, teaching practice	60
6. Classroom Management	6.1	Compare online and offline classroom management.	Group discussion	20
	6.2	Apply techniques to give constructive and corrective feedback to online learners.	Inquiry-based instruction, role playing	30
	6.3	Develop strategies to respond to learners' behaviours or misbehaviours.	Group discussion, collaborative brainstorming	40
7 & 8. Teaching Practice	Participants practice teaching, self-reflection and peer feedback.		Teaching practice, self-reflection, peer feedback	15 minutes/ participant

3.2.3. Research questions

On the basis of the established conceptual model, ***Study 1*** attempts to answer the following research questions:

RQ1. To what extent does the proposed training program in synchronous online teaching affect the self-confidence ratings of hospitality and tourism teachers in Vietnam?

RQ2. If the proposed training program has an impact on the participants' self-confidence in synchronous online teaching, are there any possible underlying factors that contribute to this perceived improvement?

RQ3. How can the proposed training program be improved?

3.2.4. Research methods

This study defined teachers' improved self-confidence as their perceived improvement in the skills required for synchronous online teaching as expressed in their self-evaluation. The study was carried out as mixed-method research to evaluate the proposed course by measuring participants' perceived improvement in their synchronous online teaching skills. Training needs analysis (TNA) and post-training evaluation (PTE) (Salas & Cannon-Bowers, 2001; Scaradozzi et al., 2019) were adopted for the quantitative approach. The items in these two questionnaires measured the participants' perceived levels of self-confidence in conducting online teaching before and after attending the course. The TNA and PTE survey questionnaires were administered before and after the course, respectively, to the 67 teachers who participated in the course. Using SPSS Statistics 27.0, the Cronbach's alpha was computed to evaluate the reliability of the TNA, the PTE, and the ten course evaluation items. Then paired-samples t-tests were conducted to compare the pre- and post-training mean scores of the participants' self-confidence in each required skill complexes. The effect size was also calculated to determine the extent to which the proposed program is an effective educational intervention.

For the qualitative evaluation of the course, ten online semi-structured interviews were conducted. Online interviews complemented the PTE questionnaire because they enabled the individual course participants to provide insights into their learning experiences and the factors contributing to their post-training confidence levels. The interviews were conducted after collecting and analyzing the PTE data. Participants were invited for an interview if they had perceived either the greatest or lowest self-improvement in the complex skills required for synchronous online teaching as expressed in their self-evaluation. Each interview was approximately 20 minutes long.

3.2.5. Recruitment of participants

The author of this study recruited 67 participants by sending invitations to in-service teachers working at various hospitality and tourism institutions in Vietnam. Additionally, "snowball sampling" (Kosnik et al., 2018, p. 109) offered the opportunities to recruit more participants. Those who accepted our invitation suggested their colleagues who might also be interested in participating in our study. The recruited participants were experienced hospitality and tourism teachers with knowledge in the relevant subject matters but mostly in offline settings, or corporate trainers/training managers working at lodging properties, restaurants or travel agencies in Vietnam. They were required to conduct synchronous online classes during

the COVID-19 pandemic. Table 12 summarizes the participants' demographics and backgrounds.

Table 12. Participants' demographics and background ***(Study 1)***

Participants' demographics and background (n = 67)		**Number of cases**	**Percentage**
Gender	Male	15	22.4
	Female	51	76.1
	Prefer not to answer	1	1.5
Age	25–30	11	16.4
	31–40	30	44.8
	41–50	12	17.9
	51–60	10	14.9
	> 60	4	6.0
Education	Bachelor's degree	33	49.3
	Master's degree	30	44.8
	Ph.D. or higher	4	6.0
Teaching experience	Less than a year	27	40.0
	1 year – less than 5 years	16	23.9
	5 years – less than 10 years	12	17.9
	10–15 years	10	14.9
	More than 15 years	2	3.0
Specialization	Hospitality vocational training	3	4.5
	Hospitality management	10	14.9
	Tourism vocational training	3	4.5
	Travel services management	4	6.0
	Vocational culinary arts	1	1.50
	Vocational restaurant serving	4	6.0
	Restaurant management	12	17.9
	Supervisory/ Management/ Leadership training	41	61.2
	English for hospitality and tourism	13	19.4
	Others	23	34.3

Regarding the age, most participants were 31–40 years old (44.8%). Only four participants were over 60 years old. Most (49.3%) of the participants had a bachelor's degree, and 44.8% had a master's degree. Only four participants had a Ph.D. Regarding teaching experience, 40% of the participants had less than one-year teaching experience in hospitality and tourism; 23.9%, more than one year to less than five years; 17.9%, five to less than ten

14.9%, 10–15 years. There were only two senior teachers with more than 15 years' teaching experience.

A noticeable characteristic is the teaching specialization. Although all participants had a professional background in hospitality and tourism, most specialized in delivering management courses (each participant may be teaching more than one subject matter). Only 7.5% conducted vocational training. Teachers who gave language training in the hospitality and tourism sector also participated, accounting for 19.4% of the study participants. The author conducted six courses from the beginning of June to the end of September 2020. Each had 10–12 participants. This small class size supported the adoption of the *online learner-centered classrooms* mode outlined in Figure 5.

3.2.6. Data coding and analysis

The TNA survey questionnaire is a 25-item instrument consisting of eight subscales. Two subscales focus on participants' demographic data and registered classes (ten items). The others represent participants' confidence levels in the complex skills needed for synchronous online teaching: general knowledge about synchronous online conferencing technology (three items), developing online presence (three items), planning lessons (two items), handling technology to ensure learning (two items), adapting to learners' preferences (two items) and classroom management (two items). Each item is rated on the basis of a five-point Likert scale, where 1 means "strongly disagree" and 5, "strongly agree." There is one open-ended question asking participants about their challenges when teaching in synchronous online classrooms.

The structure of the PTE questionnaire is similar to that of the TNA questionnaire, but it has additional ten items related to participants' evaluation of the course. All the items in the PTE questionnaire seek to measure participants' self-confidence in the complex skills required for synchronous online teaching after taking part in the proposed program. As in the TNA questionnaire, all the self-evaluation items are scored on the basis of a five-point Likert scale, where 1 means "strongly disagree" and 5,"strongly agree."

The data obtained from the individual interviews were analyzed by answering the following guide questions:

- What are the features of feelings of self-confidence in synchronous online teaching?
- In what aspects did the proposed course contribute to the post-training perceived improvement of participants' self-confidence?

- How can the training course be improved?

The interview coding involved identifying words and phrases from the interviews that respond to any of the aforementioned guide questions. Emerging themes were also determined to provide suggestions for future research on the topic.

3.3. *Study 2:* Sampling, data collection, and analysis

3.3.1. An overview of PLS-SEM

Study 2 uses the PLS-SEM procedure suggested by Hair et al. (2022) as the primary approach to propose and evaluate a path model for instructors' innovative behavior in online teaching in the context of hospitality and tourism education in Vietnam. PLS-SEM is a regression-based approach that investigates the linear relationships between various independent variables and a single or multiple dependent variable(s) which are often "unobservable or unable to be measured directly" (Hair et al., 2022, p. 18).

This quantitative method has offered substantial benefits to social research, particularly those aiming to identify psychological success drivers to draw out managerial implications. First, it has been a prominent "causal-predictive" approach that estimates coefficients, i.e., path model relationships, to maximize the R^2 values, i.e., the amount of explained variance of the model's endogenous constructs. The fundamental causal-predictive logic of PLS-SEM follows what Gregor (2006) refers to as *explaining and predicting (EP) theories*. According to Gregor (2006, p. 626), this theory "corresponds to commonly held views of theory in both the natural and social sciences". Influential theories and models, e.g., Oliver (1980)'s expectation-disconfirmation theory or Davis (1989)'s technology acceptance model, have followed this EP approach as they were constructed primarily to explain and predict. Second, it works efficiently with small samples and complex models composed of both reflective and formative models (Cassel et al., 1999; Chin, 2010). However, to avoid misusing this characteristic of PLS-SEM, numerous researchers have provided guidelines for determining the sample size needed to ensure the statistical quality of PLS-SEM results. In their most recent study on finding the appropriate sample size for PLS-SEM research, Hair et al. (2022) propose a prospective approach where the required sample size is determined via the minimum expected effect size prior to data analysis drawn from a pilot study or previous research. Table 13 shows Hair et al. (2022, p. 27)'s guidelines on the minimum sample size requirement for different significance levels and varying ranges of the minimum path coefficient, i.e., p_{min}.

*Table 13. Minimum Sample Sizes for Different Levels of Minimum Path Coefficients (p_{min}) and Significance Levels (*Hair et al., 2022, p. 27*)*

p_{min}	Significance level		
	1%	5%	10%
0.05-0.1	1,004	619	451
0.11-0.2	251	155	113
0.21-0.3	112	69	51
0.31-0.4	63	39	29
0.41-0.5	41	25	19

Last, unlike its alternative SEM approach, i.e., covariance-based structural equation modeling (CB-SEM), PLS-SEM does not require normally distributed data. Thus, it can be adopted in a broad range of research disciplines. However, because of this nonparametric characteristic, when testing the significance of path coefficients, PLS-SEM researchers need to derive a distribution from the data using *bootstrapping* technique in which subsamples of data are randomly drawn with replacements from the original set of data. This replacement process is repeatedly conducted until a large number of random subsamples (often 10,000) have been produced. The estimated parameters from the subsamples, e.g., the path coefficients, are used to derive standard errors for the estimates (Hair et al., 2022). Then, researchers can rely on the *bootstrap confidence interval* to determine whether the estimated parameters are statistically significant or not.

There is a variety of software programs that offer the PLS-SEM algorithm. The first built program was LVPLS (Lohmöller, 1987), which later was visually supported by Chin (2001)'s PLS-Graph. According to Hair et al. (2022), more user-friendly softwares have been developed recently. Researchers can choose from some of the most popular ones, such as Adanco (Henseler, 2017), SmartPLS (Ringle et al., 2015), and WarpPLS (Kock, 2020). Among these programs, SmartPLS has been the most broadly used, comprehensive, and advanced application for performing PLS analyses (Hair et al., 2022; Sarstedt & Cheah, 2019). For this reason, SmartPLS 3, i.e., the latest version of the software, is used as the primary tool for evaluating all the path models proposed in this thesis.

3.3.2. Research questions

Study 2 attempts to answer the following research questions:

RQ1. What are the exogenous factors influencing instructors' innovative behavior in online teaching?

RQ2. How are these factors related to each other?
RQ3. To what extent do these factors influence instructors' innovative behavior in online teaching?

3.3.3. Hypothetical path models and designed questionnaire

Although this study's target construct of interest is the *instructors' innovative behavior in online teaching (IBOT)*, this study has its particular interests in two other endogenous constructs, which are simultaneously the antecedents of *IBOT*. These are *instructors' attitudes towards online teaching (ATT)* and *innovative organizational climate (OGC)*. Accordingly, there are three path models constructed and evaluated in this study. It should be noted that, to reduce model complexity, the author of this thesis chose to propose three separate path models despite their connections (instead of placing them all in the same model).

The original questionnaire was a 95-item instrument consisting of two subscales. One subscale is about participants' demographic and background data (six items). The others represent participants' perceptions about 14 different constructs, as shown in Table 14. Each item is rated on the basis of a five-point Likert scale, with the categories: *(1) Fully disagree* (or *Never*), *(2) Disagree* (or *Rarely*), *(3) Neither agree nor disagree* (or *Every once in a while*), *(4) Agree* (or *Sometimes*), and *(5) Fully agree* (or *Always*).

*Table 14. Structure of the questionnaire **(Study 2)***

Subscales	**Number of items**
Participants' demographic and background	6
Instructors' innovative behavior in online teaching (IBOT)	8
Skill complexes required for online teaching (SKILL)	14
Self-confidence in Online Teaching (SCOT)	6
Instructors' attitude towards online teaching (ATT)	7
Organizational innovative climate (OGC)	6
Macro-environmental factors (MEF)	6
Perceived usefulness of online teaching technology (PU)	4
Perceived ease of use of online teaching technology (PEU)	3
Attitude towards professional learning (PROF)	4
Internalization of organizational goals into personal goals (ISPG)	3
Transformational leadership (LEAD)	10
Collaboration among instructors (COLL)	7
Shared decision making (SDM)	3
Supportive infrastructure for online teaching (SIF)	8

The above measurement scale is appropriate because it presents symmetry of Likert items about a middle category and thus ensures that equidistant attributes can be observed. According to Hair et al. (2022), when a Likert scale is symmetric and equidistant, it can act more like an interval scale since it does not bias any results in favor of a preferable outcome. "So, while a Likert scale is ordinal, if it is well presented, then it is likely that the Likert scale can approximate an interval-level measurement" (Hair et al., 2022, p. 10). In addition, according to Simms et al. (2019), the psychometric differences between an odd- and even-numbered scale were "small to nonexistent" (p. 19), and a six-option response might be preferred to a seven-option one merely due to parsimonious advantage. Given the symmetric and equidistant advantage of an odd-numbered Likert scale, this study thus selects the five-point Likert scale for its measurement.

The three path models specified in this study are presented as follows.

Path model 1: Instructors' innovative behavior in online teaching (IBOT)

In this study, *instructors' innovative behavior in online teaching* is defined as a complex set of actions categorized into three different types: generating, promoting, and realizing ideas and solutions useful for online teaching practices. The first one, i.e., idea generation, refers to the creation and introduction of new or adapted pedagogical methods for teaching in virtual classrooms. The second group of actions is related to idea promotion, which involves seeking support and sponsorship for implementing the proposed solutions. Finally, realizing ideas points to applying and converting new ideas into practical and effective online teaching practices or procedures. Table 15 shows the measurement indicators for this construct and the existing surveys from which these items are drawn.

Based on the current literature about *individual innovative behavior* and personal experiences of the author of this study, five antecedent dimensions of *instructors' innovative behavior in online teaching* were identified. Three of these constructs belong to the psychological group of factors, which includes: *skill complexes required for online teaching (SKILL), self-confidence in online teaching (SCOT),* and *instructors' attitude towards online teaching (ATT).* The other two antecedents are instructors' perceptions of environmental conditions, which are *innovative organizational climate (OGC)* and *macro-environmental factors (MEF).*

Table 15. Indicators for Instructors' Innovative Behavior in Online Teaching (IBOT)

IBOT	Instructor's innovative behavior in online teaching (1 – "never" to 5 – "always")	Existing surveys
ibot_1	I create new teaching practices to solve challenges in the online teaching environment.	Scott and Bruce (1994); Zhou and George (2001); Zhang et al. (2018); Asbari et al. (2021)
ibot_2	I am looking for new teaching methods, techniques, and technologies to deliver my online lessons/lectures.	Scott and Bruce (1994); Asbari et al. (2021)
ibot_3	I promote my ideas in online teaching so that other teachers can use them in their online classes.	Scott and Bruce (1994); Zhang et al. (2018); Asbari et al. (2021)
ibot_4	I make important organizational members enthusiastic about innovative ideas in online teaching.	Janssen (2000)
ibot_5	I develop adequate plans and schedules to implement new ideas in online teaching.	Scott and Bruce (1994); Zhang et al. (2018)
ibot_6	I evaluate the utility of innovative ideas in online teaching.	Janssen (2000)
ibot_7	I contribute suggestions or approaches for others' teacher creative ideas in online teaching.	Zhang et al. (2018)
ibot_8	I am innovative in online teaching/ I am a good source of innovative ideas online teaching.	Scott and Bruce (1994); Zhou and George (2001)

Based on the current literature and textbooks that provide guidelines on online teaching, this study identifies *the complex skills needed to facilitate online classes* which include developing an online presence, planning lessons, handling technology, adapting to learners' preferences, and classroom management. A list of studies mentioning these skills has been provided in Table 5. Table 16 below displays the indicators for this construct.

Table 16. Indicators for Skill Complexes Required for Online Teaching (SKILL)

Skill complexes	SKILL	Skill complexes required for online teaching (1 – "fully disagree" to 5 – "fully agree")
Basic knowledge about online teaching	skill_1	I can distinguish synchronous from asynchronous technology.
	skill_2	I can list the pros and cons of synchronous and asynchronous online teaching.
	skill_3	I can list the differences among popular synchronous online conferencing platforms (WebEx, Microsoft Teams, Blackboard, Zoom, etc.)
Planning lessons	skill_4	I can list steps to help learners prepare before the online course starts.
	skill_5	I can design and implement online learning activities.
Developing online presence	skill_6	I can explain the definition and importance of online presence.
	skill_7	I can identify strategies to enhance my relationships with and among learners.
	skill_8	I can develop methods of enhancing social presence to overcome the lack of visual clues in online classes.
Handling technology	skill_9	I can explain what creates a quality online learning experience.
	skill_10	I can use the different built-in features of synchronous video conferencing platforms.
Adapting to learners' preferences	skill_11	I can recognize varied learning preferences and backgrounds.
	skill_12	I can identify technological resources and tools for adapting to various learning preferences.
Classroom management	skill_13	I can distinguish between online and offline class management approaches.
	skill_14	I can identify strategies to respond to student behaviors/misbehaviors in online classes.

In this study, *instructors' self-confidence in online teaching (SCOT)* is defined as the reflection and expectation of their perceived capabilities when attempting to teach in online classrooms. Table 17 presents the measurement indicators for this construct and the existing surveys from which these items are adapted.

Table 17. Indicators for Self-confidence in Online Teaching (SCOT)

SCOT	**Self-confidence in online teaching** (1 – "fully disagree" to 5 – "fully agree")	**Existing surveys**
scot_1	I expect myself to design new online teaching practices that work effectively.	Shrauger and Schohn (1995); Kolb (1999); Cox et al. (2003)
scot_2	I expect myself to implement new online teaching practices effectively.	
scot_3	I expect myself to design a new online course.	Shrauger and Schohn (1995); Cox et al. (2003)
scot_4	I expect myself to engage students better with my new methods in online teaching.	
scot_5	I expect myself to maintain students' hope and commitment to their study and future career in the hospitality and tourism profession with my new methods in online teaching.	
scot_6	I am innovative in online teaching/ I am a good source of innovative ideas for online teaching.	Kolb (1999)

In this study, *instructors' attitude towards online teaching (ATT*) refers to opinions instructs hold towards the online teaching environment. Instructors with a positive attitude towards online education appear to be more willing to adopt technological web-based advances in their pedagogical practices than those with an unfavorable opinion of the online classroom environment. For this reason, when instructors believe in the strengths of online education, they may openly display their innovative behavior in online teaching. Table 18 shows the measurement indicators and the existing surveys where these items are adapted.

Table 18. Indicators for Instructors' Attitude towards Online Teaching (ATT)

ATT	**Instructors' attitude towards online teaching** (1 – "fully disagree" to 5 – "fully agree")	**Existing surveys**
att_1	Digital competence is an important 21st-century skill for every teacher.	Sangwan et al. (2021)
att_2	I believe online learning can improve the quality of my teaching performance.	
att_3	Online teaching is more interesting than classroom teaching.	
att_4	Online teaching can replace traditional teaching styles (face-to-face physical classrooms).	
att_5	I enjoy teaching online.	
att_6	I like reading magazines on new technology innovations for teaching.	
att_7	Discussions on online teaching technologies are interesting.	

Organizational innovative climate (OGC) is defined in this study as the perceived organizational conditions that support or motivate innovations necessary for enhancing organizational effectiveness and long-term development. When an organization sends out specific signals that expose its values and expectation, organizational members will take such cues as guidelines for reacting or behaving in a manner that may lead to more satisfactory outcomes such as improved performance evaluation and recognition. Table 19 presents the measurement indicators for this construct and the existing surveys from which these items are adapted.

Table 19. Indicators for Organizational Innovative Climate (OGC)

OGC	**Organizational innovative climate** (1 – "fully disagree" to 5 – "fully agree")	**Existing surveys**
ogc_1	My organization values my innovations in online teaching practices.	Eisenberger et al. (1986)
ogc_2	Help is available from my organization when I have a problem in shifting from face-to-face to online classrooms.	
ogc_3	My organization would forgive an honest mistake in implementing online teaching innovations.	
ogc_4	My organization takes pride in my innovations in online teaching.	
ogc_5	My organization provides financial rewards for online teaching innovations.	
ogc_6	I have enough supportive technological infrastructure needed for online teaching.	

The author of this research also based on the literature and personal experiences to identify *macro-environmental factors (MEF)* that may influence *instructors' innovative behavior in online teaching*. Although the existing research mentions these factors, survey items reflecting this construct have not been developed. Therefore, the MEF measurement items produced in this study are newly designed and shown in Table 20.

Table 20. Indicators for Macro-Environmental Factors (MEF)

MEF	**(Perceived) Macro-environmental factors** (1 – "fully disagree" to 5 – "fully agree")
mef_1	Internet access to online teaching resources and tools in my country is restricted due to political reasons. (R)
mef_2	The current economic conditions of my country support the adoption of online teaching and learning.
mef_3	The current government policies are sufficient for guiding institutions in shifting classes to the online learning environment.
mef_4	The government provides sufficient resources for institutions and teachers to effectively implement innovations in online teaching.
mef_5	The hospitality and tourism industry forces institutions and teachers to shift classes online.
mef_6	The changes in learners' characteristics and behaviors urge institutions and teachers to have more innovations in online teaching.

Note. (R) indicates the item is reverse scored.

Based on the preceding review and previous research, a diagram demonstrating the hypothetical path model for *instructors' innovative behavior in online teaching (IBOT)* is proposed and displayed in Figure 7.

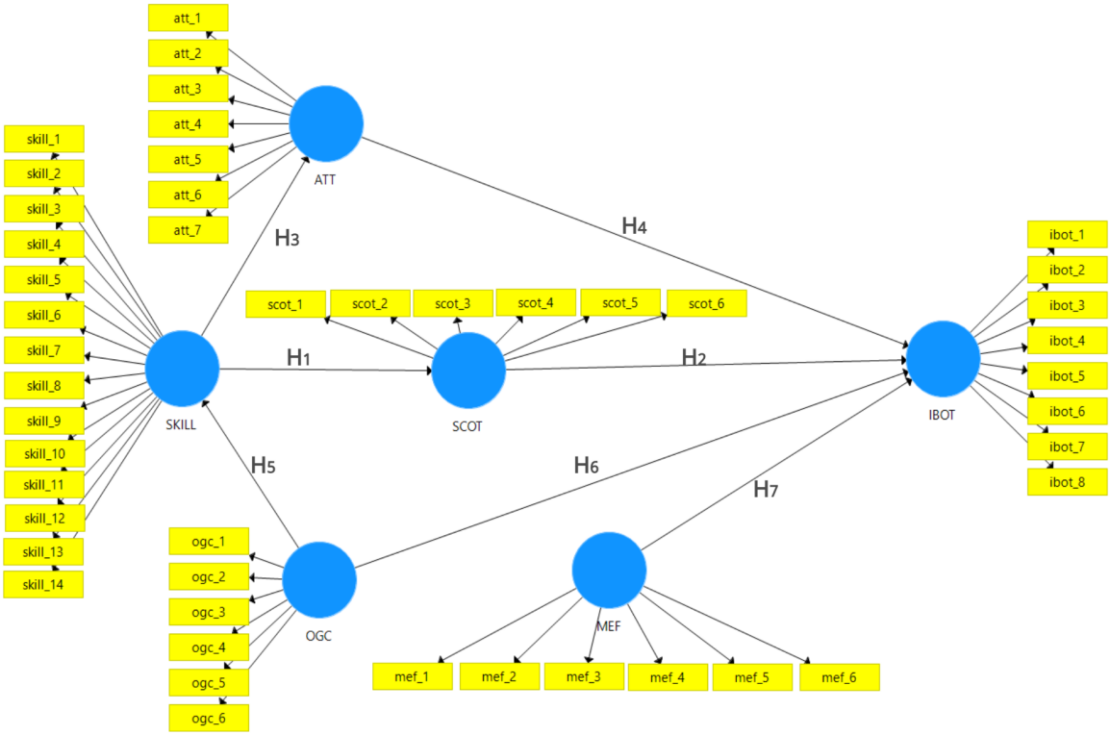


Figure 7. A conceptual model for Innovative Behavior in Online Teaching (IBOT)

Accordingly, the following hypotheses are posited in this study:

H_1: *(Perceived) Skills complexes required for online teaching (SKILL)* positively influence *instructors' self-confidence in online teaching (SCOT).*

H_2: *Instructors' self-confidence in online teaching (SCOT)* positively influences their *innovative behavior in online teaching (IBOT).*

H_3: *(Perceived) Skills complexes required for online teaching (SKILL)* positively influence *instructors' attitudes toward online teaching (ATT).*

H_4: *Instructors' attitude towards online teaching (ATT)* positively influences their *innovative behavior in online teaching (IBOT).*

H_5: *Innovative organizational climate (OGC)* positively influences *instructors' (perceived) skills in online teaching (SKILL).*

H_6: *Innovative organizational climate (OGC)* positively influences *instructors' innovative behavior in online teaching (IBOT).*

H_7: *(Perceived) macro-environmental factors (MEF)* positively influence *instructors' innovative behavior in online teaching (IBOT).*

H_{8a}: *Instructors' attitude towards online teaching (ATT)* mediates the relationship between *instructors' (perceived) skills in online teaching (SKILL)* and their *innovative behavior in online teaching (IBOT)*.

H_{8b}: *Instructors' self-confidence in online teaching (SCOT)* mediates the relationship between *(perceived) skills in online teaching (SKILL)* and instructors' *innovative behavior in online teaching (IBOT)*.

H_{8c}: *Instructors' (perceived) skills in online teaching (SKILL)* mediate the relationship between *innovative organizational climate (OGC)* and *instructors' innovative behavior in online teaching (IBOT).*

Path model 2: Instructors' attitude towards online teaching (ATT)

In addition to the main model, i.e., the *instructors' innovative behavior in online teaching (IBOT)*, there are two more endogenous constructs that are simultaneously the antecedents of *IBOT*. They are also explored further in this study. One of them is the *instructors' attitude towards online teaching (ATT)*, whose measurement items have been displayed earlier in Table 18. Based on the current literature, five antecedent dimensions of this psychological construct are identified: *Perceived usefulness of online teaching technology (PU), Perceived ease of use of online teaching technology (PEU), Attitude towards professional learning (PROF),* and *Internalization of organizational goals into personal goals (ISPG)*. The definitions of these constructs are provided in Table 7 (in sub-chapter 2.2.2). Tables 21-24 below show the measurement indicators for PU, PEU, PROF, ISPG, and the existing surveys from which these items are adapted.

Table 21. Indicators for Perceived Usefulness of Online Teaching Technology (PU)

PU	**Perceived usefulness of online teaching technology** (1 – "fully disagree" to 5 – "fully agree")	**Existing surveys**
pu_1	Online teaching and learning are very economical for institutions to adopt.	Kisanga and Ireson (2016)
pu_2	Online teaching can enhance the quality of knowledge attained.	
pu_3	Communicating through online social networks in online classrooms is fun.	
pu_4	Online teaching and learning are flexible for both teachers and students.	

Table 22. Indicators for Perceived Ease of Use of Online Teaching Technology (PEU)

PEU	Perceived ease of use of online teaching technology (1 – "fully disagree" to 5 – "fully agree")	Existing surveys
peu_1	It's easier to prepare online lessons than face-to-face lessons.	Kisanga and Ireson (2016)
peu_2	Interacting with computer systems is easy.	
peu_3	Using online technologies for teaching requires few mental efforts.	

Table 23. Indicators for Attitude towards Professional Learning (PROF)

PROF	Attitude towards professional learning (1 – "never" to 5 – "always")	Existing surveys
prof_1	I proactively work on my own professional development in online education.	Geijsel et al. (2009)
prof_2	I participate in professional training programs in online teaching, even if it is not compulsory.	
prof_3	I enjoy reading professional literature about online teaching.	
prof_4	I study online-teaching textbooks and lesson material thoroughly and regularly.	

Table 24. Indicators for Internalization of Organizational Goals into Personal Goals (ISPG)

ISPG	Internalization of organizational goals into personal goals (1 – "fully disagree" to 5 – "fully agree")	Existing surveys
ispg_1	I make an effort to put the school's vision of online education into practice.	Geijsel et al. (2009)
ispg_2	I do my best to understand what implications the school's vision has for my teaching strategies for online classes.	
ispg_3	I know the next steps for putting the schools' vision of online education into practice.	

Based on the existing literature, a diagram demonstrating the hypothetical path model for *instructors' attitudes towards online teaching (ATT)* is proposed and displayed in Figure 8 below.

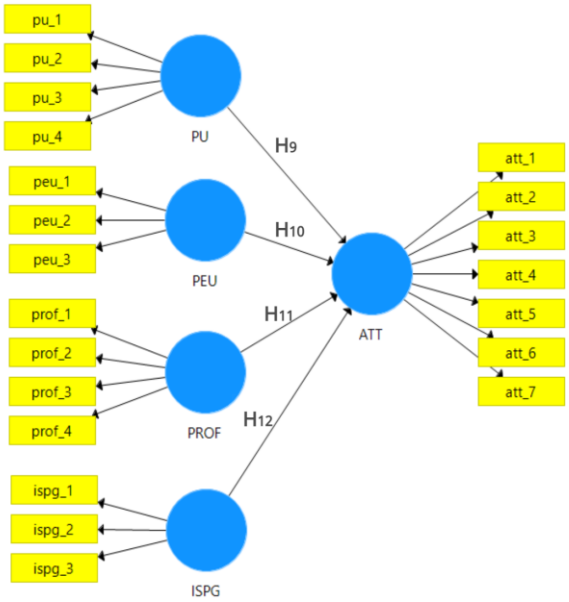


Figure 8. A conceptual model for instructors' Attitude towards Online Teaching (ATT)

As shown in Figure 8, the following hypotheses are posited in this study:

> H_9: *Perceived usefulness of online teaching technology (PU)* positively influences *instructors' attitudes toward online teaching (ATT).*
>
> H_{10}: *Perceived ease of use of online teaching technology (PEU)* positively influences *instructors' attitudes towards online teaching (ATT).*
>
> H_{11}: *Attitude toward professional learning (PROF*) positively *influences instructors' attitudes toward online teaching (ATT).*
>
> H_{12}: *Instructors' internalization of organizational goals into personal goals (ISPG)* positively influences *their attitudes toward online teaching (ATT).*

Path model 3: Innovative organizational climate (OGC)

Innovative organizational climate has various dimensions, among which four prominent antecedents are selected for the context of online teaching outlined in this thesis. These factors include *transformational leadership (LEAD), collaboration among instructors (COLL), shared decision making (SDM),* and *supportive infrastructure for online teaching (SIF)*. Tables 25-28 show the measurement indicators for these constructs and the current surveys from which these items are adapted.

Table 25. Indicators for Transformational Leadership (LEAD)

LEAD	Transformational leadership (1 – "fully disagree" to 5 – "fully agree")	Existing surveys
lead_1	The leaders make use of all possible opportunities to communicate the school's vision of online education to teaching staff, students, parents, and others.	Geijsel et al. (2009)
lead_2	The leaders have comprehensive knowledge about online education.	
lead_3	The leaders understand the current problems caused by the shift from face-to-face to online classrooms.	
lead_4	The leaders believe in the power of online teaching and learning.	
lead_5	The leaders support me in solving problems related to online teaching.	
lead_6	The leaders appreciate it when a teacher takes the initiative to improve online teaching.	
lead_7	The leaders offer financial rewards for my innovations in online teaching.	
lead_8	The leaders encourage teachers to implement innovations in online teaching.	
lead_9	The leaders encourage teachers to seek and discuss new information and ideas relevant to the institution's vision of online education.	
lead_10	The leaders provide me with opportunities to participate in professional training programs about online teaching.	

Table 26. Indicators for Collaboration among Instructors (COLL)

COLL	Collaboration among instructors (1 – "never" to 5 – "always")	Existing surveys
coll_1	My colleagues discuss new methods for online teaching with me.	Geijsel et al. (2009)
coll_2	My colleagues give me positive feedback about my online teaching.	
coll_3	My colleagues give support when I try out new teaching methods for online classrooms.	
coll_4	My colleagues tell me what online teaching problems they have and how they solve them.	
coll_5	My colleagues pass on to me things they have learned from training programs about online teaching.	
coll_6	My colleagues let me observe their teaching performance in online classrooms.	
coll_7	My colleagues often co-teach (online) to learn from each other.	

Table 27. Indicators for Shared Decision Making (SDM)

SDM	Shared decision making (1 – "never" to 5 – "always")	Existing surveys
sdm_1	Teachers at my organizations are involved in decisions about acquiring new technologies/resources/materials for online teaching.	Geijsel et al. (2009)
sdm_2	At my organization, teachers make decisions about new educational objectives together.	
sdm_3	At my organization, teachers are involved in decisions about using new online teaching methods.	

Table 28. Indicators for Supportive Infrastructure for Online Teaching (SIF)

SIF	Supportive infrastructure for online teaching (1 – "never" to 5 – "always")	Existing surveys
sif_1	My organization has an IT department/team to support teachers in teaching online.	Meyer and Barefield (2010)
sif_2	My organization has an effective and well-supported campus network.	
sif_3	My organization has effective server support.	
sif_4	My organization has an effective learning management system (LMS).	
sif_5	My organization has effective online library services.	
sif_6	My organization evaluates new online technology for online teaching.	
sif_7	My organization assesses and updates the quality of online course content.	
sif_8	When I have to deliver online lessons from home, my organization provides incentives and financial support for my online teaching.	

In this study, the author argues that *transformational leadership (LEAD)* directly impacts all constructs in this model. That is to say, when leaders show their efforts in building an organizational vision for the future, providing support for each member of the organization, and encouraging intellectual stimulation, they strengthen the collaboration among instructors and create more opportunities for instructors to participate in making decisions related to adopting new approaches or technology. Based on these arguments, a hypothetical path model for *innovative organizational climate (OGC)* is proposed and shown in Figure 9 below.

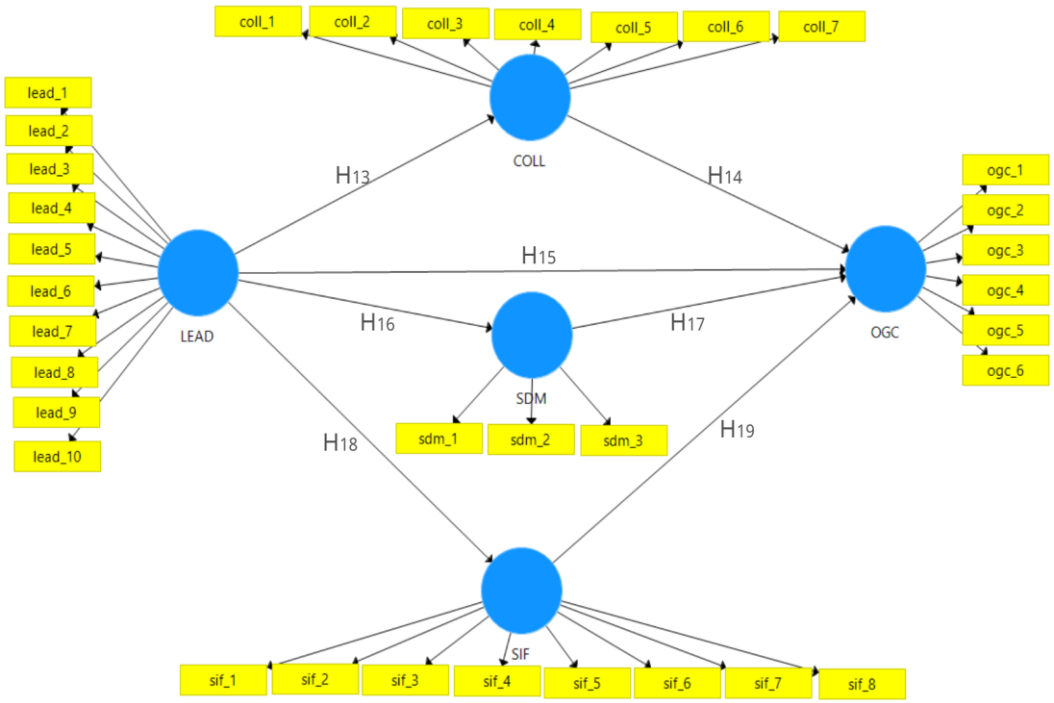


Figure 9. A conceptual model for Innovative Organizational Climate (OGC)

As can be seen in Figure 9, the following hypotheses are posited in this study:

H_{13}: *Transformational leadership (LEAD)* positively influences *collaboration among instructors (COLL)*.

H_{14} : *Collaboration among instructors (COLL)* positively influences *innovative organizational climate (OGC)*.

H_{15}: *Transformational leadership (LEAD)* positively influences *innovative organizational climate (OGC).*

H_{16}: *Transformational leadership (LEAD)* positively influences *shared decision-making (SDM)*.

H_{17}: *Shared decision-making (SDM)* positively influences *innovative organizational climate (OGC).*

H_{18}: *Transformational leadership (LEAD)* positively influences *supportive infrastructure for online teaching (SIF)*.

H_{19}: *Supportive infrastructure for online teaching (SIF)* positively influences *innovative organizational climate (OGC)*.

H_{20a} : *Collaboration among instructors (COLL)* mediates the relationship between *transformational leadership (LEAD)* and *innovative organizational climate (OGC)*.

H_{20b}: *Shared decision-making (SDM)* mediates the relationship between *transformational leadership (LEAD)* and *innovative organizational climate (OGC).*

H_{20c}: *Supportive infrastructure for online teaching (SIF)* mediates the relationship between *transformational leadership (LEAD)* and *innovative organizational climate (OGC)*.

3.3.4. Sample size and recruitment of participants

The author of this study used "*targeted personal network sampling*" (Spreen & Zwaagstra, 1994), i.e., "*network sampling"* (Frank, 2011), for implementing both the pilot and the main study. *Targeted sampling* is a data collection technique for obtaining an appropriate sample of respondents for survey research while allowing researchers to better control the sampling process and the implementation of the survey (Kozłowski et al., 2021; Spreen & Zwaagstra, 1994). In this study, respondents are experienced hospitality and tourism instructors or corporate trainers/training managers working at lodging properties, restaurants, or travel agencies in Vietnam. They were required to conduct online classes during the COVID-19 pandemic. It can be noted that around 50% of participants in ***Study 1*** also took part in ***Study 2***.

A pilot phase was conducted to test the three hypothesized models, using a smaller sample of respondents from the same population. Quantitative data were collected through an online survey, which was open from 6th to 18th March 2022. Because the draft questionnaire was initially developed in the English language, the author translated it into Vietnamese and performed back-translation with the support of two English language experts. The results from this pilot study were used to improve the designed questionnaire and draw a minimum path coefficient used for determining the sample size needed for the main study. According to Johanson and Brooks (2009), 30 representative participants from the population of interest is a reasonable minimum recommendation for a pilot study where the purpose is a preliminary survey or scale development. Therefore, 30 participants were recruited for the pilot study. The characteristics of these respondents are summarized in Table 29.

After the pilot study had been conducted and the scale's reliability had been initially tested, the original questionnaire was shortened, and the total number of items was reduced from 95 to 60. Since the pilot study produced a minimum path coefficient of 0.24, this value is chosen as input for computing the required sample size for the main study. Accordingly, as suggested by Hair et al. (2022) (see Table 13), when the minimum path coefficient expected to be significant is from 0.21 to 0.3, the main study would need approximately 69 observations to render the corresponding effect significant at 5%. Therefore, in the main study, 76 participants were recruited for the second online survey, which was open from 19th to 31st March 2022. The characteristics of these respondents are summarized in Table 30.

As can be seen in Table 30, female instructors account for approximately 58%. Regarding the age, most participants in the main study were 31–40 years old (48.7%). Those under 30 comprise a lower percentage of the total (19.7%), teachers from 41 to 50 years old account for approximately 17.1%, while the oldest group accounts for the lowest percentage (about 14.5%).

Most (49.3%) of the participants in the main study had a Master’s degree (53.9%), and 42.1% had a Bachelor’s degree. Only one participant had a Ph.D. Regarding teaching experience, most of the participants had less than five years of teaching experience in the area of hospitality and tourism; 18.4%, five to less than ten years; the most experienced instructors (10-15 years, and more than 15 years) account for the lowest percentages (14.5% each). Regarding teaching specialization, although all participants had a professional background in hospitality and tourism, most of them specialized in delivering management courses (each

participant may be teaching in more than one subject matter). 48 participants conducted vocational training. In addition, instructors who gave language training in the hospitality and tourism sector also participated in the study, accounting for 15.8% of the study participants.

Table 29. Participants' demographics and background ***(Study 2 - pilot phase)***

Participants' demographics and background (n = 30)		**Number of cases**	**Percentage**
Gender	Male	7	23.3
	Female	23	76.7
Age	25–30	2	6.7
	31–40	19	63.3
	41–50	6	20.0
	51–60	3	10.0
Education	Vocational College Diploma	1	3.3
	Bachelor's degree	8	26.7
	Master's degree	20	66.7
	Ph.D. or higher	1	3.3
Teaching experience	Less than a year	4	13.3
	1 year – less than 5 years	7	23.3
	5 years – less than 10 years	9	30.0
	10–15 years	7	23.3
	More than 15 years	3	10.0
Specialization	Hospitality vocational training	4	13.3
	Hospitality management	5	16.7
	Tourism vocational training	5	16.7
	Travel services management	1	3.3
	Vocational culinary arts	4	13.3
	Vocational restaurant serving	1	3.3
	Restaurant management	4	13.3
	Supervisory/ Management/ Leadership training	16	53.3
	English for hospitality and tourism	10	33.3
	Others	10	33.3

Table 30. Participants' demographics and background ***(Study 2 - main study)***

Participants' demographics and background (n = 76)		**Number of cases**	**Percentage**
Gender	Male	27	35.5
	Female	44	57.9
	Prefer not to answer	5	6.6
Age	25–30	15	19.7
	31–40	37	48.7
	41–50	13	17.1
	51–60	11	14.5
Education	High School	1	1.3
	Vocational College Diploma	1	1.3
	Bachelor's degree	32	42.1
	Master's degree	41	53.9
	Ph.D. or higher	1	1.3
Teaching experience	Less than a year	15	19.7
	1 year – less than 5 years	25	32.9
	5 years – less than 10 years	14	18.4
	10–15 years	11	14.5
	More than 15 years	11	14.5
Specialization	Hospitality vocational training	11	14.5
	Hospitality management	11	14.5
	Tourism vocational training	24	31.6
	Travel services management	8	10.5
	Vocational culinary arts	8	10.5
	Vocational restaurant serving	5	6.6
	Restaurant management	5	6.6
	Supervisory/ Management/ Leadership training	26	34.2
	English for hospitality and tourism	12	15.8
	Others	19	25.0

3.3.5. Analysis procedure

The author of this study adopted the PLS-SEM's systematic procedure suggested by Hair et al. (2022) to evaluate all the proposed path models. Specifically, after specifying the models and collecting data, the analysis starts with assessing the measurement models. When the data for the measures are deemed reliable and valid, the structural models can be evaluated. The established criteria used for each phase of the evaluation process are as follows.

Evaluation of the measurement models

According to Hair et al. (2022), assessing the measurement models involves the evaluation of the relationships between the indicators and the constructs. Since all the measurement models in this study are reflective, i.e., the specified indicators represent the effects of the underlying constructs, the author focuses on evaluating their *indicator reliability*, *internal consistency reliability*, *convergent reliability*, and *discriminant validity*.

Indicator reliability refers to assessing the outer loadings of the measurement items. The large size of the outer loadings on a construct signifies that its indicators have much in common captured by the construct. Specifically, the standardized outer loadings should be at least 0.708 because this number squared $(0.708)^2$ equals 0.5, i.e., the latent construct could explain at least 50% of each indicator's variance (Hair et al., 2022). Figure 10 shows Hair et al. (2022)'s recommendations on indicator retention based on outer loadings.

The *internal consistency reliability* of measurement models is measured via three primary criteria: the *Cronbach's alpha*, the *composite reliability* (ρ_c), and the *reliability coefficient* (ρ_A). These three reliability metrics complement each other and thus should be jointly used by researchers to ensure the satisfactory level of the measurement models' *internal consistency reliability*. Although their values often vary between 0 and 1, with larger sizes indicating higher levels of reliability, the range 0.6-0.7 is acceptable in exploratory studies, and values above 0.95 are not desirable since such high rates are often the results of rephrasing the same indicators (Hair et al., 2022).

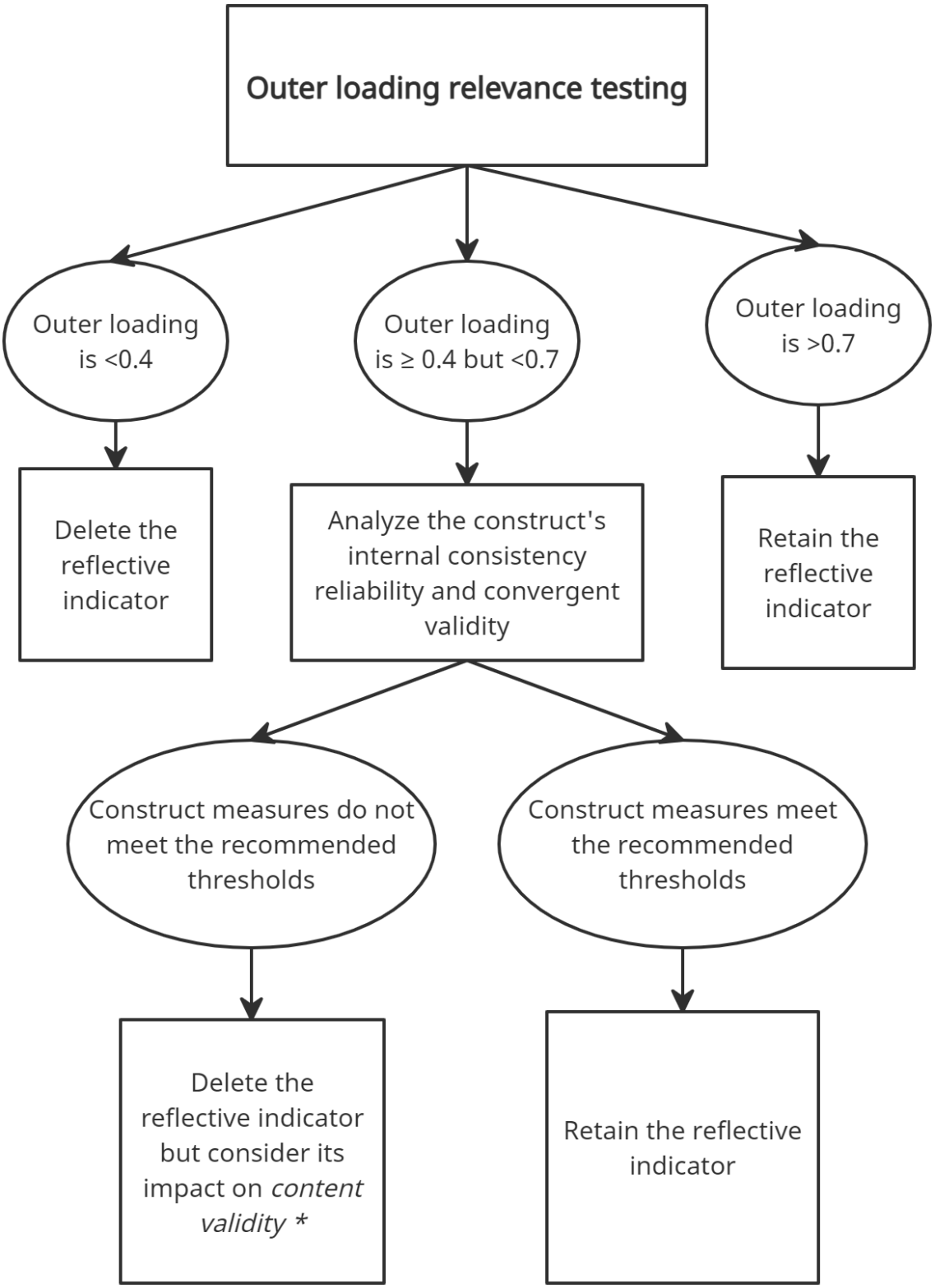


*Figure 10. Outer Loading Relevance Testing (*Hair et al., 2022*)*

Convergent validity is the degree to which an indicator correlates positively with its alternatives in the same construct (Hair et al., 2022). In other words, the measurement items of a particular reflective construct should share a relative amount of variance. The typical metric for this criterion is the *average variance extracted (AVE)*. Similar to the rationale behind the *indicator reliability*, *AVE* should have a value of at least 0.5, i.e., the reflective construct can explain more than 50% of the variance of its indicators.

Discriminant validity is defined by Hair et al. (2022, p. 120) as "the extent to which a construct is truly distinct from other constructs by empirical standards". Although there are various metrics to establish this criterion, numerous researchers recommend that the *heterotrait-monotrait ratio of the correlations among constructs (HTMT)* is the most accurate indicator of *discriminant validity*. *HTMT* is the mean of all correlations of indicators across constructs. It estimates the degree to which two particular constructs are genuinely correlated. Although the threshold for this metric is often set at 0.9 (Henseler et al., 2015), Garson (2016) contends that *discriminant validity* between two closely-related reflective constructs can also be justified when the *HTMT* ratio is below 1.0. Noticeably, when adopting the *HTMT* approach in PLS-SEM analysis, since there is no distributional assumption, researchers need to rely on the *bootstrapping* procedure, i.e., randomly and repeatedly drawing subsamples (with replacement) from the original dataset. This process helps researchers to acquire a distribution of the *HTMT* statistics and accordingly obtain a *bootstrap confidence interval*, which is used for assessing whether the *HTMT* ratio is statistically significantly lower than a given threshold value with a certain level of confidence, e.g., 95%. As suggested by Hair et al. (2022), the typical number of randomly drawn subsamples in the *bootstrapping* procedure is about 10,000. Therefore, in this study, the *bootstrapping* process is only conducted in the main study where sufficient data have already been collected.

Evaluation of the structural models

After the reliability and validity of the measurement models are established, the next step is to assess the path models' capabilities in explaining and predicting the target constructs. Hair et al. (2022) introduced a systematic procedure to conduct this task. This procedure is shown in Figure 11 below.

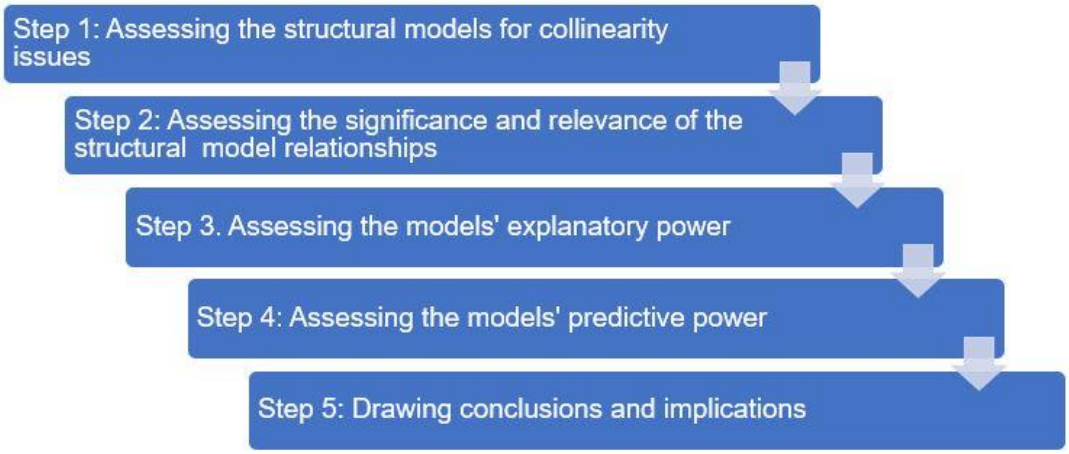


Figure 11. Structural model assessment procedure, based on Hair et al. (2022)

As can be seen in Figure 11, the first step of evaluating the structural models is to examine whether there are collinearity issues. The rationale behind this step is that the estimated path coefficients might be biased if excessive levels of collinearity among the predictor variables exist. To assess collinearity, the author of this study computes the *variance inflation factor (VIF),* which is defined as the inverse of the *tolerance coefficient (TOL),* i.e., the amount of variance of one formative indicator not explained by the other indicators in the same block. Each set of predictor constructs (of the same target construct) needs to be examined separately to determine whether there are high levels of collinearity between them. According to Hair et al. (2022), the *VIF* values in the predictor constructs should be lower than 5 and preferably below 3 to ensure that no substantial collinearity issues exist in the structural models. If the *VIF* estimates indicate a high level of collinearity, there might be a need to eliminate, merge predictor constructs, or even create higher-order constructs.

After treating collinearity problems and ensuring that there is no critical level of collinearity, the next step in evaluating structural models is to assess the *significance* and *relevance* of the model relationships. The *significance* of these relationships is examined through the size of the *path coefficients,* which indicate the *hypothesized relationships* among the constructs. The standardized values of these coefficients range from -1 to +1. The closer their estimated values are to +1, the stronger positive relationships are indicated (and vice versa for negative values). A low value close to 0 represents a relationship potentially not statistically significant (Hair et al., 2022).

To better determine whether the *path coefficients* are statistically significant, the author of this study uses the *bootstrapping* procedure in which the empirical *p* values for all the

structural *path coefficients* are computed. The *p* value is the "probability of erroneously rejecting a true null hypothesis, i.e., assuming a significant path coefficient when in fact it is not significant" (Hair et al., 2022, p. 192). When assuming a significance level of 5%, the *p* value must be lower than 0.05 to conclude that the relationship under investigation is significant at a 5% level.

After the *significance* of relationships is examined, the *relevance* of these relationships needs to be evaluated. It should be noted that the *path coefficients* in the structural models may be significant, but their values may be very low and thus may not require managerial attention. Therefore, it is suggested that instead of merely focusing on the direct effects, one should also compute the *total effects*, i.e., the sum of *direct* and *indirect effects* that one construct has on one another. The *indirect effects* are indicated via one or more *mediating* constructs. The interpretation of the *total effects* has been considered essential in research studies where various driver constructs impact an endogenous construct (through one or more mediators) (Hair et al., 2022).

In step 3, i.e., assessing the models' explanatory power or their ability to fit the dataset, a commonly used metric to establish this criterion is the *coefficient of determination* (R^2) value, calculated as the squared correlation between a specific endogenous construct's actual and predicted values. R^2 indicates the amount of variance in one endogenous construct explained by all of the predictor constructs. Hair et al. (2022) also refer to this value as an indicator for *in-sample predictive power*. Since it ranges from 0 to 1, a higher value of this metric represents a higher level of the model's *explanatory power*. Interpreting its size can be based on related studies and models with comparable complexity.

The R^2 value can also be used to compute the f^2 *effect size*, which is the change in the R^2 value when a specific predictor construct is discarded from the model. Although the f^2 *effect size* is somewhat similar to the *path coefficient*, the author of this study still uses this metric to make the evaluation more comprehensive. Guidelines for assessing this metric are that values of 0.02, 0.15, and 0.35, respectively, represent the predictor constructs' small, medium, and large effects (Cohen, 1988).

The last step of the evaluation process is essential for ensuring that the structural models produce generalizable findings, i.e., the results not only apply to the original data but also to other datasets. When this generalizable quality is established, the specified path models thus can be used for making managerial decisions (Hair et al., 2022). In other words, PLS-SEM

researchers need to assess their models' *out-of-sample predictive power*, commonly referred to as their *predictive power*. In this study, the author uses two indicators of this criterion: the *Stone-Geisser's* Q^2 *statistic* (Geisser, 1974; Stone, 1974) and the *root mean square error (RMSE)*, obtained through the process of running the *blindfolding* and the Shmueli et al. (2016)'s $PLS_{predict}$ procedure, respectively.

Blindfolding is a sample reuse technique that repeatedly omits every *d*th data point in the endogenous variable's indicators and estimates the parameters with the remaining data points. The difference between the actual (omitted) data points and the predicted one is used as an input for the *Stone-Geisser's* Q^2 *statistic*. According to Henseler et al. (2009), a Q^2 value above zero indicates that the model has predictive relevance.

The $PLS_{predict}$ procedure guided by Shmueli et al. (2019) refers to the process of dividing the original dataset into *training* and *holdout samples*. A *training sample* is used for estimating parameters such as the *path coefficients* or the *outer loadings*, whereas the *holdout sample* is the remaining portion of the dataset. $PLS_{predict}$ uses the values for the predictor constructs' indicators of observations in the *holdout sample* and applies the model estimates from the *training sample* to produce predictions of the target constructs' indicators (Shmueli et al., 2016). Accordingly, a minor difference between the actual and the predicted values indicates that the model has high *predictive power*.

When conducting the $PLS_{predict}$ procedure, researchers need to base on the concept of *k-fold cross-validation* where the original dataset is separated into *k* equally sized subsets of data. Hair et al. (2022) recommend that *k* can be set to 10 for predictive studies as long as the minimum sample size requirements are met (see Table 13). Therefore, in this study, when performing the $PLS_{predict}$ procedure, the author also set *k* to 10 in the main study for assessing the models' *predictive power* (the pilot study does not have a large-enough sample size to conduct this validation step). In addition to the concept of *k-fold cross-validation*, the author also pays attention to the number of times the $PLS_{predict}$ algorithm is repeatedly run, i.e., *r times*. The higher value *r* is, the higher precision of the estimates (Hair et al., 2022). According to Witten et al. (2016), setting *r* to 10 generally helps balance accuracy and runtime. Therefore, in this study, the author also sets *r* to 10 when performing the $PLS_{predict}$ procedure for generating the prediction statistics.

Regarding the prediction statistics, the *mean absolute error (MAE)* and the *root mean square error (RMSE)* are two important metrics for evaluating the path models' *predictive*

power. As suggested by Hair et al. (2022), since the *RMSE* should be primarily used unless the prediction error distribution is highly non-symmetric, the author considers the *RMSE* as the default metric for interpreting the prediction error of the endogenous construct' indicators. Because the *RMSE* is scaled, the smaller its values are, the higher predictive power the path models have. This statistic is defined as follows, whereby y_i represents the value of y for observation *i* (i = 1,…,n) and $\hat{y}_i$ is the predicted value for that observation:

$$RMSE = \sqrt{\frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{n}}$$

Lastly, a *linear regression model (LM) benchmark*, suggested by Shmueli et al. (2016), is adopted in this study to generate predictions for the manifest variables by running a linear regression of each of the endogenous variable's indicators on the indicators of the exogenous variables in the path models. Researchers would expect their predictions, which consider the whole model structure, to outperform the *naive LM benchmark*. In other words, when the $Q^2_{predict}$ value, i.e., the naive benchmark using the mean value of the variables in a *training sample* as predictions of the variables in the *holdout samples*, is higher than zero, the indicator outperforms the most naive benchmark, i.e., the indicator means from the *training sample* for the formula to compute $Q^2_{predict}$. In this study, only when $Q^2_{predict} > 0$ has been established, the author then started comparing the RMSE values with the *naive LM benchmark*. According to Hair et al. (2022), this comparison can lead to four outcomes:

1. If all indicators (of the target construct) have lower *RMSE* values than that of the *naive LM benchmark*, the model has *high predictive power*.
2. If the majority (or the same number) of indicators in the path models produce smaller prediction errors compared to the *LM*, this indicates a *medium predictive power*.
3. If a minority of the indicators yield lower prediction errors compared to the *LM*, this indicates the model has *low predictive power*.
4. If none of the indicators have lower *RMSE* values, the model *lacks predictive power*.

4. Results of *Study 1*: Evaluating an innovation in online teaching (*SRO1*)

4.1. Perceived improvement of self-confidence in the complex skills required for online teaching through the proposed course

The resulting α coefficients of reliability of the TNA, PTE, and course evaluation items ranged from 0.74 to 0.94 (see Table 31), indicating that the designed questionnaires are reliable instruments.

Table 31. α coefficients of the TNA, PTE, and course evaluation items

Measures	Number of items	Cronbach's alpha
Training Needs Analysis (TNA)	14	0.94
Post-Training Evaluation (PTE)	14	0.89
Course evaluation	10	0.74

Before taking the proposed course, the TNA results show that participants rated their self-confidence in the complex skills required for synchronous online teaching at a medium level, ranging from 2.32 to 2.71 (see Table 32 below). In their responses to the open-ended question on their current difficulties in synchronous online teaching, most participants claimed that they had not had much experience conducting virtual training programs and thus felt a significant lack of confidence in interacting with their target learners. Furthermore, participants whose job was running vocational training programs shared their common challenges in moving their hands-on training programs to virtual classrooms. They also expressed their doubts on whether practice-based courses can be delivered through a virtual environment. Such concern may explain the low percentage of vocational trainers who participated in this study. Lastly, most participants claimed that they could not distinguish synchronous from asynchronous technologies and thus were unable to use such tools. In essence, participants' lack of both pedagogical and technological knowledge appears to force them and other hospitality and tourism instructors in Vietnam to adopt a traditional passive lecture format, which is not particularly effective in online classrooms.

The PTE results revealed an enhancement in the 67 participants' self-confidence in the complex skills required for synchronous online teaching, with average post-training self-evaluation ratings ranging from 4.17 to 4.53 (see Figures 12-17 and Table 32). The paired-samples t-tests confirmed that the proposed training course had a significant impact on the participants' self-confidence in the complex synchronous online teaching skills, with all the p-values lower than 0.001. The Cohen's d values, which were computed to evaluate the effect

size, ranged from 0.83 to 0.96, indicating that the course had a large effect on the participants' perceived improvement in self-confidence across the complex synchronous online teaching skills (RQ1). The effect size results also ensures that the selected sample size meets the requirements of sample size for evaluating educational interventions, according to McConnell et al. (2019). Table 32 shows the paired self-evaluation ratings (before and after the training) in each online teaching skill.

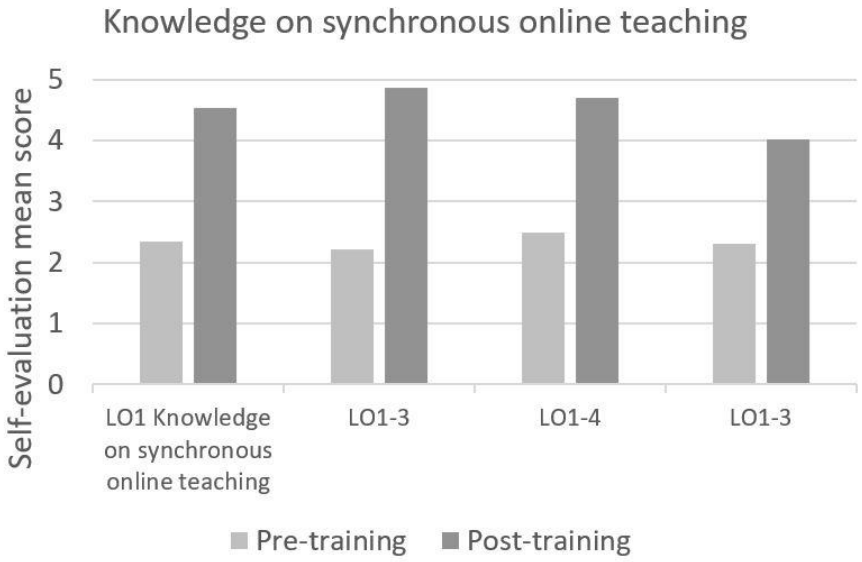


Figure 12. Perceived improvement in 'knowledge on online teaching' after training

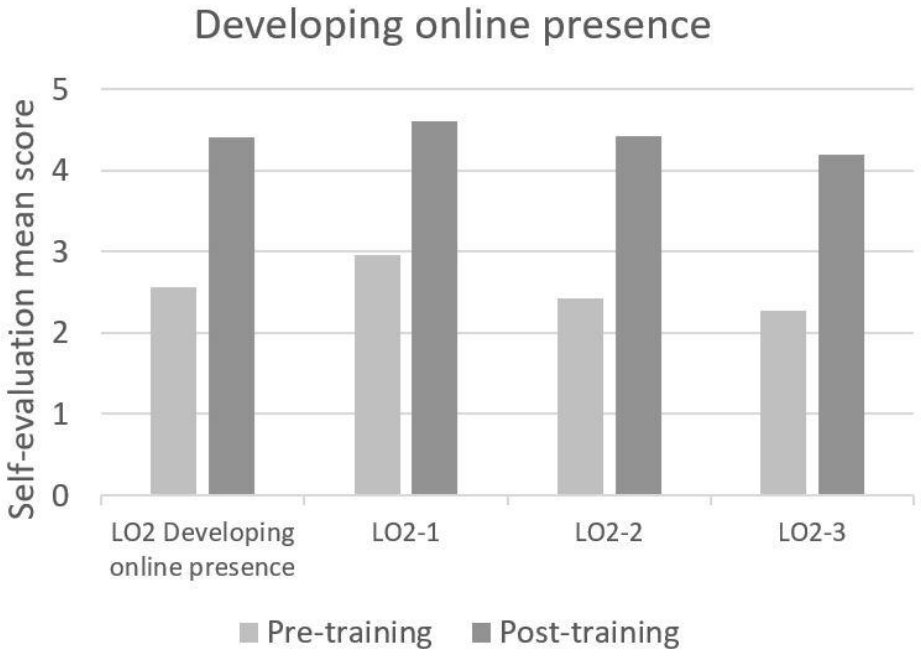


Figure 13. Perceived improvement in 'developing online presence' after training

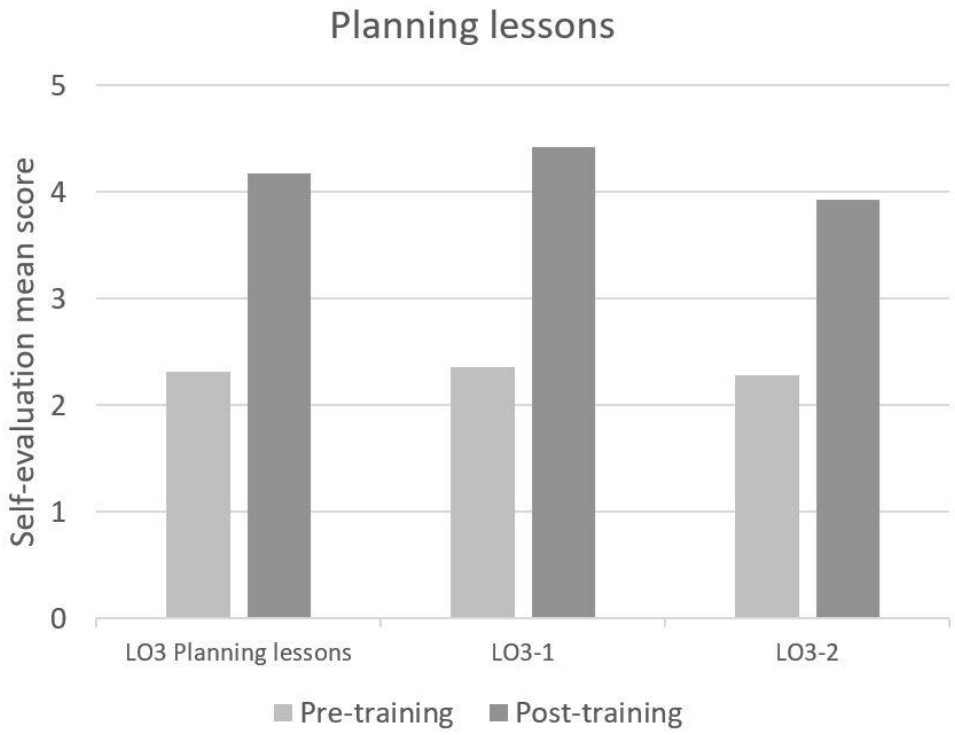


Figure 14. Perceived improvement in 'planning lessons' after training

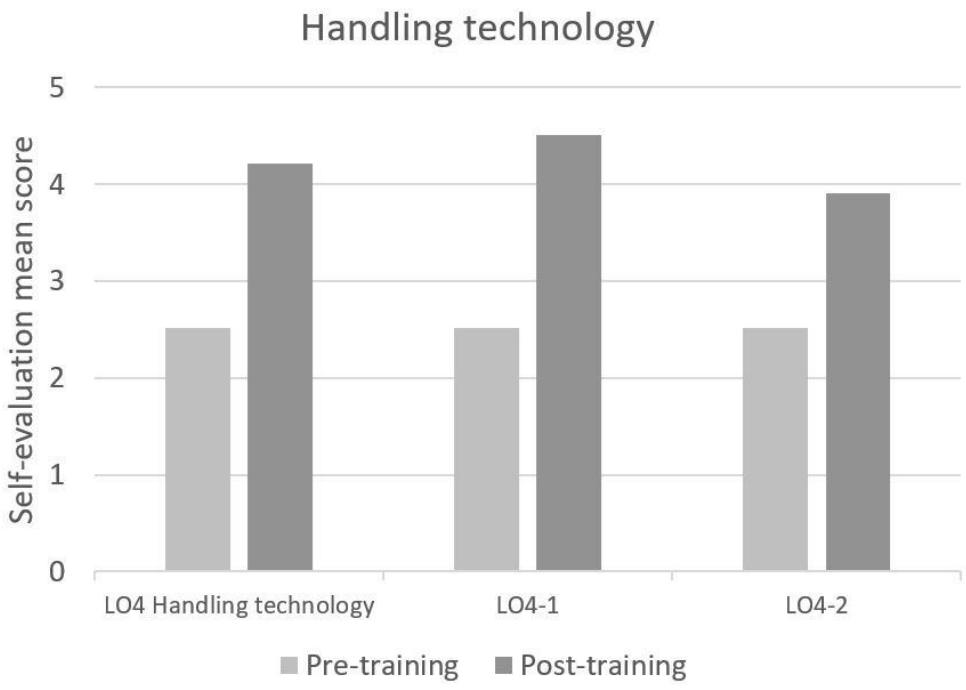


Figure 15. Perceived improvement in 'handling technology' after training

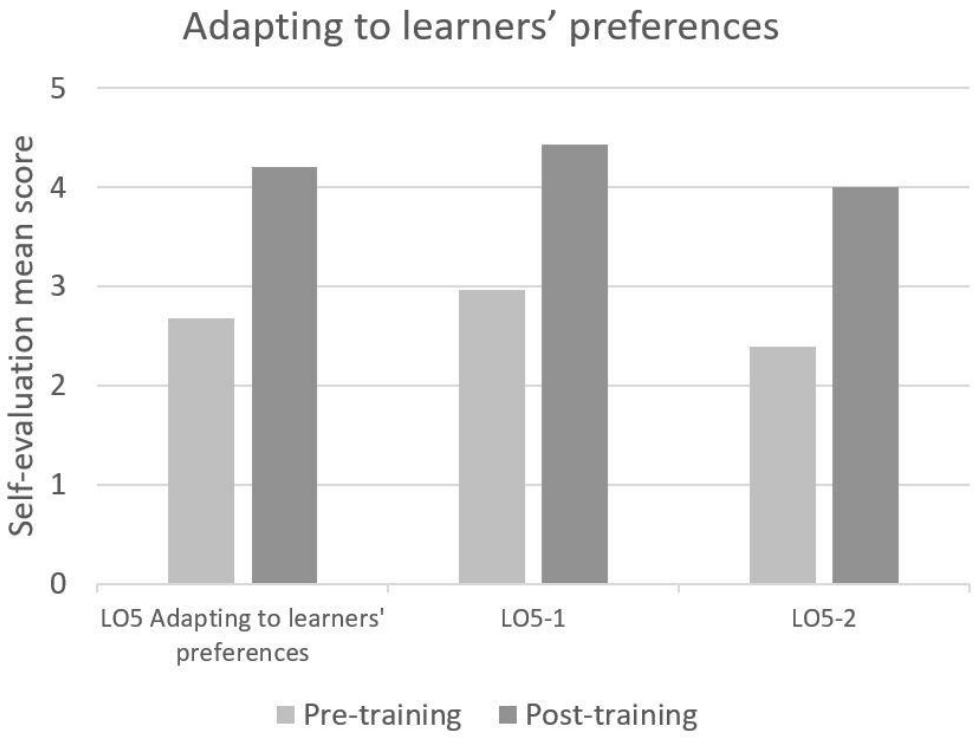


Figure 16. Perceived improvement in 'adapting to learners' preferences' after training

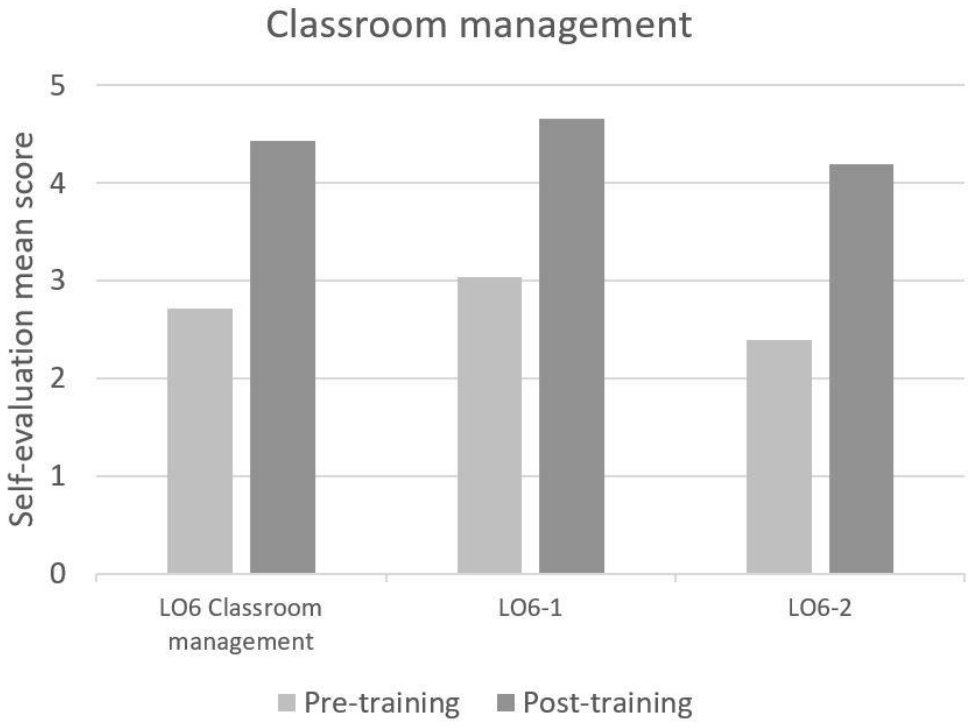


Figure 17. Perceived improvement in 'classroom management' after training

Table 32. Paired-samples t-test results for perceived improvement in online teaching skills

Learning outcomes (LO)		Mean (Pre-training)	Mean (Post-training)	T value	Cohen's d	p value < 0.001?
LO1	**Knowledge on synchronous online teaching**	**2.34**	**4.53**	**-18.74**	**0.95**	**Yes**
LO1-3	I can distinguish synchronous from asynchronous technology.	2.22	4.87			
LO1-4	I can list the pros and cons of synchronous online teaching.	2.49	4.7			
LO1-5	I can list differences among popular synchronous conferencing platforms.	2.31	4.01			
LO2	**Developing online presence**	**2.56**	**4.41**	**-16.23**	**0.94**	**Yes**
LO2-1	I can explain the definition and importance of online presence.	2.96	4.61			
LO2-2	I can develop strategies to enhance relationships with and among learners.	2.43	4.43			
LO2-3	I can develop methods to enhance social presence to overcome the lack of visual clues in online classes.	2.28	4.19			
LO3	**Planning lessons**	**2.32**	**4.17**	**-15.76**	**0.96**	**Yes**
LO3-1	I can list steps to help learners prepare before the course starts.	2.36	4.42			
LO3-2	I can design and implement synchronous online learning activities.	2.43	3.93			
LO4	**Handling technology**	**2.52**	**4.21**	**-14.37**	**0.96**	**Yes**
LO4-1	I can explain what creates quality online learning experience.	2.52	4.51			
LO4-2	I can use different built-in features of synchronous platforms.	2.43	3.91			
LO5	**Adapting to learners' preferences**	**2.68**	**4.21**	**-14.29**	**0.88**	**Yes**
LO5-1	I can recognize varied learning preferences and background.	2.97	4.43			
LO5-2	I can identify technological resources and tools for adapting to various learning preferences.	2.39	4.00			
LO6	**Classroom management**	**2.71**	**4.43**	**-16.90**	**0.83**	**Yes**
LO6-1	I can distinguish between online and offline class management approaches.	3.03	4.66			
LO6-2	I can identify technological resources and tools for adapting to various learning preferences.	2.39	4.19			

As shown in Table 32, participants' perceived improvement in the general knowledge about synchronous online teaching had the highest mean value. On the other hand, the lowest mean value was found in the perceived improvement in the complex skill of adapting to

learners' preferences. These findings are consistent with the interview results, indicating that participants need more time to identify the technological tools and resources that could enable them to adapt to learners' learning styles and practice using these.

This study also found two participants with negative differences between the post- and pre-training self-evaluation ratings. This result subtly showed a reperception of the self-evaluation ratings after the training. The two participants with these lower self-evaluation ratings were invited for a posttraining interview for a more in-depth analysis of their unique results.

4.2. Underlying factors contributing to the perceived self-confidence improvement

Principal component analysis (PCA) was run on the 14-item PTE questionnaire to identify the underlying elements of the participants' self-confidence levels after the training. The suitability of PCA was assessed prior to its use. The inspection of the correlation matrix showed that all the 14 learning outcome items in the PTE had at least one correlation coefficient greater than 0.3. The PCA revealed three components that had eigenvalues greater than 1. These three components explained 44.2%, 12.1%, and 7.5% of the total variance, respectively. The visual inspection of the scree plot in Figure 18 also indicated that three components should be retained (Cattell, 1966). Therefore, the three-component solution was adopted. Table 33 shows the rotated loading matrix, with all the factor loadings less than 0.3 omitted.

Figure 18. Retention of the three components before the last inflection point

Table 33. Rotated structure matrix for PCA with Varimax rotation of a three-component solution

Learning outcome (LO) items (post-training self-evaluation)		**Rotated component coefficients**		
		Component		
		1	**2**	**3**
LO3-1	I can list steps to help learners prepare before the course starts.	**0.764**	0.376	
LO1-4	I can list the pros and cons of synchronous online teaching.	**0.763**		
LO4-1	I can explain what creates quality online learning experience.	**0.750**		
LO6-1	I can distinguish between online and offline class management approaches.	**0.702**		0.391
LO1-3	I can distinguish synchronous from asynchronous technology.	**0.683**		
LO5-1	I can recognize varied learning preferences and backgrounds.	**0.637**	0.319	
LO3-2	I can design and implement synchronous online learning activities.		**0.844**	
LO4-2	I can use the different built-in features of synchronous platforms.		**0.767**	0.318
LO5-2	I can identify technological resources and tools for adapting to various learning preferences.	0.436	**0.753**	
LO2-3	I can develop methods of enhancing social presence to overcome the lack of visual clues in online classes.		**0.723**	0.378
LO6-2	I can identify strategies to respond to student behaviours/misbehaviours in synchronous online classes.	0.391	**0.683**	
LO2-2	I can develop strategies to enhance my relationships with and among learners.			**0.793**
LO2-1	I can explain the definition and importance of online presence.			**0.746**
LO1-5	I can list the differences among popular synchronous online conferencing platforms (WebEx, Microsoft Teams, Blackboard, Zoom).			**0.367**

Notes: The major loadings for each PTE item are boldfaced. Extraction method: PCA. Rotation method: Varimax with Kaiser normalization.

As shown in Table 33, although some PTE items loaded onto two components in the PCA (e.g. LO3-1, LO6-1, LO5-1, LO4-2, LO5-2, LO2-3 and LO6-2), the difference in factor loadings for the two components either reach nearly 0.3 (in the case of LO6-2) or are more than 0.3 (in all the remaining cases). Therefore, all these items are deemed to measure the underlying constructs with the higher corresponding factor loading. Other items loaded onto only one component, when grouped accordingly, appeared to measure the same element of the

participants' self-confidence level in the post-training stage. After grouping the items that measure the same underlying element, we adopted the structure of the knowledge dimension of the revised Bloom's taxonomy developed by Krathwohl (2002) to recognize the elements that might have contributed to the participants' improved self-confidence after the training.

Based on the PCA results, the PTE items with primary loadings onto the first component are LO3-1, LO1-4, LO4-1, LO6-1, LO1-3, and LO5-1. Despite being embedded in various course sessions, all these items belong to the category of "factual knowledge," defined by Krathwohl (2002) as the "basic elements that students must know to be acquainted with a discipline or solve problems in it" (p. 214). Specifically, factual knowledge includes knowledge of terminology and an understanding of specific details and elements. Therefore, in this study, the course sessions that equipped the participants with such knowledge might have contributed to the resulting participants' perceived improvement in their abilities to teach online.

Similarly, the PTE items with major loadings onto the second component included LO3-2, LO4-2, LO5-2, LO2-3, and LO6-2. These items appeared to characterize "procedural knowledge," which refers to as "how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods" (p. 214). Accordingly, the second component was related to the procedural knowledge needed to practice synchronous online teaching.

The last component had three items, LO2-2, LO2-1, and LO1-5, which were deemed to measure "knowledge of principles and generalizations," "knowledge of theories, models and structures", and "knowledge of classifications and categories," respectively. According to Krathwohl (2002), these three types of knowledge are categorized as "conceptual knowledge."

In essence, the PCA results in this study suggested that a training program for building teachers' self-confidence in conducting synchronous online teaching should enhance three essential categories of the knowledge dimension in the revised Bloom's taxonomy: factual, conceptual, and procedural knowledge.

4.3. Participants' evaluation of the proposed training program

Regarding the participants' course evaluation, the participants had a high level of satisfaction with the proposed course. However, among the evaluation items (see Table 34), the time allotted for the training received the lowest mean score, indicating that the proposed course needs to offer more time for the participants to adopt and practice synchronous online teaching.

Table 34. Participants' evaluation of the proposed course (n = 67)

Evaluation items	Minimum	Maximum	Mean
1. The objectives of the training were well defined.	4.00	5.00	4.86
2. The topics covered were relevant to me.	4.00	5.00	4.91
3. The content was well organized and easy to follow.	4.00	5.00	4.82
4. Blackboard Coursesites LMS was helpful for the learning process.	3.00	5.00	4.44
5. The materials that were distributed were helpful.	4.00	5.00	4.77
6. The learning activities helped achieve the learning outcomes.	4.00	5.00	4.79
7. The training facilitator was able to establish an online presence.	4.00	5.00	4.71
8. Blackboard Collaborate was a helpful synchronous platform for this training.	3.00	5.00	4.43
9. The time allotted for the training was sufficient.	2.00	5.00	4.07
10. This training experience will be useful for my future work.	4.00	5.00	4.89

Spearman's rank-order correlation tests were also conducted to determine if there was a relationship between the participant's satisfaction with the proposed course and the mean difference in their self-confidence ratings before and after the training. The preliminary analysis showed that all the relationships were monotonic, as evaluated through the visual inspection of the scatterplots. The results showed that all the Spearman's correlations were not statistically significant (i.e., $p > 0.05$). Therefore, the participants' expressed satisfaction with the proposed course and the self-confidence improvement they achieved after the training were not correlated. This finding indicates that a high level of satisfaction with a training course does not necessarily relate to the participants' self-confidence improvement after attending the course, although the paired-samples t-tests that were conducted in this study confirmed that the proposed training course had a significant impact on the participants' self-confidence in conducting synchronous online teaching.

To further identify what contributes to the participants' improved self-confidence in conducting synchronous online teaching and to search for ways to improve the design of the proposed course, ten participants were invited to participate in the post-training interviews. Five of them perceived the greatest improvement in their post-training self-confidence, while the others had the lowest perceived improved self-confidence levels.

The participants who perceived the most considerable improvement in their selfconfidence after the training shared their overall satisfaction with the constructivist design and learning activities of the proposed course. They particularly enjoyed the process of active reflection as part of a learning community. One participant noted:

> At the end of the course, I felt that each class member was an essential part of a community. Despite our lack of openness at the beginning of the course, we learned during our teaching practice and peer feedback sessions that we face the same challenges in online teaching. We then learned a lot by seeing how each member designed learning activities and handled difficult situations (Female, 40 years old, conducting training on supervisory skills).

Another participant particularly noted her changing attitude towards synchronous online teaching as follows:

> I believe that my self-confidence in teaching online has improved significantly. Besides numerous technological tools that I can now utilize in my future online classes, I no longer feel scared of delivering online lessons after completing the course. As my negative feeling about online teaching has faded away, I just need to practice and innovate more in my online classes, and I'm ready for that. (Female, 47 years old, teaching restaurant management courses).

A teacher who expressed her eagerness to conduct an online session to apply what she had learned fromthe course stated:

> The course came at the right time because many teachers in Vietnam had to adapt to the COVID-19 situation and deliver their lessons online. Many tools and classroom management activities were introduced in the course, giving the trainee enough confidence to begin a class right away (Female, 29 years old, teaching English to hospitality and tourism professionals).

The two participants who perceived a lower level of self-confidence in conducting synchronous online teaching after the training were asked why their self-confidence became even lower. We also asked whether the negative differences between their post- and pretraining self-evaluation ratings indicate a lower level of self-confidence in the complex skills concerned. The responses appeared to show the occurrence of a reperception process as one participant noted:

> Before participating in the training, I thought I had a thorough understanding of the technological tools that could be used for online teaching. This prior belief led me to give a high rating for my self-confidence before the training. I thus chose to register for the course with very low motivation. Also, I used to believe that online teaching could never replace the traditional face-toface classroom. However, after attending the course and learning from the other teachers who likewise attended it, I have changed this attitude of mine and now know that my prior knowledge was restricted. I now believe that there's more that I need to learn about online education (Male, 61 years old, giving courses in hospitality and restaurant management).

The interviews with the five participants with the lowest perceived skill improvement revealed that more time for practice designing learning activities and handling the technological features of the online teaching platforms used is needed to achieve a higher level of self-confidence in teaching online. More specifically, these participants suggested that each session in the proposed course should be allocated two hours instead of only 90 min so that participants would have more time for discussion and teaching practice.

To summarize, at the end of the proposed course, the teacher participants' self-confidence in conducting synchronous online teaching improved because they perceived self-improvement in the complex skills required for such. Also, this study suggested that training programs for increasing teachers' self-confidence in synchronous online teaching should enhance three essential categories of the knowledge dimension in the revised Bloom's taxonomy (Krathwohl, 2002): factual, conceptual, and procedural knowledge.

5. Results of *Study 2*: Evaluating the path models (*SRO2*)

5.1. Results from the pilot phase

5.1.1. Path model 1: Innovative Behavior in Online Ieaching (IBOT)

After running the PLS-SEM algorithm for the pilot phase, all indicators with outer loadings lower than 0.4 were deleted. As suggested by Hair et al. (2022), this study retained only indicators with outer loadings of at least 0.708 to ensure sufficient levels of indicator reliability. A few indicators with loadings between 0.4 and 0.7, e.g., *ibot_4*, *scot_4*, *mef_1*, were also maintained due to their contribution to the content validity. In addition, the construct *MEF* was merged into *ATT* to improve the model's validity and reliability. Therefore, its indicators (with outer loadings at least 0.7) were reassigned to *ATT*. A summary of the measurement model evaluation results is shown in Table 35 and Table 36.

As can be seen in Table 35, the *convergent validity* of all the measurement models has been achieved because the *indicator reliability* has been established, i.e., indicators' outer loadings meet the required minimum level. In addition, the *AVE* values of all the constructs are well above the 0.50. Regarding the *internal consistency reliability*, the Cronbach's Alpha, p_A, and p_c values of all the reflective constructs in the *IBOT* model are larger the 0.70 threshold, indicating that all construct measures have high degrees of *internal consistency reliability*.

From Table 36, the *discriminant validity* of the *IBOT* measurement models is also confirmed as the *HTMT* ratios for all pairs of constructs are below the conservative threshold value of 0.85. It should be recalled that the threshold value of *HTMT* ratios for conceptually similar constructs is 0.90 (Henseler et al., 2015) or 1.00 (Garson, 2016). In this pilot phase, the *bootstrapping* procedure for testing whether the *HTMT* values are significantly different from the threshold value was not conducted since the sample size requirement has not been met. This procedure will be implemented in the main study. In brief, in the pilot phase, the most valid and reliable indicators have been retained and the assessment results for the measurement models show that all model evaluation criteria have been met, providing support for the measures' reliability and validity.

Table 35. Results summary for IBOT measurement models (pilot phase)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability		
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c
		>0.70	>0.50	>0.50	>0.70	>0.70	>0.70
IBOT	ibot_1	0.71	0.50	0.57	0.85	0.86	0.89
	ibot_2	0.79	0.62				
	ibot_3	0.83	0.69				
	ibot_4	0.67	0.45				
	ibot_7	0.77	0.59				
	ibot_8	0.75	0.56				
SCOT	scot_1	0.77	0.59	0.60	0.77	0.80	0.85
	scot_2	0.91	0.83				
	scot_3	0.77	0.59				
	scot_4	0.61	0.37				
ATT	att_6	0.82	0.67	0.56	0.75	0.82	0.83
	att_7	0.85	0.72				
	mef_1	0.57	0.32				
	mef_5	0.73	0.53				
OGC	ogc_1	0.84	0.71	0.69	0.85	0.87	0.90
	ogc_2	0.80	0.64				
	ogc_3	0.77	0.59				
	ogc_4	0.91	0.83				
SKILL	skill_3	0.71	0.50	0.54	0.92	0.92	0.93
	skill_4	0.80	0.64				
	skill_5	0.70	0.49				
	skill_6	0.66	0.44				
	skill_7	0.81	0.66				
	skill_8	0.78	0.61				
	skill_9	0.68	0.46				
	skill_10	0.72	0.52				
	skill_11	0.72	0.52				
	skill_12	0.79	0.62				
	skill_13	0.71	0.50				

Table 36. HTMT ratios showing discriminant validity of IBOT measurement models (pilot phase)

	ATT	IBOT	OGC	SCOT	SKILL
ATT					
IBOT	0.71				
OGC	0.39	0.49			
SCOT	0.40	0.71	0.82		
SKILL	0.47	0.81	0.76	0.72	

After evaluating the measurement models, the next step is to examine the structural model. Assessing the structural model in the pilot phase refers to only addressing potential *collinearity* issues (since path coefficients might be biased if high levels of *collinearity* among predictor constructs exist) and establishing the path coefficients necessary for determining the sample size required for the main study. Table 37 displays the *collinearity* statistic, i.e., the *VIF* values, of all combinations of endogenous constructs (represented by the columns) and corresponding exogenous (i.e., predictor) constructs (represented by the rows). These values are clearly below the conservative threshold of 3, indicating that collinearity among the predictor constructs is not a critical issue in the structural model. The path coefficients of the structural model can then be examined.

Table 37. VIF values in the IBOT structural model (pilot phase)

	ATT	IBOT	OGC	SCOT	SKILL
ATT		1.24			
IBOT					
OGC		2.40			1.00
SCOT		2.10			
SKILL	1.00	2.30		1.00	

In the pilot phase, only the path coefficients, which show the relative importance of the predictor constructs, were examined to determine the sample size needed for the main study. As shown in Figure 19 below, the lowest path coefficient in the *IBOT* model is 0.27 (OGC→IBOT). This value is chosen as input for computing the required sample size for the main study. Accordingly, as suggested by Hair et al. (2022) (see Table 13), when the minimum path coefficient expected to be significant is between 0.21 and 0.3, the main study would need approximately 69 observations to render the corresponding effect significant at 5%. Therefore, 76 participants were recruited for the second online survey in the main study.

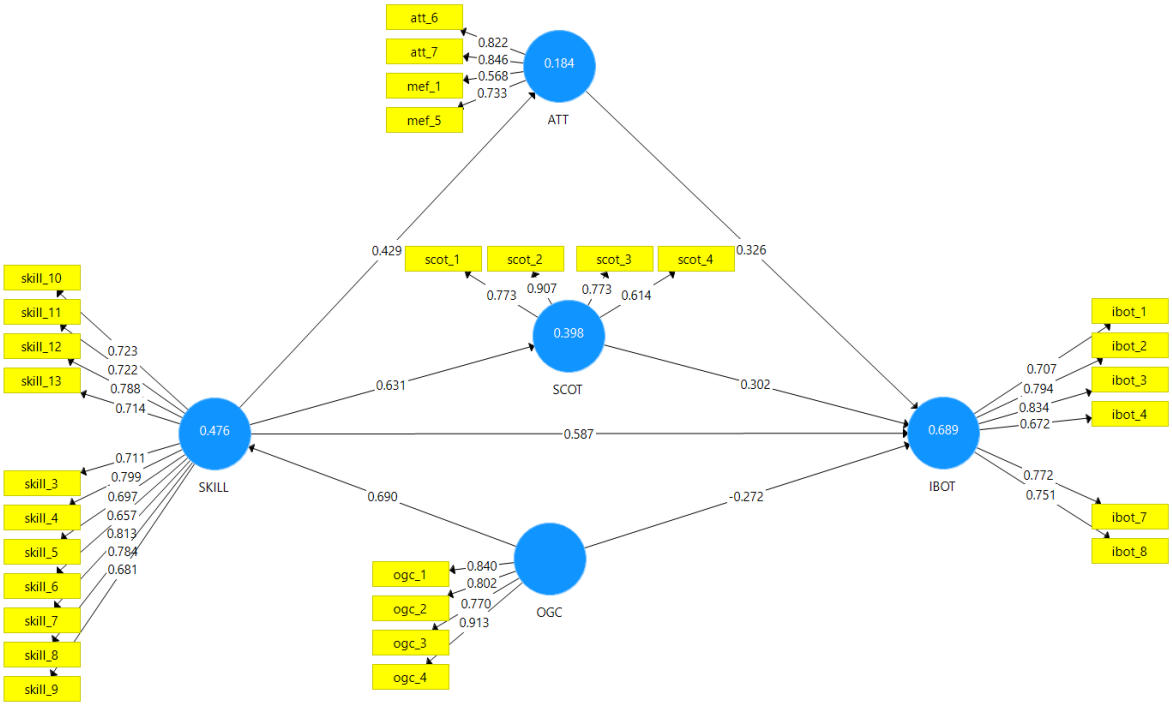


Figure 19. IBOT model obtained in the pilot phase

5.1.2. Path model 2: Instructors' Attitude towards Online Teaching (ATT)

The PLS-SEM algorithm for the *ATT* model eliminated numerous indicators whose outer loadings are lower than 0.7. Only indicators with outer loadings of at least 0.7 were retained to ensure sufficient levels of indicator reliability. In addition, the construct *PROF* was merged into *ATT* to improve the model's validity and reliability. Therefore, three of its indicators (with outer loadings at least 0.7) were reassigned to *ATT*. The measurement model evaluation results are displayed in Table 38 and Table 39.

As shown in Table 38, the *convergent validity* has been achieved because the indicator reliability has been established, i.e., indicators' outer loadings are at least 0.7. Also, the *AVE* values of all the constructs are higher than the required minimum level of 0.5. For the *internal consistency reliability*, the Cronbach's Alpha, p_A, and $p_c$values of all the constructs in the *ATT* model are above the 0.70 thresholds, indicating that all construct measures have high degrees of *internal consistency reliability*. It should be noted that for the single item construct PEU, these metrics are not appropriate measures because the indicator loading is fixed at 1.00. Therefore, this construct will be re-examined in the main study.

Table 38. Results summary for ATT measurement models (pilot phase)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability		
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c
		>0.70	>0.50	>0.50	>0.7	>0.7	>0.7
ATT	att_6	0.79	0.62	0.62	0.85	0.86	0.89
	att_7	0.77	0.59				
	prof_1	0.76	0.58				
	prof_2	0.74	0.55				
	prof_3	0.86	0.74				
ISPG	ispg_1	0.91	0.83	0.83	0.79	0.79	0.91
	ispg_2	0.91	0.83				
PEU	peu_1	1.00					
PU	pu_1	0.80	0.64	0.66	0.75	0.81	0.85
	pu_3	0.75	0.56				
	pu_4	0.88	0.77				

Regarding the *discriminant validity* of the measurement models, from Table 39, the *HTMT* ratios for all pairs of constructs in the *ATT* measurement models are below the conservative threshold value of 0.85, showing that the measurement models have high levels of *discriminant validity*.

Table 39. HTMT ratios to show discriminant validity of ATT measurement models (pilot phase)

	ATT	ISPG	PEU	PU
ATT				
ISPG	0.66			
PEU	0.48	0.46		
PU	0.54	0.39	0.10	

Next, potential *collinearity* issues are investigated to ensure that the estimated path coefficients are not biased. Table 40 shows the *VIF* values, all of which are below the conservative threshold of 3, indicating that there are not any collinearity issues among the

predictor constructs exist the *ATT* structural model. The path coefficients of the structural model can then be examined.

Table 40. VIF values in the ATT structural model (pilot phase)

	ATT
ATT	
ISPG	1.31
PEU	1.20
PU	1.10

As shown in Figure 20 below, the lowest path coefficient obtained in the *ATT* model is 0.28 (PEU→ATT), this value is chosen as input for computing the required sample size for the main study. Like the *IBOT* model, the main study for further evaluating the ATT model would also need approximately 69 observations to make the corresponding effect significant at 5%. Therefore, the sample size of 76 participants recruited for the main study of the *IBOT* model can also be used for further assessing the *ATT* model.

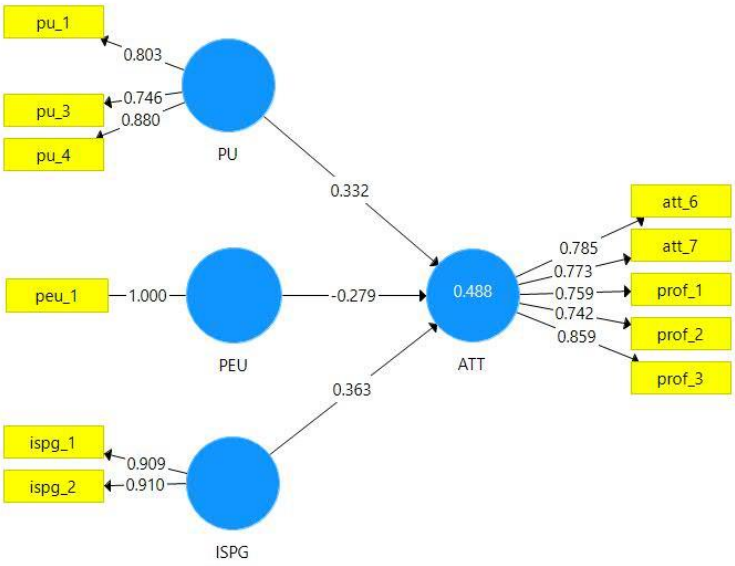


Figure 20. ATT model obtained in the pilot phase

5.1.3. Path model 3: Innovative Organizational Climate (OGC)

Similar to the previous two path models, i.e., the *IBOT* and *ATT* model, running the PLS algorithm helps retain only indicators with outer loadings above 0.7 to ensure sufficient levels of indicator reliability. Furthermore, the construct *SDM* was merged into *OGC* to improve the model's validity and reliability. However, only one of its indicators, i.e., *sdm_2*, was retained

and reassigned to *OGC*. A summary of the measurement model evaluation results of the OGC measurement models is displayed in Table 41 and Table 42.

As can be seen in Table 41, the *convergent validity* of the *OGC* measurement models has been established because all indicators' outer loadings are well above 0.7. Also, the *AVE* values of all the constructs are higher than the required minimum level of 0.5. Regarding the *internal consistency reliability*, the Cronbach's Alpha, p_A, and $p_c$values of all the constructs in the OGC model are above the 0.70 thresholds, indicating that these latent constructs have high degrees of *internal consistency reliability*. The *discriminant validity* of the *OGC* measurement models is also confirmed because the *HTMT* ratios for all pairs of constructs shown in Table 42 are below or equal to the conservative threshold value of 0.85, indicating that the measurement models have high levels of *discriminant validity*.

Table 41. Results summary for OGC measurement models (pilot phase)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability		
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c
		>0.70	>0.50	>0.50	>0.7	>0.7	>0.7
OGC	ogc_1	0.88	0.77	0.63	0.85	0.87	0.89
	ogc_2	0.82	0.67				
	ogc_4	0.72	0.52				
	ogc_6	0.72	0.52				
	sdm_2	0.80	0.64				
COLL	coll_2	0.85	0.72	0.79	0.87	0.88	0.92
	coll_4	0.94	0.88				
	coll_5	0.88	0.77				
LEAD	lead_5	0.87	0.76	0.79	0.93	0.93	0.95
	lead_6	0.90	0.81				
	lead_8	0.90	0.81				
	lead_9	0.89	0.79				
	lead_10	0.88	0.77				
SIF	sif_1	0.77	0.59	0.68	0.92	0.93	0.94
	sif_2	0.86	0.74				
	sif_3	0.87	0.76				
	sif_4	0.87	0.76				
	sif_5	0.82	0.67				
	sif_6	0.80	0.64				
	sif_7	0.80	0.64				

Table 42. HTMT ratios to show discriminant validity of OGC measurement models (pilot phase)

	COLL	LEAD	OGC	SIF
COLL				
LEAD	0.70			
OGC	0.85	0.82		
SIF	0.64	0.48	0.68	

Then, potential *collinearity* issues are examined. As shown in Table 42, all the *VIF* values are below the conservative threshold of 3, indicating that there are no collinearity issues among the predictor constructs in the *ATT* structural model. The path coefficients of the structural model can then be examined.

Table 43. VIF values in the OGC structural model (pilot phase)

	COLL	LEAD	OGC	SIF
COLL			2.05	
LEAD	1.00		1.72	1.00
OGC				
SIF			1.53	

As shown in Figure 21 below, the lowest path coefficient obtained in the OGC model is 0.24 (SIF→OGC), this value is chosen as input for computing the required sample size for the main study. Like the *IBOT* and *ATT* models, the main study for further evaluating the OGC model would also need approximately 69 observations to make the corresponding effect significant at 5%. Therefore, the sample size of 76 participants recruited for the main study of the *IBOT* and *ATT* models can also be applied for further assessing the OGC model.

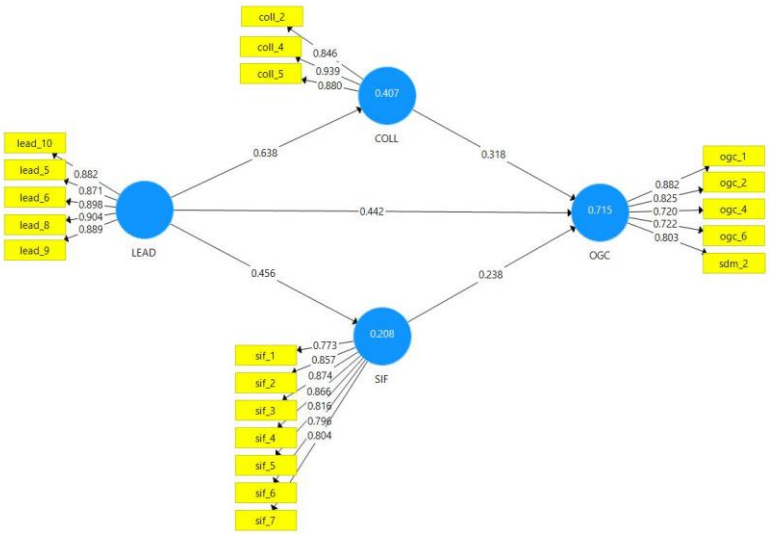


Figure 21. OGC model obtained in the pilot phase

5.2. Main study: Evaluation results for IBOT (path model 1)

5.2.1. Evaluation results for the measurement models

After collecting data for the main study, the PLS-SEM algorithm was rerun to evaluate the path models. For the first path model, i.e., *IBOT*, indicators with outer loadings at least 0.7 were retained. Those with loadings between 0.4 and 0.7, i.e., *ibot_2*, *scot_3*, *mef_5*, *ogc_3*, were also not eliminated due to their contribution to the content validity. In addition, the construct *SCOT* was merged into *IBOT* to improve the model's validity and reliability. In addition, according to Asbari et al. (2021), the concept of *individual innovative behavior* can be open to various modifications which embrace and reflect change-oriented activities that impact employees' performance. In the online teaching context, the indicator *scot_3* (*I expect myself to design a new online course*) clearly shows an inclination to innovate in the virtual classroom environment. Therefore, the combination of the two constructs, *SCOT* and *IBOT* (with *scot_3* is now retained under the *IBOT* construct), is deemed relevant and still ensures the model's content validity. A summary of the measurement model evaluation results is shown in Table 44.

As shown in Table 44, the *convergent validity* of all the measurement models has been achieved because the indicator reliability has been established, i.e., indicators' outer loadings meet the required minimum level. In addition, the *AVE* values of all the constructs are well above 0.50. Regarding the *internal consistency reliability*, the Cronbach's Alpha, p_A, and $p_c$values of all the reflective constructs in the IBOT model are larger than the 0.70 thresholds, indicating that all construct measures have high degrees of *internal consistency reliability*.

To evaluate the *discriminant validity* of the IBOT measurement models, in addition to examining the *HTMT* ratios, the author of this study also tested whether they were significantly different from the threshold value. Specifically, first, a threshold of 0.9 for all pairs of constructs was assumed. Then, the *bootstrapping* procedure was run to compute the *bootstrap confidence intervals*. With 10,000 bootstrap samples and a 0.05 significance level, the results from the procedure show that all *HTMT* values are significantly lower than the corresponding threshold value of 0.9 (with a 5% probability of error). Therefore, the bootstrap confidence interval results of the *HTMT* criterion demonstrate the *discriminant validity* of the constructs.

Table 44. Results summary for IBOT measurement models (main study)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability			Discriminant Validity
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c	HTMT
		>0.70	>0.50	>0.50	>0.70	>0.70	>0.70	Significantly lower than 0.90?
IBOT	ibot_2	0.60	0.36	0.57	0.81	0.83	0.87	Yes
	ibot_3	0.87	0.76					
	ibot_4	0.78	0.61					
	ibot_7	0.85	0.72					
	scot_3	0.66	0.44					
ATT	att_6	0.81	0.66	0.61	0.87	0.89	0.90	Yes
	att_7	0.74	0.55					
	mef_5	0.57	0.32					
	prof_1	0.80	0.64					
	prof_2	0.85	0.72					
	prof_3	0.87	0.76					
OGC	ogc_1	0.81	0.66	0.61	0.78	0.82	0.86	Yes
	ogc_3	0.64	0.41					
	ogc_4	0.90	0.81					
	sdm_2	0.75	0.56					
SKILL	skill_4	0.71	0.50	0.59	0.86	0.87	0.90	Yes
	skill_7	0.80	0.64					
	skill_9	0.70	0.49					
	skill_10	0.66	0.44					
	skill_11	0.81	0.66					
	skill_13	0.78	0.61					

5.2.2. Evaluation results for the structural model

After establishing the *IBOT* measures' reliability and validity, the next step is to assess the *IBOT* structural model by means of the *bootstrapping* routine, the *blindfolding* technique, and the $PLS_{predict}$ procedure. First, the potential *collinearity* issues need to be examined to ensure that the estimated path coefficients are not biased. The results from running the PLS-SEM algorithm show that the *VIF* values (see Table 45) of all combinations of endogenous constructs (represented by the columns) and corresponding predictor constructs (represented by the rows)

are clearly below the conservative threshold of 3. Therefore, it can be concluded that *collinearity* among the exogenous constructs is not a critical issue in the *IBOT* structural model.

Table 45. VIF values in the IBOT structural model (main study)

	ATT	IBOT	OGC	SKILL
ATT		1.91		
IBOT				
OGC		1.45		1.00
SKILL	1.00	2.17		

The next step of the structural model assessment process is to evaluate the significance and relevance of the structural model relationships. The *significance* of these relationships is examined through the size of the *path coefficients*. In addition, to better determine whether the *path coefficients* are statistically significant or not, the author of this study uses the *bootstrapping* procedure in which the empirical *p* values for all the structural *path coefficients* are computed. Accordingly, Figure 22 displays the estimated size of the path coefficients, while Table 46 shows the significance testing results of these coefficients. It can be noted that when assuming a significance level of 5%, the *p* value must be lower than 0.05 to conclude that the relationship under investigation is significant at a 5% level.

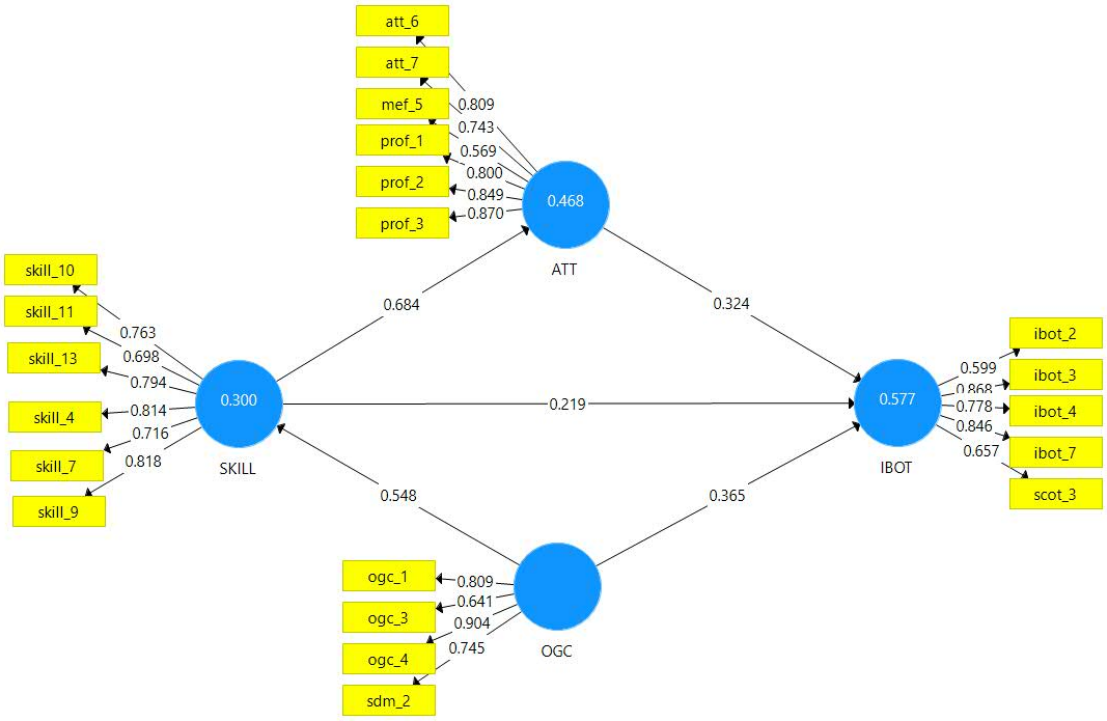


Figure 22. IBOT model path coefficients (main study)

Table 46. Significant testing results of the IBOT structural model path coefficients

	Path coefficients	***p* values**	**Significance (*p*<0.05)?**
OGC → IBOT	0.37	0.00	Yes
ATT → IBOT	0.32	0.01	Yes
SKILL → IBOT	0.22	0.11	No
SKILL → ATT	0.68	0.00	Yes
OGC → SKILL	0.55	0.00	Yes

As shown in Figure 22, it can be found that among the driver constructs for the *IBOT*, the *OGC* has the highest path coefficient (0.37), followed by the *ATT* (0.32). The *(perceived) SKILL* have the lowest impact on *IBOT*. However, it has a relatively large influence on *ATT* with a path coefficient of 0.68 (RQ3). Accordingly, *ATT* appears to mediate the relationship between *SKILL* and *IBOT*. Furthermore, it can be noted that for instructors to have a high level of *SKILL*, *OGC* also has some bearing (the *OGC → SKILL* path coefficient is 0.55). With respect to significance testing, Table 46 shows that, assuming a 5% significance level, all relationships in the *IBOT* structural model are significant since all the *p* values obtained from the *bootstrapping* procedure (by the percentile approach) are lower than 0.05, except *SKILL → IBOT* (*p = 0.11*).

After the significance of relationships is examined, the *relevance* of these relationships needs to be evaluated. It should be noted that the *path coefficients* in the structural models may be significant, but their values may be very low and thus may not require managerial attention. Therefore, instead of merely focusing on the direct effects, the author of this study also computed the *total effects*. In the *IBOT* model, the *indirect effects* might be indicated via the *mediating* constructs, i.e., *SKILL* and *ATT*. Again, the *bootstrapping* procedure was run to examine whether the *total effects* of the predictor constructs *SKILL, ATT, and OGC* on the target construct *IBOT* are significant. As shown in Table 47, all the *total effects* are significant at a 5% level. This means that all relationships in the *IBOT* structural model are significant. Noticeably, although *SKILL* does not directly affect IBOT, it is indeed at the second highest position in terms of the *total effects* on the target construct *IBOT* (RQ3).

Table 47. Significance testing results of the total effects for IBOT model

	Total effects	***p* values**	**Significance (*p*<0.05)?**
OGC → IBOT	0.61	0.00	Yes
SKILL → IBOT	0.44	0.00	Yes
ATT → IBOT	0.32	0.01	Yes
SKILL → ATT	0.68	0.00	Yes
OGC → SKILL	0.55	0.00	Yes
OGC → ATT	0.37	0.00	Yes

Since the *SKILL* construct has been identified as a *mediator*, it is necessary to evaluate further the significance of the *specific indirect effects* from the relationships displayed in the model. Table 48 shows the significance analysis of these *specific indirect effects.*

Table 48. Significance analysis of the specific indirect effects in the IBOT model

	Specific indirect effects	***p* values**	**Significance (*p*<0.05)?**
OGC → SKILL → ATT → IBOT	0.12	0.02	Yes
OGC → SKILL → ATT	0.37	0.00	Yes
OGC → SKILL → IBOT	0.12	0.13	No
SKILL → ATT → IBOT	0.22	0.01	Yes

Interestingly, as shown in Table 48, *SKILL* has been identified as a *mediator* between *OGC* and *ATT*, which mediates the relationship between *SKILL* and *IBOT*. From these results, it can be concluded that *ATT* plays a mediating role between their *SKILL* and *IBOT*. In other words, without having the right positive attitude towards online teaching, even teachers with high levels of skills may not have sufficient motivation to create more innovations in their pedagogical practices (because, as found earlier, *SKILL* does not have a direct impact on *IBOT*).

Meanwhile, it should be noted from Table 48 that, whereas *SKILL* mediates the relationship between *OGC* and *ATT*, its mediating role between *OGC* and *IBOT* is not statistically significant (*p* value >0.05). That is to say, instructors' high levels of skills result from a supportive organizational environment, and such skills may drive instructors towards having a positive attitude about online teaching, which ultimately motivates them to initiate and implement innovations in online teaching. In other words, *SKILL* is not a direct cause for *IBOT*, not without the proper attitude towards online teaching (*ATT*), as empirically indicated in this study.

To classify the mediating effects found in the *IBOT* model, the author compares the *direct effects* with the *indirect effects*. The mediation analysis in Table 49 shows that the *direct effects* that *OGC* has on *IBOT* are significant, but its *indirect effects* on *IBOT* via merely *SKILL* is not significant). Accordingly, this type of relationship is classified by Hair et al. (2022) as *complementary mediation* or *partial mediation*, i.e., both the *indirect* and *direct* effects are significant (and point in the same direction). On the other hand, when examining the mediating role of *ATT*, it can be found that this construct completely functions as a *mediator* in the relationship between *SKILL* and *IBOT*. In other words, since *SKILL*'s *direct effect* on *IBOT* is not significant while its *indirect effect* on *IBOT* via *ATT* is significant, the type of mediating effects is found to be *indirect-only mediation* or *full mediation*. That is to say, having a high level of perceived skills needed for online teaching does not encourage more innovative behavior in online teaching, although it partly contributes to a more positive attitude towards teaching in the virtual environment. After all, instructors need to take the right attitude towards online teaching tasks so that online pedagogical innovations can be fostered.

Table 49. Types of mediating effects in the IBOT model

	Direct effects	**Significance (p<0.05)?**	**Indirect effects**	**Significance (p<0.05)?**	**Types of mediating effects**
OGC → IBOT	0.37	Yes			
OGC → SKILL → IBOT			0.12	No	Complementary mediation
OGC → SKIL → ATT → IBOT			0.12	Yes	(Partial mediation)
SKILL → IBOT	0.22	No			Indirect-only mediation
SKILL → ATT → IBOT			0.22	Yes	(Full mediation)

To assess the model's *explanatory power*, following the rules of thumb set by Hair et al. (2011), the *coefficient of determination* (R^2) value of *IBOT*, which was 0.58 (see Figure 22), can be considered *moderate*, i.e., the amount of variance in *IBOT* explained by all of the predictor constructs (*OGC, ATT, SKILL*) associated with it is at a *moderate* level. However, while interpreting the R^2 size also needs to be based on related research; there has not been any study focusing on instructors' *innovative behavior in online teaching*. This study is the first work that identifies and evaluates factors influencing this endogenous construct.

Then, the R^2 value was used to compute the f^2 *effect size*, i.e., the change in the R^2 value when a specific predictor construct is omitted from the model. Table 50 shows the f^2

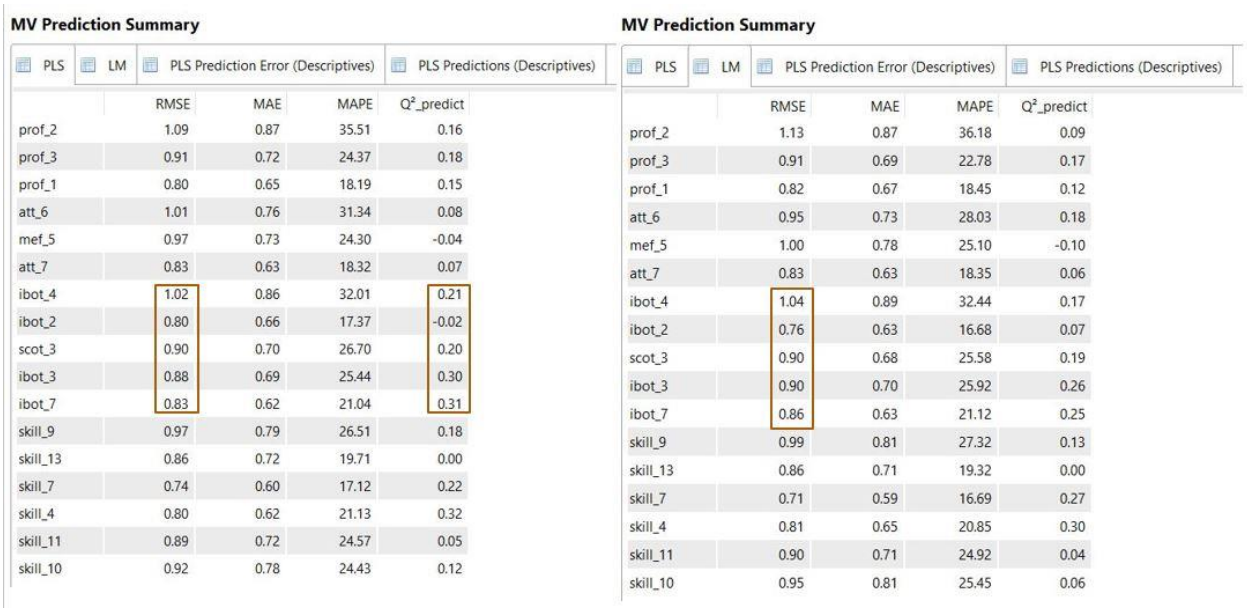
values for all the combinations of endogenous constructs (represented by the columns) and corresponding exogenous constructs (represented by the rows). As can be seen, for the key target construct *IBOT*, both *innovative organizational climate* (*OGC*) and *instructors' attitude towards online teaching* (*ATT*) have a medium effect size of 0.22 and 0.13, respectively. On the contrary, the f^2 size of *SKILL* on *IBOT* is relatively small (0.05), although it does have a large effect size for *ATT* (0.88). Last, *OGC* also has a significant f^2 value for *SKILL* (0.43), indicating that organizational conditions play a major role in helping instructors acquire the skills for online teaching (RQ3).

Table 50. f^2 Effect sizes (IBOT model)

	ATT	IBOT	OGC	SKILL
ATT		0.13		
IBOT				
OGC		0.22		0.43
SKILL	0.88	0.05		

The last step of the evaluation process is to assess the model's *out-of-sample predictive power*. In this study, the author uses two indicators of this criterion: the *Stone-Geisser's Q^2 statistic* (Geisser, 1974; Stone, 1974) and the *root mean square error (RMSE),* obtained through the process of running the *blindfolding* and the Shmueli et al. (2016)'s $PLS_{predict}$ procedure, respectively. According to Henseler et al. (2009), a Q^2 value above zero indicates that the model has *predictive relevance*. After the *blindfolding* procedure was run, all the Q^2 values obtained for the endogenous constructs, i.e., *IBOT* (0.31), *ATT* (0.27), and *SKILL* (0.15), are above the threshold zero. Therefore, based on the *blindfolding* routine and the corresponding *Stone-Geisser's Q^2 statistic,* the proposed model for instructors' *innovative behavior in online teaching* (*IBOT*) can be considered to have predictive relevance.

Most PLS-SEM studies rely mainly on the *Stone-Geisser's Q^2 statistic* to draw evaluative conclusions about the *predictive power* of the proposed models. In this study, in addition to the Q^2 values produced from the *blindfolding* routine, the $PLS_{predict}$ procedure guided by Shmueli et al. (2019) was also used for assessing the models' predictive power. With 10 *folds* and 10 *repetitions,* i.e., *k* and r is set to 10 each, the $PLS_{predict}$ analysis was run. When reporting the results, the author focus mainly on the model's key target construct *IBOT* and considers the *RMSE* as a default metric for interpreting the prediction error of this construct's indicators. Figure 23 displays the $PLS_{predict}$ results.



MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
prof_2	1.09	0.87	35.51	0.16
prof_3	0.91	0.72	24.37	0.18
prof_1	0.80	0.65	18.19	0.15
att_6	1.01	0.76	31.34	0.08
mef_5	0.97	0.73	24.30	-0.04
att_7	0.83	0.63	18.32	0.07
ibot_4	1.02	0.86	32.01	0.21
ibot_2	0.80	0.66	17.37	-0.02
scot_3	0.90	0.70	26.70	0.20
ibot_3	0.88	0.69	25.44	0.30
ibot_7	0.83	0.62	21.04	0.31
skill_9	0.97	0.79	26.51	0.18
skill_13	0.86	0.72	19.71	0.00
skill_7	0.74	0.60	17.12	0.22
skill_4	0.80	0.62	21.13	0.32
skill_11	0.89	0.72	24.57	0.05
skill_10	0.92	0.78	24.43	0.12

MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
prof_2	1.13	0.87	36.18	0.09
prof_3	0.91	0.69	22.78	0.17
prof_1	0.82	0.67	18.45	0.12
att_6	0.95	0.73	28.03	0.18
mef_5	1.00	0.78	25.10	-0.10
att_7	0.83	0.63	18.35	0.06
ibot_4	1.04	0.89	32.44	0.17
ibot_2	0.76	0.63	16.68	0.07
scot_3	0.90	0.68	25.58	0.19
ibot_3	0.90	0.70	25.92	0.26
ibot_7	0.86	0.63	21.12	0.25
skill_9	0.99	0.81	27.32	0.13
skill_13	0.86	0.71	19.32	0.00
skill_7	0.71	0.59	16.69	0.27
skill_4	0.81	0.65	20.85	0.30
skill_11	0.90	0.71	24.92	0.04
skill_10	0.95	0.81	25.45	0.06

Figure 23. $PLS_{predict}$ results for IBOT model

As shown in Figure 23, most $Q^2_{predict}$ values for the IBOT indicators (except for *ibot_2*) are above zero, indicating the PLS path model outperforms the most naive benchmark. For those indicators with $Q^2_{predict}$ >0, the *RMSE* values were compared with the *naive LM benchmark*. As can be seen, the PLS-SEM analysis produces smaller prediction errors (i.e., smaller *RMSE* values) than the *LM* for three out of five *IBOT* indicators (except for the *ibot_2*). These results suggest that the proposed IBOT model has a *medium predictive power*, i.e., it has a medium level of usefulness for producing generalizable findings and thus can be adopted for managerial decision-making.

5.3. Main study: Evaluation results for ATT (path model 2)

5.3.1. Evaluation results for the measurement models

The evaluation results for the first path model, which focuses on the target construct *IBOT*, indicate that *ATT* is an essential factor influencing *IBOT*. In addition to *SKILL*, identified earlier as a predictor for *ATT*, the author also proposes a path model of factors responsible for *ATT*. This section assesses the *ATT* measurement models and its structural model as follows.

In the first step to assess the *ATT* measurement models, all indicators with outer loadings at least 0.7 were retained. Those with loadings between 0.4 and 0.7, i.e., *mef_5* and *pu_1*, were also not eliminated due to their contribution to the content validity. A summary of the measurement model evaluation results is shown in Table 51. As can be seen, the indicator reliability has been achieved, i.e., indicators' outer loadings meet the required minimum level.

The *AVE* values of all the constructs are also well above 0.50. Regarding the *internal consistency reliability*, the Cronbach's Alpha, p_A, and $p_c$values of all the reflective constructs in the *ATT* model are larger the 0.70 thresholds, except for *PU,* whose Cronbach's Alpha was 0.68, yet it was still acceptable, according to Hair et al. (2022). Based on these results, the *internal consistency reliability* of the *ATT* measurement models has been established. Regarding the *discriminant validity* of the *IBOT* measurement models, the *bootstrapping* procedure was run to compute the *bootstrap confidence intervals*. With 10,000 bootstrap samples and a 0.05 significance level, the results from the procedure show that all *HTMT* values are significantly lower than the corresponding threshold value of 1.0 (with a 5% probability of error). Therefore, the bootstrap confidence interval results of the *HTMT* criterion demonstrate the *discriminant validity* of the constructs in the *ATT* path model.

Table 51. Results summary for ATT measurement models (main study)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability			Discriminant validity
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c	HTMT
		>0.70	>0.50	>0.50	>0.7	>0.7	>0.7	Significantly lower than 1.0?
ATT	att_6	0.80	0.64	0.61	0.87	0.89	0.90	Yes
	att_7	0.76	0.58					
	mef_5	0.56	0.31					
	prof_1	0.80	0.64					
	prof_2	0.84	0.71					
	prof_3	0.87	0.76					
ISPG	ispg_1	0.95	0.90	0.91	0.90	0.90	0.95	Yes
	ispg_2	0.95	0.90					
PEU	peu_1	1.00						Yes
PU	pu_1	0.67	0.45	0.60	0.68	0.71	0.82	Yes
	pu_3	0.81	0.66					
	pu_4	0.84	0.71					

5.3.2. Evaluation results for the structural model

To assess the *ATT* structural model, the potential collinearity issues were examined. The results from running the PLS-SEM algorithm show that all the VIF values of all combinations of endogenous constructs are below the conservative threshold of 3. Therefore, it can be

concluded that *collinearity* among the exogenous constructs is not a critical issue in the *ATT* structural model.

Next, to evaluate the *significance* and *relevance* of the structural model relationships, the *bootstrapping* procedure was run to compute the empirical *p* values for all the structural *path coefficients*. Accordingly, Figure 24 displays the estimated size of the path coefficients.

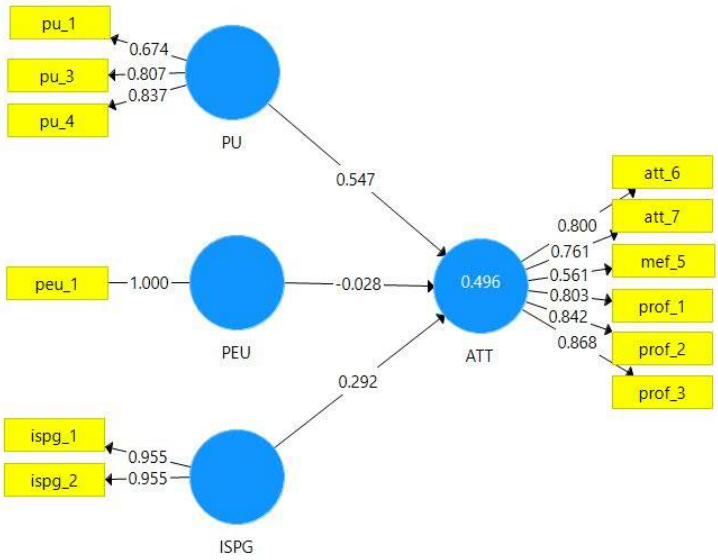


Figure 24. ATT model path coefficients (main study)

As shown in Figure 24, it can be found that among the driver constructs for *ATT*, the *PU* construct has the highest path coefficient (0.55), followed by *ISPG* (0.29). The *PEU* has the lowest impact on *ATT*. With respect to significance testing, Table 52 shows that, assuming a 5% significance level, all relationships in the *ATT* structural model are significant since all the *p* values obtained from the *bootstrapping* procedure (by the percentile approach) are lower than 0.05, except *PEU* → *ATT* (*p = 0.74*). Accordingly, the impact of both *PU* and *ISPG* on *ATT* has been statistically significantly established. The *PEU* has been shown to have very little bearing on *ATT*. Unlike the *IBOT* model, there is no mediation analysis needed to be done for the *ATT* model.

Table 52. Significant testing results of the ATT structural model path coefficients

	Path coefficients	***p* values**	**Significance (*p*<0.05)?**
PU → ATT	0.55	0.00	Yes
ISPG → ATT	0.29	0.01	Yes
PEU → ATT	-0.03	0.74	No

In the next step, i.e., assessing the model's *explanatory power*, the *coefficient of determination* (R^2) value of *ATT*, which was nearly 0.5 (see Figure 24), can be considered *moderate*. In addition, the f^2 values for all the combinations of the endogenous construct ATT and corresponding exogenous constructs *PU, PEU,* and *ISPG,* are 0.47 (large effect), 0.00 (no effect), and 0.15 (medium effect), respectively. These results indicate that instructors need to be aware of the usefulness of online teaching technology so that they can adopt a more positive attitude towards teaching in online classrooms. Also, organizations may need to pay more attention to communicating their goals and visions about online education to instructors to encourage instructors to internalize these goals into their personal goals. Last, the results from both path coefficient and f^2 value analyses show that *instructors' perceived ease of use of online teaching technology (PEU)* does not influence their attitudes toward the task of teaching online.

The last step of the evaluation process is to assess the model's *predictive power*. After the *blindfolding* procedure was run, the Q^2 value obtained for the endogenous construct *ATT* is 0.27 (i.e., above the threshold zero). Therefore, based on the *blindfolding* routine and the corresponding *Stone-Geisser's* Q^2 *statistic*, the proposed model for instructors' attitude towards online teaching (*ATT*) can be considered to have *predictive relevance*. Furthermore, with *k* and r is set to 10 each, all $Q^2_{predict}$ values for the *ATT* indicators are above zero (see Figure 25), indicating the PLS path model outperforms the most naive benchmark. Since all the $Q^2_{predict}$ values meet the requirements (i.e., >0), the *RMSE* values were then compared with the *naive LM benchmark*. As shown in Figure 25, the PLS-SEM analysis produces smaller *RMSE* values than the *LM* for all the *ATT* indicators. These results suggest that the proposed *ATT* model has a *high predictive power*, i.e., it has a high level of usefulness for producing generalizable findings and thus can be adopted for drawing managerial implications.

MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
mef_5	0.93	0.73	23.09	0.05
prof_1	0.67	0.54	14.64	0.40
att_6	0.98	0.71	29.03	0.13
att_7	0.72	0.56	16.10	0.30
prof_3	0.87	0.65	22.36	0.24
prof_2	1.01	0.76	30.99	0.27

MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
mef_5	0.95	0.75	24.23	0.02
prof_1	0.68	0.51	13.61	0.38
att_6	1.05	0.76	31.86	0.01
att_7	0.72	0.55	15.54	0.30
prof_3	0.89	0.67	22.17	0.20
prof_2	1.02	0.79	30.72	0.25

Figure 25. $PLS_{predict}$ results for ATT model

5.4. Main study: Evaluation results for OGC (path model 3)

5.4.1. Evaluation results for the measurement models

The evaluation results for the first path model, which focuses on the target construct *IBOT*, indicate that the *OGC* is an essential factor influencing the *IBOT*. Therefore, to further understand what factors contribute to the OGC, the author also proposes a path a model for this construct. First, a summary of the measurement model evaluation results is shown in Table 53 below.

Table 53. Results summary for OGC measurement models (main study)

Latent variables	Indicators	Convergent validity			Internal Consistency Reliability			Discriminant validity
		Loadings	Indicator reliability	AVE	Cronbach's Alpha	Reliability p_A	Composite Reliability p_c	HTMT
		>0.70	>0.50	>0.50	>0.7	>0.7	>0.7	Significantly lower than 1.0?
OGC	ogc_1	0.87	0.76	0.78	0.71	0.71	0.87	Yes
	sdm_2	0.89	0.79					
COLL	coll_4	0.95	0.90	0.90	0.89	0.89	0.95	Yes
	coll_5	0.95	0.90					
LEAD	lead_8	0.88	0.77	0.81	0.88	0.90	0.93	Yes
	lead_9	0.90	0.81					
	lead_10	0.92	0.85					
SIF	sif_1	0.83	0.69	0.73	0.93	0.93	0.94	Yes
	sif_2	0.87	0.76					
	sif_3	0.91	0.83					
	sif_4	0.87	0.76					
	sif_5	0.86	0.74					
	sif_6	0.80	0.64					

For the *OGC* measurement models, all indicators with outer loadings of at least 0.7 were retained. Accordingly, the indicator reliability has been achieved, i.e., indicators' outer loadings meet the required minimum level. In addition, the *AVE* values of all the constructs are well above 0.50. Regarding the *internal consistency reliability*, the Cronbach's Alpha, p_A, and $p_c$values of all the reflective constructs in the *OGC* model are larger than the 0.70 thresholds. Based on these results, the *internal consistency reliability* of the *OGC* measurement models has been established. Regarding the *discriminant validity*, with 10,000 bootstrap samples and

a 0.05 significance level, the results from the procedure show that all *HTMT* values are significantly lower than the corresponding threshold value of 1.0 (with a 5% probability of error). Therefore, the bootstrap confidence interval results of the *HTMT* criterion clearly demonstrate the *discriminant validity* of the constructs in the *OGC* path model.

5.4.2. Evaluation results for the structural model

The potential *collinearity* issues in the *OGC* model were investigated first. The results from running the PLS-SEM algorithm show that all the *VIF* values of all combinations of endogenous constructs are below the conservative threshold of 3. Therefore, it can be concluded that *collinearity* among the exogenous constructs is not a critical issue in the *OGC* structural model.

Next, to evaluate the *significance* and *relevance* of the structural model relationships, the bootstrapping procedure was run to compute the empirical p values for all the structural path coefficients. As can be seen in Figure 26, among the predictor constructs for *innovative organizational climate (OGC)*, *collaboration among instructors (COLL)* has the highest path coefficient (0.38), followed by *the supportive infrastructure for online teaching (SIF)* (0.35) and *transformational leadership (LEAD)* (0.32). In addition, *COLL* and *SIF* appear to mediate the relationship between *LEAD* and *OGC*. These mediating effects will be tested further in this section after the significance testing for the path coefficients. As respect to significance testing, Table 54 shows that, assuming a 5% significance level, all relationships in the *OGC* structural model are significant, i.e., all the *p* values are lower than 0.05.

Table 54. Significant testing results of the OGC structural model path coefficients

	Path coefficients	***p* values**	**Significance (*p*<0.05)?**
COLL → OGC	0.42	0.00	Yes
LEAD → COLL	0.46	0.00	Yes
LEAD → OGC	0.34	0.00	Yes
LEAD → SIF	0.48	0.00	Yes
SIF → OGC	0.31	0.00	Yes

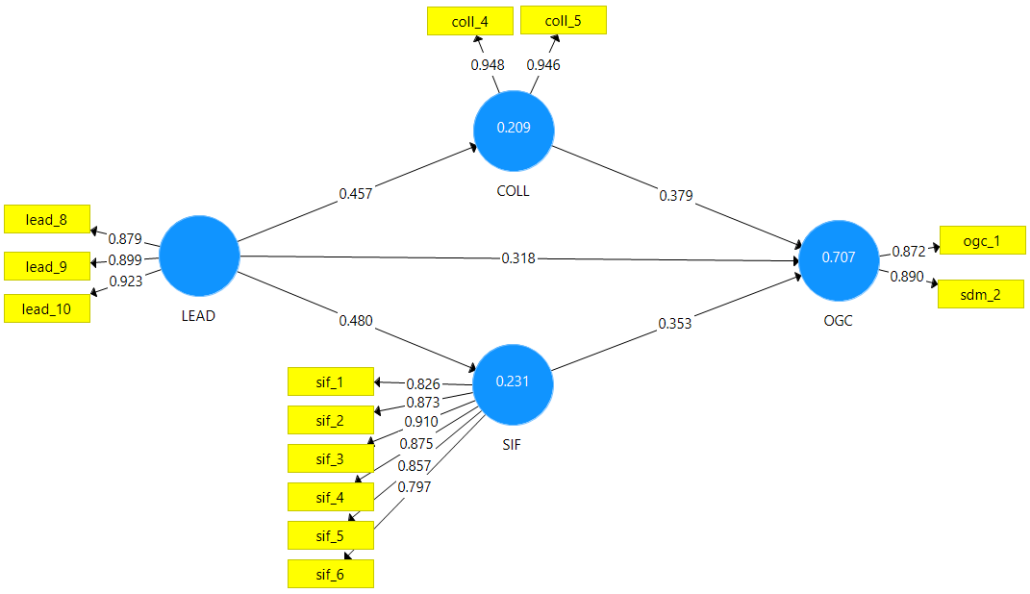


Figure 26. OGC model path coefficients (main study)

Regarding the *total effects*, in the *OGC* model, the *indirect effects* are indicated via two *mediators*, i.e., *COLL* and *SIF*. Again, the *bootstrapping* procedure was run to examine whether the *total effects* of the predictor constructs *LEAD, COLL, and SIF* on the target construct *OGC* are significant. As a result, all the *total effects* are significant at a 5% level. To further analyze the mediating effects, the significance of the *specific indirect effects* from the relationships displayed in the *OGC* model was also evaluated and shown to be significant (at a 5% level). As can be seen in Table 55, since both the direct effects, i.e., the path coefficients, and the indirect effects are significant and point in the same direction, the mediation shown in the OGC model can be classified as *complementary mediation*, or *partial mediation*. That is to say, *transformational leadership (LEAD)* has a statistically significant impact on all the other constructs in this OGC model (i.e., *COLL, SIF, and OGC)*, as indicated from the mediation analysis.

Table 55. Types of mediating effects in the OGC model

	Direct effects	**Significance (p<0.05)?**	**Indirect effects**	**Significance (p<0.05)?**	**Types of mediating effects**
LEAD → OGC	0.32	Yes			Complementary mediation (Partial mediation)
LEAD → COLL → OGC			0.17	Yes	
LEAD → OGC	0.32	Yes			Complementary mediation (Partial mediation)
LEAD → SIF → OGC			0.17	Yes	

To evaluate the model's *explanatory power*, following the rules of thumb set by Chin (1998), the *coefficient of determination* (R^2) value of *OGC*, which is 0.71 (see Figure 26), can be considered as *substantial*, i.e., the amount of variance in *OGC* explained by all of the predictor constructs (*LEAD*, *COLL*, *SIF*) associated with it is at a high degree. In addition, the f^2 values for all the combinations of the endogenous construct *OGC* and corresponding exogenous constructs *LEAD*, *COLL*, and *SIF* are respectively 0.24 (medium effect), 0.36 (large effect), and 0.30 (medium effect). Accordingly, it is found that the perceptions about collaboration among instructors in online teaching have the most considerable impact on creating a (perceived) innovative organizational climate. These results indicate that it's necessary for organizations to focus on constructing a collaborative environment where instructors can share their experiences and pass on lessons they have learned from their pedagogical practices in online classrooms.

The last step of the evaluation process is to assess the model's *predictive power*. After the *blindfolding* procedure was run, all the Q^2 values obtained for the endogenous constructs, i.e., *OGC* (0.52), *COLL* (0.19), and *SIF* (0.16), are above the threshold zero. Therefore, based on the *blindfolding* routine and the corresponding *Stone-Geisser's* Q^2 *statistic*, the proposed model for *innovative organizational climate* (*OGC*) can be considered to have predictive relevance. Furthermore, with 10 *folds* and 10 *repetitions*, the $PLS_{predict}$ procedure shows that all $Q^2_{predict}$ values for the *OGC* indicators are above zero (see Figure 27), indicating the PLS path model outperforms the most naive benchmark. Then, the *RMSE* values were compared with the *naive LM benchmark*. The results demonstrate that among the two *OGC* indicators, only one yields a smaller prediction error (i.e., lower *RMSE* value) than the *LM*. Therefore, it can be concluded that the proposed *OGC* model has a *medium predictive power*, i.e., it has a medium level of usefulness for producing generalizable findings.

MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
coll_4	0.89	0.71	24.80	0.13
coll_5	0.88	0.72	25.43	0.20
ogc_1	0.82	0.71	23.35	0.23
sdm_2	0.92	0.69	30.67	0.40
sif_1	1.08	0.78	39.32	0.07
sif_2	1.17	0.88	44.47	0.14
sif_5	1.24	1.05	56.43	0.13
sif_6	1.02	0.78	39.37	0.18
sif_3	1.04	0.77	39.10	0.23
sif_4	1.20	0.92	47.84	0.15

MV Prediction Summary

PLS | LM | PLS Prediction Error (Descriptives) | PLS Predictions (Descriptives)

	RMSE	MAE	MAPE	Q²_predict
coll_4	0.89	0.69	24.59	0.12
coll_5	0.89	0.70	25.40	0.19
ogc_1	0.84	0.72	23.87	0.19
sdm_2	0.91	0.68	28.74	0.41
sif_1	1.07	0.79	39.12	0.09
sif_2	1.23	0.92	46.08	0.05
sif_5	1.25	1.05	54.78	0.12
sif_6	1.12	0.81	41.65	0.01
sif_3	1.09	0.78	39.59	0.15
sif_4	1.25	0.97	49.58	0.08

Figure 27. $PLS_{predict}$ *results for OGC model*

5.5. A summary of evaluation results

Based on the evaluation results of the three path models, i.e., *IBOT, ATT, and OGC,* Figure 28 shows the overall path model, which combines and integrates the obtained evaluation results. This model will be further discussed to draw out managerial implications in sub-chapter 6.2. of this thesis.

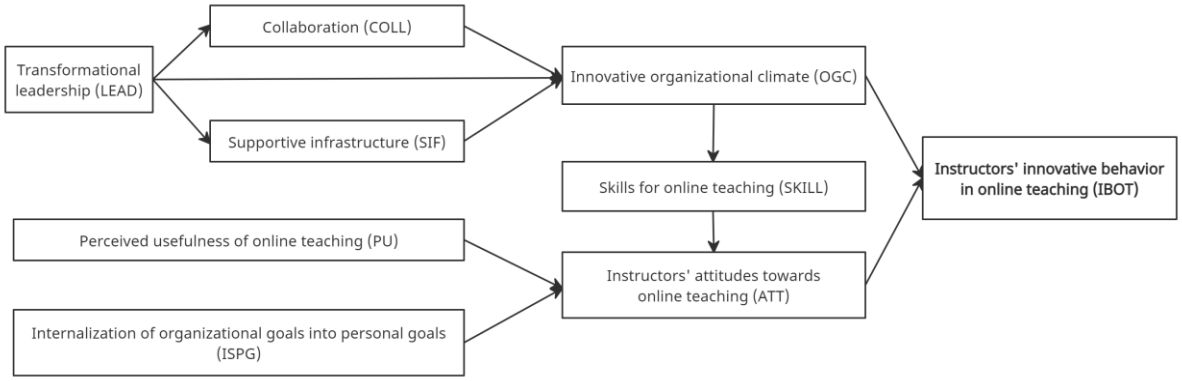


Figure 28. Factors enhancing innovative behavior in online teaching

6. Discussion and Conclusion

6.1. From *Study 1*: Components of innovations in online teaching

Study 1 of this thesis addressed the lack of a framework to define online teaching innovations and the absence of appropriate theoretical underpinnings for designing such innovations. The proposed teachers' training program for improving online teaching skills has illustrated the argument that educational innovations should not be defined generally and merely as new tools, practices, technologies, or systems developed and shared to improve educational quality (Foray and Raffo (2012). Instead, such innovations should be referred to as a multistage process starting from selecting appropriate theoretical underpinnings and analyzing relevant users' needs to evaluating the innovative ideas. Each of these single steps is composed of the input from the previous and current stage, and the output as the result of the current stage. Therefore, each step itself is also deemed to be a multistage procedure. Although this definition is somewhat similar to how Scott and Bruce (1994) characterized "innovation", it is introduced in this study as more specific guidelines and in the particular context of online educational settings. Specifically, to characterize online pedagogical innovations, there should be a specific framework or a checklist for practitioners to adopt when planning and implementing innovations. As shown through ***Study 1***, to implement an online teaching innovation, it is necessary for educators or instructors to conduct six steps of the following procedure shown in Figure 29.

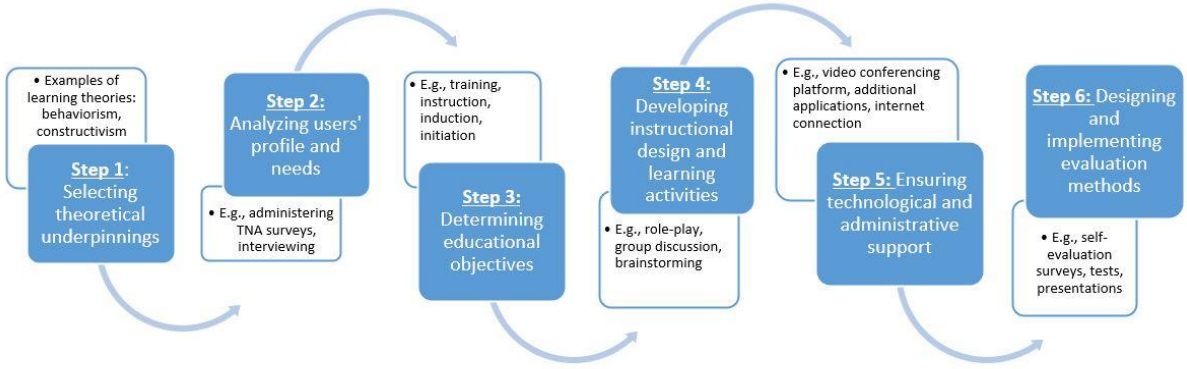


Figure 29. Six steps to implement online teaching innovations

Since this framework is constructed on the basis of the current literature, it can be referred to as an example of *incremental innovation* rather than a *disruptive* one. In other words, it does not focus on developing an entirely new framework. Instead, its target is improving or innovating the existing process (by gathering all the components of online teaching mentioned

in the literature and placing them in an appropriate sequence). These steps are also described further below.

6.1.1. Selecting theoretical underpinnings for designing the innovations

Most research on online teaching innovation often misses an explanation of why or on which foundation was some specific innovative instructional design developed. Prominent learning theories, such as behaviorism, cognitivism, or constructivism, should be given a critical role in establishing a solid theoretical background for developing educational interventions. According to Ertmer and Newby (1993), "learning theories provide instructional designers with verified instructional strategies and techniques for facilitating learning as well as a foundation for intelligent strategy selection" (p. 50). In the illustrative online teaching innovation proposed and conducted in this study, i.e., the proposed teachers' training program to improve online teaching skills, the author of this thesis has adopted the compelling theory of constructivism as the theoretical groundwork to design and implement an online teaching innovation. Without a theory-informed approach to transforming online education, the online pedagogical innovation remains merely adding technology to educational processes.

6.1.2. Analyzing users' profiles and needs

An important step in developing any educational intervention is needs analysis (Cook & Dupras, 2004). Educational innovations are designed and implemented to serve the needs of various users, e.g., learners, instructors, or management staff. Therefore, understanding the preferences and characteristics of these target users is significant to the successful development of the new tools, practices, technologies, or systems in online classrooms. In ***Study 1***, the author has determined that the target participants were experienced hospitality and tourism teachers with knowledge in the relevant subject matters but mostly in offline settings, or corporate trainers/training managers working at lodging properties, restaurants, and travel agencies in Vietnam. They were required to conduct synchronous online classes during the COVID-19 pandemic. In addition, a sophisticated and reliable TNA survey was also designed and administered to participants to investigate their learning needs. Without being derived from a proper understanding of the target learners/users' needs, the designed innovation might not be as effective as expected (Bienvenu, 2016; Mahmoud, 2014; Shi, 2013). It may even lead to failure and waste of resources (Gould et al., 2004).

6.1.3. Determining educational objectives of the innovation

Educational innovations are designed to serve a variety of purposes. Based on the needs analysis, whether the innovation aims at the acquisition of skills (in the case of *training*), retention of information (when it comes to *instruction*), or construction of abilities to understand and make judgments (as in *induction*), needs to be determined so that the outcomes or effectiveness of the innovation can be evaluated later. According to Betts et al. (1993, p. 317), it is essential to seek appropriate answers to the question "why we teach what we do" before determining what and how to teach. Clear objectives and purposes constructed at the beginning of the innovation process help effectively design new tools, practices, technologies, or systems in online teaching. In addition, they are also essential guidelines for evaluating the innovation in the later stage of the process. In *Study 1*, the designed training program aimed to improve the trainees' self-confidence in online teaching skills. The expected outcomes were carefully outlined in the course structure (see Table 11).

6.1.4. Developing instructional design and learning activities

Based on the needs analysis and educational objectives, specific learning activities are designed. In *Study 1*, the development of these activities based on the three compelling aspects of constructivism is the innovation itself since transferring aspects of traditional face-to-face instructions to a new online teaching environment requires innovative approaches to ensure that meaningful interaction and learning effectiveness are maintained or enhanced. It should be noted that online teaching innovations do not necessarily center only around technological aspects. Instead, innovative online pedagogical procedures or pedagogical technological integration practices can also be considered innovations in online teaching. Learners may benefit more from putting the pedagogy, not the technology, at the focus of online teaching innovations (Draper & Brown, 2004).

6.1.5. Ensuring technological and administrative support

Through the design and implementation process of *Study 1*, the author has the opportunity to recognize the importance of technological and administrative support for online teaching as an online instructor. Support under any forms such as funding, guidance, oversight, and assistance in confronting challenges of online teaching is critical to an effective online classroom (Meyer & Barefield, 2010). In terms of technological infrastructure needed for online teaching, elements such as a well-supported high-speed internet connection, an effective server system, or comprehensive online library services also significantly enhance the enthusiastic buy-in

from online instructors. This study confirms what Scherer et al. (2021) have contended: the availability and quality of online instructional media and technological tools are an important component of instructors' readiness to implement online teaching innovations.

6.1.6. Designing and implementing evaluation methods

The last component of online teaching innovations is the assessment techniques designed to evaluate the extent to which the innovation has delivered its objectives or outcomes. Developing educational innovations requires a methodological approach in which educational gaps have to be diagnosed, and evaluating the effectiveness of such innovations in filling the gaps needs to occur. In *Study 1*, in addition to having a TNA survey, the author has built and administered a PTE questionnaire to measure the participants' perceived levels of self-confidence in conducting online teaching after attending the course. Semi-structured interviews were also conducted to further explore participants' evaluative insights into the proposed course. Both the qualitative and quantitative approaches adopted to evaluate the proposed training program have enabled the author to improve the program in the future and determine which learning activities should be maintained, revised, or omitted. In essence, without well-designed evaluation methods, instructors would not be able to determine whether the online teaching innovations have genuinely worked.

6.1.7. Further implications from *Study 1*

Besides proposing components essential for characterize online teaching innovations, *Study 1* also provides important insights that could help address the considerable challenges online instructors faced in Vietnam during the current COVID-19 pandemic. It has underscored the inadequacy of governmental support in financing, guiding, and encouraging educational institutions' use of advanced technology in their teaching and learning activities. Particularly, the study highlighted the need for the Vietnamese government and its Ministry of Education and Training to establish a set of official guidelines and quality standards for online teaching and learning activities. Such guiding support will play an important role in enabling administrators and teachers to successfully switch to the online lesson delivery mode. In addition, unlike the numerous recent studies that generally focused on outlining Vietnamese schools' difficulties during the current pandemic owing to school closures, this study proposed a specific pedagogical solution in the form of a training program designed to enhance teachers' self-confidence in synchronous online teaching. Although the empirical evidence gathered by the study was from the field of hospitality and tourism education, the designed course content

could also be delivered to instructors in other disciplines or regions because the training concentrates on technological pedagogical integration rather than on the specialized knowledge domain in the hospitality and tourism sector.

For the leaders and administrators in the Vietnamese educational institutions, the proposed training program offers an effective pedagogical model that can be adopted to enhance the teachers' readiness in transitioning from face-to-face classrooms to the virtual learning environment to maintain the quality of teaching and learning. Providing details on how the proposed course was designed and implemented based on the compelling theory of constructivism, the author recommends that universities and schools in Vietnam adopt this theoretical framework in their online teaching activities and promptly equip their teachers with sufficient training and support. More importantly, this study invites the educational institutions in Vietnam to take the proposed training program as a reference and use it in their teacher education programs so that the potential of online pedagogy can be fully harnessed.

For instructors and students not only in the hospitality and tourism institutions in Vietnam but also in other institutions, this doctoral study offers a way of settling into a worldwide "new normal" where numerous transformed modes of teaching and learning are being established. As the proposed training program aims to equip teachers with self-confidence and skills in online teaching, it thus also helps students learn better and become more motivated in the online learning environment. Therefore, it brings both the instructors and learners in Vietnam, where online education is still in the early stages, closer to the cutting-edge global modern educational technology.

For society as a whole, this research urges the use of new information and communication technologies in education not only to cope with the effects of the COVID-19 pandemic but also as a way of moving towards a knowledge-based society, where people are required to be familiar with strategies to access and process information and thus be capable of learning flexibly and continuously. Accordingly, the author reckons that a long-term strategy for developing online education is essential and needs to be mapped out by both the government and educational institutions in a developing country such as Vietnam. Such a strategy can articulate and operationalize a collective vision of establishing high-quality and cost-effective online learning services and programs and consequently help the country benefit from the transformation.

6.2. Managerial implications from *Study 2*

6.2.1. Factors enhancing instructors' innovative behavior in online teaching

While ***Study 1*** provides a framework to define online teaching innovations and thus guide instructors through their process of initiating and implementing new online pedagogical practices, ***Study 2*** has generated a list of factors motivating online instructors to innovate in online teaching. As shown in Figure 28, through the PLS-SEM analysis results, it is found that for instructors to foster innovative behavior in online teaching, the first essential factor is the organizational climate conducive to initiating and implementing changes. As empirically indicated in this study, this innovative climate needs to be composed of various dimensions: collaboration among instructors, transformational leadership, and supportive infrastructure necessary for online teaching. While collaboration among instructors has been identified as the most critical element contributing to the innovative organizational climate, transformational leadership plays a central driver role. It influences the two other dimensions (collaboration among instructors and supportive infrastructure necessary for online teaching) directly, and the perceived innovative climate, both directly and indirectly. In other words, effective transformational leadership leads to an organizational environment favorable for instructors' innovative behavior in online teaching and fosters collaboration among instructors in confronting challenges in shifting classes to the online environment. Such shared experiences and knowledge create a workplace environment that motivates instructors to initiate and experiment with their online pedagogical innovations. Additionally, transformational leaders appear to pay more attention to providing supportive infrastructures such as a well-supported high-speed internet connection, an effective server system, or comprehensive online library services. The findings of this study reiterate previous studies which highlighted that, to employees, such perceived support indicates an organizational commitment to organizational goals, values, and the staff themselves and thus motivates them to put more effort into performing their assigned tasks more effectively (Amabile, 1998; Chou, Hsiao, et al., 2010; He, 2013; Rich et al., 2010).

The second factor responsible for instructors' innovative behavior in online teaching is instructors' attitude towards online teaching. This research indicates that instructors with a positive attitude towards online teaching are more willing to adopt technological web-based advances in their pedagogical practices than those with an unfavorable opinion of the online classroom environment. This finding is compatible with the previous study by Uzunboylu

(2007), who contends that when instructors believe in the strengths of online education, they may openly display their innovative behavior in online teaching. Interestingly, as shown through the PLS-SEM analysis performed in ***Study 2***, instructors' attitudes towards online teaching are reflected primarily and specifically in their interests in acquiring knowledge and skills necessary for improving the quality of online education (see Figure 30). Most of the retained indicators for measuring instructors' attitudes towards online teaching (which have a high level of reliability and validity) focus on the positive opinions of how instructors take responsibility for their own professional development and acquire the essential knowledge to perform their online teaching tasks properly. This finding is different from previous studies, which often refer to instructors' attitudes generally and merely as their belief in the power of online education and the intention to adopt advanced online teaching technology (Davis, 1989; Ertmer et al., 2012; Kisanga & Ireson, 2016; Sangwan et al., 2021; Uzunboylu, 2007).

Furthermore, the item *mef_5*, i.e., *'The hospitality and tourism industry is forcing institutions and teachers to shift classes online*', is also retained and placed under the reflective construct of instructors' attitudes towards online teaching. This indicator was used initially to reflect instructors' perceptions about the macro-environment factors that might impact their innovative behavior in online teaching. This construct was then omitted due to its indicators' lack of reliability, validity, and its ability to make predictions. Only one of its indicators, *mef_5*, was retained and merged into the latent construct of instructors' attitudes towards online teaching. That is to say, other external macro-environmental conditions such as political restraints, economic situations, learners' changing demographic characteristics, or governmental policies do not influence instructors' innovative behavior in online teaching. Only the practical operation of the hospitality and tourism industry appears to reflect instructors' focus on shifting classes to the online environment and making such learning more effective. In essence, the findings of this study provide empirical support for the newly-found relationship between instructors' attitudes towards the industry's pressure for changes and their innovative behavior in performing online pedagogical practices.

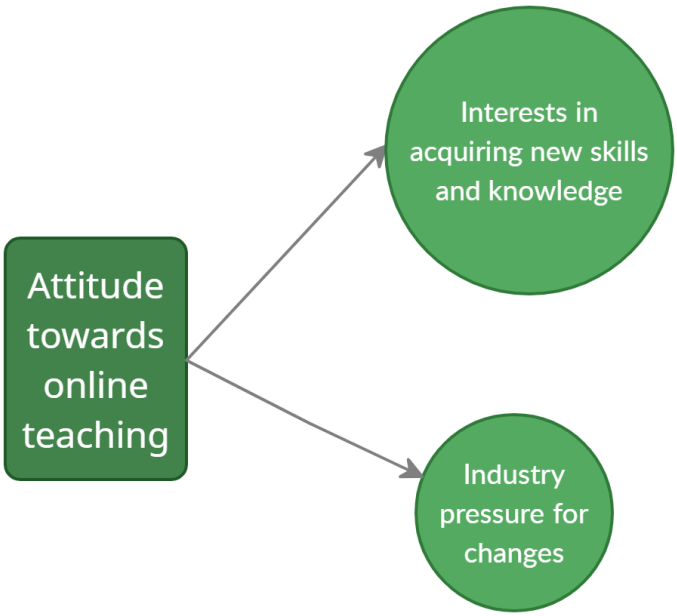


Figure 30. Instructors' attitude towards online teaching

Another factor that is found to have a bearing on instructors' innovative behavior in online teaching is their perceived levels of skills needed for teaching online. However, unlike previous research which often refers to this factor as a variable directly responsible for the target construct (Birdi et al., 2016), in this study, this factor is found to have an indirect influence on instructors' innovative behavior in online teaching. It serves as a full mediator (or indirect-only mediator) for the relationship between innovative organizational climate and instructors' attitudes towards online teaching (which directly affects their innovative behavior in online teaching). In other words, an innovative organizational environment leads to instructors' high level of perceived skills in online teaching, and such perceptions about one's skills, in turn, lead to more optimistic perspectives about online teaching. These positive attitudes will ultimately encourage innovative behavior. Therefore, what has been newly found is that having a high level of perceived skills needed for online teaching does not necessarily encourage more innovative behavior in online teaching, although it directly contributes to a more positive attitude towards teaching in the virtual environment. Figure 31 demonstrates this indirect influence of required skills on the innovative behavior in online teaching via instructors' attitudes towards online teaching.

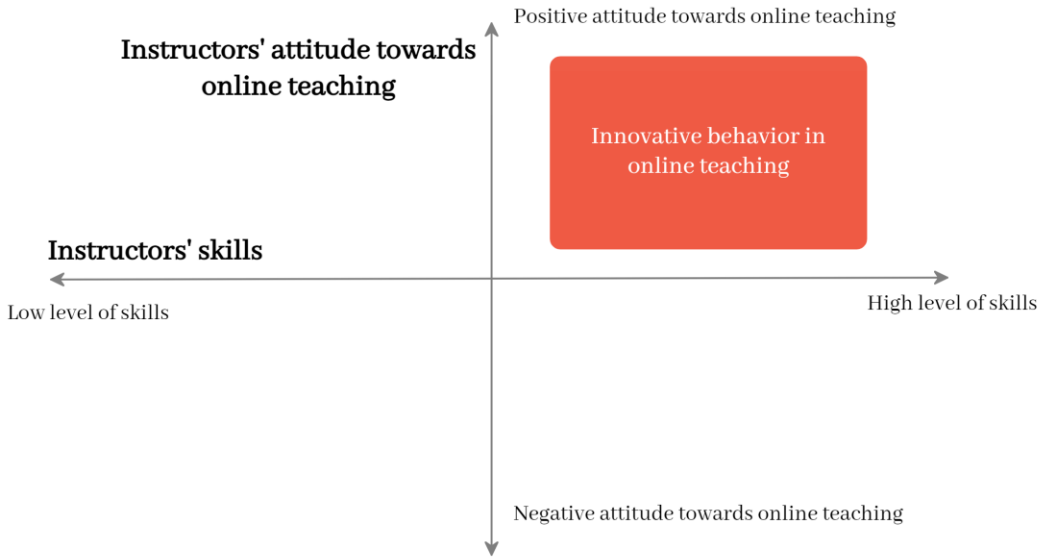


Figure 31. The influence of attitudes and skills on innovative behavior in online teaching

Study 2 also investigated further what contributes to a positive attitude towards online teaching, i.e., what makes instructors interested in developing their skills and knowledge in online teaching because this factor has been a vital antecedent for instructors' innovative behavior in online learning teaching. The PLS-SEM results revealed that among the hypothetical driver constructs for instructors' attitudes towards online teaching, the perceived usefulness of online teaching technology has the highest impact, followed by instructors' internalization of organizational goals into personal goals. Unlike what previous studies often emphasize (Davis, 1989; Saadé & Bahli, 2005; Venkatesh & Davis, 2000; Yuen & Ma, 2008), instructors' perceived ease of use of online teaching technology does not influence their opinions about online teaching. These results indicate that instructors need to be aware of the usefulness of online teaching technology so that they can adopt a more positive attitude towards teaching in online classrooms. Also, organizations may need to pay more attention to communicating their goals and visions about online education to instructors to encourage instructors to take a positive attitude towards online teaching.

6.2.2. Managerial implications

Study 2 revealed several meaningful managerial implications for motivating instructors to create and implement online teaching innovations, particularly in the context of hospitality and tourism education in Vietnam. First, the study encourages institutions' leaders and administrators to create an innovative organizational climate by demonstrating an influential transformational leadership role in guiding and supporting instructors along the path to shift

classes from the traditional face-to-face learning environment to the online virtual classrooms. To show such a leadership style, administrators should focus on creating opportunities for instructors to participate in professional development programs where instructors can enhance their knowledge and skills in online teaching. In addition, there is a need to direct more attention to cultivating the collaborative partnership between instructors so that they can share their online teaching problems and how they solve them with colleagues who might be facing similar issues. A transformational leadership style also provides sufficient equipment, tools, technology, and infrastructure essential for successfully delivering an online lesson. That is to say, the more attention to details leaders pay toward what instructors need for teaching in online classrooms, the greater extent to which instructors can feel confident in initiating and experimenting with their online pedagogical innovations.

Second, in addition to creating an organizational climate conducive to instructors' innovative behavior in online teaching, leaders should also pay attention to whether instructors have an interest or belief in the strength of the online learning environment, i.e., their attitudes towards online teaching. What is newly found in this study is that, leaders may provide numerous opportunities for instructors to develop their knowledge and skills needed for online teaching. However, without an appropriate attitude towards the power of online teaching and learning, even instructors with high levels of online pedagogical skills may not want to create and implement new ideas for making online classes more effective and meaningful. To help instructors build a positive attitude towards online teaching, besides providing sufficient teacher training programs which enable instructors to understand the usefulness of online teaching technology, administrators need to ensure that organizational goals and visions about online education are communicated clearly and openly to instructors as a way to build instructors' desire to internalize organizational goals into their personal objectives. These organizational efforts will help instructors shape an appropriate attitude needed to enhance their innovative online teaching behavior.

Lastly, for the context of hospitality and tourism education in Vietnam, the results of this study reiterate the significance of a competitive professional education system that should be able to respond to the changing industry. According to Zhong et al. (2021), the future of hospitality and tourism education depends on whether students' hopefulness and career loyalty can be maintained when the industry starts recovering after having experienced the substantial damage caused by the COVID-19 pandemic. Teaching still plays a significant role in maintaining such hopefulness and loyalty. Therefore, what and how to teach still need to be

among the primary concerns of hospitality and tourism stakeholders. Thus, policy makers and administrators in Vietnam need to build a long-term strategy for online education so that sufficient and prompt guidance and support are in place for instructors to search for and construct new online pedagogical approaches and practices for the sake of improving teaching effectiveness, which may also contribute significantly to the recovery of the industry in the post-pandemic era.

6.3. Contribution to Knowledge Science

Knowledge science is the science of all other sciences. In other words, it is the science from which meta-knowledge is created. Meta-knowledge is the knowledge that guides the processes of collecting, organizing, validating, and applying domain knowledge in various fields or industries (Nakamori, 2020). Therefore, knowledge science plays a significant role in decision-making and problem-solving in society because of its dominant theories and tools to support these processes. As this doctoral research focuses on encouraging teachers to create and implement innovations in online teaching for the hospitality and tourism education system in Vietnam, it aims at creating meta-knowledge that guides and facilitates the process of defining online pedagogical innovations and the development of a model for enhancing instructors' innovative behavior in implementing these innovations. Such knowledge provides practical managerial implications for policymakers, institutions' leaders, and instructors in making resource allocation decisions to improve the efficiency and quality of online pedagogical practices. Accordingly, education providers or instructors will gain the meta-knowledge, which is the framework for creating online teaching innovations and enhancing the individual innovative behavior necessary for implementing such innovations. They thus can use this knowledge to continue producing domain knowledge in their narrower fields, such as teaching hotel or restaurant serving skills to students via the online learning environment.

In summary, this doctoral thesis contributes to the creation of meta-knowledge to guide educational providers and instructors in hospitality and tourism institutions towards more effective online pedagogical practices in their specific teaching fields. It could be considered that this research is guided by the meta-knowledge established by knowledge science. At the same time, it also produces meta-knowledge for instructors who wish to understand how to initiate and implement their online teaching innovations. When these teachers develop innovative teaching practices that solve educational quality issues, their innovations are no longer merely domain knowledge but a body of meta-knowledge that will guide students

towards effective learning, thus creating more knowledge not only for the recovery of the hospitality and tourism industry but also for the transformation of online education in a broad sense.

6.4. Limitations and future research

6.4.1. Study 1

Among the six steps outlined as a framework for implementing online teaching innovations (Figure 29), Study 1 did not point out which step(s) is (are) the most critical to the process of innovating in online teaching. Future studies could adopt qualitative approaches such as interviews or focus groups to identify which steps should receive more attention than the others so that resources can be better allocated to the implementation of each step in the overall process.

Due to its focus on enhancing teachers' self-confidence in conducting synchronous online teaching by helping them develop the complex skills required for such, ***Study 1*** did not examine if the proposed training program achieved its expected learning outcomes, i.e., improving the actual skill levels. In other words, besides using self-evaluation surveys, future research should design assessment instruments to measure how much knowledge and skills the participants genuinely acquired from the training. Such evaluation will complement the comprehensive assessment of how effective educational interventions for teacher development can be. In addition, although this study did not investigate how the participants would apply the acquired knowledge in their daily work, the author of this study has been informed that the teachers who have participated in the proposed training course have taken the initiative to practice what they have learned by taking turns delivering weekly synchronous sessions on various topics within their field of specialization and have formed an informal Facebook group so they can share their related experiences with each other. Therefore, to improve this study's value and the generalizability of the findings, future studies should use training follow-up methods such as sending out self-reflection reports or conducting post-training meetings for the participants to have exchanges with each other on what they have done after the training.

Regarding practicality, the costs of using the existing synchronous online conferencing platforms were not considered in this study, whereas in reality, it is an essential factor to be considered by administrators and teachers. For greater practicality, studies on the use of technological tools in online teaching need to consider the platforms' pricing plans to give the stakeholders helpful suggestions on how to select an appropriate platform to use.

With regard to the factors that may have been responsible for the participants' increased level of self-confidence in synchronous online teaching, besides the effects of the constructivism-based learning activities in the proposed training program, which were recognized mainly through the post-training interviews, the author has not conducted any further procedure to identify them. Such factors may include the participants' motivation, their psychological conditions, or the support that they obtain from their supervisors or administrators. Although there have been numerous studies on factors influencing training effectiveness, few have focused on analyzing these elements in the context of the online learning environment for instructors. Thus, future studies will further investigate the other possible factors that may contribute to the effectiveness of online training courses for teachers.

Despite indicating the minor appearance of the reperception process in the participants' self-evaluation of their skill development, this study subtly reinforced what Vásquez Der (2018) posited about this psychological change, that "reperception implies a change in the appreciation of a person's experiences, which, in turn, leads to other additional mechanisms, such as exposure, self-regulation, clarification of values, as well as emotional, cognitive and behavioral flexibility" (p. 143). Accordingly, further research on how educational interventions contribute to the acceptance and achievement of teachers' reperception is needed.

Lastly, the findings from ***Study 1*** indicate that although online classes should be shorter than traditional face-to-face sessions, a sufficient amount of time is required to ensure that interactive activities, group discussions, and practice sessions are appropriately delivered in an online teacher training course. Specifically, the study suggests that each training session be allocated 2 hours instead of only 90 minutes. This additional amount of time should be added to the time spent on collaborative and interactive activities.

6.4.2. Study 2

Study 2 has two primary limitations. First, although all the reliability, validity, and in-sample predictive relevance criteria of every path model proposed in this study were well established, the substantial out-of-sample predictive power was shown only in one model, i.e., the instructors' attitude towards online teaching (path model 2). The other two models, which are instructors' innovative behavior, i.e., the main model of the study, and the innovative organizational climate, have only medium out-of-sample predictive power. In other words, these two models' ability to produce generalizable findings is only at a medium level. Future research should increase the sample size and reconsider the measurement models to treat this

predictive-power issue. Secondly, due to a lack of available theoretical literature about instructors' innovative behavior in online teaching (the literature on teachers' innovative behavior is extensive yet in a broad context), the content validity of the measurement models proposed in this study was based mainly on the adaptation of the existing studies about innovative behavior in a wide context into the specific circumstances of online pedagogy. Since an increasing number of studies focusing on supporting instructors in online teaching are produced as a result of the COVID-19 pandemic, future studies on this topic will benefit from these expanding theoretical considerations and accordingly improve the content validity of the future measurement models.

Publications

1. Scholarly Journals

(1) Luong, T.-T., & Kim, E. (2021). Teachers' Training Course Using Synchronous Conferencing Tools for Hospitality and Tourism Education in Vietnam: A Constructivist Approach. *International Journal of Information and Education Technology*, *11*(5), 229-234. https://doi.org/10.18178/ijiet.2021.11.5.1516

(2) Luong, T.-T., & Kim, E. (2022). A constructivism-based training course for hospitality and tourism instructors in Vietnam to improve their self-confidence in synchronous online teaching. *Interactive Technology and Smart Education*, *19*(3), 360-389. https://doi.org/10.1108/ITSE-04-2021-0070

(3) Luong, T.-T., Huynh, V.-N., & Kim, E. (2022). A Hybrid Use of Soft Systems Methodology for Developing a Framework of Evidence-Based Teaching for Hospitality and Tourism Instructors in Vietnam. *Systemic Practice and Action Research*. https://doi.org/10.1007/s11213-022-09609-9

(4) Luong, T.-T., & Kim, E. (2022). A Model of Factors Enhancing Instructors' Innovative Behavior in Online Teaching: Evidence from Hospitality and Tourism Education in Vietnam. *Journal of Educational Change*. [Under Review]

2. Conference Presentations

(1) Luong, T. T., & Kim, E. (2020). *Innovations in Hospitality and Tourism Education in Vietnam: A Hypothetical Framework* The IAFOR International Conference on Education - IICEHawaii2020, Honolulu. https://doi.org/10.22492/issn.2189-1036.2020.22

(2) Luong, T.-T., & Kim, E. (2021). Teachers' Training Course Using Synchronous Conferencing Tools for Hospitality and Tourism Education in Vietnam: A Constructivist Approach. International Conference on Education Technology and Computers, Hertfordshire, UK.

3. Book chapters

(1) Luong, T.-T., & Kim, E. (2021). Chapter 02. Knowledge and Learning. In E. Kim (Ed.), *Topics on Creating Innovations for Graduate Students*. Hakuei Publishing Company.

(2) Luong, T.-T., & Kim, E. (2021). Chapter 03. Flow and Creativity. In E. Kim (Ed.), *Topics on Creating Innovations for Graduate Students*. Hakuei Publishing Company.

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Appendices

Appendix A. TNA Survey Questionnaire for ***Study 1***

I. Informed Consent

You are invited to participate in a research study about technological and didactic potentials of technological tools for online teaching. The goal of this research study is to propose and evaluate a training course designed to support teachers in Vietnam's hospitality and tourism institutions to build the skills and confidence in teaching via web synchronous conferencing environments.

This study is being conducted by Luong Thanh Thao and Kim Eunyoung from Japan Advanced Institute of Science and Technology. This organization has provided funding for the study.

If you have the following characteristics, you are encouraged to participate in this study:

1) I am an inservice teacher/ instructor/ lecturer/ educator in the field of hospitality and tourism. I have knowledge in the subject matters, or the content to be taught, as well as teaching experiences, yet mostly in offline settings.
2) I am a Corporate Trainer (or Training Manager) working at lodging properties, restaurants, or travel agencies in Vietnam. I have knowledge in the subject matters, or the content to be trained, as well as training experiences, yet mostly in offline settings.
3) I am required to use synchronous conferencing to teach or train at the workplace during the period in which the pandemic of COVID-19 took place.

Participation in this study is voluntary. If you agree to participate in this study, you will take part in a training course on teaching with synchronous conferencing technology. You will be required to respond to a Training Needs Survey (TNA) and a Post-Training Evaluation (PTE) Questionnaire. You might also be interviewed for about 30 minutes. The interview includes questions about your experiences during the courses and your self-evaluation of skill complexes needed for teaching with synchronous conferencing technology.

If you participate in this study, the information you share with us will be kept completely confidential to the full extent of the law. Study findings will be presented only in summary form and your name would not be used in any report.

If you have any questions about this study, please contact Luong Thanh Thao (Ms.), E-mail address: luong.thanh.thao@jaist.ac.jp

By completing this Training Needs Survey, you are consenting to participate in this study.

II. Personal information:

1) Your full name: Click or tap here to enter text.
2) E-mail address: Click or tap here to enter text.
3) Year of birth: Click or tap here to enter text.
4) What gender do you identify yourself as:
    a. Male ☐
    b. Female ☐
    c. Prefer not to answer ☐
5) What is the highest degree or level of education you have completed?
    a. High School ☐
    b. Vocational College Diploma ☐
    c. Bachelor's Degree ☐
    d. Master's Degree ☐
    e. Ph.D. or higher ☐
    f. Prefer not to say ☐
6) Your official workplace (where you spend most of your working hours) is:
    a. Vocational college ☐
    b. University ☐
    c. Enterprises ☐
    d. Others ☐
7) Who are your target learners?
    a. Vocational college students ☐
    b. Undergraduate students ☐
    c. Graduate students ☐
    d. Company staff ☐
8) Your experience in hospitality and tourism education:
    a. Less than 1 year ☐
    b. 1 year – less than 5 years ☐
    c. 5 years – less than 10 years ☐
    d. 10 – 15 years ☐
    e. More than 15 years ☐

9) What is (are) your professional subject matter(s)?
    a. Hospitality Vocational Training
    b. Hospitality Management
    c. Tourism Vocational Training
    d. Tourism Management / Travel Services Management
    e. Vocational Culinary Arts
    f. Vocational Restaurant Serving
    g. Restaurant Management/ F&B Management
    h. Supervisory/ Management/ Leadership skills
    i. English / Foreign Languages for Hospitality and Tourism
10) Please describe briefly the current difficulties / challenges you have in teaching with synchronous conferencing technology: Click or tap here to enter text.

III. Self-evaluation on skills complexes:

In the next sections, please rate your degree of knowledge/skill in each of the competencies sections below using a scale of 1-5 or N/A and the free text space to provide additional comments.

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

		1	2	3	4	5
LO1	**Knowledge on synchronous online teaching**					
LO1-3	I can distinguish synchronous from asynchronous technology.	☐	☐	☐	☐	☐
LO1-4	I can list the pros and cons of synchronous online teaching.	☐	☐	☐	☐	☐
LO1-5	I can list differences among popular synchronous conferencing platforms.	☐	☐	☐	☐	☐
LO2	**Developing online presence**					
LO2-1	I can explain the definition and importance of online presence.	☐	☐	☐	☐	☐
LO2-2	I can develop strategies to enhance relationships with and among learners.	☐	☐	☐	☐	☐
LO2-3	I can develop methods to enhance social presence to overcome the lack of visual clues in online classes.	☐	☐	☐	☐	☐
LO3	**Planning lessons**					
LO3-1	I can list steps to help learners prepare before the course starts.	☐	☐	☐	☐	☐
LO3-2	I can design and implement synchronous online learning activities.	☐	☐	☐	☐	☐
LO4	**Handling technology**					
LO4-1	I can explain what creates quality online learning experience.	☐	☐	☐	☐	☐
LO4-2	I can use different built-in features of synchronous platforms.	☐	☐	☐	☐	☐
LO5	**Adapting to learners' preferences**					
LO5-1	I can recognize varied learning preferences and background.	☐	☐	☐	☐	☐
LO5-2	I can identify technological resources and tools for adapting to various learning preferences.	☐	☐	☐	☐	☐
LO6	**Classroom management**					
LO6-1	I can distinguish between online and offline class management approaches.	☐	☐	☐	☐	☐
LO6-2	I can identify technological resources and tools for adapting to various learning preferences.	☐	☐	☐	☐	☐

Appendix B. PTE Survey Questionnaire for ***Study 1***

Thank you very much for having participated in the research study proposing a training course designed to support teachers in Vietnam's hospitality and tourism institutions to build the skills and confidence in teaching via web synchronous conferencing environments.

This study is being conducted by Luong Thanh Thao and Kim Eunyoung from Japan Advanced Institute of Science and Technology. This organization has provided funding for this study.

Please help us improve the course design by offering your feedback and comments about your experiences and learning after joining the course by responding to the Training Evaluation form below. The information you share with us will be kept completely confidential to the full extent of the law. Study findings will be presented only in summary form and your name would not be used in any report.

If you have any questions about this study, please contact Luong Thanh Thao (Ms.), E-mail address: luong.thanh.thao@jaist.ac.jp

I. Personal information:

1) Your full name: Click or tap here to enter text.
2) E-mail address: Click or tap here to enter text.
3) Which class did you participate?: Click or tap here to enter text.

II. Course evaluation

Please indicate your level of agreement with the statements listed below using a scale of 1-5 or N/A:

1 = Strongly Disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly Agree

Statements		1	2	3	4	5
2.1	The objectives of the training were clearly defined.	☐	☐	☐	☐	☐
2.2	The training objectives were met.	☐	☐	☐	☐	☐
2.3	The topics covered were relevant to me.	☐	☐	☐	☐	☐
2.4	The content was organized and easy to follow.	☐	☐	☐	☐	☐
2.5	The materials distributed were helpful.	☐	☐	☐	☐	☐
2.6	This training experience will be useful in my work.	☐	☐	☐	☐	☐
2.7	The trainer facilitates the training well.	☐	☐	☐	☐	☐
2.8	Blackboard synchronous conferencing platform was helpful for conducting this training.	☐	☐	☐	☐	☐
2.9	Participation and interaction were encouraged.	☐	☐	☐	☐	☐
2.10	The time allotted for the training was sufficient.	☐	☐	☐	☐	☐

III. Self-evaluation on skills complexes after participating in the course:

In the next sections, please rate your degree of knowledge/skill in each of the competencies sections below using a scale of 1-5 or N/A and the free text space to provide additional comments.

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

		1	2	3	4	5
LO1	**Knowledge on synchronous online teaching**					
LO1-3	I can distinguish synchronous from asynchronous technology.	☐	☐	☐	☐	☐
LO1-4	I can list the pros and cons of synchronous online teaching.	☐	☐	☐	☐	☐
LO1-5	I can list differences among popular synchronous conferencing platforms.	☐	☐	☐	☐	☐
LO2	**Developing online presence**					
LO2-1	I can explain the definition and importance of online presence.	☐	☐	☐	☐	☐
LO2-2	I can develop strategies to enhance relationships with and among learners.	☐	☐	☐	☐	☐
LO2-3	I can develop methods to enhance social presence to overcome the lack of visual clues in online classes.	☐	☐	☐	☐	☐
LO3	**Planning lessons**					
LO3-1	I can list steps to help learners prepare before the course starts.	☐	☐	☐	☐	☐
LO3-2	I can design and implement synchronous online learning activities.	☐	☐	☐	☐	☐
LO4	**Handling technology**					
LO4-1	I can explain what creates quality online learning experience.	☐	☐	☐	☐	☐
LO4-2	I can use different built-in features of synchronous platforms.	☐	☐	☐	☐	☐
LO5	**Adapting to learners' preferences**					
LO5-1	I can recognize varied learning preferences and background.	☐	☐	☐	☐	☐
LO5-2	I can identify technological resources and tools for adapting to various learning preferences.	☐	☐	☐	☐	☐
LO6	**Classroom management**					
LO6-1	I can distinguish between online and offline class management approaches.	☐	☐	☐	☐	☐
LO6-2	I can identify technological resources and tools for adapting to various learning preferences.	☐	☐	☐	☐	☐

IV. Other comments

1) What did you like most about this training? Click or tap here to enter text.

2) What aspects of the training could be improved? Click or tap here to enter text.

3) How do you hope to change your teaching practices as a result of this training? Click or tap here to enter text.

4) What other trainings would you like to have in the future? Click or tap here to enter text.

Appendix C. Survey questionnaire for ***Study 2***

I. Informed Consent

Thank you for participating in a research study designed for assisting hospitality and tourism institutions and instructors in Vietnam in balancing between ensuring academic quality standards and keeping up with the rapid development and the new trends in the industry through effective use of online pedagogy, particularly in the post-COVID-19 era.

This study is being conducted by Luong Thanh Thao and Eunyoung Kim. Japan Advanced Institute of Science and Technology (JAIST) has provided funding for this study.

Participants of this study need to have at least one of the following characteristics:

1) Instructors/lecturers currently teaching in relevant subject matters*** in hospitality and tourism institutions in Vietnam;
2) Corporate trainers/ training managers/ training executives/ trainers working at lodging properties, restaurants, or travel agencies in Vietnam.

** Relevant subject matters include hospitality vocational training, hospitality management, tourism vocational training, travel services management, vocational culinary arts, vocational restaurant serving, restaurant management, supervisory/management/leadership training, English (or other languages) for hospitality and tourism.

Participation in this study is voluntary. If you agree to participate in this study, you would complete a questionnaire about your opinions about implementing online teaching innovations.

The information you will share with us if you participate in this study will be kept completely confidential to the full extent of the law.

Your information will be assigned a code number that is unique to this study. The list connecting your name to this number will be kept in a locked file and only the researchers of this study will be able to see the survey you participated in. No one will be able to see your survey or even know whether you participated in this study. When the study is completed and the data have been analyzed, the list linking participant's names to study numbers will be destroyed. Study findings will be presented only in summary form and your name would not be used in any report.

If you have any questions about this study or about your rights as a research participant, please contact Luong Thanh Thao (Ms.), Doctoral Research Fellow, Japan Advanced Institute of Science and Technology (luong.thanh.thao@jaist.ac.jp).

II. Personal information:

1) Your full name: Click or tap here to enter text.
2) E-mail address: Click or tap here to enter text.
3) Year of birth: Click or tap here to enter text.

4) What gender do you identify yourself as:
    a. Male ☐
    b. Female ☐
    c. Prefer not to answer ☐
5) What is the highest degree or level of education you have completed?
    a. High School ☐
    b. Vocational College Diploma ☐
    c. Bachelor's Degree ☐
    d. Master's Degree ☐
    e. Ph.D. or higher ☐
    f. Prefer not to say ☐
6) Your official workplace (where you spend most of your working hours) is:
    a. Vocational college ☐
    b. University ☐
    c. Enterprises ☐
    d. Others ☐
7) Who are your target learners?
    a. Vocational college students ☐
    b. Undergraduate students ☐
    c. Graduate students ☐
    d. Company staff ☐
8) Your experience in hospitality and tourism education:
    a. Less than 1 year ☐
    b. 1 year – less than 5 years ☐
    c. 5 years – less than 10 years ☐
    d. 10 – 15 years ☐
    e. More than 15 years ☐

9) What is (are) your professional subject matter(s)?

a. Hospitality Vocational Training
b. Hospitality Management
c. Tourism Vocational Training
d. Tourism Management / Travel Services Management
e. Vocational Culinary Arts
f. Vocational Restaurant Serving
g. Restaurant Management/ F&B Management
h. Supervisory/ Management/ Leadership skills
i. English / Foreign Languages for Hospitality and Tourism

III. Your opinions about online teaching:

	Statements	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
ibot-1	I create new teaching practices to solve challenges in online teaching environment.	☐	☐	☐	☐	☐
ibot-2	I am looking for new teaching methods, techniques, technologies to deliver my online lessons/lectures.	☐	☐	☐	☐	☐
ibot-3	I promote my ideas in online teaching so that other teachers can use them in their online classes.	☐	☐	☐	☐	☐
ibot-4	I make important organizational members enthusiastic for innovative ideas in online teaching.	☐	☐	☐	☐	☐
ibot-5	I develop plans and schedules for the experimentation and implementation of new ideas in online teaching.	☐	☐	☐	☐	☐
ibot-6	I evaluate the utility of my innovative ideas in online teaching.	☐	☐	☐	☐	☐
ibot-7	I contribute suggestions or approaches for others' teacher ideas in online teaching.	☐	☐	☐	☐	☐
ibot-8	I am innovative in online teaching/ I am a good source of innovative ideas online teaching.	☐	☐	☐	☐	☐
scot-1	I expect myself to design and implement new online teaching practices that work effectively.	☐	☐	☐	☐	☐
scot-2	I expect myself to assess whether my new ideas for online teaching work effectively.	☐	☐	☐	☐	☐
scot-3	I expect myself to design a new course (or courses) for virtual classes.	☐	☐	☐	☐	☐
scot-4	I expect myself to engage and motivate students better with my new methods in online teaching.	☐	☐	☐	☐	☐
scot-5	I expect myself to maintain students' hope and commitment to their study and future career in hospitality and tourism profession with my new methods in online teaching.	☐	☐	☐	☐	☐
scot-6	I expect myself to defend my new approaches in online teaching when someone challenges them.	☐	☐	☐	☐	☐

skill-1	I can distinguish synchronous from asynchronous technology.	☐	☐	☐	☐	☐
skill-2	I can list the pros and cons of synchronous and asynchronous online teaching.	☐	☐	☐	☐	☐
skill-3	I can list the differences among popular synchronous online conferencing platforms (WebEx, Microsoft Teams, Blackboard, Zoom, etc.).	☐	☐	☐	☐	☐
skill-4	I can list steps to help learners prepare before the online course starts.	☐	☐	☐	☐	☐
skill-5	I can design and implement online learning activities.	☐	☐	☐	☐	☐
skill-6	I can explain the definition and importance of online presence.	☐	☐	☐	☐	☐
skill-7	I can identify strategies to enhance my relationships with and among learners.	☐	☐	☐	☐	☐
skill-8	I can develop methods of enhancing social presence to overcome the lack of visual clues in online classes.	☐	☐	☐	☐	☐
skill-9	I can explain what creates quality online learning experience.	☐	☐	☐	☐	☐
skill-10	I can use the different built-in features of synchronous video conferencing platforms.	☐	☐	☐	☐	☐
skill-11	I can recognize varied learning preferences and backgrounds.	☐	☐	☐	☐	☐
skill-12	I can identify technological resources and tools for adapting to various learning preferences.	☐	☐	☐	☐	☐
skill-13	I can distinguish between online and offline class management approaches.	☐	☐	☐	☐	☐
skill-14	I can identify strategies to respond to student behaviors/misbehaviors in online classes.	☐	☐	☐	☐	☐
att-1	Digital competence is an important 21st century skill for every teacher.	☐	☐	☐	☐	☐
att-2	I believe online learning can improve the quality of my teaching performance.	☐	☐	☐	☐	☐
att-3	Online teaching is more interesting than classroom teaching.	☐	☐	☐	☐	☐
att-4	In hospitality and tourism education, online teaching can replace traditional teaching style (face-to-face physical classrooms).	☐	☐	☐	☐	☐
att-5	I enjoy teaching online.	☐	☐	☐	☐	☐
att-6	I like reading magazines on new technology innovations for teaching.	☐	☐	☐	☐	☐
att-7	Discussions on online teaching technologies are interesting.	☐	☐	☐	☐	☐
pu-1	Online teaching and learning is very economical for institutions to adopt.	☐	☐	☐	☐	☐
pu-2	Teaching online can enhance the quality of knowledge attained.	☐	☐	☐	☐	☐
pu-3	Communicating through online social networks in online classrooms is fun.	☐	☐	☐	☐	☐
pu-4	Online teaching and learning is flexible for both teachers and students.	☐	☐	☐	☐	☐

peu-1	It’s easier to prepare and deliver online lessons than face-to-face lessons.	☐	☐	☐	☐	☐
peu-2	Interacting with computer systems is easy.	☐	☐	☐	☐	☐
peu-3	Using technologies for online teaching does not require a lot of mental efforts.	☐	☐	☐	☐	☐
prof-1	I proactively to work on my own professional development in online education.	☐	☐	☐	☐	☐
prof-2	I take part in professional training programs in online teaching even if it is not compulsory.	☐	☐	☐	☐	☐
prof-3	I enjoy reading professional literature about online teaching.	☐	☐	☐	☐	☐
prof-4	I study online teaching’s textbooks and lesson material thoroughly.	☐	☐	☐	☐	☐
ispg-1	I make an effort to put the school’s vision of online education into practice.	☐	☐	☐	☐	☐
ispg-2	I do my best to understand what implications the school’s vision has for my teaching strategies for online classes.	☐	☐	☐	☐	☐
ispg-3	I know what the next steps for putting the schools’ vision on online education into practice.	☐	☐	☐	☐	☐
ogc-1	My organization values my innovations in online teaching practices.	☐	☐	☐	☐	☐
ogc-2	Help is available from my organization when I have a problem in shifting from face-to-face to online classrooms.	☐	☐	☐	☐	☐
ogc-3	My organization would forgive an honest mistake I have when implementing online teaching innovations.	☐	☐	☐	☐	☐
ogc-4	My organization takes prides in my innovations in online teaching.	☐	☐	☐	☐	☐
ogc-5	My organization provides financial rewards for online teaching innovation.	☐	☐	☐	☐	☐
ogc-6	I have enough supportive technological infrastructure needed for online teaching.	☐	☐	☐	☐	☐
coll-1	My colleagues discuss new methods for online teaching with me.	☐	☐	☐	☐	☐
coll-2	My colleagues give me positive feedback about my online teaching.	☐	☐	☐	☐	☐
coll-3	My colleagues give support when I try out new teaching methods for online classrooms.	☐	☐	☐	☐	☐
coll-4	My colleagues tell me what online teaching problems they have and how they solve them.	☐	☐	☐	☐	☐
coll-5	My colleagues pass on to me things they have learned from training programs about online teaching.	☐	☐	☐	☐	☐
coll-6	My colleagues let me observe their teaching performance in online classrooms.	☐	☐	☐	☐	☐
coll-7	My colleagues and I co-teach (online) to learn from each other.	☐	☐	☐	☐	☐
lead-1	The leaders make use of all opportunities to communicate the school’s vision on online education to teaching staff, students, parents, and others.	☐	☐	☐	☐	☐

lead-2	The leaders have comprehensive knowledge about online education.	☐	☐	☐	☐	☐
lead-3	The leaders understand the current problems caused by the shift from face-to-face to online classrooms.	☐	☐	☐	☐	☐
lead-4	The leaders believe in the power of online teaching and learning.	☐	☐	☐	☐	☐
lead-5	The leaders support me in solving problems related to online teaching.	☐	☐	☐	☐	☐
lead-6	The leaders appreciate when a teacher takes initiative to improve online teaching.	☐	☐	☐	☐	☐
lead-7	The leaders offer financial rewards for my innovations in online teaching.	☐	☐	☐	☐	☐
lead-8	The leaders encourage teachers to implement innovations in online teaching.	☐	☐	☐	☐	☐
lead-9	The leaders encourage teachers to seek and discuss new information and ideas relevant to the institution's vision on online education.	☐	☐	☐	☐	☐
lead-10	The leaders provides me with opportunities to take part in professional training programs about online teaching.	☐	☐	☐	☐	☐
sdm-1	Teachers at my organizations are involved in decisions about acquiring new technologies/resources/materials for online teaching.	☐	☐	☐	☐	☐
sdm-2	At my organization, teachers make decisions about new educational objectives together.	☐	☐	☐	☐	☐
sdm-3	At my organization, teachers are involved in decisions about using new online teaching methods.	☐	☐	☐	☐	☐
sif-1	My organization has an IT department/team to support teachers to teach online.	☐	☐	☐	☐	☐
sif-2	My organization has an effective and well supported campus network.	☐	☐	☐	☐	☐
sif-3	My organization has an effective server support.	☐	☐	☐	☐	☐
sif-4	My organization has an effective learning management system (LMS).	☐	☐	☐	☐	☐
sif-5	My organization has an effective online library services.	☐	☐	☐	☐	☐
sif-6	My organization evaluate new online technology for online teaching.	☐	☐	☐	☐	☐
sif-7	My organization assess and update quality of online course content.	☐	☐	☐	☐	☐
sif-8	When I have to deliver online lessons from home, my organization provides incentives and financial support for my online classes.	☐	☐	☐	☐	☐
mef-1	Internet access to online teaching resources and tools in my country is restricted due to political reasons.	☐	☐	☐	☐	☐
mef-2	The current economic conditions of my country supports the adoption of online teaching and learning.	☐	☐	☐	☐	☐
mef-3	The current governmental policies are sufficient for guiding institutions on shifting classes to the online learning environment.	☐	☐	☐	☐	☐

mef-4	The government is providing sufficient resources for institutions and teachers to effectively implement innovations in online teaching.	☐	☐	☐	☐	☐
mef-5	The hospitality and tourism industry is forcing institutions and teachers to shift classes online.	☐	☐	☐	☐	☐
mef-6	The changes in learners characteristics and behaviors urge institutions and teachers to have more innovations in online teaching.	☐	☐	☐	☐	☐
Other comments:						