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HOW DO TEACHING STYLES AND STUDENT SELF-DETERMINATION SHAPE THE VIRTUAL LEARNING ENVIRONMENT IN HOSPITALITY AND TOURISM EDUCATION?

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Abstract: The rapid expansion of virtual learning during and after the COVID-19 pandemic has transformed higher education, yet limited research has examined how teacher- and student-related factors jointly shape virtual learning in hospitality and tourism education. Drawing on teaching-style perspectives and self-determination theory, this study investigates the direct effects of teaching styles on virtual learning success and student self-determination, as well as the mediating role of self-determination. A quantitative cross-sectional design was adopted, and questionnaire data were collected from 428 undergraduate students enrolled in hospitality and tourism programs at seven Egyptian universities. The proposed model was assessed using partial least squares structural equation modeling with 5,000 bootstrap resamples. The results show that teaching styles positively influence both virtual learning success and student self-determination. Student self-determination emerged as the strongest predictor of virtual learning success and significantly mediated the relationship between teaching styles and virtual learning success. These findings demonstrate that successful virtual learning depends not only on technological infrastructure but also on instructors' ability to adopt directive and participative approaches that provide structure, interaction, and support while strengthening students' autonomy, competence, and motivation. The study extends hospitality and tourism education research by integrating teaching styles and self-determination within a unified explanatory model. Practically, higher education institutions should provide pedagogical and technological training for instructors and establish student-support mechanisms that facilitate effective participation and adaptation in virtual classes.

Keywords: Virtual learning, student self-determination, teaching styles, hospitality, tourism, education

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INTRODUCTION

Our communities have been affected by the COVID-19 pandemic in a variety of ways. One of these consequences is the closure of educational institutions from preschool to university (Lei & So, 2021). According to Siow et al. (2021), the COVID-19 pandemic has caused the most serious disruption to education in history. While social isolation and stay-at-home policies are unavoidable, many educational institutions, especially post-secondary institutions, have reacted rapidly by bringing typical classes online (Lei & So, 2021). Thus, higher education (HE) institutions were forced to conduct all interactions with students online. Although internet-based learning is not new and generally regarded as an option, a replacement for traditional learning (Abou El-Seoud et al., 2014; Sobaih et al., 2020), it has exploded in popularity and development since the COVID-19 pandemic and became a necessary component for the continuation of school and university activity (Finlay et al., 2022) since many universities decided to provide online courses despite having limited preparation time. More optimistically, it is clear that the Coronavirus not only created obstacles but also unique and new opportunities for the education sector, allowing for the development of more adaptable learning options that make better use of distance learning and digital technology (Agyeiwaah et al., 2022). However, hospitality and tourism HE institutions

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have been slow to embrace technological innovations as a teaching resource. To stay current in the modern-day technology world and maintain sustainability, hospitality and tourism educators must not only embrace current IT advances but also focus on the future and investigate the most recent insights into education and IT (Alrousan et al., 2022). According to Dhawan (2020), previous research has shown that online learning has several advantages for students since it is more flexible and student-centered, and it can also promote student connection by offering synchronous and asynchronous technologies like e-mail, forums, chat rooms, and video conferencing. However, there has been little academic research into online teaching and learning, particularly in hospitality and tourism education, where practice and theory remain a key component of student experience and satisfaction (Dhawan, 2020; Wang et al., 2021).

Over the last decade, online learning has grown in popularity, and the popularity of web degree programs has increased. Online learning, in contrast to traditional learning communities, is evolving through asynchronous dialogue, allowing students to read, consider, and create thoughtful responses (Alsetoohy et al., 2024; King & So, 2014). These advanced technologies can be used in a variety of ways to provide important help and are a wonderful alternative to traditional schooling methods. This option could take the shape of a virtual classroom. A virtual education community is a virtual platform where students and teachers can communicate to obtain mutually beneficial results (Alrousan et al., 2022; Sheard et al., 2003). The virtual learning approach frees students from being bound to a certain building or to a specific location or time. Virtual learning provides students with greater "room" to interact and can assist some students by relieving them of the pressures of speech and on-the-spot grammar precision (Alrousan et al., 2022).

The usage of technology in HE presents a significant problem for hospitality and tourism students (Hasanein, 2025). Asad & Qureshi (2025) describes the modern student as both a driver and a key obstacle in the growing role of new technology deployment in education. The modern student is distinguished by quick changes in learning behavior, increased competency, and rapid information turnover. Students who are intrinsically driven study more and maintain their learning for a longer period of time, so self-determination behavior is the foundation that is more relevant for learning success in times of challenge (Ryan & Deci, 2016) (e.g., pandemic time). Learners who are self-determined direct, monitor, and change their behavior, thoughts, and motivation (Brenner, 2022). This means they can make an informed decision and attain their goals of effective learning. They can choose how much time they have to complete their academic tasks, and study, as well as organize that time and be responsible enough to handle those online duties on their own (McCardle et al., 2017). However, in a virtual learning environment, teachers have a significant impact on students' experiences (Bolliger & Wasilik, 2009). Teachers have a tremendous impact on their students' lives both inside and outside of the classroom. Conformingly, teacher-student interaction is extremely important because it contributes to the successful learning of students. Furthermore, the classroom structure established by the teacher motivates the ability of the student to participate and thrive is determined (Inayat & Ali, 2020).

This study identifies the roles of tourism and hospitality student self-determination and the style of teaching in the virtual learning approach post the COVID-19 pandemic. Unlike past research, which frequently focuses on analyzing students' and teachers' online learning and teaching behaviors separately (Mejia & Phelan, 2013, 2014), this study focuses on both students' and teachers' virtual learning and teaching experiences. Few researchers have used a multivariate approach to investigate the interaction between learners' personal behaviors, teachers' teaching methods, and the success of e-learning (Dincer et al., 2019). More specifically, research in the tourism and hospitality field that addresses online education is still in its early stages of development (Ma & Au, 2014).

A better understanding of the many educational contexts in which learners' and teachers' engagement is promoted or impeded in a virtual learning environment is required (Ferreira et al., 2025). Extensive research has been conducted on the implementation of e-learning or virtual learning in developed countries (Cardenal et al., 2023; Dinçer et al., 2017; Dincer et al., 2019; Goh, 2020; Goh & King, 2020; Lei & So, 2021; Mouratidou et al., 2022; Philp & Duchesne, 2016; Villar-Aldonza, 2023), while there is a scarcity on virtual learning' research in the developing countries like Egypt.

However, it was confirmed that the Egyptian universities have the chance to benefit from the E-learning by reducing crowded classes, offering flexible learning schedules, improving students' self-learning skills, enhancing information retention, reaching students in remote areas, attracting more international students, cutting education costs per student, and catering to students with special needs (Afifi, 2011; Noour & Hubbard, 2015).

Meanwhile, it was argued that Egyptian universities need to recognize that virtual learning will provide more flexibility in terms of time and location when compared to traditional in-person classes. It will also allow institutions to reach a wider geographical audience and offer various learning methods for self-regulated learning among adults. Additionally, virtual learning can enhance the quality of education, promote interactive communication, improve efficiency for both institutions and students, and achieve customer satisfaction and cost-effectiveness in comparison to traditional classroom settings (Waquar et al., 2025).

Thus, to address this, the current study emphasizes the dynamic roles of teaching style and student self-determination to the adoption of the virtual learning approach in the hospitality and tourism colleges in Egypt.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Advanced technologies are rapidly spreading into all aspects of life. In schools and colleges, technology has transformed educators into facilitators and learners into active participants. Presently, students opt to engage with their classmates through the usage of social media platforms (Bataineh et al., 2021). When individuals utilize online platforms and digital technologies, they tend to be more interactive, socially engaged, and active (Asad & Hussain, 2023).

When collaborative learning is combined with a virtual environment, learners are able to actively participate in their learning process and meet their learning needs effectively (Munoz, 2020). Excluding particular online providers, such as the virtual learning approach, the COVID-19 epidemic weakened the majority of conventional educational practices (Aucejo et al., 2020). A web-based learning community is a virtual platform that allows students to collaborate to achieve genuinely beneficial outcomes (Alrousan et al., 2022; Sheard et al., 2003). Simonson & Schlosser (2006) defined virtual learning as learning that can take place in the absence of typical classroom surroundings in a viable and effective manner, see Figure 1.

Although home study is an important aspect of higher education, extended durations of home learning are uncommon (Bataineh et al., 2021; Murphy, 2020), students may prefer aspects of virtual learning such as more convenient learning environments or appropriate time utilization through the recurrence of educational content on YouTube or on the university's systems (Shim & Lee, 2020). The virtual learning approach has the possibility of utilizing the services of the most skilled professionals in various domains of need, which is not achievable in a typical classroom setting, such as (Bouchard, 2011; Husu, 2000):

- The social and intellectual collaboration is produced by virtual classroom technologies. Students who use technical equipment develop the habit of taking on leadership roles in respect to their peers. Aside from that, the virtual classroom allows students to build a variety of communication skills that help them to do well in class.
- Cost and time effectiveness are a massive advantage. Students save time, money, and transportation by using a virtual classroom.
- The teachers may prefer online teaching as well because everything is online, and these works are generally sent via email. Also, they can easily reuse their resources and obtain materials from other sources.
- It allows learners to get learning experiences at their preferred time, location, and convenient conditions. Furthermore, it will assist with admissions, course information, educational work, projects and assignments, tests and evaluations, assessment and results, counselling, and essential assistance, as well as information on the start of public examinations, merit systems, and admission into vocational and professional streams, etc.

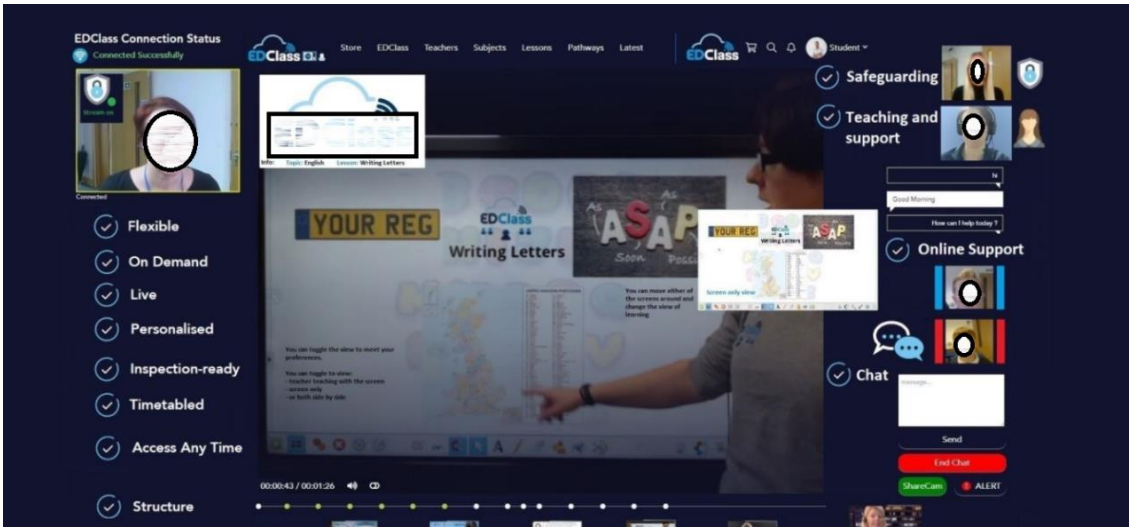

Figure 1. The typical virtual classroom layout (Source: https://www.edclass.com/ accessed on May 18, 2025)

Regarding its online aspects, the approach can be highly beneficial to all stakeholders in various ways. However, to actualize virtual learning opportunities (Abdeljaber et al., 2025), the nature of student-teacher relationships must be effectively utilized and integrated to achieve overall classroom success (Asad & Hussain, 2023; Jang et al., 2016; Ryan & Deci, 2016). Consequently, the next section discusses teaching style and student characteristics concerning self-determination.

1. Teaching style and virtual learning

Teaching styles are the various methods of instruction used in the classroom to achieve specific learning outcomes (Cardenal et al., 2023). It highlights the teaching aspect of the educator's role. Consequently, teaching styles are important social and environmental aspects in addressing the need for inclusion in the classroom, which promotes satisfaction and engagement (Gillet et al., 2010). The educator's role has shifted from providing knowledge to designing knowledge in the digital age (Garba & Yusuf, 2016). Engaging students in a digital learning environment that is appropriate and supportive can enhance their personal abilities by tailoring the learning process to meet their specific needs (Asad & Hussain, 2023). According to the studies, various learning styles might result in varying student outcomes (Cardenal et al., 2023; Mouratidou et al., 2022; Villar-Aldonza, 2023). As a result, the teacher's personal attributes are critical to students' virtual learning experiences (Ahmed, 2010; Alrousan et al., 2022).

It was argued that the success and effectiveness of e-learning adoption are significantly influenced by the characteristics of the educator (Alqahtani & Rajkhan, 2020; Alrousan et al., 2022). Therefore, their role is not just to educate, but their teaching style reflects the behaviors and environment they create in the classrooms.

According to Garba & Yusuf (2016), teaching styles indicate the pattern of attitudes, beliefs, strategies, motivation, control and conduct displayed by classroom teachers. Thus, educators' understanding of the importance of their own professional growth is a crucial driver for improving teaching methods and creating a more engaging virtual learning space (Madanat et al., 2024). To describe teaching style, different academics employ various definitions. Teaching style, according to Grasha (1996), is the structure of teachers' knowledge, beliefs, performance, and conduct when they are teaching. It's their natural, routine, tendency, or even a practice that is employed to communicate knowledge and skills in the class. In his study, Grasha (1996) identified five categories for teaching styles: formal authority, expert style, delegator style, personal pattern style, and facilitator style. According to Rollett et al. (2021), using student views as a kind of feedback is seen to be a highly fascinating technique to learn more about how well a teacher is teaching.

This study, however, focuses on how students perceive their teachers' teaching methods and their impressions of the teacher's emotional and instructional relationship with them, rather than the caliber of the teacher. Ornstein & Miller (1980) divided teaching styles into two categories: expressive styles and instrumental styles. According to Shaari et al. (2014), the emotional interaction established by the instructor with the learner or the classroom as a whole, including friendliness, authority, understanding, trust, and some emotional qualities displayed by the teacher, is referred to as expressive style (Savina et al., 2025). This teaching approach incorporates interpersonal ties between lecturers and students and is linked to mindsets toward learning. The expressive teaching method is used to regulate students, manage classroom activities, and manage negative or good sentiments toward teaching. Instrumental style, on the other hand, refers to how instructors carry out tasks such as assisting students, organizing lessons, establishing classroom standards, and ensuring that students meet those requirements (Tikochinski et al., 2025).

According to Zhang (2025), student learning experiences are tightly connected to teacher teaching. According to Skinner & Belmont (1993), a student's impressions of a teacher's participation can predict subsequent engagement in class to the point where when students see teachers as supportive and creative, they feel better and more excited in class. Implementing classroom strategies such as providing frequent formative feedback and introducing choice-based tasks can concretely demonstrate supportiveness and creativity. Students who perceive positive interactions with professors are more likely to participate in academics, leading to higher involvement and total academic accomplishment (Prananto et al., 2025). Referring to Lei & So (2021), when teachers do well in the classroom, their students are more satisfied.

This pattern could be ascribed to a variety of factors. First, the teacher's teaching style and approach can have a significant impact on student motivation and engagement (Xiong, 2025). So, teaching styles must also be taken into account while planning a class. In this regard, Ouyang & Scharber (2017) asserted the impact of teaching style on student learning and cohesion over the academic years. In the same line, Jaggars & Xu (2016) confirmed the style of a teacher has an impact on student communication, interest, and (Derakhshan & Lalli, 2025). Consequently, students perceive the teacher's actions differently based on the teacher's behavior and their own characteristics. This implies that a student's perception of relevance is influenced by their profile (Cardenal et al., 2023).

Thus, our research focuses on classifying teaching styles into two dimensions: directive and participative. This classification has been used in previous studies (Cardenal et al., 2023; Sheridan et al., 2022).

Similarly, Dogan & Gogus (2025) asserted that technology is merely a tool, and the teacher's instructional use of technology can significantly impact the efficacy of online learning. Thus, the teachers' technological proficiency is critical to students' virtual learning experiences (Habibi et al., 2025). Consequently, when instructors are motivated to teach online, students enjoy a better virtual learning experience (Thanasi-Boçe, 2021). Therefore, students have urged teachers to modify their teaching practices to account for the significant variations between online sessions (Yang, 2025). To make teaching practices more effective, educators should consider differentiating instructional adjustments based on learner readiness. By articulating tiers of support for varied student profiles, teachers can tailor directive and participative approaches to meet the needs of both novice and advanced learners. For instance, novice learners may benefit from more structured guidance, while advanced learners might thrive under a facilitative and open-ended approach. These tailored strategies can contribute to more responsive teaching, adapting to the unique requirements of virtual learning contexts (Beck & Beasley, 2021). Therefore, the following hypotheses are proposed:

H1. The style of teaching has a significant positive relationship with the success of virtual learning.

H2. The style of teaching has a significant positive relationship with the degree of student self-determination in virtual learning.

2. Student self-determination and virtual learning

Learning necessitates a student engages in activities that promote learning. To put it another way, "student attendance without efficient engagement does not equal learning," because "learning is determined by how a student engages in educationally meaningful activities"(Coates, 2006). In online learning, establishing such student involvement is dependent on students' desire to use and embrace the system (Ma et al., 2025). During the epidemic, students must devote time to become acquainted with and employ the online platform (Wang et al., 2021). According to Andrés-Gárriz et al. (2025), promoting self-determination is seen to be a good way to help students improve their executive functioning. Given its importance, it's helpful to place engagement in the context of a larger motivating paradigm (Chiu, 2022). Likewise, Ryan & Deci (2020) self-determination is multifaceted in that it includes both inner psychological attributes, such as intrinsic motivation, and behavioral skill sets, such as cognitive reasoning abilities. Self-determined conduct is described as volitional acts that allow one to operate as the principal etiological factor in one's life to maintain or improve one's quality of life (Gim et al., 2022).

Specific cognitive actions, such as identifying, assessing, and applying, serve as a foundation for selecting appropriate strategies to achieve specific goals that the person wants to pursue in life (Al-Salman & Haider, 2021; McCardle et al., 2017). Such cognitive actions are instrumental in fulfilling the intrinsic psychological needs as postulated by the self-determination theory. In the process of identifying, individuals recognize goals that pertain to their sense of autonomy by making choices of direction on their own. Through assessment, they can evaluate their competence by recognizing strengths and aspects that need improvement to attain intended results. Application of these findings develops relatedness through meaningful contact and cooperation with others. In this regard, self-determination behavior is one relevant paradigm that takes a comprehensive approach to motivation (Ryan & Deci, 2016).

It suggests that the character and depth of involvement are determined by the mechanics of self-processes. According to the self-determination theory, individuals have universal innate psychological demands for identity and self-initiation in activities, a sense of competence, and a sense of emotional connection with others (McCardle et al., 2017).

When these psychological demands are addressed by connections with others in their life situation, individuals are more likely to succeed in relevant activities (Dincer et al., 2019). In the educational field, Bunce et al. (2021) highlighted that self-determination behaviour helps students achieve their requirements for the sense of belonging, autonomy, and competence while also reaching the sensation of wellbeing. Similarly, self-determined students were more effective in achieving their academic goals (Chiu et al., 2022).

Furthermore, student-related characteristics might influence the success of the online learning process as well as the teachers' online teaching satisfaction (Aiyoob et al., 2025). Students with autonomy-supportive instructors perform better in terms of focus and time management, like their classes more, and interact with their instructors about their learning (Alnusairat et al., 2021; Chiu et al., 2022; Reeve, 2013; Skinner & Belmont, 1993). Conformingly, Chiu (2022) argued that a variety of contextual elements, including the support of teachers, has an impact on students' motivation and engagement in online or remote learning. Instructor support plays a critical role in improving student motivation. This support takes the form of active participation through teaching methods, clear educational structure, and encouragement of student autonomy. A mixed-methods follow-up study could enrich understanding by combining quantitative achievement data with qualitative reflections on autonomy, revealing additional nuances. Enhanced student performance boosts the success of online learning. Thus, when student performance improves, the likelihood of online learning success rises (Alnusairat et al., 2021). Therefore, the following hypotheses are proposed, see Figure 1.

H3. The degree of student self-determination has a significant positive relationship with the success of virtual learning.

H4. Student self-determination mediates positively the relationship between teaching styles and the success of virtual learning.

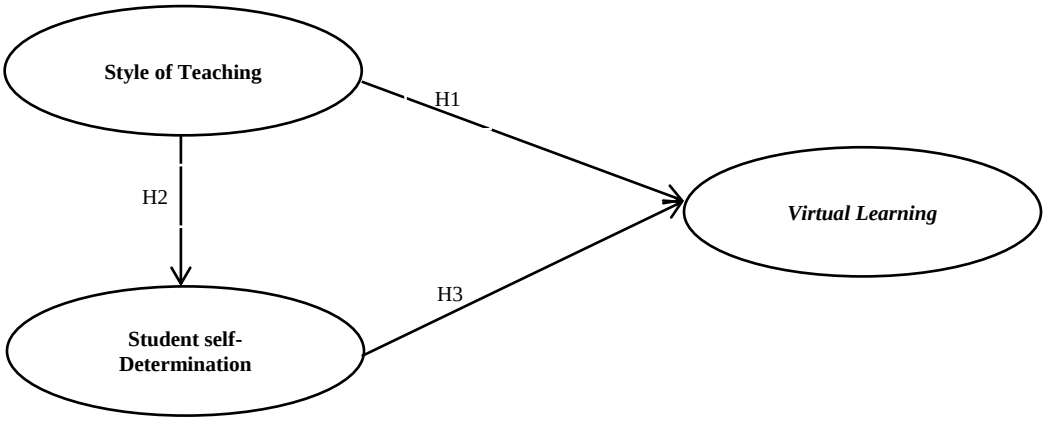

Figure 1. The research model

METHODS

1. Participants of the study and the survey process

Undergraduate students studying tourism and hotel management in Egypt were selected as participants in this study. Most of the attendees came from the University of Sadat City, Luxor Alexandiria, Helwan, Suez Canal, Marsa Matruh and Manoura Universities. In general, the sample is a strong representation of the full student population in the hospitality and tourism departments. Furthermore, we collect data by utilizing Google Forms. The first online survey, created using Google Forms, was started on June 30th, 2025, with a focus on participants from university students, and concluded on July 23rd, 2025. After receiving official approvals, we have sent the link of the survey to students directly or via their mentors in class. The snowball method was used to engage mentors, preventing duplicated concerns and providing a thoughtful response to the survey. Participant consent was obtained prior to completing the survey.

On average, the survey took between 5 to 8 minutes to complete. In addition, we carefully examined every entry by hand rather than relying on automated approvals, resulting in a high quality of responses and fewer instances of missing data. To ensure a varied group of participants, we chose not to limit the survey to a particular university or gender in Egypt. This approach resulted in a large group of approximately 8200 suitable participants (virtually representing all students enrolled in the hospitality and tourism colleges in Egypt), expanding the range and relevance of the research.

The thumb rule of number of items * 10, or 39 * 10 = 390 participants, was used to determine the sample (Hair et al., 2021). Finally, 512 respondents provided the data, and 428 respondents were examined after the outlier behavior responses were eliminated. Finally, the majority of students were male (257; 60%), with most in the 7th educational level (196 students; 45.7%), followed by the 6th level (96 students; 22.4%). Additionally, approximately 123 students were from the University of Sadat City, followed by 66 from Helwan University, 62 from Suez Canal University, 54 from Luxor University, 51 from Alexandria University, 43 from Mansoura University, and only 23 from Marsa Matruh University.

2. Measures

The survey tool included 39 carefully designed statements, each related to important concepts identified in earlier research. These items were carefully modified from previous academic works and refined with the help of expert panel discussions to ensure their relevance and conceptual consistency. Participants evaluated each statement using a five-point Likert scale to measure the level of their agreement, 1 (never) to 5 (always), with the exception of the virtual learning scale, which utilized a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Five items measuring online learning were retrieved and modified from Madanat et al. (2024) and Anekwe (2017). Ten items measuring teaching styles were borrowed from Cardenal et al. (2023) and categorized into two constructs: five items for directive teaching style and five items for participative teaching style. In conclusion, the evaluation of students' self-determination (24 items) was modified from Farrar (2020) and focused on two concepts: capacity (12 items) and opportunity (12 items). This scale consists of three versions: student, parent, and educator. For this study, the researcher exclusively employed the student assessment. Thus, the capacity dimension pertains to the expertise, self-awareness, and competencies that enable students to exercise self-determination. The other dimension, opportunity, denotes the prospects available for students to leverage the aforementioned knowledge, skills, and abilities (Farrar, 2020; Wehmeyer, 1995).

At first, items were assessed for their linguistic clarity and connection to the construct, resulting in some items being revised according to these standards. Furthermore, the scale items were subjected to empirical examination through SEM, with items showing low factor loadings being singled out for removal. This careful method made sure that the final list included items that were both linguistically precise and empirically strong, thus enhancing the reliability and validity of the research results. Excluding items from consideration is also based on empirical statistical indicators, particularly low factor loadings identified in SEM analysis. Factor loadings in structural equation modeling are usually required to be at least 0.6 to be considered significant, and items with lower loadings are often excluded for not adequately contributing to the construct being measured (Alsetoohy et al., 2021; Alsetoohy & Ayoun, 2018). Items with low loadings are considered inadequate in representing the underlying construct and are thus removed to improve the construct validity of the scale. After thorough examination of trustworthiness and accuracy, three statements were found to be inconsistent and were therefore excluded from the final analysis in order to maintain the strength of the analytical framework. This calibration led to a succinct, concentrated collection of 36 statements that underwent extensive statistical analysis.

3. Analysis of data

Based on the innovative concept of the current study, Partial Least Squares Structural Equation Modelling (PLS-SEM) has been chosen for its exceptional ability to aid in building and supporting theories.

This method excels in navigating the intricacies found in advanced model structures, making it possible to test theoretical hypotheses through empirical means. In addition to the PLS-SEM strengths in dealing with non-normal data, PLS-SEM is especially useful in analyzing and confirming causal-predictive connections within the theoretical foundation of model building and hypothesis testing. PLS-SEM is recognized for its ability to simultaneously clarify constructs while improving predictive accuracy (Alsetoohy et al., 2026a; 2026b). This double function enhances both theoretical advancements and practical applications stemming from the model's forecasts.

RESULTS

1. Model of measurement

Reflective measurement models were employed for each construct in this research, following the guidelines for assessing these models. These guidelines highlight the significance of evaluating reliability, as well as convergent and discriminant validity. The survey questions included in this study were thoroughly evaluated for reliability using Cronbach's alpha and composite reliability (CR) as key measures. As shown in Table 1, all the values obtained were higher than the minimum threshold of 0.7, as suggested by Hair et al. (2021).

This finding highlights the reliability and consistency of the scale items used. Moreover, the CR and AVE values together validate the constructs' strength. Significantly, the factor loadings and AVE values surpassed the thresholds of 0.6 and 0.5 (Alsetoohy et al., 2021), respectively, thus removing worries about convergent validity. After these evaluations, the discriminant validity was examined by using the Heterotrait-Monotrait (HTMT) ratio of correlations as recommended by Ringle et al. (2023). Table 2 displays the HTMT ratios, all of which were significantly lower than the value of 0.9. This was additionally supported by confidence intervals calculated from 5,000 bootstrapped samples, all of which were below one. These findings, in accordance with the criteria established by (Henseler et al., 2015; Alsetoohy et al., 2026c), confirm that discriminant validity is not an issue in the later phases of data analysis.

Finally, it was noted that the highest Variance Inflation Factor (VIF) observed was 1.551, which is below the commonly accepted threshold of 5, indicating no significant multicollinearity problems.

Table 1. Validity and reliability of the research model

Items/construct/ variable	Loadings	Mean	SD
Virtual learning (CR= 0.839, Cronbach's Alpha= 0.759, AVE= 0.512, VIF= 1.265)			
VL1	0.835	3.626	0.908
VL2	0.665	3.736	0.845
VL3	0.724	3.722	0.753
VL4	0.682	3.467	0.983
VL5	0.658	3.626	0.908
Self-determination (CR=0.843, Cronbach's Alpha= 0.728, AVE= 0.729, VIF= 1.247			
Capacity (CR= 0.919, Cronbach's Alpha= 0.901, AVE= 0.533, VIF= 1.338)			
CAP2	0.638	4.028	0.762
CAP3	0.623	3.883	0.756
CAP4	0.786	3.974	0.722
CAP6	0.747	4.29	0.66
CAP7	0.640	4.154	0.737
CAP8	0.829	4.096	0.7
CAP9	0.791	4.143	0.653
CAP10	0.777	3.965	0.775
CAP11	0.732	4.168	0.762
CAP12	0.704	4.243	0.696
Opportunity (CR= 0.913, Cronbach's Alpha= 0.895, AVE= 0.501, VIF=1.41)			
OPT1	0.619	3.771	0.90
OPT2	0.648	3.717	0.952
OPT3	0.701	3.657	0.937
OPT4	0.672	3.572	1.025
OPT5	0.713	3.956	1.121
OPT6	0.605	3.308	0.979
OPT7	0.742	4.021	1.066
OPT9	0.810	4.182	1.062
OPT10	0.691	4.121	0.994
OPT11	0.759	4.119	1.081
OPT12	0.723	3.907	1.121
Teaching Style (CR= 0.885, Cronbach's Alpha= 0.740, AVE= 0.793, VIF=1.005)			
Directive (CR= 0.928, Cronbach's Alpha= 0.901, AVE= 0.514, VIF=1.551)			
DTS1	0.933	3.839	1.175
DTS2	0.935	3.829	1.182
DTS3	0.863	3.764	1.096
DTS4	0.745	3.612	1.149
DTS5	0.753	3.673	1.139
Participative (CR= 0.84, Cronbach's Alpha= 0.761, AVE= 0.514, VIF=1.551)			
PTS1	0.659	3.568	1.126
PTS2	0.807	3.593	1.115
PTS3	0.726	3.706	1.07
PTS4	0.677	3.575	1.125
PTS5	0.706	3.589	1.114

Table 2. HTMT values

First order					Second order			
Construct	VL	CAP	OPT	DTS	Variable	VL	SD	TS
Virtual learning (VL)					Virtual learning (VL)			
Capacity (CAP)	0.421				Self-determination (SD)	0.646		
Opportunity (OPT)	0.559	0.509			Teaching styles (TS)	0.123	0.09	
Directive (DTS)	0.089	0.127	0.095					
Participative (PTS)	0.154	0.105	0.108	0.717				

2. Results of the research structural model

According to El-Sherbeeny et al. (2024), we have verified the robustness and predictive capacity of the proposed research model through R^2 and Q^2 prediction values. The model demonstrated robustness and commendable predictive accuracy. Comparative analysis of prediction errors between the linear regression model and the PLS path model, further established the predictive validity of the model. The R-square values, indicating 27% for virtual learning and 10% for students' self-determination, suggested a moderate level of explanatory power, while the Q^2 predict values pointed to a moderate level, (Q^2 = 0.264 & 0.015; higher than the zero value), of predictive validity (Hair et al., 2021).

Guidance on evaluating and interpreting the structural model was based on the principles set forth by Hair et al. (2021). Thus, a method involving 5,000 sub-samples was used to enable hypotheses testing. Hence, we carried out a

two-tailed test at a 95% confidence level to determine the significance of the research findings. As shown in Figure 2, our research findings revealed that teaching styles were found to exert a positive impact on adoption of virtual learning ($\beta = 0.16$, $p < 0.01$) and students' self-determination ($\beta = 0.11$, $p < 0.01$), confirming the research hypotheses 1 and 2. Additionally, students' self-determination was found to have the strongest positive effect ($\beta = 0.49$, $p < 0.01$) on the adoption of virtual learning. This finding supports hypothesis 3. Interestingly, the results from this study underscore the pivotal, positive mediating role of students' self-determination, as evidenced by confidence intervals that excluded the zero value, between teaching styles and virtual learning, which supports H4.

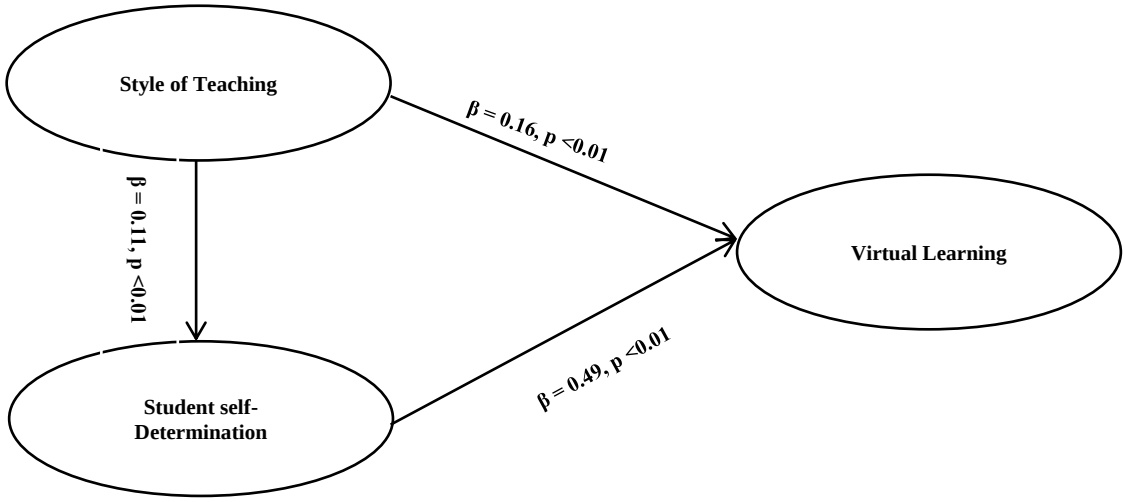

Figure 2. Results of the research study

DISCUSSION

Not only are there few research studies conducted in the context of hospitality and tourism education, but previous research has often concentrated on examining the online learning and teaching behaviors of both teachers and students separately (Mejia & Phelan, 2013, 2014). This study focuses on the virtual learning and teaching experiences of both teachers and students. This study explores the roles of student self-determination and the style of teaching in the virtual learning approach within hospitality and tourism education.

Our research indicated that the way in which students are taught positively influences their self-determination and acceptance of virtual learning. This research suggests that students' preparedness and ability to participate in virtual learning may be significantly affected by how teachers present content, engage with students, and structure their teaching style (e.g., directive and/or participatory). Students' engagement in virtual learning environments may be significantly increased by using a variety of instructional strategies, including collaborative, student-centered, and interactive techniques. Therefore, educators need to develop the ability to create online classrooms, involve students in virtual assignments and projects, and effectively guide learning using virtual teaching methods (Fernández David & Aguilar-Cruz, 2023; Madanat et al., 2024; O'Dowd & Dooly, 2022). The present study's results align with those of Goh & King (2020), who confirmed that academics in the tourism and hospitality domain have consistently emphasized the importance of educators cultivating a sense of community in virtual learning environments rather than concentrating exclusively on material delivery. In a similar vein, students are more likely to have a positive attitude toward online learning if educators use strategies that encourage active interaction and provide a supportive learning environment (Goh, 2020; Lei & So, 2021). It was argued that educators must modify traditional teaching methods for use in virtual learning environments as a result of the shift to virtual learning. For instructors/ educators to effectively use e-learning technology and increase students' willingness to participate in e-learning experiences, they must be highly motivated and skilled. Consequently, traits of teachers including quick reactions, technical proficiency, confidence, and inventiveness enable them to inspire students to participate in online learning environments (Alrousan et al., 2022; Bhuasiri et al., 2012). Furthermore, Liu et al. (2010) stated that an important aspect in deciding whether or not students successfully accept e-learning is the design of online courses. Hence, by making virtual classrooms more dynamic and engaging, effective teaching methods may dramatically raise student engagement. This method promotes enthusiastic student engagement and a favorable attitude toward virtual learning. Instructors may encourage students to accept and succeed in virtual learning environments by customizing their teaching methods to fit the format and using multimedia, live/in-person interactions/ conversations, and individualized feedback.

Additionally, the results confirmed the strongest positive relationship between students' self-determination and the adoption of virtual learning approaches. The results suggest that students with increased self-determination are more inclined to enroll in virtual learning platforms. This is consistent with He et al. (2025) who claimed that student traits, such as autonomy, proficiency, and self-knowledge, can affect online learning success and teachers' satisfaction with online instruction. In the same way, Gim et al. (2022) found that there is a positive relationship between students' self-determination and satisfaction of students in virtual learning education. In 2020, Farrar discovered a notable correlation between the self-determination levels reported by college students with disabilities and their GPA. Also, Zheng et al.

(2014) proposed that high school students who had greater self-concept and self-determination were able to attain higher academic achievements. These results indicate that students who feel autonomous, intrinsic motivated and have a proactive attitude to learning are more likely to prosper in virtual learning environments (Gim et al., 2022). Students who are self-motivated are likely to assume control over their learning, allowing them to adjust better to the requirements of virtual learning. This confirms Cassandra et al.'s (2024) claim that adults put in more effort to learn when they see the advantages of the content. Hence, students are more likely to actively participate in digital learning tools, effectively manage their time, and proactively find resources, all of which enhance their virtual learning experience. Encouraging students to develop self-determination could increase their preparedness and openness to using virtual learning platforms, ultimately boosting educational outcomes in virtual educational environments.

The study highlights the significance of addressing students' self-identification needs in virtual education by suggesting that student self-identification can play a mediating role in the relationship between teachers' teaching styles and students' participation in virtual learning. This suggests that student self-identification can play a positive mediating role in the relationship between teaching styles and virtual learning. This is consistent with the findings of Chiu (2022), who noted that a variety of contextual elements, including the support of teachers and peers, have an impact on students' motivation and engagement. In online or remote learning, teacher support plays a critical role in improving student motivation. This support takes the form of active participation through teaching methods, clear educational structure, and encouragement of student autonomy. Students with autonomy-supportive instructors perform better in terms of focus and time management, like their classes more, and interact with their instructors about their learning (Bond et al., 2021; Reeve, 2013).

IMPLICATIONS & FUTURE RESEARCH

Self-determination is an essential precursor of success in virtual learning environments. This study, therefore, attempts to determine the significant antecedents that shape the adoption of virtual learning in hospitality and tourism education by conducting a survey among this cohort of students. The study gives several meaningful advances to the body of knowledge on experiential learning, formulating implications for tourism and hospitality institutions through both the students and instructors in these programs. Improved virtual learning methodologies would engage students more fruitfully for better academic outcomes that may increase job placement rates when they graduate; faculty members could benefit from new teaching strategies, breaking the barriers toward more successful communication and delivering course content. On top of that, increased institutional efficiency due to better resourcefulness will make their programs attractive to a broader audience.

Even though the study's findings are limited in generalizability due to the scope of hospitality and tourism education, they provide valuable insights into virtual learning and its antecedents for stakeholders. The findings suggest that institutions may achieve the support of the successful implementation of the virtual learning approach through the two main stakeholders (students and instructors). This study discovered that, even when confronted with a global crisis or emergency, student self-determination is a critical predictor of virtual learning success. Self-determined students might engage in a positive attitude, which could be extremely helpful to the success of virtual learning. In many Middle Eastern cultures, including Egypt, there is a strong preference for oral communication over written forms, which can be linked to cultural norms that emphasize spoken interaction. This preference may contrast with cultures that have high power-distance or low collectivism scores according to Hofstede's dimensions, where written communication is often more formalized and prevalent. Even using traditional pieces of knowledge, students tend to respond to information that they have discovered on their own, such as through internet blogs and social media. On one hand, virtual learning also offers an option for tourism and hospitality students with part-time jobs or seeking ongoing professional development, in addition to enabling the sharing of knowledge and collaboration (Lei & So, 2021). On the other hand, due to the large numbers of students enrolled in Egyptian universities, about 3.7 million students in 109 universities, these institutions need to acknowledge that virtual learning will bring about fewer constraints in terms of time and space when compared to traditional in-person classes. This approach will also broaden the geographical scope of educational institutions, enable diverse self-regulated learning methods for adult learners, enhance the overall quality of education, promote interactive communication, boost efficiency for both institutions and students, and ultimately lead to higher satisfaction and cost-effectiveness compared to traditional classroom settings.

Consequently, universities must first encourage students and help them develop incentives to achieve successful virtual learning. Students should be given assistance not only with virtual courses but also with their individual needs. Furthermore, universities must carefully control all aspects of students' interactions with their offerings, as each virtual touchpoint significantly contributes to students' overall perception of service quality. Key service-interaction metrics such as response time, feedback loops, and clarity in communication are crucial indicators of student satisfaction and engagement. By mapping these metrics to specific virtual learning features, institutions can provide a more responsive and supportive learning environment. This approach translates the call for 'careful control' into practical design steps, ensuring a high-quality virtual learning experience. In addition, to gain a competitive edge, institutions should actively build and sustain a favorable, distinct image. According to the study, virtual learning requires skilled instructors who can captivate students and positively impact their academic achievement. Faculty members must be mindful of their students' difficulties when transitioning to a new learning environment. Therefore, the HE institution should ensure that professors have adequate support and training to deliver high-quality virtual classes. The teaching style is considered a powerful indicator of students' experience with virtual learning. Instructors should interact with students more regularly to collect student feedback on the success of various teaching techniques. Inviting students to co-design discussion prompts and participate in pilot projects where they curate weekly case studies could exemplify the participative teaching style recommended in the study. By doing so, students become co-creators

of their learning experience, which enhances reciprocal engagement. Virtual classes should be developed and managed in ways different from traditional classes to help students see the advantages of online learning.

Theoretical underpinnings of the current study's model aim to bridge a gap in the literature on the relationship between teaching styles, students' self-determination, and the success of the virtual learning approach. Furthermore, the model addresses new teaching styles, specifically 'directive' and 'participative.' 'Directive' teaching involves structured guidance provided by instructors, while 'participative' teaching encourages student involvement in decision-making and active learning. These approaches, based on student perception assessments, could be applicable to academics in their daily teaching routines.

This study drew on information gathered from a specific geographic area (Egypt). The findings should be interpreted with caution, as they may not be applicable in culturally diverse environments. Future studies may diversify the findings of this study by employing multiple data sources and research methodologies. The study also has the limitation of not including all stakeholders. Only students and instructors were included in the study. Although students and instructors are the primary stakeholders, understanding virtual learning activities from the standpoint of university coordinators is also important. To spur comparative studies, it would be beneficial to explore additional variables that might influence the findings across different regions. For instance, institutional technology budgets could play a role in how virtual learning is perceived and adopted in various places. By explicitly posing these questions, this study can invite collaborative research efforts and enhance its appeal to the scholarly community.

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