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Decoding Success: The Role of E-Learning Readiness in Linking Technological Skills and Employability in Hospitality Management Graduates

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Abstract: Technological advancement alongside global epidemics stimulated the widescale implementation of e-learning. However, it is reported that e-learning is in the experimental phase and still requires fundamental improvements, particularly in disciplines that go beyond theoretical knowledge. The current study examines the nexus between e-learning readiness, psychological motivation, technological skills, and employability skills among hospitality management undergraduates. It also explores the moderating effects of student engagement on the linkages among these variables. To that end, this study adopted a quantitative approach and used a self-administered questionnaire survey to collect primary data. The sample included a total of 428 participants who were recruited from undergraduates of hospitality management programs in Egyptian universities using the convenience sampling technique. Data analysis included performing PLS-SEM using Smart PLS 3.0 software. The results confirm the positive effects of psychological motivation and technological skills on both e-learning readiness and the employability skills of hospitality management undergraduates. The study also underscores the mediated role of e-learning readiness in the linkages between study predictors and outcomes. Additionally, the findings highlight the moderating effect of student engagement in supporting e-learning readiness and eventually employability skills. This study adds to the hospitality management body of knowledge and provides valuable insights for education institutions and policymakers to optimize e-learning experiences.

Keywords: psychological motivation; technological skills; e-learning readiness; employability; hospitality management undergraduates

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1. Introduction

1.1. Background

The advancement of technology and digital capabilities have transformed the way educational institutions operate and stimulated the adoption of technology-driven learning [1]. Such transformation has been widely embraced during the outbreak of COVID-19 causing the major shift from traditional classroom learning to technology-based learning, such as

virtual lectures via Zoom or Teams, blended learning, or e-learning [2–5]. Even after the pandemic, institutions continue to embrace e-learning as it offers several advantages over traditional learning, such as enabling access to learning systems and materials anytime and anywhere [4,5] and using engaging audiovisual materials, in addition to being relatively inexpensive compared to traditional classroom education [6]. E-learning also supports continuous interactions among students, enables learning on demand, provides a pace-based experience, and encourages independent learning and innovation [7]. Furthermore, e-learning enables hospitality educational institutions to provide foreign study courses offered by international university partners [8].

Nevertheless, the path from classroom to career is influenced by a variety of interconnected factors, such as motivation, technological skills, e-learning readiness, and student engagement, that combine to shape both learning and career outcomes. For instance, Ahmed et al. [5] indicated that students' willingness, dedication, and technological skills represent key drivers for an effective e-learning experience. Likewise, student engagement–the active participation in learning activities in and out of class–is a primary aspect of a responsive e-learning experience [5]. Engaged students tend to effectively participate in the learning experience, cooperate with colleagues and professors, and overcome any emerging obstacles. This will reflect on their employability through developing their interpersonal and problem-solving skills. Yet, engaging students in e-learning activities can be challenging since they are far away from classrooms [9]. More importantly, the ultimate goal of any learning system is helping students develop their employability skills, i.e., the skills, knowledge, and attributes necessary for obtaining and excelling in jobs [10,11]. Although e-learning has many advantages and capabilities, it still has some limitations when it comes to certain employability skills, namely, practical/professional skills [12].

In the past few years, higher education in Egypt has witnessed a surge in the implementation of e-learning across various disciplines through the development of blended learning models and digital hubs. This prevalent adoption of e-learning in Egyptian universities was accelerated by the outbreak of the COVID-19 pandemic, leading many institutions to integrate e-learning platforms, such as Moodle and Blackboard, in their learning and assessment process [13]. Such digital transformation in higher education is supported by government policies seeking to foster high-quality education and develop skills that align with domestic and global labor market demand [14]. Nonetheless, some challenges still hinder the optimization of e-learning in Egyptian universities, including limited infrastructure and access to digital technology in rural areas, in addition to low digital literacy levels among both learners and faculty members [15,16].

1.2. Gaps and Study Rationale

Given the increased reliance on technology in e-learning settings, it is important to understand the factors that influence students' readiness for e-learning and their employability for crafting effective education strategies and pedagogical approaches [7]. This is particularly important for hospitality management education, considering the nature of the industry and the requirement of mastering interpersonal and technical/practical skills [12]. Unfortunately, e-learning mainly addresses theoretical aspects and inadequately develops practical competencies [12], which begs the question of how effective e-learning is in the field of hospitality management. A study by Chandra et al. [12] indicated that tourism and hospitality is a labor-intensive industry that generates immense demand for trained professionals, sparking e-learning to fulfill this demand. Their study endorsed further studies to investigate the potential effects of interpersonal skills and technological skills on students' learning results. Moreover, the majority of studies in this area focus on immediate or short-term outcomes of e-learning, such as learner satisfaction, academic performance,

and learning outcomes (such as [17–20]), with limited studies investigating the effects of e-learning on employability skills among hospitality management undergraduates [21]. Prior studies have reported a notable gap in industry expectations regarding the employability of hospitality management graduates, and the transition to digital learning might contribute to magnifying this gap [12,22].

Additionally, e-learning is still in the experimental phase and requires fundamental improvements in relation to the digitalization of learning materials and capabilities of both students and academic staff [4]. In this context, Salikhova et al. [23] reported that there are various issues that affect the quality of digital learning, necessitating an exploration of the aspects and factors that affect the e-learning experience. Likewise, Hasan and Bao [24] indicated that several drivers determine the success of e-learning or contribute to the distress of students in e-learning experiences, such as interaction with peer students, availability of technical support, quality of course materials and content, and technological ease of use.

Therefore, this study sets out to address these gaps and seeks to address the overarching question: How do undergraduates' psychological motivation, technological skills, and engagement impact their e-learning readiness and employability skills? To that end, this study examines these three subsequent linkages: (1) the direct effects of undergraduates' psychological motivation and technological skills on e-learning readiness and employability skills; (2) the mediating effects of undergraduates' e-learning readiness in the linkages between motivation, technological skills, and employability; and (3) the moderating effects of students' engagement on the associations between undergraduates' psychological motivation, technological skills, and e-learning readiness. The investigation of these relationships can yield insights into how educational institutions can capitalize on e-learning resources and further support their students' readiness and employability skills.

2. Literature and Hypotheses

2.1. E-Learning and Psychological Motivation

E-learning refers to the use of electronic media and technology to deliver digital educational materials, such as text, images, audio, and video [25]. In simple words, e-learning is the creation of an interactive and learner-centered environment that can be accessed anywhere and anytime through exploiting digital resources and educational techniques [4]. Student motivation represents a key element in a successful e-learning experience [23]. It is the self-stimulation for learning activities [26], which is concerned with all aspects of activation and intention, such as energy and persistence [27], and shapes learners' attitudes and learning behavior [28]. Salikhova et al. [23] reported that a successful e-learning experience requires internal motivation, autonomy, connectedness, and a high level of self-regulation. Such characteristics are core ideas in Self Determination Theory (SDT) [29], which has been widely adopted in e-learning research [23]. Ryan and Deci [27,29] posit that motivation for development and growth exists in a continuum with three categories: amotivation, extrinsic motivation, and intrinsic motivation. Amotivation denotes the absence of motivation or intention to act due to a lack of purpose or sense of value in action. Extrinsic motivation stems from external factors, such as rewards/recognition or avoiding punishment, whereas intrinsic motivation is driven by internal factors, such as genuine interest, enjoyment, or satisfaction in the activity.

Undergraduates' psychological motivation for e-learning can affect their overall learning experience and eventually impact their employability skills. Students' motivation can influence their readiness for e-learning experiences, i.e., their physical and mental preparedness for learning through electronic media [30,31]. In simple terms, highly motivated students, whether intrinsically or extrinsically, are likely to be genuinely interested

in learning, have a sense of value and purpose, or pursue rewards and career opportunities [27,28]. This ignites their energy and stimulates them to be well-prepared and ready for e-learning experiences and eventually perform well throughout their learning journey. Such e-learning readiness is manifested by confidence in navigating online tools, persistence in e-learning environments, active engagement in online learning, and acquiring knowledge and skills through e-learning platforms [28]. Likewise, students' motivation for e-learning can help develop their employability skills, i.e., the skills, knowledge, and attributes necessary for obtaining and excelling in jobs [10,11]. When motivated students get involved in e-learning experiences, they tend to develop lifelong learning habits, such as self-regulated learning and continuous professional development, as well as gain key skills to thrive in the workplace, including adaptability and digital skills [32]. Conversely, a lack of motivation for e-learning coupled with limited technological skills have been widely reported as the key drivers for the low readiness of undergraduates to adopt e-learning [3].

Prior research indicates that students' motivation can contribute to favorable outcomes of e-learning experiences. For example, a study by Hung et al. [28] reported that motivated students tend to develop essential skills for e-learning success, such as digital literacy and time management. Also, Zepke and Leach [33] reported that highly motivated students are willing to actively engage in experiential learning and peer collaboration. Such engagement helps develop essential soft skills that are highly valued in the workplace, such as teamwork, effective communication, and problem-solving [34]. Similarly, Hsu et al. [35] indicated that self-regulatory motivation positively contributed to higher success in mastering knowledge and achieving learning outcomes. Hence, this study predicts a positive impact of students' motivation for e-learning on their readiness for e-learning and their employability skills and argues the following hypotheses:

H1. *Students' psychological motivation positively contributes to their e-learning readiness.*

H2. *Students' psychological motivation positively contributes to their employability skills.*

2.2. Technological Skills of Hospitality Undergraduates

Technological skills refer to the ability to understand, operate, and manage various digital technologies and tools and take full advantage of ICTs [36,37]. This involves a broad range of technology mastering skills, such as technical operations, communication and sharing, creation of content and knowledge, information management, ethics and responsibility, evaluation, and problem-solving [3]. Broadly speaking, technological skills in the e-learning context involve a wide range of skills, such as navigating Learning Management Systems (LMSs), such as Moodle and Blackboard [36]; multimedia creation and usage, including presentations and videos [38]; collaborative tools usage, like Teams and Zoom [39]; data management, including Google Drive and Dropbox [40]; online research and information literacy [41] troubleshooting and technical problem-solving [42]; and cybersecurity awareness [43]. Cybersecurity and multimedia skills may be advanced, but training in these areas has become essential due to the anxiety that some individuals may experience when dealing with modern technologies in general [44]. Moreover, multimedia provides certain advantages, such as facilitating the learning and understanding of complex topics [45]. Barchenko et al. [46] highlighted that cybersecurity training has become a necessity for both higher education students and companies in general.

Technological skills are essential for both learning/development and employability. Students with higher levels of digital technology skills are better equipped to actively use e-learning platforms [3]. Proficiency in digital tools helps students navigate online learning platforms, access educational resources, and participate in virtual collaborations to promote independent and efficient learning [39]. Ahmed et al. [5] disputed that for e-learning

platforms to yield an effective learning experience, students must possess advanced technological skills and maintain a positive tech-friendly attitude. Conversely, a study by Wagiran et al. [3] reported that limited technological skills are a major contributor to low levels of students' readiness for e-learning. Additionally, many of these technological skills, such as creating multimedia, analyzing data, and being aware of cybersecurity threats, align with labor market requirements, enabling students to adapt and gain employment in a technology-based economy [47–49]. As students become competent in using technology to solve problems and communicate, they achieve academic success and exercise the competencies that employers require, like digital proficiency and critical thinking [40]. Accordingly, this study argues that technological skills can support students' e-learning readiness and employability skills and assumes the following hypotheses:

H3. *Students' technological skills positively contribute to their e-learning readiness.*

H4. *Students' technological skills positively contribute to their employability skills.*

2.3. Students' Readiness for E-Learning

E-learning is an advanced approach to providing well-structured, interactive, and guided learning experiences that are available to anyone, anywhere, and at any time through leveraging the capabilities and resources of digital technologies combined with other educational materials creating the digital learning environment [50]. For the successful implementation of e-learning, institutions need to ensure the readiness of the two key stakeholders, i.e., educators and learners. Warner et al. [51] first introduced the concept of online learning readiness (OLR) and defined it as learners' preferences for methods of instructional delivery, competence, and confidence in their use of the Internet and electronic communication and their capacity for autonomous learning. Alem et al. [52] referred to e-learning readiness as the overall assessment of the individual and organizational necessary factors of e-learning experiences. Hung et al. [28] explained that e-learning readiness includes the capacity of the students to engage in electronic learning, which includes the availability of resources, digital literacy, and the ability to learn independently. To a large extent, e-learning readiness denotes the physical and mental preferences for learning through electronic media [30,31,53].

E-learning readiness is an integral part of e-learning systems that determines the success of the e-learning process [54]. E-learning readiness enables students to actively participate in the learning process and helps students meet individual needs through tailored learning, which is crucial for online learners to be responsible for their own learning progress and development [7,55]. In this context, precedent studies revealed that e-learning readiness is a key determinant of the successful design and implementation of e-learning [4]. Other studies correlated e-learning readiness to positive academic achievements and the marketability of students as their performance in digital spheres shows better-coping mechanisms once included in the labor market [56]. Hence, this study assumes that the e-learning readiness of learners can favorably impact their employability skills and argues the following hypothesis:

H5. *Students' e-learning readiness positively contributes to their employability skills.*

E-learning readiness can mediate the relationship between students' psychological motivation and their employability skills by supporting the primary attributes that enable motivated learners to optimize the benefits of e-learning, such as persistence, resilience, and proactive attitudes. That is, motivated learners are likely to develop a high level of e-learning readiness and support by engaging in meaningful and skill-building online

learning activities that meet the requirements of the labor market [27,57]. Likewise, e-learning readiness can assume a mediation role in the linkage between technological skills and employability skills. Readiness for e-learning denotes that students are well prepared to actively exploit their technological competencies in the digital learning process in order to develop their employability skills. Aspects of e-learning readiness, such as technical confidence and self-regulation, ensure that students employ their technical abilities to gain critical work-related skills, such as adaptability, problem-solving, collaboration, and teamwork. Doing so will boost their employment opportunities [58,59]. Therefore, the subsequent hypotheses can be postulated:

H6a. *Students' e-learning readiness mediates the linkage between psychological motivation and employability skills.*

H6b. *Students' e-learning readiness mediates the linkage between technological skills and employability skills.*

2.4. Employability of Students

Employability refers to the set of skills, knowledge, attitudes, and personal attributes that enable individuals to obtain and maintain a job, as well as adapt to changing work conditions and environments throughout their career [10,11]. Silva et al. [11] explained that employability is the ability of students to utilize and adjust their knowledge, skills, and attitudes to the labor market and ensure their social inclusion. Thus, employability is a critical issue for numerous stakeholders, including educational institutions, students, and employers or business organizations [21]. Employability encompasses a wide range of skills that can be categorized into job-specific technical skills and transferable skills that are essential for various roles and industries, such as problem-solving, interpersonal skills, and teamwork [21,60]. In the context of the hospitality industry settings, Yang et al. [21] concluded from the relevant literature that there are four sets of employability skills, including job performance and self-management; organization and time-management; creativity and innovations; and problem-solving. Silva et al. [11] advocated further research in the area of employability and online learning as their study reported that developing employability skills through e-learning is a challenging process due to the limitations of e-learning in developing certain professional skills and the difficulties facing new graduates when joining the labor market.

2.5. The Moderating Role of Student Engagement

Hu et al. [61] defined student engagement as the quality of effort and time directed to achieving academic goals. Ahmed et al. [5] explained that engagement refers to students' ability to use their cognitive, emotional, psychological, and behavioral resources to attain academic learning outcomes. A study by Chandra et al. [12] reported that participation and engagement can be a serious challenge for hospitality online learning as it requires creating a more interactive learning environment. Nevertheless, student engagement is an essential aspect of an e-learning system, affecting the outcomes of the learning experience through its direct effects and mediation or moderation role. The present study examines the moderation effects of student engagement in supporting their e-learning readiness and eventually their employability.

Student engagement in the e-learning experience can play an important moderating role between student motivation and e-learning readiness through boosting the drivers of preparing students for online learning. It helps create a productive learning environment as motivated students transform their enthusiasm and interest into actual readiness for e-learning by developing technical and time management skills in addition to self-regulated

learning strategies. This is supported by prior studies [57,62] that indicated engaged students leverage their motivation to be more persistent through the e-learning process, overcome challenges, and adapt to learning conditions and requirements. Moreover, student engagement enables a profound interaction with both learning materials and peers, which, in turn, creates a sense of community and augments the overall learning experience [62–64]. Accordingly, this study postulates the following assumption:

H7a. *Student engagement in e-learning positively moderates the linkage between psychological motivation and e-learning readiness.*

Student engagement in e-learning can also assume a moderating role in the association between students' technological skills and their e-learning readiness through the active utilization of these skills in the e-learning process. Student engagement denotes active participation and interaction with e-learning platforms and materials that allow students to effectively exploit their technological skills in the learning experience. Engaged students in the e-learning process tend to enhance their technological skills to actively use various e-learning tools and troubleshoot any technical issues that might arise. In so doing, students can develop a self-directed learning approach, a participative mindset, and eventually a higher level of e-learning readiness [62,65]. Additionally, engagement in e-learning environments enables students to use e-learning tools to collaborate with each other to overcome difficulties and share ideas and insights which amplify the sense of readiness for e-learning [62,64]. Thus, we predict a positive moderation effect of student engagement on the linkage between technological skills and employability skills as follows:

H7b. *Student engagement in e-learning positively moderates the linkage between technological skills and e-learning readiness.*

In light of the literature presented in the above sections, this study proposes a conceptual model (Figure 1), which encompasses the hypothesized relationships between the study variables.

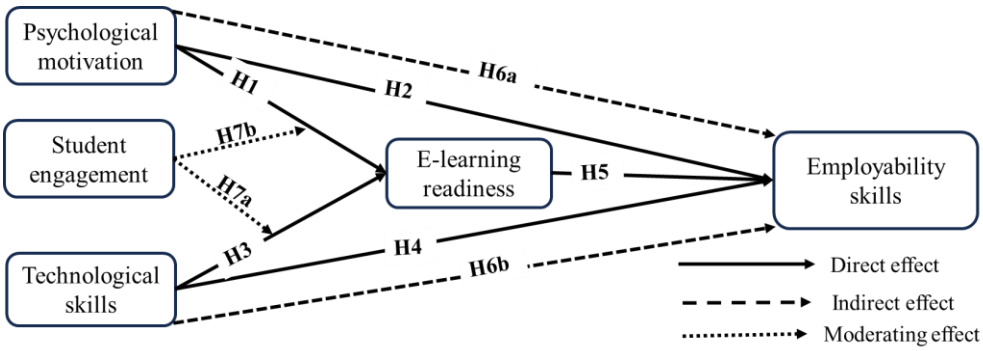

Figure 1. Conceptual framework of the study.

3. Methods

3.1. Measures

To enhance the credibility and validity of the measurement tool—the survey questionnaire—previously established scales from prior studies were utilized. Six items from Lee et al. [66] were utilized to assess psychological motivation (PM). Technological skills (TSs) were measured using a 5-item scale proposed by Wagiran et al. [67]. E-learning readiness (E_LR) was estimated by operating a 6-item scale derived from Adams et al. [68] and Yilmaz [69]. Furthermore, employability skills (ES) were evaluated utilizing 15 items

adapted from Yang et al. [70]. Finally, student engagement (SE) was gauged using four items adapted from Krause and Coates [71] (See Appendix A). The study relied on these scales due to their use in a previous study, where their validity and reliability were confirmed. Additionally, they were employed in contexts closely aligned with the objectives of the current study. The survey questions were derived from transcriptions and refined for clarity. To ensure validity, 17 academics and professors reviewed the survey. The content was preserved without modifications during this process.

3.2. Data Collection

The study employed convenience sampling, drop-off, and pick-up procedures to gather data from undergraduates of hospitality management programs in Egyptian universities. Participation in the questionnaire was voluntary, and respondents were assured that their answers would be kept confidential. The data were collected during the summer semester of the 2023–2024 academic year and the first semester of the 2024–2025 academic year. A total of 428 participants completed the questionnaire, and all responses were valid. The survey was conducted online, and the mandatory response feature was enabled to proceed to the next question. The study sample included 223 males (52.1%) and 206 females (47.9%). The study sample consisted of 186 fourth-year students (43.5%) and 242 third-year students (56.5%).

3.3. Data Analysis

The hypotheses were examined using PLS-SEM with SmartPLS V3.0, while descriptive statistics were performed using SPSS 22.0. PLS was deemed appropriate for this study because the primary aim was to predict one or more variables rather than confirm an established theoretical framework. Additionally, the PLS method helps evaluate complex models that involve testing independent, dependent, mediating, and moderating variables. The approach passes through two phases, evaluating the outer model and assessing the inner model [72].

4. Results

4.1. Test of Common Method Bias (CMB) and Normality

Harman's single-factor method was employed to check for potential bias in the instrument. Podsakoff et al. [73] indicate common method bias (CMB) when a single factor accounts for more than 50% of the variance. The results reveal that a single factor explained 45.665% of the variance, indicating that CMB was not a concern. Additionally, skewness and kurtosis values were examined to assess data normality. As shown in Table 1, the absolute skewness and kurtosis values for all items were within the recommended limits of +2 and +7, respectively [74], confirming that non-normality was not an issue.

Table 1. Confirmatory factor analysis results for measurement model.

Factors and Items	λ	VIF	Mean	SD	SK	KU
Psychological motivation (PM) (α = 0.905, CR = 0.926, AVE = 0.676)						
PM_1	0.818	2.426	3.631	1.358	−0.622	−0.829
PM_2	0.852	2.868	3.769	1.291	−0.769	−0.440
PM_3	0.863	2.855	3.748	1.373	−0.831	−0.552
PM_4	0.821	2.334	3.643	1.436	−0.682	−0.869
PM_5	0.749	2.040	3.463	1.355	−0.502	−0.873
PM_6	0.826	2.138	3.729	1.454	−0.770	−0.816

Table 1. *Cont.*

Factors and Items	λ	VIF	Mean	SD	SK	KU
Technological skills (TSs) (α = 0.923, CR = 0.942, AVE = 0.765)						
TS_1	0.871	2.609	3.643	1.419	−0.634	−0.951
TS_2	0.882	3.027	3.792	1.294	−0.756	−0.524
TS_3	0.890	3.293	3.794	1.311	−0.799	−0.497
TS_4	0.856	2.655	3.748	1.294	−0.715	−0.574
TS_5	0.874	2.806	3.787	1.271	−0.723	−0.501
E-learning readiness (E_LR) (α = 0.930, CR = 0.945, AVE = 0.741)						
E_LR_1	0.876	2.956	3.750	1.329	−0.688	−0.718
E_LR_2	0.826	2.454	3.572	1.366	−0.579	−0.865
E_LR_3	0.870	3.063	3.806	1.335	−0.899	−0.368
E_LR_4	0.863	2.913	3.790	1.356	−0.831	−0.552
E_LR_5	0.875	3.112	3.834	1.325	−0.834	−0.489
E_LR_6	0.853	2.519	3.748	1.347	−0.711	−0.737
Employability skills (ESs) (α = 0.951, CR = 0.957, AVE = 0.595)						
ES_1	0.750	2.849	3.470	1.393	−0.311	−1.215
ES_2	0.739	3.359	3.673	1.355	−0.531	−1.005
ES_3	0.747	2.901	3.743	1.262	−0.519	−0.879
ES_4	0.742	2.563	3.521	1.361	−0.448	−0.961
ES_5	0.764	2.611	3.638	1.328	−0.525	−0.900
ES_6	0.802	2.788	3.671	1.268	−0.588	−0.656
ES_7	0.794	2.888	3.850	1.373	−0.815	−0.715
ES_8	0.780	2.865	3.808	1.286	−0.806	−0.432
ES_9	0.792	2.964	3.935	1.277	−0.894	−0.368
ES_10	0.793	2.576	3.841	1.310	−0.752	−0.724
ES_11	0.805	2.882	3.808	1.350	−0.744	−0.746
ES_12	0.776	2.955	3.741	1.411	−0.709	−0.855
ES_13	0.753	2.722	4.012	1.299	−1.096	0.008
ES_14	0.776	2.721	3.883	1.291	−0.889	−0.354
ES_15	0.755	2.246	3.703	1.294	−0.516	−0.889
Student engagement (SE) (α = 0.913, CR = 0.939, AVE = 0.793)						
SE_1	0.911	3.235	3.283	1.400	−0.276	−1.156
SE_2	0.891	3.010	3.166	1.451	−0.107	−1.317
SE_3	0.867	2.597	2.932	1.567	0.080	−1.505
SE_4	0.893	2.677	3.250	1.568	−0.233	−1.469

Note: SK = skewness, KU = kurtosis.

4.2. Psychometric Characteristics of the Measurement Model

As recommended by [75], convergent validity (CV) of the outer model in PLS-SEM was evaluated using factor loadings (λ), coefficient alpha (α), and construct reliability (CR), all of which should be >0.70. Furthermore, the average variance extracted (AVE) must

be >0.50. Table 1 demonstrates that the measurement model satisfies all these criteria, confirming the CV's adequacy and the internal model's reliability.

On the other hand, Ref. [76] suggested that discriminant validity (DV) is established when the AVE of each construct is greater than the squared inter-construct correlations. The HTMT test has also been employed in other studies to assess DV and should remain below 0.90 [77]. As indicated in Table 2, the DV was successfully validated.

Table 2. Discriminant validity.

	Fornell–Larcker Criterion Matrix					**HTMT Matrix**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
E-learning Readiness	0.861									
Employability Skills	0.680	0.772				0.712				
Psychological Motivation	0.390	0.527	0.822			0.405	0.553			
Student Engagement	0.492	0.611	0.507	0.890		0.523	0.647	0.544		
Technological Skills	0.419	0.564	0.601	0.617	0.875	0.446	0.595	0.648	0.665	

4.3. Structural Model and Testing Hypotheses

The structural model was evaluated using VIF, R^2, Q^2, and Beta coefficients (β), as recommended by Hair et al. [75]. According to Table 1, VIFs ranged from 2.040 to 3.359, remaining <5.0. This indicates the absence of significant correlations between independent and dependent variables, confirming that multicollinearity is not an issue [75]. Regarding R^2, the value of e-learning readiness was 0.358, indicating that the other constructs in the proposed structural model explained 35.8% of the variance in this variable. Similarly, the R^2 for employability skills was 0.578, exceeding the acceptable threshold of 0.10. As presented in Table 3, the Q^2 values were also above 0.0. Additionally, the β coefficients were significant at the 0.01 level. These findings collectively confirm that the inner model fits the data appropriately [75].

Table 3. Hypotheses testing.

Hypothesis	**β**	**t**	***p***	**Remark**
Direct effect				
H1: Psychological motivation → E-learning readiness	0.249	3.839	0.000	✔
H2: Psychological motivation → Employability skills	0.184	2.851	0.005	✔
H3: Technological skills → E-learning readiness	0.335	4.680	0.000	✔
H4: Technological skills → Employability skills	0.240	3.588	0.000	✔
H5: E-learning readiness → Employability skills	0.508	11.068	0.000	✔
Indirect mediating effect				
H6a. Psychological motivation → E-learning readiness → Employability skills	0.126	3.779	0.000	✔
H6b. Technological skills → E-learning readiness → Employability skills	0.170	4.833	0.000	✔
Moderating effects				
H7a. Psychological motivation × Student engagement → E-learning readiness	0.136	2.303	0.022	✔
H7b. Technological skills × Student engagement → E-learning readiness	0.250	4.644	0.000	✔

E-learning readiness	R^2	0.358	Q^2	0.224
Employability skills	R^2	0.578	Q^2	0.317

After confirming the validity of the measurement and structural model benchmarks, PLS-SEM was operated to test the proposed hypotheses (Table 3).

Table 3 and Figure 2 show that psychological motivation had a significant effect on e-learning readiness (β = 0.249, t = 3.839, and $p < 0.000$) and employability skills (β = 0.184,

t = 2.851, and $p < 0.005$), supporting H1 and H2. Additionally, technological skills influenced both e-learning readiness (β = 0.335, t = 4.680, and $p < 0.000$) and employability skills (β = 0.240, t = 3.588, and $p < 0.009$), confirming H3 and H4. Furthermore, e-learning readiness impacted employability skills (β = 0.508, t = 11.068, and $p < 0.000$), validating H5. Concerning the mediation relationships, e-learning readiness mediated the link between psychological motivation and employability skills (β = 0.126, t = 3.779, and $p < 0.000$), as well as the relationship between technological skills and employability skills (β = 0.170, t = 4.833, and $p < 0.000$). Therefore, both H6a and H6b are supported.

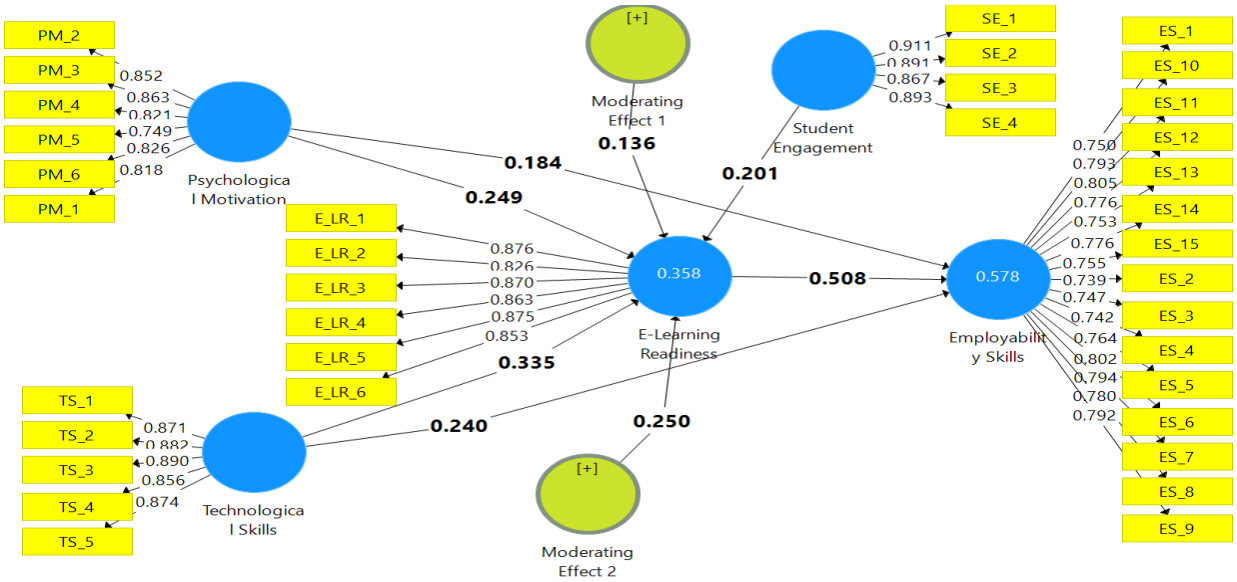

Figure 2. Estimation of structure model.

Concerning the moderating function, Table 3 and Figures 3 and 4 display that student engagement strengthens the positive impact of psychological motivation on e-learning readiness (β = 0.136, $p = 0.022$, and t = 2.303), as well as the effect of technological on e-learning readiness (β = 0.250, $p = 0.000$, and t = 4.644); thus, H7a and H7b are confirmed.

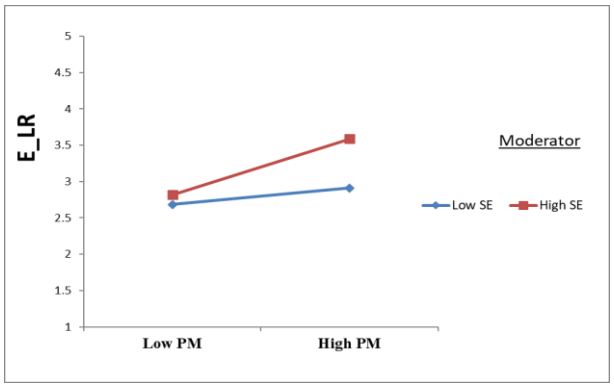

Figure 3. Moderation effects of student engagement on the relationship between psychological motivation and e-learning readiness.

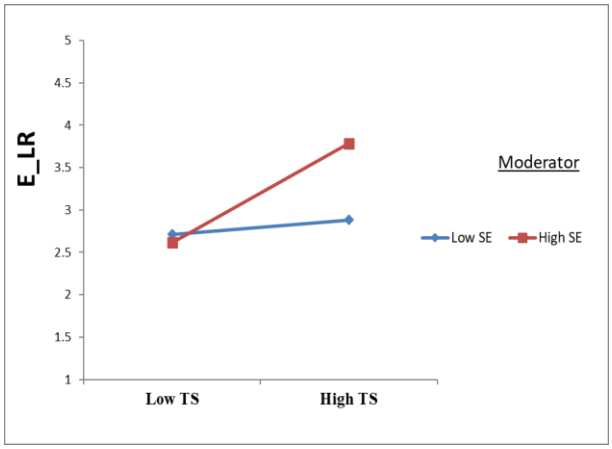

Figure 4. Moderation effects of student engagement on the relationship between technological skills and e-learning readiness.

5. Discussion and Conclusions

Understanding the elements that affect students' preparedness for e-learning and their employability is crucial for developing successful teaching strategies and pedagogical approaches [7], especially in the context of hospitality management education, given the nature of the hospitality sector and its need to master interpersonal and technical/practical skills [12]. Accordingly, this study aimed to address several gaps identified through the review of existing literature, including the limited research exploring the relationship between e-learning and employability skills in the hospitality sector [21], concerns that e-learning may weaken the employability of hospitality graduates [12,22] and that e-learning has only recently been introduced and is still in its experimental phase. This necessitates examining the improvements required in e-learning materials, as well as the skills of students, employees, and lecturers [4]. The findings, in alignment with Self-Determination Theory (SDT) [27,29], demonstrate that psychological motivation positively influences e-learning readiness and is positively associated with employability skills. SDT confirms that motivation enhances readiness and employability. Highly motivated students, whether intrinsically or extrinsically, are genuinely interested in learning, have a sense of value and purpose or seek rewards and career opportunities [27,28]. On the other hand, the results show that technological skills are positively associated with both e-learning readiness and employability skills. Previous studies have proven that technological skills are required for practical e-learning readiness and developing employability skills [3], enabling students to navigate platforms, access resources, and collaborate with peers virtually [39]. Advanced digital skills, such as data analysis and cybersecurity awareness, align with labor market demands, enhancing employability in a tech-driven economy [47,48]. On the contrary, limited technological skills hinder students' e-learning readiness, thus weakening their employability skills [3]. In sum, competence in using technology fosters academic success and develops critical skills valued by employers, such as problem-solving and digital literacy. The result for the last direct hypothesis reveals that e-learning readiness is positively linked to employability skills. E-learning readiness is responsible for the success of e-learning approaches, promoting students to actively engage in tailored learning and take responsibility for their progress [3,55]. A growing number of studies correlate e-learning readiness to academic success, employability, and better adaptability in the labor market [56,78].

E-learning readiness, according to the PLS-SEM results, successfully mediates the relationship between psychological motivation and employability skills and between technological skills and employability skills. E-learning fosters attributes, like persistence, resilience, and technical confidence, facilitating students' leveraging of their motivation

and technological competencies in skill-building activities [4]. This enriches essential work-related skills, such as adaptability, problem-solving, and teamwork, ultimately enhancing employability [56].

One of the study's main objectives was to test the moderating role of student engagement in the impact of psychological motivation on e-learning readiness and in the effect of technological skills on e-learning readiness. The results demonstrate that student engagement strengthens and supports these relationships. Student engagement enhances technical, time management, and self-regulation skills [62,64]. It boosts persistence, adaptability, and deeper interaction with learning materials and peers, improving the general learning experience. It also stimulates active participation, enhances technical skills, fosters self-directed learning, and promotes collaboration, supporting e-learning readiness [62,65].

5.1. Practical Suggestions

The study underlines the critical role of e-learning readiness as a mediator between psychological motivation and employability skills and between technological skills and employability skills. It also highlights the vital role of student engagement as a moderator that strengthens the role of e-learning readiness in supporting employability skills in hospitality management education. Based on this, this study recommends developing e-learning using various online teaching models focusing on task-based practical classes. Faculty members should focus on raising student engagement in order to enhance skill development, perseverance, and flexibility. To enable student engagement in e-learning, faculty staff can stimulate and support students by using, for example, interactive content, promoting collaborative activities, motivating peer collaboration, offering timely feedback, and incorporating real-world applications. For further knowledge about e-learning, the influencing factors, and its benefits, the following studies can be referred to: [45,66,79,80].

5.2. Study Limitations and Future Research

This study has some limitations. First, the study utilized a self-reported survey to capture students' employability skills. Thus, future studies can investigate students' employability skills from the viewpoint of other stakeholders, including educational institutions and various employers from hospitality enterprises. Another limitation of this study is that its findings are based on data gathered from education settings in Egypt. Country-specific research yields profound insights and provides tailored solutions that align with national goals and concur with domestic sociocultural and economic conditions. Nonetheless, the conclusions can be affected by specific technological and sociocultural characteristics and should be carefully applied to similar settings. Hence, future research should incorporate participants from multiple countries to provide broader results and enable comparative analysis of the key findings. Additionally, future studies should examine different moderators, such as instructor support or student collaboration, in magnifying the effects of e-learning on students' employability skills.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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

Appendix A

Measures of the study

Psychological motivation

- Online classes enhance my interest in learning;
- I am motivated to study when I take an online class;
- Online classes are very useful to me;
- It is very interesting to take online classes;
- After taking an online lesson, I look forward to the next one;
- I am satisfied with the online class I am taking.

Technological skills

- Awareness of the development of digital technology has been embedded in me;
- I have a comprehensive understanding of digital technology;
- I can operate digital devices;
- The creativity of digital technology-based learning has been awakened in me;
- I can choose the right technology for distance learning.

E-learning readiness

- I have self-efficacy to be able to use information and communication technology (ICT);
- Self-efficacy in managing distance learning has been built;
- My self-confidence has been built through the use of internet and ICT media;
- I already have the expertise in accessing and managing electronic learning systems;
- A strong urge has been awakened in me to adopt distance learning mode;
- The effectiveness of learning outcomes is a target that I am ready to achieve.

Employability skills

Factor 1: Job Performance and Self-management Skills

- Adapting to situations of change;
- Recognizing the effects of decisions made;
- Functioning at an optimal level of performance;
- Reconceptualising your role to changing corporate realities;
- Ability to work independently.

Factor 2: Organization and Time Management Skills

- Setting priorities;
- Taking reasonable job-related tasks;
- Allocating time efficiently.

Factor 3: Creativity and Innovation Skills

- Initiating change to enhance productivity;
- Keeping up-to-date on developments in the field;
- Gaining new knowledge from everyday experiences;
- Providing innovative paths for the company for future development.

Factor 4: Problem-solving Skills

- Identifying essential components of the problem;

- Identifying problems;
- Solving problems.

Student engagement

- Regularly use web-based resources and information designed specifically for the course;
- Regularly use email and/or other electronic means (such as WhatsApp, WeChat and Facebook) to contact friends in my course;
- Regularly use the internet for study purpose;
- Online resources (e.g., course notes, free software and materials on the web) are very useful to me.

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