

PAPER

The Role of Teaching Methods and Self-Efficacy in Strengthening the Link Between Perceived Quality Online Learning, Learner Satisfaction, and Continuation Intention in Developing Countries

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ABSTRACT

This study empirically tests the role of teaching methods and self-efficacy in the link between perceived quality of online learning, learner satisfaction, and continuance intention. Therefore, a sample of 438 participants in a laboratory experiment on an online learning platform called “Dokeos” was examined. A structural equation method via AMOS was used to test causal relationships and multi-group analyses to estimate the same structural model on two groups of individuals to measure the moderation effects of self-efficacy and learning methods. The results showed that perceived quality of online learning has a positive and significant effect on satisfaction with online learning, and this effect varies based on moderating effects of self-efficacy and pedagogical approaches. Likewise, satisfaction was found to positively impact the intention to continue online learning. The research results have provided a set of theoretical and managerial recommendations on the design of educational platforms.

KEYWORDS

perceived quality, satisfaction, continuation intention, self-efficacy, objectivism, constructivism

1 INTRODUCTION

E-Learning is growing in higher education, particularly amid the COVID-19 pandemic [1, 2]. Indeed, beyond the quality of the infrastructure and resources sought [3], the success of e-learning certainly bears on online learners’ expectations being satisfied but also on their intentions to continue using them [4, 5]. The challenge would therefore be to determine the explanatory factors allowing us to understand the links between the perceived quality of e-Learning and online learner satisfaction. Such an effort aligns with the principles of service and relationship

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marketing, which encompass all marketing activities aimed at establishing, developing, and maintaining successful relational exchanges [6, 7]. E-Learning systems are complex and constantly changing, a consequence not only of the permanent evolution of information and communication technologies, including AI, but also of the diversified professional fields, which gradually endorse it. It is important that an e-Learning system offers learners the means of contact and exchange for good learning [8, 9]. For exchanges to develop, the system must be designed to encourage learners to work collaboratively and adapt to their needs. It is therefore essential, under a marketing approach, to study and understand the behavior of this very particular consumer, the online learner. Given the virtual absence of research at this level, the aim of this study is therefore to test the following research problem: To what extent does perceived e-Learning quality influence online learner satisfaction, and how does the latter impact the intention to continue e-Learning?

It is clear that e-Learning combines technological (ICT and Internet), educational, and service tools. The service marketing approach provides a global vision of the system, supplemented by a review of the literature of education science, didactics and information systems. By covering the contributions of literature from these fields, a research model was then proposed. From this perspective, our study promotes the development of a model that integrates “quality, satisfaction, and intention to continue using e-Learning.” In addition, we were able to specify, through the use of moderating variables such as the feeling of personal efficacy and the used teaching methods, the nature and sensitivity of the causal links between the determinants of perceived e-Learning quality and online learner satisfaction. In this regard, the contribution of this study is not a theoretical explanation of the factors that push learners to continue learning online but rather the construction and validation of a research framework for evaluating an e-Learning system quality and the improved scrutiny of these relationships through moderating variables.

2 LITERATURE REVIEW

2.1 Perceived quality

Early conceptualizations of perceived quality have proposed a definition that is rooted in the disconfirmation paradigm used in the literature on physical products [10, 11]. According to this paradigm, quality stems from the difference between perceived performance and expected performance [12]. If the delivered quality surpasses expectations, the perceived quality is high; if the delivered quality falls short of expectations, the perceived quality is low. Zeithaml [13] defined perceived quality as a comprehensive evaluative judgment of a product or service, reflecting its relative superiority. Perceived quality refers to the judgment made by the consumer throughout the product life cycle, from the conditions of production and manufacturing to the conditions of distribution and finally use [14]. Analyzed under these terms, e-Learning is considered a service, essentially determined by the delivery of an intangible product specifically characterized by intangibility (intangible service), heterogeneity (knowledge found at different levels of the learning process), inseparability (synchronism of production and consumption) and participation of learners in the production process of the content through which the offer is made.

In the field of e-commerce, Zeithaml et al. [15] and Parasuraman et al. [16] define e-service quality (E-SQ) as “the way with which a commercial website facilitates the effectiveness and efficiency of purchasing and delivering products and services.”

Extrapolating this definition to e-Learning, perceived e-Learning quality is defined as “the way with which an educational platform facilitates the achievement of educational objectives in an effective and efficient manner and to the extent that it designs the training offer and ensures its content, its transmission, and the monitoring of learning.” Furthermore, E-SQ assessment is a more cognitive assessment, whereas traditional service quality assessment is emotional [17]. Thus, quality assessment depends on the services offered by the site before, during, and after learning.

2.2 E-learner satisfaction

Defining this concept has been the subject of much controversy. Consumer satisfaction has several definitions depending on the researchers’ point of view [18]. Most authors generally use the definition that best suits their particular purpose [19, 20]. There is no universally accepted conceptualization of satisfaction. The marketing lens views students as final customers because their satisfaction with an education process is the outcome of an interaction between them and their teachers [19]. Accordingly, their satisfaction is compared favorably with the conventional definition of customer satisfaction, which is a particular affective response [7, 19].

Giese and Gote [18] refer to learner satisfaction as an effective response of varying intensity, supported by e-learning activities and influenced by several factors, such as content, interface usability, customization, and learning performance [19]. According to Sun et al. [21], perceived online learner satisfaction, also known as e-satisfaction [22, 23] or web-based satisfaction [24], is the overall perception of the online learners’ experience using the e-Learning system. Learner satisfaction in online learning arises from a comprehensive sense of fulfilment that spans multiple stages of the learning process—from the initial motivation phase to the final evaluation phase—and can persist throughout the learner’s entire educational journey.

2.3 Teaching methods

The learning method is the arrangement of media and content provided according to a well-defined logic and a certain sequencing and depending on the target audience [25]. In this study, we examine two types of methods, namely objectivism and constructivism. Subsequent research has allowed the notion of objectivism to be further explored. This concept, which Jonassen et al. [26] emphasized, is found in conceptual studies carried out by Cronjé [27]. These authors define objectivism based on the fundamental metaphysical assumption that the globe is genuine structured, and that this structure can be modeled by the learner. Consequently, learning involves assimilating this objective reality. This model serves as the foundation for objective-based pedagogy. This teaching method calls for a coherent and simple breakdown of the training objectives.

In the literature of didactics and educational science, the work of Piaget, Vygotsky, and Bruner is the ground for defining constructivism and socio-constructivism approaches [28, 29, 30]. These essentially North American approaches are perceived as the pedagogical model of change. The many definitions of constructivism and its derivatives generally remain linked to the active and individual aspect of knowledge construction in interaction with the environment [31, 32, 33, 29] and to its fundamental characteristics, namely, the construction of knowledge, the primacy of the subject, the importance of the context [34, 35], and the influence of prior [34, 35] and current knowledge [36].

3 HYPOTHESES DEVELOPMENT

3.1 Perceived quality and online learner satisfaction

The integrated use of educational technologies is likely to increase learner-learner and learner-teacher interactions and make the learner the primary of learning. Accordingly, online teaching would allow more individualized learning by offering immediate feedback and improving retention compared to conventional learning [37]. It allows learners to feel a higher level of satisfaction than that in the conventional learning environment [38]. Roach and Lemasters [39] suggested that the use of an e-Learning service raises expectations from learners (the requirement for clear and detailed information on modules; details of course information; security of personal data on the university database; requirement for assessment; existence of communication between the different actors; and immediate feedback and help), which generally allow online learning to be well evaluated and their needs to be met. Hence, our hypothesis:

H.1. Perceived quality of e-Learning positively influences the satisfaction of online learners.

The sub-hypotheses are:

H.1.a. Ease of use positively influences online learner satisfaction.

H.1.b. The quality and quantity of information positively influence the satisfaction of online learners.

H.1.c. Security and privacy positively influence the satisfaction of online learners.

H.1.d. Design and aesthetics positively influence the satisfaction of online learners.

H.1.e. Customization and interactivity positively influence the satisfaction of online learners.

3.2 Satisfaction and intention to continue using the e-learning service

Chiu et al. [40], Levy [41], Roca et al. [42], and Hayashi et al. [43] have demonstrated that the success of an e-Learning service is heavily influenced by the satisfaction of online learners, which in turn impacts their willingness to continue using the service in the future or to persist in completing it. Then, our hypothesis is formulated:

H.2. Online learner satisfaction has positively influenced the intention to continue adopting e-learning.

3.3 The moderating effect of self-efficacy

Individuals with a positive attitude toward technology enhance their sense of self-efficacy regarding technology and the Internet more than those with a negative attitude [44]. For Piccoli et al. [37], the higher the students' sense of self-efficacy in technology-related tasks, the higher their performance. Similarly, these authors add that self-efficacy related to personal abilities enhances active participation in a virtual learning environment, expectations tied to personal goals help participants develop their learning strategies, and mastery of technology use can foster communication and interaction among participants. Gong et al. [45] showed that technology

self-efficacy positively influences the ease of use of the e-Learning service, which in turn affects the intention to continue using the service. Therefore, we suggest:

H.3. The link between perceived quality and online learner satisfaction is moderated by a high level of self-efficacy

This hypothesis is expressed in the following two sub-hypotheses:

H.3. a. According to the constructivism model, the group of learners who followed the course is more sensitive to the link between perceived quality and online learner satisfaction with the online environment

H.3.b. According to the objectivism model, the group of learners who followed the course is less sensitive to the link between perceived quality and online learner satisfaction with the online environment

3.4 Moderating effect of teaching methods

The study of Kala et al. [46] showed the existence of a strong correlation between theories and learning outcomes in the case of e-Learning. In their study, advanced technologies not only help to promote the results of the teaching-learning axiom but also stimulate the creativity and critical thinking of learners through personal involvement and social interaction. This environment also facilitates problem-solving skills through interactivity and customization and the different used communication tools that satisfy online learners. Chen et al. [47] presented a blended course design based on objectivist and constructivist models used in intensive online courses. The findings of this work showed that learners who have positive learning experiences with the course delivered via the Internet are satisfied with their learning outcomes. Therefore, we suggest:

H.4. The link between perceived e-learning quality and online learner satisfaction is influenced by learning methods

This hypothesis is expressed in the following two sub-hypotheses (see Figure 1):

H.4.a. According to the constructivism model, the group of learners who followed the course is more sensitive to the effect of perceived quality on online learner satisfaction.

H.4.b. According to the objectivism model, the group of learners who followed the course are more sensitive to the relationship between perceived e-Learning quality and online learner satisfaction.

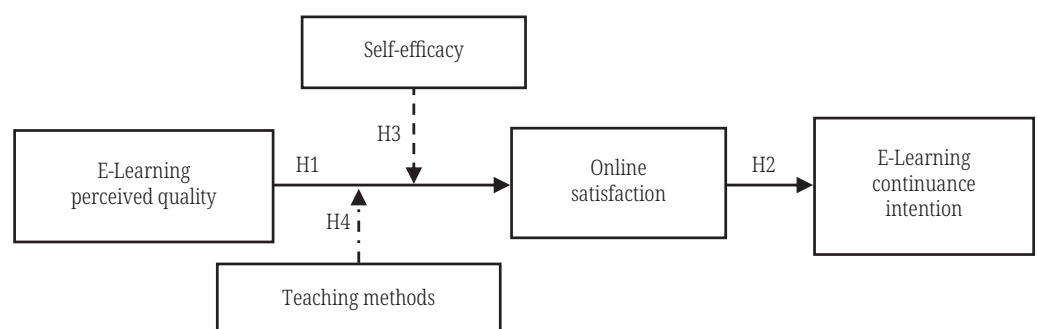


Fig. 1. Research model

4 METHODOLOGY

4.1 Course description

In this study, we designed two educational granules of the same content of a marketing course, “consumer behavior,” following the same cutting principle. Two design approaches are adopted: A first version is designed using an objectivism-based method and a second constructivism-based method. The difference between the two versions lies in the breakdown of the content, the teaching method used to present the course, and the assessment.

4.2 Conduct of the experiment

The study was carried out through laboratory experimentation in a number of higher education institutions in Tunisia. The experiment involved three phases for each learning method (the objectivist method and the constructivist method). The first phase of each learning model took place during a back-to-school meeting with the students in the laboratory. Beforehand, they were given an explanation and demonstration of how the “Dokeos” platform works, how to register on the platform, and how to register for the course modules. The second phase focused on the actual experimentation. This phase covered the theme of the “consumer behavior” course, designed according to the two versions (constructivist method versus objectivist method). Learners were asked to study the course and then solve the list of tasks (according to the appropriate learning model) and send their work to the course instructor. However, they could not call on the instructor during this session and had to (except for sending messages) complete the task individually. The session lasted about one hour. The third phase was set up following messages sent by the instructor to the different learners to meet on the forum to discuss the marking of the tasks and to interact between the different learners and between the learners and the instructor. This session lasted about an hour.

4.3 Participants measurement scales

The questionnaire was administered to 438 individuals, containing two groups. The allocation of experimental groups was done randomly. The students did not choose the experimental group in which they participated. The participants were split into two experimental groups as follows:

Group 1 – consists of 213 learners who participated in online learning using an objectivist-based pedagogical approach.

Group 2 – consists of 225 learners who participated in online learning using a constructivist-based pedagogical approach.

The 438 who participated in the experiment consist of 235 females (53.7%) and 203 males (46.3%). All students are in their second year of a management degree; their ages vary between 20 and 26 years old. All participants (100%) are officially allowed to study online. Similarly, a sample of 119 subjects (27.2%) are from the Higher Institute of Applied Studies in Humanities of Kef, 142 (32.4%) students are from the Faculty of Economics and Management of Jendouba, while 171 (39%) are from the Higher Institute of Technological Studies of Kef and 6 (1.4%) are from

the Higher Institute of Technological Studies of Jendouba, Tunisia. Table 1 shows the sources used to develop the scale items for each variable adopted in the current research.

Table 1. Description and sources of measurement scales

Latent Construct	Source	Items
Perceived quality	Kort and Gharbi [48]	19
E-learner satisfaction	Lee [49]	3
Continuance intention	Lee [49]	3
Self-efficacy	Choi et al. [49]	3

4.4 Reliability and convergent validity

The findings indicate that all constructs in the model are reliable, as the Joreskog's Rho values surpass 0.7. Convergent validity is confirmed, as the AVE was higher than the empirical threshold of 0.5 [50]. Additionally, discriminant validity (Table 2) is established, as the convergent validity (ρVC) of each construct is higher than the squared correlations it has with the other variables ($VD = \rho VC > \text{Correlations}^2$).

Table 2. Measurement items, factor loadings, Joreskog's Rho, and AVE

Constructs	Items	SD	Alpha	ρ of Jöreskog	AVE
Perceived Quality	EU1	0.753	0.796	0.771	0.460
	EU2	0.808			
	EU3	0.684			
	EU4	0.544			
	QQI1	0.769	0.791	0.683	0.418
	QQ2	0.716			
	QQ3	0.692			
	SP1	0.602	0.744	0.808	0.513
	SP2	0.720			
	SP3	0.747			
	SP4	0.714			
	ADCI 1	0.625	0.692	0.831	0.451
	ADCI 2	0.662			
	ADCI 3	0.748			
	ADCI 4	0.688			
	ADCI 5	0.642			
	ADCI 6	0.591			

(Continued)

Table 2. Measurement items, factor loadings, Joreskog's Rho, and AVE (*Continued*)

Constructs	Items	SD	Alpha	ρ of Jöreskog	AVE
Satisfaction	SATIS1	0.775	0.652	0.658	0.407
	SATIS2	0.832			
	SATIS3	0.68			
Continuance Intention	CINT1	0.734	0.633	0.643	0.407
	CINT2	0.806			
	CINT3	0.741			
Self-efficacy	SE1	0.741	0.544		
	SE2	0.757			
	SE3	0.669			

Notes: EU: Ease of use, QQI: quality and quantity of information; SP: security and privacy, ADCI: aesthetic design customization and interactivity, SAT: satisfaction, CINT: Continuance Intention.

5 HYPOTHESIS TESTING

The relationship between perceived e-Learning quality is understood through ease of use (H.1.a), quality and quantity of information (H.1.b), and aesthetic design, customization and interactivity (H.1.c), and online learner satisfaction. This relationship was validated in light of the results provided. The security and privacy dimension (H.1.d) is not significant at the 5% threshold. We can deduce that there is a partially significant and positive association. Thus, hypothesis H.1 is partially confirmed. Similarly, the results also show that the link between online learner satisfaction and intention to continue e-Learning is significant and positive. Therefore, hypothesis H2 is validated. Then, we can affirm that ease of use, quantity and quality of information and design and aesthetics, customization, and interactivity represent the key variables and essential determinants of learner satisfaction in e-Learning. Obviously, we can conclude that ease of using the platform, readability and clarity of information, and interactivity provide the learner with satisfaction in using the e-Learning device (see Table 3).

Table 3. Significance of causal links

	Path	Standardized Regression	Student's Test	P	Results
H.1.a	EU $\rightarrow$ SAT	0.243	2.889	0.004*	Supported
H.1.b	QQI $\rightarrow$ SAT	0.331	3.126	0.002*	Supported
H.1.c	SP $\rightarrow$ SAT	0.079	0.836	0.403*	Not Supported
H.1.d	ADCI $\rightarrow$ SAT	0.300	2.596	0.009*	Supported
H.2.	SAT $\rightarrow$ CINT	0.728	5.395	0.000*	Supported

Note: * $p < 0.05$.

Figure 2 demonstrates a strong, statistically significant relationship between online satisfaction and the intention to e-Learning continuance (0.73). This underscores the importance of this relationship within the causal model.

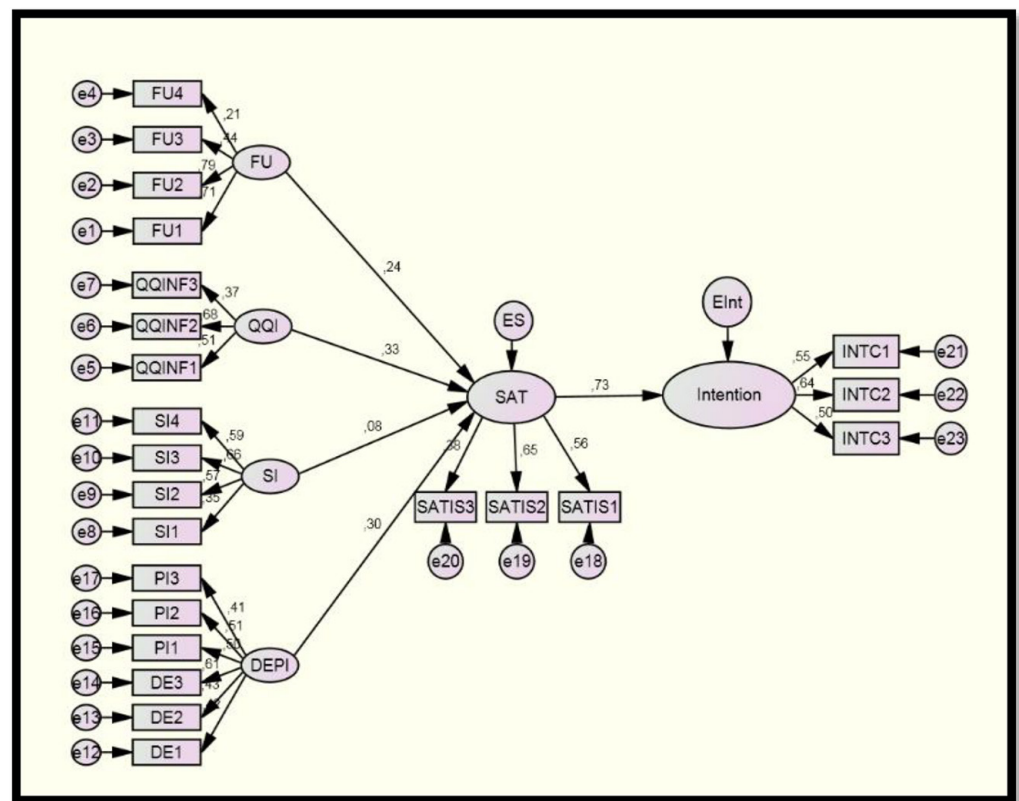


Fig. 2. Structural model

5.1 Moderation and multigroup analysis

To examine the moderating effect of these variables, we conducted a multi-group analysis with full invariance by identifying groups of individuals using the dynamic cloud classification technique in relation to each moderating variable to be tested. Then, check a Chi-square difference test and determine its significance and compare across groups and examine the specific characteristics of moderating effects on test significance. In a multi-group analysis, each group represents a specific modality of the moderator. In our study, we created two modalities for each moderating variable: weak modality and strong modality. Each group becomes the basic sample. It is therefore necessary to have enough individuals in each group.

The obtained results indicate that the classification of observations according to the variable self-efficacy (SEP) presents relevant results. Indeed, the obtained classes converged at the 11th iteration. In addition, ANOVA of each of the items of self-efficacy towards the accomplishment of e-Learning tasks is highly discriminating. Then, the data in Table 4 highlights that the first group, which represents 81.5% of online learners, has a strong sense of efficacy towards e-learning, while for the second group, only 18.5% of online learners have a low level of self-efficacy.

Table 4. Distribution of SEP observations by class

Classes	Number	Percentage
Strong sense of self-efficacy	357	81.5
Low sense of self-efficacy	81	18.5
Total	438	100

The Chi-square difference coefficient (5) is statistically significant at the 5% level (see Table 5). Indeed, the link between perceived e-learning quality and learner satisfaction is influenced by the sense of self-efficacy. Thus, this initial finding confirms a moderating effect.

Table 5. Results of the Chi-square difference test of self-efficacy

	Chi-Square	DDL	Probability Level (P)
Model	152.997	44	0.000

Table 6 clearly shows that the influence of perceived e-Learning quality on online learner satisfaction is not significant when the learners' sense of self-efficacy is low. However, this relationship is significant and positive in the learners' sense of self-efficacy, which is strong. Indeed, the impact of the "aesthetic design, customization, and interactivity" dimension of perceived quality is higher on satisfaction when the learners' sense of self-efficacy is strong. However, the effect of security and privacy on the dimension of perceived e-Learning quality and satisfaction is significant and positive but of less importance than in the case of a strong feeling of self-efficacy. Therefore, hypothesis H3 is validated.

Table 6. Comparison between the two groups of self-efficacy

Groups	Group 1 Low Level of Self-Efficacy			Group 2 Strong Level of Self-Efficacy		
	Standardized Coefficients	CR	P	Standardized Coefficients	CR	P
EU → SAT	0.019	1.316	0.188	0.397	3.810	***
QQI → SAT	0.004	0.195	0.845	0.295	2.766	0.006*
SP → SAT	0.039	1.247	0.213	0.203	1.885	0.059*
ADCI → SAT	0.022	0.074	0.941	0.377	2.930	0.003*

Note: *** $p < 0.001$, * $p < 0.05$.

Table 7 shows two groups of individuals, of which 225 subjects (51.4% of observations) followed a learning constructivist-based model, while the second group is made up of 213 subjects (i.e. 48.6% of observations) who followed an objectivist-based course design.

Table 7. Number of observations in each group of the learning model

Teaching Methods	Frequency	Percentage
Constructivism	225	51.4
Objectivism	213	48.6
Total	438	100

Chi-square difference tests are used to assess the effect of each moderator variable on the overall model. Data in Table 8 shows that the Chi-square difference test is statistically significant for both groups of learning models at a 5% risk. Learning models, namely constructivism and objectivism, significantly moderate the link between perceived e-Learning quality and online satisfaction. In other words, the link between perceived e-Learning quality and learner satisfaction relates to the way the course is designed. Therefore, we deduce that learning models (constructivism versus objectivism) moderate the link between perceived e-Learning quality and online learner satisfaction.

Table 8. Results of the Chi-square difference test of the learning method

	Chi-Square	DF	Probability Level (<i>P</i>)
Model	149,582	44	0.000

After examining the significance of the two learning methods (Constructivism vs. Objectivism) through the Chi-square difference test, a multi-group analysis was undertaken to test the intensity of the moderating role of each of the two learning models via the results obtained by comparing the coefficients of each of the two learning models. (see Table 9).

Table 9. Comparison between the two groups on learning methods

Groups	Group 1: Constructivism			Group 2: Objectivism		
	Standardized coefficients	CR	<i>P</i>	Standardized coefficients	CR	<i>P</i>
EU → SAT	0.304	2.263	0.024*	0.288	2.645	0.008*
QQI → SAT	0.365	2.215	0.027*	0.326	2.497	0.013*
SP → SAT	0.105	0.833	0.405	0.221	1.896	0.058*
ADCI → SAT	0.571	2.885	0.004*	0.100	0.089	0.929

Note: * $p < 0.05$.

Table 9 shows a positive moderating effect of learning models for both groups. However, this intensity is evaluated by comparing the coefficients of the two groups. The effects of the link between “the ease of use” and “the quality and quantity of information” and satisfaction are greater when the learning model is constructivist, while they are lower in the case of objectivism. Furthermore, the link between “design and aesthetics, customization and interactivity” and satisfaction is very strong for the constructivist learning model, while it is not significant for the objectivist learning model with $p = 0.05$.

For the constructivist model, this link becomes the main determinant of online learner satisfaction, while for this same model the relationship between security and privacy and satisfaction is not significant at $p = 0.05$. However, for the objectivist learning model, the link between “quality and quantity of information” and satisfaction is the strongest, followed by the link between “ease of use” and satisfaction, which is the weakest in the constructivist learning model.

These findings indicate that the constructivist model somewhat enhances the moderating influence of perceived e-learning quality on online learner satisfaction, whereas the objectivist learning model slightly weakens the link between perceived

e-learning quality and online learner satisfaction. Therefore, sub-hypotheses H4a and H4b were partially validated.

6 DISCUSSION

This study aimed to study the influences of perceived e-Learning quality on online learner satisfaction, and subsequently, on the intention to continue using the e-Learning service, as well as the influence of moderating variables (self-efficacy and teaching methods) on the relationship between “perceived quality and satisfaction.” The results confirm the interest in testing the significance and nature of the links between these constructs in order to establish a stable and lasting relationship with online learners.

The findings show that the dimensions that contribute the most in a descending order are the quantity and quality of information ($r = 0.331$), the design and aesthetics, customization Interactivity ($r = 0.300$), and ease of use ($r = 0.243$). These dimensions are intended to be relevant to reliably ensure assessment in e-Learning services. Learners were more satisfied with online courses when the course design was consistent with their preferences and when there was ease of navigation. Graphic presentations, such as icons, colors, images, and animations, are used to make the website vivid and therefore increase satisfaction [51].

Our study also showed that satisfaction has a positive and significant influence on the intention continuance of e-Learning. Therefore, hypothesis H2 is validated. Indeed, the more online learners are satisfied with the perceived quality of e-Learning delivered by the platform, the more they intend to continue learning via this device [5, 52, 53]. In other words, our results indicate that when the online learner is satisfied with the ease of use of the course as well as its design and the interactivity provided through communication tools delivered by the platform, the more the online learner will show their intention to continue learning online and to use its services in the future.

The results also indicated that the higher the online learner’s sense of self-efficacy, the more the factors of perceived e-Learning quality influence the online learner’s satisfaction (H3). In other words, the more the online learner sets challenging goals and maintains a strong commitment to the learning experience, the more the dimensions of perceived e-Learning quality such as “design and aesthetics, customization and interactivity,” “quality and quantity of information,” “ease of use,” and “security and privacy” influence their online satisfaction. In addition, it seems that a learner with a strong sense of self-efficacy is more open to innovations and educational changes and achieves greater success when implementing new teaching practices. Learners with a strong sense of self-efficacy contribute to perceiving the quality of the e-Learning service as more customized and interactive and show more enthusiasm and satisfaction in learning. Therefore, intensity of the feeling of self-efficacy has a positive impact on the online learning journey.

Multi-group analyses show that the constructivist learning method positively moderates the link between the dimensions of perceived e-Learning quality and online learner satisfaction. Indeed, the most important dimensions of perceived quality that affect online learner satisfaction are: “design and aesthetics, customization and interactivity,” “quality and quantity of information,” and “ease of use.”

This suggests that the “design and aesthetics, customization and interactivity” dimension of perceived quality is a structuring dimension of online learner satisfaction when the course is designed according to a constructivist learning. Thus, interactivity allows the online learner to define and structure the content and design of the course according to their needs [54]. Interactivity bears on the possibility of sending emails, discussing on the forum and conversing synchronously or asynchronously

in order to engage in an intellectual partnership between the different peers. Thus, the more the online learning subject participates in the construction of their online learning environment, the more the design and interactivity dimensions of perceived quality influence their satisfaction. This adaptation of constructivism is based on a learning approach where the student will participate in the construction of their knowledge like a researcher. Which amounts to saying that the learner is then a “co-actor” [55, 31] of the offer. This co-creation results in the establishment of dialogue and continuous interaction between the consumer and the service provider during the design of the product, its production, its launch, and its marketing [32]. The learner’s approach in this case will be increasingly proactive

6.1 Theoretical and practical implications

This study aimed to develop an integrative conceptual framework for examining the variables that influence online learners of e-Learning continuance. This conceptual framework grouped the constructs “perceived quality-satisfaction-intention to continue using e-Learning.” It made it possible to link the perceived quality of e-Learning and the satisfaction of the online learner, as well as e-Learning continuance intention.

From an operational point of view, our results are encouraging and provide support for current managerial practices when it comes to the diversification of an e-Learning service offering, which consists of investing massively in this service. The finding of our study first showed that perceived quality of e-Learning can motivate online learners to continue learning via satisfaction. Therefore, this study stresses the importance of ensuring an e-Learning system that meets the expectations of online learners and guarantees the continuity of learning via this system in the future by providing an e-Learning service organized in such a way that the online learner can efficiently and easily reach information through a customized offer dynamically adapted to the different needs.

From a management perspective, perceived quality is considered a means of differentiation. An effective e-Learning quality service increases added value and ensures service efficiency [56]. Subsequently, a better-perceived quality of e-Learning enables institutions in the sector to better grasp learners’ expectations and perceptions as well as to refine the service offered. On a practical and pedagogical level, the contribution of this study consists of the use of two types of educational scenarios of the same educational granule. As a result, training engineering cannot rely solely on simple technical considerations, but it should design an effective training system in line with the learners’ aspirations. Our findings may also help to draw the attention of marketers and design teachers to change scenarios to consider both “push” and “pull” reasoning. In this case, the e-learning device should be adapted to the learner rather than the other way round. In fact, on the “Push” side, information can be sent directly to the learner by email, for example. However, the main contribution should happen on the “Pull” side through additional activities such as specific exchanges between learners in the virtual classroom or in the forum to build their knowledge. For a better illustration, let us take, for example, the particularities of the “Pull” type offer: it provides a variety of offers of diverse quality adapted to learners an access to demand independent of place and time, and the use of digital versions and illustrations. On the “Push” side, different skills should be strengthened: Ability to navigate; customization and adaptation of the quality of the offer in line with the needs of learners, customized feedback, and a coherent offer structure.

7 AUTHOR CONTRIBUTIONS

“Conceptualization, N.E. and A.E.S.; methodology, N.E. and A.E.S.; software, N.E.; validation, N.E.; formal analysis, N.E.; investigation, N.E. and A.E.S.; resources, N.E. and A.E.S.; data curation, N.E. and A.E.S.; writing—original draft preparation, N.E. and A.E.S.; writing—review and editing, A.E.S.; visualization, N.E. and A.E.S.; supervision, A.E.S.; project administration, N.E. and A.E.S.; funding acquisition, A.E.S.” “All authors have read and agreed to the published version of the manuscript.”

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9 INSTITUTIONAL REVIEW BOARD STATEMENT

“The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of King Faisal University (KFU254027 and date of approval 1 September 2025).”

10 CONFLICTS OF INTEREST

“The authors declare no conflicts of interest.”

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