

Using Service Quality Model Analysis To Uncover The Influence Of Language On E-Learning Quality

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Abstract

The widespread adoption of electronic learning (e-learning) has emerged as a highly promising solution within the higher education sector. E-learning, often referred to as digital learning or virtual learning, encompassing technology-enhanced learning, has ushered in a multitude of advantages. These include the crucial aspects of temporal and spatial flexibility, leading to substantial cost savings and greater accessibility of learning opportunities for a broader demographic. The surge in embracing these contemporary digital pedagogies has not only captured the attention of researchers but has also engendered a substantial body of research focusing on both the merits and challenges associated with e-learning. However, it's important to recognize that education is fundamentally a service-oriented endeavor, where the caliber of service provision holds immense significance. Astonishingly, there remains a paucity of research directed towards comprehensively evaluating the quality-related facets of e-learning systems within the context of education. In our scholarly work, we advocate for the integration of the SERVQUAL model, a widely accepted and reliable framework for gauging perceived service quality, as the cornerstone for evaluating the quality dimensions of e-learning. This intricate model comprises five foundational constructs: Reliability, Assurance, Website Content, Empathy, and Responsiveness. Furthermore, we introduce the dimension of 'Language' as a moderating factor, aimed at probing its influence on the overall model. The choice of incorporating 'Language' as a moderator, stems from the realization that the core of any educational environment lies in its learning content, where the medium of language plays an integral role in shaping the curriculum. Rigorous scrutiny of the measurement model's reliability and validity was conducted through the lens of Structured Equation Modeling. Empirical analysis, derived from a robust sample of 400 students, divulges a compelling insight: the overall satisfaction derived from e-learning experiences is significantly heightened when the instructional delivery is conducted in the local language. This observation is particularly pronounced in the augmentation of the 'Empathy' and 'Website Content' dimensions, underlining the pivotal role that language plays in shaping the e-learning landscape.

Keywords: SERVQUAL, E-Learning, Quality, Local language, Satisfaction, Education delivery.

I. Introduction

In the era of information and communication technology (ICT), specifically via the internet, a remarkable transformation has unfolded, particularly within higher education and learning methodologies at large (Valencia-Arias et al., 2019). The convenience offered by e-learning

environments (Levy, 2007; Paiva, Morais, Costa, & Pinheiro, 2016; Hills, 2017) has propelled the rapid growth of technology-driven distance learning, leading to a seismic shift in student demographics characterized by diversity and enhanced business acumen (Lykourantzou, Giannoukos, Nikolopoulos, Mpardis, & Loumos,

2009; Hwang, Kuo, Chen, & Ho, 2014). Fueled by evolving e-learning enrollment trends, traditional educational institutions have ventured into a range of online degree programs (Al-Samarraie et al., 2018).

Multiple studies suggest that the allure of online degree programs is projected to surpass that of traditional programs, driven by their diverse course offerings and escalating student enrollments (Liu, Liao, & Pratt, 2009; Clark & Mayer, 2016). Additionally, corporate decision-makers from online backgrounds are anticipated to expedite the growth trajectory of e-learning (Martinez, Bosch, Herrero, & Nunoz, 2007). A marked departure from traditional learning approaches, e-learning demands active participation from both instructors and students (Alenezi, 2020). In this paradigm, instructors assume the role of facilitators, while students engage as active knowledge seekers, culminating in a collaborative and boundaryless learning environment (Arkorful & Abaidoo, 2015). Online students often demonstrate heightened engagement compared to their traditional counterparts (Levy, 2007; Hopkins, 2015).

This educational transformation necessitates a corresponding shift in assessment methodologies, as traditional evaluation methods become obsolete (Martinez, Bosch, Herrero, & Nunoz, 2007; Kintu, Zhu, & Kagambe, 2017). Concurrently, the growing demand for high-quality education places increased pressure on educational institutions, both traditional and online (Sallis, 2014). Despite the proposition of concrete metrics for evaluating educational quality, assessing e-learning quality proves intricate (Arkorful & Abaidoo, 2015), intensifying the need to explore alternative evaluation methods (Stodnick & Rogers, 2008; Goujon, Lutz, & Samir, 2015).

Notably, e-learning experiences higher dropout rates compared to traditional learning, partly attributed to perceived lower quality (Lykourantzou, Giannoukos, Nikolopoulos, Mparadis, & Loumos, 2009; Levy, 2007; Arkorful & Abaidoo, 2015), as well as factors like usefulness, completion rates, and social factors (Gress, Fior, Hadwin, & Winne, 2010). Addressing these issues requires metrics that can elucidate the factors affecting e-learning, thereby enhancing course quality and reducing dropout rates, ultimately boosting student satisfaction.

In this endeavor, e-learning institutions and corporations stand to benefit significantly. Service quality, a multifaceted construct, poses challenges in measurement (King & Boyatt, 2015; Kang & Lee, 2010). Notwithstanding, prior research, notably Parasuraman, Zeithaml, & Berry (1988) and Cronin & Taylor (1992), has endeavored to measure it, leading to the formulation of SERVQUAL. While SERVQUAL has been applied across industries for measuring service quality, its application in higher education, especially e-learning, has been limited (Stodnick & Rogers, 2008).

Authors King & Boyatt (2015) and Kanwal & Rehman (2017) underscore the need to explore the diverse impact and approaches of e-learning to enhance its efficacy in higher education. To this end, the present study employs a modified SERVQUAL model from Udo, Bagchi, & Kirs (2011), emphasizing the potential for improvement in developing countries where e-learning is still evolving. Significantly, this study pioneers the exploration of e-Learning, the SERVQUAL model, and the influence of "Language" as a moderator within Pakistan's higher education landscape.

The primary objective of this study is to comprehensively examine the core dimensions of e-learning quality using the modified

SERVQUAL model. Additionally, the study aims to elucidate the impact of local language on the overall perception of e-learning quality, particularly within higher education. To accomplish these goals, the study addresses the following research question:

Q1. Does the overall perception of e-learning quality improve with the integration of local language?

The modified SERVQUAL model introduced by Udo, Bagchi, & Kirs (2011) replaces the "Tangibility" construct of the original SERVQUAL model with "Web-site Content." In the context of e-learning, "Web-site Content" signifies the multimedia components encompassing audio, video, and graphics, alongside considerations of accuracy, utility value, and information quality on the website. The following is the modified SERVQUAL model used by Udo, Bagchi, & Kirs (2011):

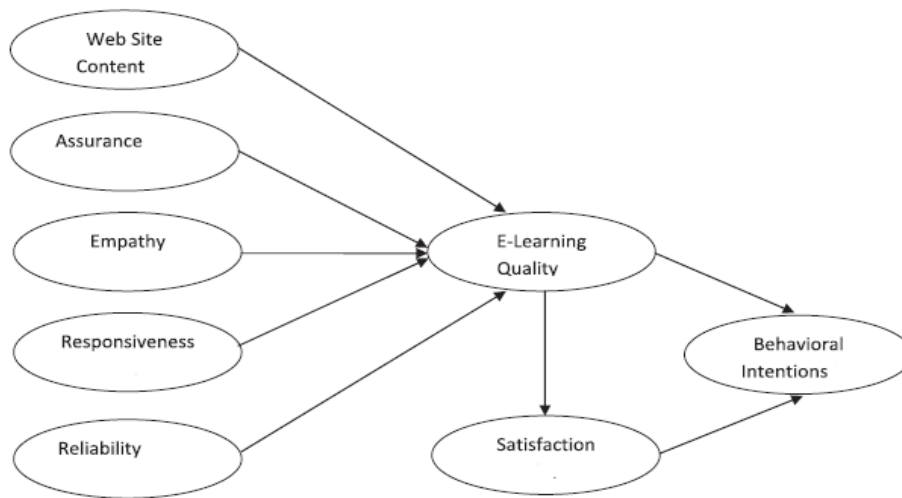


Fig 1: E-learning quality model- modified SERVQUAL

2. Theoretical foundations

2.1. Relevant Theories

When addressing the realm of e-learning quality, a multitude of technology adoption theories, varied learning theories, and consumer behavior theories can find application (Bean & Bradley, 1986; Bhattacharjee, 2001; DeLone & McLean, 1992). As a result, prior research has selectively embraced three theories - the "Cognitive Theory of Multimedia Learning (CTML)," the "Information Systems Continuance Model (ISCM)," and the modified "SERVQUAL" -

owing to their congruence with the research model and the associated hypotheses.

2.1.1 The Cognitive Theory of Multimedia Learning (CTML)

Prior research has indicated that during the teaching of complex subjects, the incorporation of visualization significantly enhances comprehension (Roberts et al., 2017). This is especially true for topics such as atomic particles, neural networks, or the solar system. CTML underscores the aspects of a website's visual presentation, including elements such as colors, layouts, shapes, visual design, and fonts.

Additionally, the user experience of a website encompasses familiar features that aid in navigation, including menus, checkboxes, and diverse navigation patterns. Considering the impact of multimedia on e-learning, the principles of CTML guided the inclusion of the "Website Content" construct.

Proposed by Mayer (1997), the Cognitive Theory of Multimedia Learning (CTML), often referred to as the "multimedia principle," draws from a range of cognitive theories. It emphasizes that "people learn more deeply from words and pictures than from words alone". CTML encompasses several dimensions, including the influence of visualization on the learning process, human information processing, and sequential learning (Gress, Fior, Hadwin, & Winne, 2010; Martinez, Bosch, Herrero, & Nuno, 2007; Clark & Mayer, 2016).

2.1.2 Information Systems Continuance Model (ISCM)

Anchored in the "consumer behavior theory of Expectation-Confirmation" and the "Technology Adoption Model" (TAM), the ISCM rests on these foundational principles. Often referred to as the "post-adoption model," it extends its purview beyond the initial acceptance stage. The ISCM, devised by Bhattacharjee (2001), is rooted in rational thinking, positing that any information system is deemed useful when users persist in its usage beyond the initial adoption phase (Kang & Lee, 2010; Chaltu, 2014; Aldholay, Isaac, Abdullah, & Ramayah, 2018). Significantly, the consumer behavior theory forms the cornerstone of both ISCM and SERVQUAL, with a central focus on assessing customer satisfaction by measuring the gap between service expectations and performance. Ultimately, this approach underscores the intention for continued usage.

2.1.3 The Native Language Magnet (NLM) Theory

Multiple studies have corroborated the notion that students effortlessly and swiftly acquire their native language regardless of cultural differences (Goujon, Lutz, & Samir, 2015), reducing cognitive load and enhancing satisfaction (Filipović, 2018). Several pieces of research have underscored the importance of an e-learning environment in the native language context, as this approach diminishes dropout rates and bolsters the percentage of students successfully completing online degree programs (Chaltu, 2014; Akello, Timmerman, & Namusisi, 2016). Kuhl (1993) introduced the Native Language Magnet (NLM) theory, also known as the Neural Commitment theory. This theory underscores the developmental changes spurred by one's native language, notably enhancing children's ability to discern speech sounds during the learning process. Furthermore, it emphasizes how children utilize computational skills to decipher the intricacies of speech, resulting in heightened social competence that significantly contributes to the learning journey.

3. The research model and study hypotheses

3.1. E-Learning Quality

Numerous prior studies have indicated that notable disparities exist between e-learning and traditional learning settings. Consequently, the assessment of e-learning quality by online students is influenced by several elements, such as the presence of instructors, technological aspects, response times, website content, and a myriad of other factors (Liu, Liao, & Pratt, 2009; Sallis, 2014). Mohammadi (2015) emphasized that the availability of instructors and their response times stand as two pivotal factors that shape perceptions of e-learning quality.

Several studies have observed that the perception of quality within a traditional learning environment is influenced by a range of factors, including the instructor-student relationship, campus environment, and correspondence with the instructor. These factors ultimately contribute to higher quality and greater student satisfaction (Hopkins, 2015).

3.2. SERVQUAL Dimensions

The SERVQUAL model has gained widespread acceptance across various industries, and since its inception by Parasuraman, Zeithaml, & Berry

(1988), it has undergone numerous modifications. Prior studies have consistently highlighted its effectiveness as a tool for measuring quality, user satisfaction, and behavioral intentions across diverse domains (Cronin & Taylor, 1992; Parasuraman, Zeithaml, & Berry, 1988; Nguyen et al., 2018), extending to sectors such as tourism and restaurants (Hussain et al., 2015).

The constructs of the SERVQUAL scale, as outlined by Parasuraman, Zeithaml, & Berry (1988), are presented in Table 1 below:

Table 1: SERVQUAL Constructs

Constructs	Description
Reliability	Ability to perform the promised service dependably and accurately
Assurance	Knowledge and courtesy of employees and their ability to convey trust and confidence
Tangibles	The appearance of physical facilities, equipment, personnel and communication materials.
Empathy	Caring, individualized attention the service provider gives its customers.
Responsiveness	Willingness to help customers and provide prompt service.

3.3. Website Content (WSC)

Website content stands as a pivotal factor that profoundly influences customers' perception of web service quality. It encompasses the visual layout, presentation, and various functionalities that collectively shape the overall public image and online presence of a firm (Mohammadyari & Singh, 2015; Clark & Mayer, 2016).

This construct comprises of several dimensions, including the quality of information, appropriateness of content, styles of presentation, patterns of imagery, size considerations, media types, and the overall visual aesthetic of websites. Numerous studies have underscored the

substantial impact of website content on learners' perception of quality, recognizing it as the principal medium for online learning (Paiva, Morais, Costa, & Pinheiro, 2016).

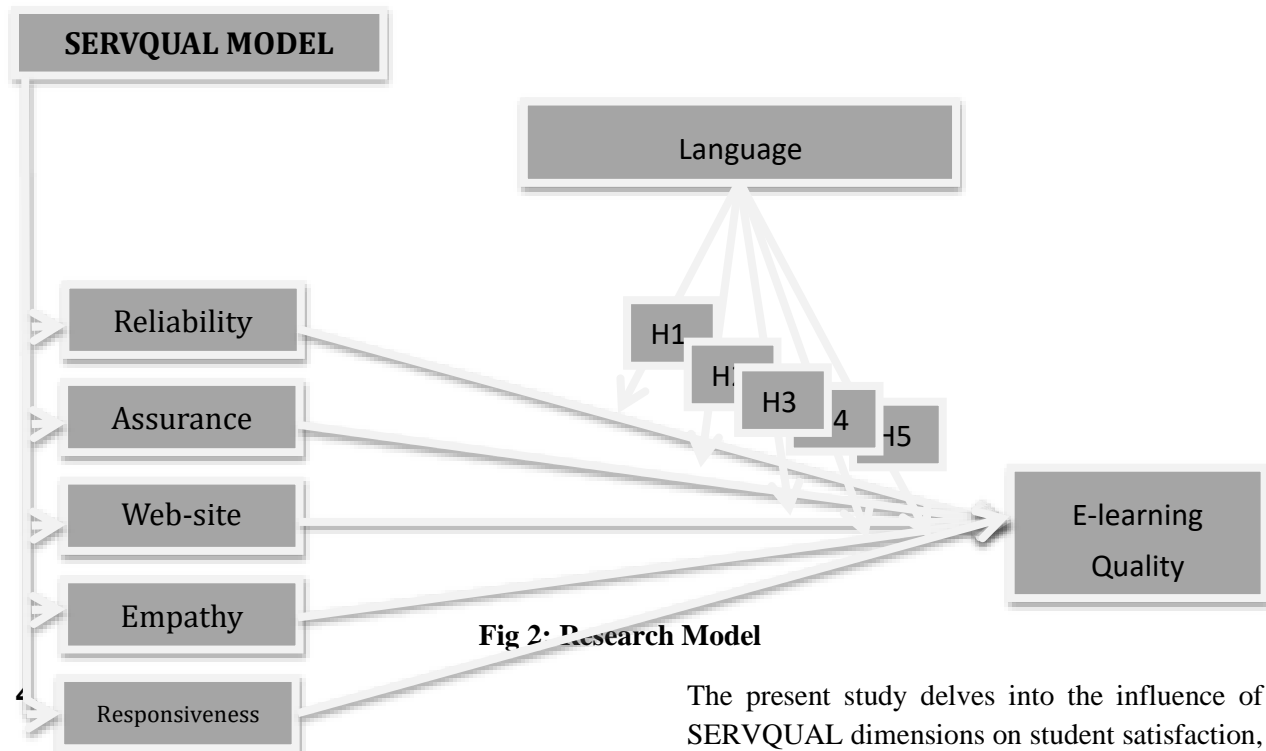
3.4. Language

Numerous research studies have underscored the pivotal role of Language as a defining element that intricately ties people to their cultural identity through their linguistic expressions (Roberts, 2016). Noteworthy authors, such as Darling-Hammond (2015), have emphasized the manifold advantages that stem from local language education, enhancing equity and accessibility within the education system. The

educational landscape is further enriched by research highlighting the importance of delivering instruction in local languages, particularly in primary schools, establishing a strong foundation for educational achievement by fostering proficiency in one's native tongue (Lin, 2015).

The significance of local language extends notably to higher education, where it has been shown to reduce cognitive load, consequently fostering perceptions of learning quality and student satisfaction (Tupas, 2015; Filipović, 2018). Additionally, the integration of local language within an e-learning context has been advocated to accelerate its adoption and utilization among students (Chaltu, 2014). Expanding upon this, the integration of local language-based multilingual education practices within online environments is poised to enhance success rates, alleviate cognitive strain, and facilitate the mastery of critical learning concepts with greater efficiency (Malone, 2016).

The model of present research is shown in figure 2:



Andersson & Grönlund (2009) and Akello, Timmerman, & Namusisi (2016) assert that local language-based education significantly contributes to students' perceptions of e-learning quality, thereby fostering student satisfaction. In light of these considerations, the following hypotheses emerge from the aforementioned discourse:

H1: The relationship between “Reliability” and e-Learning quality is enhanced by language.

H2: The relationship between “Assurance” and e-Learning quality is enhanced by language.

H3: The relationship between “Website Content” and e-Learning quality is enhanced by language.

H4: The relationship between “Empathy” and e-Learning quality is enhanced by language.

H5: The relationship between “Responsiveness” and e-Learning quality is enhanced by language.

Theoretical Model

The present study delves into the influence of SERVQUAL dimensions on student satisfaction,

exploring how this relationship is moderated by the factor of "Language" within the higher education sector. Employing a quantitative approach, the methodology and data collection process were meticulously designed. A structured questionnaire, divided into two sections, was administered to participants through convenience sampling. The questionnaire comprised a total of 35 questions, with 3 questions forming the demographic section (section one) and 32 questions dedicated to section two. Section two employed a five-point Likert scale.

The survey was conducted among students at two prominent public universities located in Lahore, Pakistan. The participants of this study were enrolled in diverse programs such as BSc Applied Management, BBA Honors, MBA, EMBA, BSc Sciences, and BSc Engineering. In total, 400 students actively participated in the survey, with a significant majority possessing prior familiarity with e-learning. However, due to concerns related to data skewness and normality, 364

questionnaires were ultimately utilized for analysis.

The collected data underwent a thorough analysis employing SPSS 22 and structural equation modeling (SEM) using AMOS. To assess the SERVQUAL constructs and e-learning quality, items were adapted from Udo, Bagchi, & Kirs (2011). Similarly, the "Language" construct was measured using an eight-item scale, adapted from the work of Chaltu (2014).

4.1. Data analysis and results

4.1.1. Reliability and Validity

In order to check the reliability of scale, Cronbach Alpha (Cronbach, 1951) was conducted to check internal consistency. The Cronbach Alpha values of our study constructs are shown in Table 3. All values in below mentioned table are greater than 0.7, implies that these constructs are highly correlated and interchangeable.

Table 3: Scale Reliability

Factor Label	Number of Items	Cronbach's alpha (α)
Assurance	4	0.847
Reliability	5	0.950
Responsiveness	4	0.951
Empathy	4	0.913
Language	8	0.963
Learning Quality	3	0.838
Course Website	4	0.884

4.1.2 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) using Principal component analysis, with Promax rotation, has been conducted in order to analyze that variables are adequately correlated i.e. reliability and validity criteria has been met (see

table 5). Promax has been selected for two reasons, first due to adequately large sample size, i.e. 364. Secondly, for the correlation of multiple factors, Promax is suitable. Also for sample adequacy, the Kaiser-Meyer-Olkin and Bartlett's test was significant, showing sufficient correlation among variables (Table 4).

Assurance Q4							.634	
E-learning quality Q3								.931
E-learning quality Q1								.772
E-learning quality Q2								.619

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

After the exploratory factor analysis, SEM has been used to prove the convergent and discriminant validity of extracted construct and for that reason Confirmatory factor analysis has been performed using AMOS.

4.1.3. Confirmatory Factor Analysis (CFA)

Convergent and divergent validity has been tested on present data, where convergent validity can be proven by the correspondence of two indicators to each other. Whereas, divergent validity exhibits difference between two dissimilar constructs. Thus, values of all loaded constructs are above 0.50, exhibits that constructs have sufficient discriminant validity (See Table 6).

Table 6: Discriminant and convergent validity

Composite Reliability	Constructs	E-learning Quality	Assurance	Empathy	Responsiveness	Reliability	Course Website	Learning Content
0.845	E-learning Quality	0.805						
0.854	Assurance	-0.020	0.772					
0.919	Empathy	-0.027	0.006	0.862				
0.945	Responsiveness	0.368	-0.031	-0.019	0.900			
0.951	Reliability	0.235	-0.105	-0.029	0.416	0.891		
0.878	Course Website	0.418	-0.105	-0.030	0.327	0.200	0.804	
0.964	Learning Content	0.520	0.018	0.003	0.541	0.442	0.291	0.877

In (table 7), depending on the tests all fitness values are within acceptable criteria limits, thus demonstrating a good model fit. Chi-square/df equaled 2.434; REMSA is 0.074, and our CFI and

NFI values are 0.908 and 0.854 respectively; indicating goodness of fit, consequently supporting the results and validating the proposed model.

Table 7: Goodness of Fit Statistics

Index	Value	Criterion
Chi – Square /Df	2.434	2.0 – 5.0
RMSEA	0.074	0 – 0.1
CFI	0.908	0 ~ 1
NFI	0.854	0 ~ 1

4.1.4. Regression analysis- without moderator

Table 8: Model summary without moderator

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.533 ^a	.284	.270	.72437	.284	20.463	5	258	.000

a. Predictors: (Constant), Assurance, Empathy, Responsiveness, Course Website, Reliability

Table (8) has provided the R and R² values, whereas value of R denotes the simple correlation and is .533, exhibits presence of correlation among variables. The value of R² indicates the degree of “how much total variation in dependent

variable can be explained by the independent variable”. In aforementioned table, its value is .284. Moreover, model is significant as sig. value is .000.

Table 9: Regression values without Moderator

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.522	.501		1.042	.298
	Course Website	.404	.063	.364	6.430	.000
	Empathy	-.013	.062	-.011	-.206	.837
	Reliability	.056	.042	.078	1.326	.186
	Responsiveness	.182	.046	.241	3.935	.000
	Assurance	.077	.110	.037	.694	.489

Dependent Variable: E-learning Quality

Table (9) highlights that regression model has been utilized to predict the dependent variable. As significance value should be less than 0.05, thus in our case two variables have been found to

be significant after applying regression test i.e. Course Website and Responsiveness with sig. value= .000. This value indicates the significant

impact of these two variables on E-learning quality.

4.1.5. Regression analysis- with moderator

Table 10: Model summary

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.701 ^a	.492	.484	.60916	.492	62.624	4	259	.000

a. Predictors: (Constant), Empathy, Course Website, LANXEMP, LANXCWS

Table (10) exhibits the moderated values, which indicates that values of R and R² have been significantly improved after moderating “Language” in this model. Therefore, implies that overall perception of E-learning quality improves with local language.

5. Conclusion and discussion

While our data collection was limited to two specific academic domains (business and engineering) across two universities in Lahore, Pakistan, our research unequivocally underscores the significance of incorporating the local language for an improved e-learning experience. In this paper, we employed an expanded SERVQUAL model, as put forth by Udo, Bagchi, & Kirs (2011), to investigate the influence of the local language on the five key constructs of the model: Reliability, Assurance, Responsiveness, Empathy, and Course Website.

The outcomes of our study affirm hypotheses H3 and H4. Specifically, the utilization of 'Website Content' in the local language leads to heightened e-learning satisfaction. Furthermore, when services are offered in the local language, the sense of 'Empathy' is perceived to be augmented, contributing to an overall enhancement of e-learning satisfaction. This observation is rationalized by the fact that learning support

delivered in the local language fosters a sense of empathy, reassuring students that their needs are well catered to. Similarly, the inclusion of learning materials in the local language simplifies comprehension, particularly when it comes to learning videos and animations, enabling students to engage with the content for longer periods without excessive cognitive load.

Further investigation is warranted to delve into students' preferences for specific types of learning materials in the local language and the services they prefer to receive in their native tongue. Nevertheless, this study firmly emphasizes the pivotal role of a fundamental factor—'local language'—in determining e-learning satisfaction.

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