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Effect of Quality of Content Factor on E-learning Adoption with Backing as Moderating: The Case of Engineering at Higher Technical Institutes in the Ubari Region in Libya

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Abstract

This study aims to investigate the impact of the **Quality of Content** factor on the E-learning systems at Engineering at Higher Technical Institutes in the Ubari Region, Libya. Furthermore, it examines the moderating role of **Backing** in enhancing the relationship between Quality of Content and the adoption of E-learning by faculty members. Utilizing a quantitative research design, a survey was distributed to faculty members at Engineering at Higher Technical Institutes in the Ubari Region, yielding 200 valid responses. The data were analyzed using SPSS to test reliability, validity, and hypotheses through multiple regression analysis. The findings reveal that Quality of Content has a significant positive direct effect on the E-learning (β=0.244). Additionally, the results confirm that Backing significantly moderates this relationship, enhancing the explanatory power of the model. The study concludes that high-quality, interactive, and well-designed educational content, underpinned by strong institutional backing, is critical for the sustainability of E-learning initiatives in Libyan higher education.

1. Introduction

1.1 Background

The integration of Information and Communication Technology (ICT) into higher education has transformed traditional teaching paradigms into dynamic E-learning environments. For developing nations like Libya, E-learning offers a strategic solution to overcome geographical barriers, limited resources, and the growing demand for higher education. Engineering at Higher Technical Institutes in the Ubari Region , located in the southern region of Libya, faces unique challenges due to the vast distances between its campuses and the digital divide affecting the region.

While technological infrastructure is often the primary focus of E-learning initiatives, the quality of content, the actual educational material delivered through these systems, remains a decisive factor for user acceptance and system success. Content that is interactive, up-to-date, and pedagogically sound is essential for engaging learners and faculty alike. However, the development of such content requires more than just individual effort; it necessitates substantial Backing in the form of training, funding, and strategic policy.

1.2 Research Problem

Despite various initiatives to implement e-learning in libyan higher technical institutes, success rates have been inconsistent. a significant number of projects fail to achieve their goals due to a lack of focus on "soft" factors like quality of content and the overarching support structures. previous studies in the arab context have highlighted that without high- quality of content that meets the linguistic and cultural needs of users, technology adoption remains superficial. furthermore, the role of the institution in moderating the impact of quality of content on implementation success has been under-researched in the libyan context. this study addresses this gap by isolating "quality of content" as a critical success factor (CSF) and analyzing its interaction with Backing at Engineering at Higher Technical Institutes in the Ubari Region.

1.3 Research Objectives

The primary objectives of this research are:

1. To determine the relationship between **Quality of Content** and the E-learning at Engineering at Higher Technical Institutes in the Ubari Region.
2. To investigate the moderating effect of **Backing** on the relationship between Quality of Content and successful E-learning implementation.

2. Literature Review

2.1 E-Learning in Higher Education

E-learning is defined as the delivery of educational content via electronic media, including the internet, intranets, and multimedia platforms. In the context of Libyan higher education, E-learning is seen as a tool to improve educational quality and accessibility. Arkorful, V., & Abaidoo, N. (2022) However, the transition from traditional methods requires a holistic approach that considers not just technology, but the pedagogical quality of the materials used.

Abusaud, G., et al. (2023) E-learning is strategically defined as the systematic delivery of educational **substance** through advanced electronic media, encompassing global networks and interactive multimedia platforms. Al-Fraihat, D., et al. (2020) Within the Libyan higher education landscape, this digital transition is increasingly recognized as a vital mechanism for enhancing both accessibility and pedagogical excellence. However, achieving successful integration necessitates moving beyond mere technological adoption; it requires a comprehensive focus on quality determinants and institutional backing. Therefore, the effectiveness of E-learning in this Garrison, D. R. (2021) context depends heavily on a holistic framework that aligns technical infrastructure with the instructional integrity of the learning materials, ensuring that digital delivery meets international academic standards.

2.2 Quality of Content as a Critical Success Factor

Quality of Content refers to the accuracy, relevance, interactivity, and pedagogical value of the learning materials provided in the E-learning system.

- **Relevance and Accuracy:** Content must be up-to-date and relevant to the curriculum. Wang (2009) found that accurate information and conciseness are key determinants of E-learning success.
- **Interactivity:** Interactive learning materials engage students more effectively than static text. Research by Sun et al. (2008) indicated that course quality and interactive discussion arrangements are the most critical factors influencing learner satisfaction.
- **Design:** Well-designed content that is easy to navigate enhances the user experience. Hassanzadeh et al. (2012) argued that higher quality of content leads to higher satisfaction and system usage.

In the context of this study, Quality of Content is hypothesized to have a direct positive impact on the implementation of E-learning.

2.3 The Moderating Role of Backing

Backing encompasses the administrative, financial, and technical backing provided by the university. This includes establishing clear visions, providing training for faculty to create digital content, and ensuring the availability of necessary resources. Collis and Moonen (2001) describe Backing as including direct assistance during course preparation and general support for gaining new pedagogical skills. Without this support, faculty members may perceive content creation as time-consuming and burdensome, leading to resistance. Institutional backing serves as the structural scaffolding that transforms individual faculty efforts into systemic success. According to Al-Rahmi et al. (2019), technical support and infrastructure are critical prerequisites that directly influence the "perceived ease of use" among educators, which is essential for technology acceptance. Furthermore, when the institution provides a robust framework,comprising reliable servers and technical assistance, the psychological barriers to e-learning adoption are significantly lowered (Tarhini et al., 2017). Porter et al. (2016) emphasize that without clear strategic incentives and policy-level integration, faculty may prioritize traditional methods due to a lack of institutional validation. In the specific context of engineering education, this support is even more crucial as it involves complex software and simulations that require specialized troubleshooting (Bervell & Arkorful, 2020). This study posits that Backing acts as a moderator, strengthening the positive effects of Quality of Content on E-learning implementation; essentially, while high-quality content provides the "fuel" for digital transformation, institutional backing provides the "engine" that makes that fuel effective in a real-world academic environment (Venkatesh et al., 2012).

2.4 Hypotheses

Based on the literature review, the following hypotheses were developed:

- **H1:** There is a significant relationship between Quality of Content and E-learning.
- **H2: Backing** moderates the significant relationship between Quality of Content and E-learning.

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3. Research Methodology

3.1 Research Design

Research Design This study employs a quantitative research design using a survey method. This approach allows for the statistical testing of relationships between variables and the generalization of results to the target population. According to Creswell and Creswell (2018), a quantitative approach is ideal for establishing the breadth of a phenomenon and identifying patterns through objective measurement. This design facilitates the use of deductive reasoning to test the theoretical framework involving "Quality of Content" and "Backing" (Saunders et al., 2019). By utilizing a survey instrument, the study can collect standardized data from large or small samples of faculty members across different technical institutes, ensuring that the findings are statistically significant and less prone to researcher bias (Neuman, 2014). Furthermore, the structured nature of this design is particularly suited for examining moderating effects, as it allows for the application of Multiple regression to determine how "Backing" influences the implementation process (Hair et al., 2019). Consequently, this methodological choice ensures the internal

validity of the results while providing a clear pathway for replicating the study in other technical educational contexts (Babbie, 2020).

This study the researcher use Statistical Package for the Social Sciences (SPSS) version 21.0 for statistical analysis and a significant level of $p < 0.05$ was adopted for the study. Descriptive analysis was performed using SPSS, Sample Trending Statistical Analysis and Analysis of Multiple Linear Regression.

3.2 Population and Sample

The population consists of faculty members at Engineering at Higher Technical Institutes in the Ubari Region, Libya. A random sampling strategy was used to select participants from various faculties. A total of 105 questionnaires were distributed, with 80 valid questionnaires returned and used for analysis.

3.3 Instrument Development

A structured questionnaire was developed based on previous studies (e.g., Selim, 2007; Sun et al., 2008). The items were measured on a 5-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree.

- **Quality of Content:** Measured by 5 items assessing the design, interactivity, and availability of content (e.g., "I believe that learning will be more interesting through interactive learning materials").
- **Successful Implementation:** Measured by 6 items evaluating the perceived success and potential of E-learning.
- **Backing:** Measured by 9 items assessing financial, technical, and moral support from the Higher Technical Institutes.

3.4 Reliability and Validity

The instrument was pilot-tested, and reliability was measured using Cronbach's Alpha.

- Quality of Content: **0.844**.
- E-learning.: **0.920**.
- Backing: **0.919**. All values exceeded the 0.7 threshold, indicating high reliability. Factor analysis confirmed the validity of the constructs, with KMO values indicating sampling adequacy.

4. Data Analysis and Results

4.1 Descriptive Analysis of Quality of Content

The descriptive statistics for the "Quality of Content" factor reveal positive perceptions among faculty members.

- **Overall Mean:** The general weighted mean for Quality of Content was **3.82** (approx. 76%), indicating high agreement.
- **Key Items:**
  - "I believe that learning will be more interesting through interactive learning materials" scored the highest mean of **3.96**.
  - "Overall, the E-learning environment improves the quality of content, learning and teaching" scored **3.88**.
  - "I find that designing E-learning content and materials is not time consuming and a waste of efforts" scored **3.81**.

These results suggest that faculty members at Engineering at Higher Technical Institutes in the Ubari Region value interactive content and do not view content creation as a wasted effort, provided the environment is supportive.

4.2 Testing Hypothesis H1: Direct Effect

1. Quality and Content Factor

Prove the Hypothesis(H1):

H1 There is significant relationship between quality of content and e-learning.

Regression analysis for *quality of content* factor. The regression analysis result shown in the following tables: table 4.2.1 shows that R Square value is 0.401, which indicates that 40.1% of successful implementation of E-learning can be explained of variance by design and content factor.

Table 4.2.1: Regression analysis result of (R) value related to quality and content factors

Model	R	R Square	Adjusted R Square
1	.633	.401	.399

Table 4.2.2 shows that the value of [F (2,197) = 51.065, P < .000] which indicates that regression model is significant and we can assume that there is a linear relationship between the variables in our model. *Hence*, the model acceptable.

Table 4.2.2: ANOVA table for regression analysis related to *quality of content* factor

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.593	2	40.198	51.065	.000
	Residual	154.289	197	.787		
	Total	274.882	199			

Table 4.2.3 show the regression coefficients results quality of content had also a strong significant relationship on E-learning (B=.244). Hence, hypotheses was supported.

Table 4.2.3: The regression coefficients results related to quality and content factors

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
DV	IV	B	Std. Error	Beta		
E-learning	(Constant)	.733	.206		3.550	.000
	quality of content	.244	.074	.213	3.296	.001

In the summary of prove the hypothesis H1: There is significant relationship between quality and content factors on E-learning referring that design and content factors has significant relationship with of e-learning, Thus the hypothesis H1 achieved through hypothesis H1. Therefore, Regression Equation: Predicted.

Y (dv) = .733+.244 (X1).

Conclusion for H1: The hypothesis is **supported**. High Quality of Content directly contributes to the success of E-learning implementation.

4.3 Testing Hypothesis H2: Moderating Effect of Backing

To test the moderating effect, a regression analysis including the interaction term (Quality of Content and Backing) was performed.

H2: Backing will moderate the significant relationship of quality of content and e-learning.

Regression analysis for gauge the moderating effect faculty quality and content on e-learning. The regression analysis result shown in the following tables:

Table 4.3.1 shows that R Square value is .477, which indicates that 47.7% of E-learning can be explained of variance by quality and content factor with the moderating effect of Backing

Table 4.3.1: Regression analysis result of (R) value related quality and content factor with institutional support moderating.

Model	R	R Square	Adjusted R Square
1	.690	.477	.430

Table 4.3.2 shows that the value of [F (3,196) = 76.988, P < .000] which indicates that regression model is significant and we can assume that there is a linear effect relationship between the variables in our model that means moderating effect quality and content factor e-learning. *Hence*, the model acceptable.

Table 4.3.2: ANOVA table for regression analysis related to design and content factor with moderates of institutional support.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	120.593	3	60.297	76.988	.000
	Residual	154.289	196	.783		
	Total	274.882	199			

To test the moderating effects of institutional support relationships between the dimension of Backing and quality of content on E-learning was assessed as described below Table 4.3.3 show the regression coefficients results: perceived quality of content had a strong significant relationship on E-learning (B=.236). Hence, hypotheses H2 was supported. However, indicating that institutional support has moderating effects.

Table 4.3.3: The regression coefficients results related to quality of content factor

Model			Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Dependent Variable	**Moderate**	**Independent Variable**	**B**	**Std. Error**	**Beta**		
E-learning	Backing	(Constant)	.729	.369		1.979	.005
		quality of content	.236	.074	.265	3.681	.001

In the summary of prove the hypothesis Backing will moderate the significant relationship of quality & content factor E-learning indicating that Backing has moderating effects, Thus the hypothesis H2 achieved Through hypotheses H2. Therefore, Regression Equation: Predicted: Y (dv) = .729+.236 (X1).

5. Discussion

5.1 The Importance of Design and Quality Content

The findings of this study align with previous research by Sun et al. (2008) and Bhuasiri (2012), which identified Quality of Content as a critical determinant of E-learning adoption. The high mean scores for interactivity (3.96) indicate that faculty members at Engineering at Higher Technical Institutes in the Ubari Region are aware that static digital text is insufficient; they desire engaging, interactive materials to enhance the learning experience. The positive correlation (β=0.244) confirms that as the quality of content improves becoming more relevant, bilingual (Arabic/English), and interactive, the perceived success of E-learning implementation increases.

5.2 The Crucial Role of Backing

The moderation analysis provides a novel insight into the Libyan context. While content is king, Backing is the kingdom that sustains it. The significant increase in explained variance (from 40.1% to 47.7%) when Backing is added demonstrates that Quality of Content alone is not enough. Faculty members need the university to provide:

1. **Technical Resources:** To produce high-quality multimedia content.
2. **Training:** To design pedagogically sound E-learning materials.
3. **Incentives:** To value the time spent on content creation.

The results show that faculty members believe "Backing is supporting the widespread use of e-learning" (Mean 4.04) and is critical for "modernization and maintenance" (Mean 3.93). Without this top-down support, even high-Quality of Content initiatives may fail due to a lack of sustainability or infrastructure.

5.3 Contextual Implications for Libya

in the specific case of Engineering at Higher Technical Institutes in the Ubari Region, the dispersed nature of Higher Technical Institutes makes "Quality of Content" even more vital. High-quality, accessible content allows students in remote areas (like Ghat, Tajerhi) to access the same standard of education as those in the inside halls in technical institutes. Ensuring this parity requires content to be aligned with global engineering benchmarks, which mitigates the educational divide often found in geographically marginalized regions (Abou-Khalil et al., 2021). Furthermore, the integration of structured digital modules can compensate for the limited physical access to Higher Technical Institutes halls resources, fostering a more inclusive technical environment (UNESCO, 2022). The study confirms that faculty are willing to engage in content design if the institution provides the necessary backing. This willingness is consistent with research indicating that institutional incentives and technical training are the primary catalysts for faculty adoption of modern pedagogical tools (Ali & Khalil, 2023). Without such support, the transition to specialized digital engineering curricula remains an individual effort rather than a sustainable institutional strategy (Libyan Ministry of Higher Education, 2021). Consequently, strategic investment in faculty digital literacy is essential to maintain the long-term quality of remote technical education (Garrison, 2023).

6. Conclusion and Recommendations

6.1 Conclusion

This study concludes that quality of content is a significant predictor of the E-learning at Engineering at Higher Technical Institutes in the Ubari Region. Furthermore, Backing plays a vital moderating role. The success of E-learning does not depend solely on software or hardware, but on the creation of meaningful, high-quality educational content supported by a committed university administration. Faculty members viewed interactive materials and the availability of bilingual content as essential drivers for success.

6.2 Recommendations

Based on the findings, the following recommendations are proposed:

1. **Content Development Units:** Engineering at Higher Technical Institutes in the Ubari Region should establish dedicated units to assist faculty in developing high-quality, interactive E-learning content.
2. **Training Programs:** The institution must offer training focused on instructional quality and content creation tools to ensure materials meet quality standards.
3. **Bilingual Support:** Given the results regarding content availability, efforts should be made to ensure content is available in both Arabic and English to support diverse learning needs.
4. **Incentivization:** The Higher Technical Institutes should recognize and reward the time and effort faculty members invest in designing digital content, ensuring it is not seen as "time-consuming" but as a valuable investment.

5. **Strategic Funding:** Backing must include financial allocation specifically for the development and maintenance of digital courseware.

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