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A Data-Driven Analytical Evaluation of ICT Portal Features and Their Influence on Faculty User Satisfaction in Higher Education

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Abstract: This study applies predictive analytics to examine how ICT portal quality influences faculty user satisfaction using the ISO/IEC 25010 framework. A quantitative research design employing descriptive, correlational, and predictive analyses was utilized. Data were collected from 88 faculty members through stratified random sampling using a structured questionnaire. Pearson correlation and multiple regression analyses were conducted. Results revealed that ICT portal quality and faculty user satisfaction were rated at very high levels. All system quality dimensions showed strong and significant relationships with satisfaction ($r = 0.73–0.79$, $p < 0.001$). Regression analysis identified reliability, performance efficiency, usability, and security as significant predictors, while functional suitability was not. The model demonstrated strong explanatory power ($R^2 = 0.76$). The findings indicate that faculty user satisfaction is primarily driven by system performance and user experience. This study contributes a predictive analytics-based evaluation model that enables institutions to prioritize ICT system improvements based on measurable impact.

Keywords: ICT Portal Evaluation, Faculty User Satisfaction, System Quality, Predictive Analytics, Regression Analysis

I. INTRODUCTION

Information and Communications Technology (ICT) plays a vital role in transforming educational institutions by enhancing efficiency, communication, and decision-making processes. ICT-driven systems enable the automation of administrative and academic functions, thereby improving service delivery and institutional productivity [1], [2], [3]. In higher education, centralized ICT portals have become essential platforms that integrate various services, including equipment requests, technical support, and academic submissions, into a unified system accessible to faculty members [4], [7].

The effectiveness of ICT systems is commonly evaluated using established frameworks such as the ISO/IEC 25010 model, which defines key system quality characteristics including usability, functional suitability, reliability, performance efficiency, and security [5], [11]. Prior studies have shown that these dimensions significantly influence user satisfaction and system adoption, particularly in academic environments where efficiency and reliability are critical to daily operations [8], [9], [12], [13]. Systems that are easy to use, stable, and responsive tend to generate higher levels of satisfaction among users [10], [16].

Despite the growing implementation of ICT portals in higher education, existing research has largely focused on descriptive evaluations and general user perceptions. While such approaches provide useful insights, they do not sufficiently identify which specific system features have the greatest impact on user satisfaction. Consequently, there is a need for more advanced analytical approaches that move beyond correlation and toward predictive modeling to determine the most influential factors affecting user experience [11], [14], [17].

This study addresses this gap by applying a predictive analytics approach to evaluate ICT portal features and their influence on faculty user satisfaction. By integrating system quality dimensions with regression-based analysis, the study provides a data-driven framework for identifying and prioritizing the most impactful features. This approach shifts ICT evaluation from descriptive assessment to a more decision-oriented model that supports institutional planning and system optimization.

This study is guided by an Input–Process–Output–Outcome (IPOO) conceptual framework, as shown in Fig. 1. The framework illustrates that ICT portal features—specifically usability, functional suitability, reliability, performance efficiency, and security—serve as input variables that are processed through predictive analytics techniques to generate measurable faculty user satisfaction outcomes. It emphasizes that not all system features contribute equally, highlighting the importance of identifying key predictors through a data-driven approach.

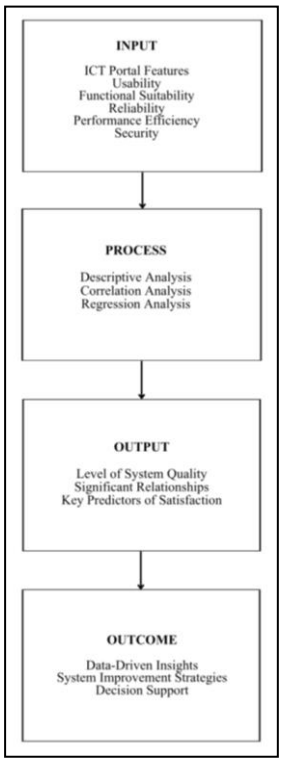

Fig. 1. IPOO conceptual framework of the study.

Specifically, this study aims to evaluate the level of ICT portal features, assess faculty user satisfaction, examine the relationships between these variables, and determine which system quality dimensions significantly predict satisfaction outcomes using multiple regression analysis. By doing so, the study contributes to the development of a predictive analytics-based ICT evaluation model that enables higher education institutions to make evidence-based decisions and enhance system performance.

II. METHODOLOGY

A. *Research Design*

This study employed a quantitative descriptive research design to evaluate ICT portal features and their influence on faculty user satisfaction. The design enabled the systematic collection of numerical data and the analysis of relationships among variables without manipulating study conditions. Descriptive, correlational, and predictive analytical techniques were utilized to achieve the objectives of the study.

B. *Respondents and Sampling*

The respondents of the study were faculty members from the College of Maritime Studies who actively use the ICT portal for academic and administrative services. The total population consisted of 113 faculty members distributed across three departments: Deck, Engine, and General Education.

A stratified random sampling technique was employed to ensure proportional representation across departments. Using Slovin's formula with a 5% margin of error, a total of 88 respondents was determined as the required sample size. Proportional allocation was applied to maintain the population structure across the identified strata.

C. *Research Instrument*

Data were collected using a structured questionnaire based on the ISO/IEC 25010 system quality model. The instrument was designed to measure five key dimensions of ICT portal quality: usability, functional suitability, reliability, performance efficiency, and security, along with faculty user satisfaction.

The questionnaire consisted of three parts: respondent profile, system evaluation, and open-ended recommendations. The system evaluation section included multiple indicators for each dimension and utilized a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

D. *Data Collection Procedure*

Prior to data collection, permission to conduct the study was obtained from the institutional research office. The questionnaires were administered through paper-based distribution to selected respondents. Participation was voluntary, and respondents were informed of the purpose of the study. Confidentiality and anonymity were strictly maintained throughout the data collection process.

E. *Data Analysis*

An analytics-driven approach was applied, integrating descriptive, correlational, and predictive techniques. Descriptive statistics, specifically the weighted mean, were used to determine the level of ICT portal features and faculty user satisfaction.

Pearson correlation analysis was conducted to examine the relationships between ICT portal features and faculty user satisfaction. Multiple linear regression analysis was employed to identify which system quality dimensions significantly predict faculty user satisfaction.

The regression model is expressed as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

where Y represents faculty user satisfaction, and X1, X2, X3, X4 and X5 correspond to usability, functional suitability, reliability, performance efficiency, and security, respectively.

The overall analytical workflow adopted in this study is illustrated in Fig. 2.

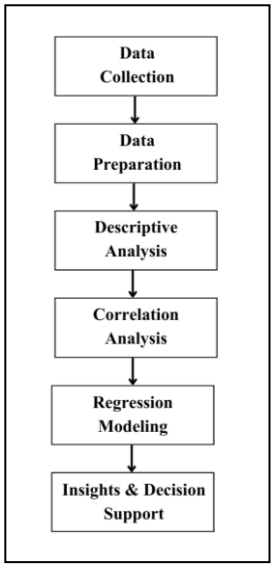

Fig. 2. Predictive analytics workflow of the ICT portal evaluation.

F. *Validity and Reliability*

The research instrument underwent content validation by a panel of experts, resulting in a Content Validity Index (CVI) of 0.92, indicating excellent validity. Reliability testing using Cronbach's alpha yielded an overall coefficient of 0.89, demonstrating high internal consistency of the instrument.

G. *Ethical Considerations*

Ethical standards were strictly observed throughout the study. Participation was voluntary, and informed consent was obtained from all respondents. Data confidentiality and privacy were ensured, and all collected information was used solely for academic purposes. The study adhered to institutional guidelines for ethical research conduct.

III. RESULTS AND DISCUSSION

This section presents the findings using an integrated analytical approach, combining descriptive, correlational, and predictive analyses to explain how ICT portal features influence faculty user satisfaction.

A. *Level of ICT Portal Features and Faculty User Satisfaction*

The level of ICT portal features and faculty user satisfaction is presented in TABLE I. The results indicate that all system quality dimensions were rated at a very high level, with security obtaining the highest mean score. Faculty user satisfaction was likewise rated very high, suggesting that the ICT portal effectively meets user expectations.

However, while descriptive results indicate strong system performance, they do not fully explain which features most significantly influence satisfaction. Further inferential analysis was therefore conducted.

TABLE I
SUMMARY of ICT PORTAL FEATURES and FACULTY USER SATISFACTION

Indicators	Mean	Interpretation
Usability	4.39	Very High
Functional Suitability	4.44	Very High
Reliability	4.34	Very High
Performance Efficiency	4.32	Very High
Security	4.60	Very High
Faculty User Satisfaction	4.54	Very High

B. *Relationship between ICT Portal Features and Faculty User Satisfaction*

The relationships between ICT portal features and faculty user satisfaction are shown in TABLE II. The results reveal that all variables exhibit strong and statistically significant correlations with satisfaction ($p < 0.001$).

These findings indicate that improvements in system quality are consistently associated with higher levels of faculty satisfaction. However, correlation analysis alone does not determine the relative influence of each variable, necessitating further predictive analysis.

TABLE II
CORRELATION BETWEEN ICT PORTAL FEATURES and FACULTY USER SATISFACTION

Variable	r-value	p-value	Interpretation
Usability vs Satisfaction	0.73	p < .001	Strong and Significant
Functional Suitability vs Satisfaction	0.74	p < .001	Strong and Significant
Reliability vs Satisfaction	0.79	p < .001	Strong and Significant
Performance Efficiency vs Satisfaction	0.76	p < .001	Strong and Significant
Security vs Satisfaction	0.77	p < .001	Strong and Significant

C. *Influence of ICT Portal Features on Faculty User Satisfaction*

The results of the multiple regression analysis are presented in TABLE III. The model identifies reliability, performance efficiency, usability, and security as significant predictors of faculty user satisfaction, while functional suitability was found to be not significant.

Among the predictors, reliability exhibited the strongest influence, indicating that system stability and consistency play a critical role in shaping user satisfaction. Performance efficiency and usability also demonstrated substantial contributions, emphasizing the importance of system responsiveness and ease of use.

TABLE III
MULTIPLE REGRESSION ANALYSIS of ICT PORTAL FEATURES

Variables	B	t-value	p-value	Interpretation
Usability (X1)	0.232	2.813	0.006	Significant
Reliability (X3)	0.311	2.423	0.018	Significant
Performance Efficiency (X4)	0.261	2.883	0.005	Significant
Security (X5)	0.211	2.199	0.031	Significant
Functional Suitability (X2)	0.036	0.306	0.760	Not Significant

D. *Model Fit of the Regression Model*

The overall model fit is presented in TABLE IV. The regression model demonstrates a very strong fit, with an R^2 value of 0.76, indicating that 76% of the variance in faculty user satisfaction is explained by the selected ICT portal features.

This result confirms the effectiveness of the predictive model in explaining satisfaction outcomes and supports the use of regression analysis for ICT system evaluation.

TABLE IV
MODEL SUMMARY of REGRESSION ANALYSIS

R	R^2	Adjusted R^2	Standard Error	Interpretation
0.87	0.76	0.75	0.37	Very Strong Model Fit

E. *Issues and Challenges Encountered by Faculty*

The level of issues and challenges encountered by faculty users is presented in TABLE V. The results indicate a low level of issues, suggesting that the ICT portal is generally effective and user-friendly.

Minor concerns were observed in terms of technical issues and system navigation, indicating areas for potential improvement.

TABLE V
ISSUES and CHALLENGES ENCOUNTERED by FACULTY

Indicators	Mean	Interpretation
I experience difficulties while using the ICT portal	2.02	Low Level of Issues
Some features are confusing or unclear	2.07	Low Level of Issues
Technical issues affect system use	2.16	Low Level of Issues

The system is accessible when needed	1.97	Low Level of Issues
Overall Mean	1.97	Low Level of Issues

F. *Discussion*

The findings confirm that ICT portal features significantly influence faculty user satisfaction, supporting established information systems theories such as the DeLone and McLean Information Systems Success Model [21]. Similar findings have been reported in prior studies, which highlight the importance of usability, reliability, and performance efficiency in shaping user experience in ICT-enabled environments [12], [13].

While all system quality dimensions exhibited strong correlations with satisfaction, regression analysis revealed that not all variables exert equal influence. Reliability emerged as the most significant predictor, indicating that system stability and consistency are critical factors in user experience. This finding aligns with recent studies emphasizing the importance of system dependability and performance in digital systems [9], [14].

Performance efficiency and usability also demonstrated strong predictive influence, highlighting the importance of responsiveness and ease of use. These results are consistent with previous research indicating that user satisfaction is highly influenced by system speed, accessibility, and interaction quality [10], [16].

In contrast, functional suitability was not a significant predictor, suggesting that once baseline functional requirements are met, users prioritize performance-related attributes over additional features. This supports findings in recent ICT evaluation studies where performance-related dimensions outweigh feature completeness in determining satisfaction [11], [17].

These findings demonstrate the value of predictive analytics in ICT evaluation. Unlike descriptive and correlational approaches, regression analysis provides a clearer understanding of the relative importance of system features, enabling institutions to prioritize improvements based on actual impact rather than perceived importance. This is consistent with recent research emphasizing the role of predictive modeling in enhancing ICT decision-making processes [3], [14].

Overall, the results support the proposed predictive analytics-based ICT evaluation model and reinforce the need for performance-oriented system design in higher education environments.

IV. CONCLUSION

This study examined the influence of ICT portal features on faculty user satisfaction using a predictive analytics approach based on the ISO/IEC 25010 framework. The findings revealed that reliability, performance efficiency, usability, and security significantly influence faculty user satisfaction, while functional suitability does not significantly predict satisfaction. These results highlight that system performance and user experience are more critical determinants of satisfaction than the mere availability of features.

The study contributes to ICT system evaluation by introducing a predictive analytics-based model that enables institutions to identify and prioritize the most influential system quality dimensions. This approach supports data-driven decision-making and provides a more accurate basis for system improvement and resource allocation in higher education.

Despite its contributions, this study has several limitations. The research was conducted within a single institution, which may limit the generalizability of the findings to other contexts. The use of self-reported data may introduce response bias, and the cross-sectional design does not capture changes in user satisfaction over time. Furthermore, the regression model explains a substantial portion of the variance in satisfaction; however, other factors such as user training, technical support, and institutional policies were not included in the analysis.

Future research may address these limitations by incorporating multi-institutional samples, longitudinal designs, and additional variables to provide a more comprehensive evaluation of ICT system effectiveness.

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