Available online at sjuoz.uoz.edu.krd

journals.uoz.edu.krd

Science Journal of University of Zakho

Vol. 12, No.3, pp.340–344 July-September, 2024

p-ISSN: 2663-628X
e-ISSN: 2663-6298

INNOVATIVE APPROACHES TO ENHANCING USER SATISFACTION IN HIGHER EDUCATION INFORMATION SYSTEMS

Aso K. Ameen [a,b,*], Ismail Y. Maolood [a], Dana A Abdullah [a]

[a] Department of Information and Communication Technology Center (ICTC)-System Information, Ministry of Higher Education and Scientific Research, Erbil, Kurdistan Region, Iraq

[b] Department of Computer Science, College of Science, Knowledge University, Erbil 44001, Iraq

aso.khaleel, ismail.maulood, dana.ali@mhe-krg.org

Received: 8 June., 2024 / Accepted: 7 July., 2024 / Published: 31 July., 2024. https://doi.org/10.25271/sjuoz.2024.12.3.1323

ABSTRACT:

In order to assess how effective information systems are, end-user computing satisfaction (EUCS) is essential. This study evaluates EUCS among 354 employees of the Iraqi Kurdistan Region's (KRI) Ministry of Higher Education and Scientific Research. Through factor analysis, the findings indicate 16-item instrument measuring five core components: content, accuracy, format, ease of use, and timeliness. The results show important patterns and connections, emphasizing how important it is to improve these parts in order to increase user satisfaction. Accuracy had the highest impact on user satisfaction (Standardized Beta = 0.347, $p < 0.001$), and timeliness were particularly important, while format and ease of use had a direct impact on usability. This study gives useful information for improving IT infrastructure and user support. This will help the Ministry create a better, more efficient, and easier-to-use computer environment that meets the needs and expectations of the workforce. In the end, this will lead to higher productivity and user satisfaction.

KEYWORDS: User Satisfaction, content, accuracy, format, ease of use, timeliness, end-user computing satisfaction, Ministry of Higher Education.

1. INTRODUCTION

This area of computer technology is well integrated into the modern global context of organizational line of work development. Research into end-user computing satisfaction (Doll & Torkzadeh, 1988) helps to evaluate the extent to which EUCS is ready to meet the requirements of the end consumer. Consequently, the Ministry of Higher Education in the Kurdistan Region of Iraq (KRI) relies significantly on information systems for administrative and educative practices. Measuring the level of satisfaction of the employees will bring further insights on how the IT resources can be aligned to the organizational goals better. This work looks at EUCS in the Ministry using survey on 354 end-users. After a factor analysis, we improved a 22-item instrument to measure five main factors, namely content, accuracy, format, ease of use, and timeliness. Saputri and Alvin (2020) have discussed the contribution of these components in achieving the user satisfaction with computing systems in earlier research. This indicates the role of EUCS in ensuring that information systems indeed provide value to the users and to the organization. This study's results may assist the Ministry in developing a better user-focused IT plan that will ultimately result in the establishment of an improved computing climate for increased efficiency and user satisfaction.

2. LITERATURE REVIEW

There are numerous ways of examining the effectiveness and efficiency of the electronic system, EUCS is defined as the level of satisfaction that end-users have with computing. Taking the example of Kurdistan Region of Iraq (KRI), the Ministry of Higher Education and Scientific Research uses the electronic technology for official communication as well as learning and administrative purposes. The assessment of the efficiency of EUCS is therefore important to provide an optimum use of the system. This review will discuss the EUCS constituents including content, accuracy, format, ease of use, and timeliness of delivery in regard to their impact on user satisfaction in institutions of learning.

Doll and Torkzadeh (1988) initially validated the EUCS model they have proposed and which has been used and expanded over the years. Some of its components are substantiated by research findings and some expand its applicability.

in additional, quality of the content used in the EUCS has a great influence on the functionality of the system. According to Iivari (2005), of all the factors of system, the role of content and relevance is significant in satisfying the users. It is crucial for educational institutions to provide the content accurate and comprehensive, yet easily accessible. As discussed in the last pertinent studies, including Suryanto et al. (2023), the use of superior content enhances decision-making and user satisfaction. For instance, DeLone and McLean (2003) remark that accuracy is one of the determinants of success in a particular system. Thus, they established that, when there are discrepancies, there is discontent and less utilization of the system. Indeed, a new work from Anderjovi et al. (2022) showed just the degree of the accuracy matters, let alone in contexts where data is the primary currency.

In this context it is possible to state that the format of information presentation has an impact on the perceived satisfaction and usability. Well-formatted information is easier to comprehend and apply, thus providing better usability. Effective information sharing requires compliance with formatting standards, according to DeLone and McLean (2003). This is especially important in learning institutions since the organization of information eases the processes of administration and learning. Nguyen (2021) also emphasizes the importance of format to improve customers' interaction and satisfaction.

* Corresponding author

According to Venkatesh and Bala (2008), there is a positive relationship between perceived ease of use and usage intention as well as usage heightened satisfaction. This is the concept behind the Technology Acceptance Model (TAM). Intuitive systems facilitate the interaction due to a reduced load in cognitive processes. Ease of use is still very important to user satisfaction, particularly with today's complex information systems (Wilson et al., 2021).

Timeliness refers to the accel with which knowledge is provided. Environments like administrative and education require timely info for decision-making and task completion. Timeliness is a key component of information systems because delayed information frustrates users (DeLone and McLean, 2003). emphasize the importance of timeliness for user satisfaction (Akıl and Ungan, 2022).

These factors are supported by practical studies. Academic student satisfaction depends on ease of use and quality content (Saputri and Avin, 2020). Reliability and accuracy are crucial to workplace acceptance and satisfaction (Chau and Hu, 2002) (Field, 2013). As well as examine EUCS's complexity, confirming its relevance in modern information systems research (Pratomo et al., 2023).

3. RESEARCH MODEL AND HYPOTHESES

3.1 Theoretical Framework

The EUCS model by Doll and Torkzadeh (1988) served as the foundation for this paper as shown in Figure 1, which aimed to demonstrate how various aspects of the system's performance affect end-user satisfaction in higher education. Based on the Information System Success Model (ISSM) and Technology Acceptance Model (TAM), this study examines the effects that five important system attributes—content, accuracy, format, ease of use, and timeliness—have directly on user satisfaction (DeLone and McLean, 2003). Previous studies on system satisfaction and usability selected these features due to their theoretical significance and relevance to users' daily interactions with the system.

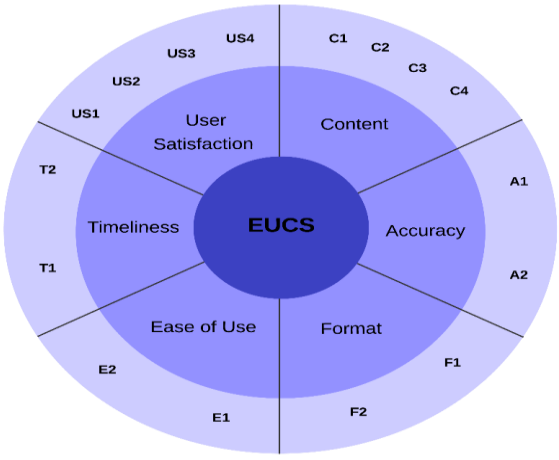

Figure 1. Research model

3.2 Variables

3.2.1 Dependent Variable: Overall user satisfaction reflects users' general perceptions of the system's efficacy and efficiency, which is essential to its success of the system (Petter et al., 2008).
3.2.2 Independent Variable: Content for user satisfaction, the usefulness and relevance of system content are very important (Iivari, 2005). The accuracy of information has a big effect on how users make decisions and how happy they are with the information (Xu and Quaddus, 2012). Format is following standards for formatting makes information easier to use and makes users happier (DeLone and McLean, 2003). Ease of Use also is an important part of TAM because how easy a system is to use directly affects how well it works and how happy its users are with it (Venkatesh and Bala, 2008). Timeliness is fast-paced educational settings, getting information to people on time is very important, and it can affect their satisfaction (DeLone and McLean, 2003).

3.3 Hypotheses

The research model will be used to test the following hypotheses:
H1: Content positively affects overall user satisfaction.
H2: Accuracy positively affects overall user satisfaction.
H3: Format positively affects overall user satisfaction.
H4: Ease of Use positively affects overall user satisfaction.
H5: Timeliness positively affects overall user satisfaction.

4. METHODOLOGY

4.1 Study Design

This research adopted a quantitative research design fitting to assess the correlations between the System attributes ,namely Content, Accuracy, Format, Ease of Use and Timeliness and User Satisfaction among the employees of the Ministry of Higher Education in the Kurdistan Region of Iraq (KRI). The study therefore used cross-sectional research design, in which data were collected using a structured questionnaire to assess the participants' perceptions of the computing system at a given point in time (Creswell, 2014).

4.2 Participants

The respondents were selected based on their job category which included both administrative and academic staff in the Ministry of Higher Education in the Kurdistan Region of Iraq. The questionnaire was delivered to 354 participants and the participants' personal information is presented ,such as age, gender, occupational status, specialty, and computer proficiency as depicted in Table 1 . The selection of participants in the study is crucial to capture the sample of population with enough variability in the variables under testing to test the research hypotheses (Kumar, 2018).

Table1: Respondents' demographic characteristics

	Valid Items	Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Male	228	64.4	64.4	64.4
	Female	126	35.6	35.6	100
Age	26 - 35 yrs	23	6.5	6.5	6.5
	36 - 45 yrs	257	72.6	72.6	79.1
	46 - 55 yrs	61	17.2	17.2	96.3
	56 years more	13	3.7	3.7	100

Occupation	Administrative Staff	253	71.5	71.5	71.5
	Academic Staff	101	28.5	28.5	100
	Nothing	31	8.8	8.8	8.8
Specialty	Humanities	151	42.7	42.7	51.4
	Scientific	172	48.6	48.6	100
	others	1	0.3	0.3	0.3
Qualification	High School - Middle	18	5.1	5.1	5.4
	Bachelor - Institute	232	65.5	65.5	70.9
	Doctorate - Master	103	29.1	29.1	100
Computer Skills	Basic	17	4.8	4.8	4.8
	Intermediate	200	56.5	56.5	61.3
	Advanced	137	38.7	38.7	100

4.3 Data Collection Instrument

As the main source of collecting data, a structured questionnaire was adopted and constructed from literature on digitalisation systems success and user satisfaction based on DeLone and McLean'(2003) model. The questionnaire administered contained questions assessing the content, accuracy, format, ease of use, and timeliness of the product as independent variables and the overall user satisfaction as the dependent variable. The responses were on a Five - Likert scale that ranged from 1' strongly disagree' to 5 'strongly agree'; this enabled the degree of satisfaction regarding different aspects of the system to be ascertained.

4.4 Data Analysis

The data were analyzed using SPSS program. The reliability of the scales was confirmed through Cronbach's alpha, where values higher than 0.7 are considered acceptable for internal consistency (Tavakol and Dennick, 2011). Moreover, correlation analysis was performed to examine the relationships between the independent variables and the dependent variable. Multiple regression analysis was then performed to determine the effect of each independent variable on user satisfaction, allowing assessment of both the individual and combined effects of system characteristics on overall satisfaction (Field, 2013).

5. RESULTS

5.1 Reliability Analysis

In order to ascertain the dependability of the variables utilized in this study, Cronbach's Alpha was computed for each crucial system attribute. Cronbach's Alpha is a statistical metric that assesses the degree of internal consistency within a group of items, indicating how closely they are related to each other. Values beyond 0.70 are often deemed satisfactory, and values surpassing 0.90 suggest exceptional reliability. The data presented in Table 2 indicate that the Cronbach's Alpha values for all variables fell within the range of 0.900 to 0.915, indicating a good level of internal consistency. The variable 'Timeliness' demonstrated the highest level of reliability, as indicated by an alpha coefficient of 0.915. This suggests that the questions used to measure timeliness were highly consistent in their assessment. The overall aggregate dependability for all variables was 0.9092.

Table 2: Cronbach's Alpha Outcomes

Variable	Mean	SD	Cronbach's Alpha
Content	3.9393	0.58654	0.9
Accuracy	3.9096	0.665	0.91
Format	3.911	0.61944	0.908
Ease of Use	4.0028	0.59268	0.913
Timeliness	3.9661	0.62772	0.915
Total	3.9458	0.6183	0.9092

The high Cronbach's Alpha values show that the survey tool used in this study was valid and that the variables that were tested are reliable when looking at the main features of the system.

5.2 Correlation Analysis

Correlation analysis was used to look at how the important parts of the system were connected. For every pair of factors as indicated in Table 3, the Pearson correlation coefficient is shown in the correlation matrix. A Pearson correlation coefficient (r) is a number between -1 and 1. Values closer to 1 mean there is a strong positive relationship, values closer to -1 mean there is a strong negative relationship, and values around 0 mean there is no relationship

.

Table 3: Correlation Matrix for Key System Characteristics

Factors	Content	Accuracy	Format	Ease of Use	Timeliness	Overall Satisfaction
Content	1					
Accuracy	0.687**	1				

Format	0.725**	0.644**	1			
Ease of Use	0.673**	0.592**	0.637**	1		
Timeliness	0.685**	0.580**	0.591**	0.596**	1	
Overall Satisfaction	0.756**	0.759**	0.708**	0.665**	0.676**	1

All of the correlations were statistically significant at the 0.01% level, which means that the links between the factors are not likely to be random. 'Overall happiness' and 'Accuracy' had the strongest correlation ($r = 0.759$, $p < 0.01$), which means that perceived accuracy is strongly linked to overall user happiness. 'Overall Satisfaction' and 'Content' were then linked ($r = 0.756$, $p < 0.01$).

The strong positive correlations show that improvements in one characteristic are probably linked to improvements in others. This shows how these system attributes are connected and how they affect user happiness as a whole.

5.3 Regression Analysis

A multiple regression analysis was performed to evaluate the prediction ability of the key system attributes on overall satisfaction. The regression model incorporated the independent variables 'Content', 'Accuracy', 'Format', 'Ease of Use', and 'Timeliness', while the dependent variable was 'Overall Satisfaction'. The findings, as presented in Table 4, indicate that all of the independent variables have a substantial impact on overall satisfaction. Among these variables, 'Accuracy' exhibits the most influential effect (Standardized Beta = 0.347, $p < 0.001$). The results show that accuracy has the highest impact on user satisfaction, followed by 'Content' (Standardized Beta = 0.208, $p < 0.001$) and 'Timeliness' (Standardized Beta = 0.167, $p < 0.001$).

Table 4: Regression Analysis Summary

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	P Value
Content	0.216	0.052	0.208	4.163	<0.001
Accuracy	0.318	0.038	0.347	8.388	<0.001
Format	0.157	0.043	0.159	3.613	<0.001
Ease of Use	0.122	0.042	0.118	2.88	0.004
Timeliness	0.163	0.039	0.167	4.132	<0.001

The high t-values and low p-values suggest that the variables provide a significant contribution to the model. Among the predictors, 'Accuracy' stands out with the highest t-value of 8.388, highlighting its importance in predicting total satisfaction.

5.4 User Satisfaction

Practical comprehension of users' perception of various features of the system was achieved by calculating user satisfaction percentages for each system attribute. The findings, displayed in Table 5, indicate that the 'Ease of Use' factor achieved the greatest satisfaction rate of 80.06%, suggesting that users perceived the system as user-friendly. The overall satisfaction rate was 78.77%, indicating a predominantly pleasant user experience in all aspects.

Table 5: Percentage of User Satisfaction for All Factors

Factors	Mean	Percentage Satisfaction (%)
Content	3.9393	78.79
Accuracy	3.9096	78.19
Format	3.911	78.22
Ease of Use	4.0028	80.06
Timeliness	3.9661	79.32
User Satisfaction	3.9025	78.05
Combined Overall Satisfaction	3.93855	78.77

5.5 Summary Findings

According to the results of this study, overall dependability was at a fairly high point, and the features considered vital in the system had considerably positive impacts on user satisfaction. This indicates high reliability and internal consistency of the survey instrument in measuring the variables, given that the obtained Cronbach's Alpha values were above the recommended 0. 7. As for the correlation coefficients, all the parameters proved strong positive correlations if overall satisfaction and accuracy had to be highlighted as the most evident connections, stressing the value of accuracy in representing the complete satisfaction of the clients. The regression study also corroborated the past studies suggesting that 'Accuracy' is the most significant factor that determines overall satisfaction with 'Content' and 'Timeliness' being the other measuring parameters. These findings point towards the importance of enhancing the general quality and accuracy of the content in system design for the purposes of user happiness. Similar results were found in the user satisfaction percentages, suggesting a good level of acceptance of this system; here again the 'Ease of Use' received the highest rating. This means that improving on the usability of the systems is likely to play a major role in an increased satisfaction. All in all, this research provides valuable information into what defines user satisfaction concerning system characteristics and can therefore point to amendments in the future or necessities in design.

DISCUSSION

From the study, it has been established that the various dimensions of the digitalization systems used in the Ministry of Higher Education in the Kurdistan Region of Iraq have an impact on system user satisfaction in terms of accuracy, content, easiness, and timeliness. These findings provide support to the improved model of user satisfaction that includes motivational factors as proposed by Venkatesh and Bala (2008) and the Dillon and McLean (2003). The criteria for selection were defined based on the fact that accuracy was considered the most basic requirement, in accordance with the concept highlighted in the

article by Xu and Quaddus (2012). As highlighted by Zhang Li and Scialdone (2015), there are main elements in the construction of an efficient system and include timeliness and accuracy of the content. This study reinforces the research hypothesis that the knowledge of the various system satisfactions would further the development of educational and administration management systems. Nevertheless, it is necessary to acknowledge the fact that the research focus on the distribution of employees in the higher education system can prevent the finding from being applicable to other institutions. From the research study results, the following research topic could be considered for future research: Examining ways in which system improvements impact on users' organisational contexts and time frames through subsequent empirical studies carried out in a diverse number of system settings.

CONCLUSION

This research has successfully shown how the system factors, such as content, correctness, format, ease of use, and time factors can positively affect the user satisfaction in the digital system of the Ministry of Higher Education in the Kurdistan Region of Iraq. The findings of the present research support the importance of the accuracy aspect as the most efficient one underlining the importance of accurate and trustworthy information in learning context. Give concrete recommendations to the Ministry of Higher Education resulting from the study, such as the need to prioritize improvements in system accuracy and ease of use, which could make the work more actionable. Realistic correlations exist and each of the above regression coefficients is also significant, which implies that by increasing these system features, it is possible to foster growth in user satisfaction in higher education institutions, which is an important area of management in these organizations. They are not only extending these literatures and enhance the theoretical framework of the acceptance model of those systems but also offer implications for administrative and technical designers in the higher education sector. Thus, by focusing on these aspects, it is possible to enhance the technological interaction between users of Ministry institutions and requirements, with the overall aim of constructing a more straightforward and satisfying relationship with the digital. We propose the following research avenue for Future study should examine this relationship in a range of cultural and institutional contexts to enhance the generalizability of these conclusions to the sphere of user satisfaction. It would further help in understanding the issues related to digital acceptance as well as user satisfaction with the existing systems of higher education across the world.

REFERENCES

Doll, W.J. and Torkzadeh, G., 1988. The measurement of end-user computing satisfaction. MIS quarterly, pp.259-274.

Saputri, N.A.O. and Alvin, A., 2020. Measurement of User Satisfaction Level in the Bina Darma Information Systems Study Program Portal Using End User Computing Satisfaction Method. Journal of Information Systems and Informatics, 2(1), pp.154-162.

DeLone, W.H. and McLean, E.R., 2003. The DeLone and McLean model of information systems success: a ten-year update. Journal of management information systems, 19(4), pp.9-30.

Petter, S., DeLone, W. and McLean, E., 2008. Measuring information systems success: models, dimensions, measures, and interrelationships. European journal of information systems, 17, pp.236-263.

Iivari, J., 2005. An empirical test of the DeLone-McLean model of information system success. ACM SIGMIS Database: the DATABASE for Advances in Information Systems, 36(2), pp.8-27.

Venkatesh, V. and Bala, H., 2008. Technology acceptance model 3 and a research agenda on interventions. Decision sciences, 39(2), pp.273-315.

Chau, P.Y. and Hu, P.J., 2002. Examining a model of information technology acceptance by individual professionals: An exploratory study. Journal of management information systems, 18(4), pp.191-229.

Creswell, J.W. and Creswell, J.D., 2017. Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.

Kumar, R., 2018. Research methodology: A step-by-step guide for beginners. Research methodology, pp.1-528.

Field, A., 2013. Discovering statistics using IBM SPSS statistics. sage.

Tavakol, M. and Dennick, R., 2011. Making sense of Cronbach's alpha. International journal of medical education, 2, p.53.

Bos, J., 2020. Research ethics for students in the social sciences (p. 287). Springer Nature.

Suryanto, A., Nurdin, N., Irawati, E. and Andriansyah, A., 2023. Digital transformation in enhancing knowledge acquisition of public sector employees. International Journal of Data and Network Science, 7(1), pp.117-124.

Anderjovi, S., Hamzah, M.L., Maita, I. and Ahsyar, T.H., 2022, April. User Satisfaction Analysis of E-Learning Using End User Computing Satisfaction in Covid 19. In Proceedings of the 4th African International Conference on Industrial Engineering and Operations Management Nsukka, Nigeria (pp. 5-7).

Nguyen, N.T., 2021. A study on satisfaction of users towards learning management system at International University–Vietnam National University HCMC. Asia Pacific Management Review, 26(4), pp.186-196.

Wilson, N., Alvita, M. and Wibisono, J., 2021. The effect of perceived ease of use and perceived security toward satisfaction and repurchase intention. Jurnal Muara Ilmu Ekonomi dan Bisnis, 5(1), pp.145-159.

Akıl, S. and Ungan, M.C., 2022. E-commerce logistics service quality: customer satisfaction and loyalty. Journal of Electronic Commerce in Organizations (JECO), 20(1), pp.1-19.

Pratomo, A.B., Harahap, M.A.K., Oswari, T., Akhirianto, P.M. and Widarman, A., 2023. The Application of End User Computing Satisfaction (EUCS) to Analyze the Satisfaction of MyPertamina User. Jurnal Sistim Informasi dan Teknologi, pp.78-83.