User Experience Investigation of Students Information System

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Abstract

Conducting studies on the user experience (UX) of the student information system (SIS) is extremely important for improving system performance, measuring students' satisfaction and ensuring continued use of these systems. Evaluating the UX of systems will help students to achieve their academic goals efficiently. Therefore, the present study delves into students' views and investigates their UX with the SIS currently implemented at Shoubak University College. Data are taken from 144 students who have used the system, the study adopted an online questionnaire for data collection. Data have been processed and analyzed to study students' perceptions and experiences in using SIS. Six dimensions were used to investigate the UX for SIS. Results showed that students have an affirmative UX. The system's Dependability, Efficiency, and Stimulation have been ranked higher than Perspicuity, Novelty, and Attractiveness. The overall average for the six dimensions is 4.37, which indicates that the SIS was highly appropriate for students. This study highlights the importance of conducting UX evaluations of the SIS regularly. Moreover, results also contribute to cutting-edge research on students' UX with SISs and their ongoing use.

Key Words: User Experience, Usability, Perception, Student Information System, Human Computer Interaction.

1 Introduction

Recently, numerous areas of research have emerged, which referred to the use of student information systems (SIS) design. Successful SIS empowers students to enhance their productivity and improve the operational efficiency of their academic services [16]. SIS enables students in higher education to carry out many operations, such as courses registration, maintaining grades, obtaining transcripts, following the study plan, and creating progress reports. SIS have become widely used in the universities. However, these systems need to be periodically evaluated to make them more productive. The effectiveness and efficiency of such systems has a significant impact on the operation and performance of stakeholder groups [14], [38]. Usability of SIS is very critical in the system development. Therefore, SIS's key features need to be clearly defined, and suitable valuation criterion must be developed to measure them [4]. The Human-Computer Interaction research concentrates on promoting the effectiveness and efficiency of human-Information systems interaction [29]. To determine the extent of the user's participation in the design and development of the system in order to fulfill the user's requirements successfully, usability and user experience (UX) are the two main terms used to measure the Human-Computer Interaction [40]. Usability allows a user to assess a system's usability and acceptability of any system [18]. The simplified usability aspects are necessity since many users use SIS to perform academic duties [23]. Lately, UX has attracted the attention of researchers in academia and industry, due to its role in the success of products. UX improves user contentment by enhancing usability and users-computers interaction [39]. Paying attention to developing systems through applying activities of UX design that contributes to achieving many features that enhance user satisfaction. UX is regarded as a pivotal element in designing products and services [13]. UX must be systematically evaluated to show its effectiveness [32]. Due to its importance, researchers have proposed many frameworks and models for designing and evaluating the UX of interactive systems, which can be used as a guide to improve the quality and design of interactive systems [35]. Although user opinions have been studied for a range of information systems, there are few usability studies that focus explicitly on student evaluations of SIS in terms of usability and value. Accordingly, identifying and evaluating the components of the SIS is crucial [15]. UX is essential to understand, along with the analysis of system procedures and usability. Designing usable SIS is fundamental. However, the researcher believes that there is a lack of studies that examined the development and analysis of SIS in terms of students' perceptions and their UX in Jordan. Therefore, this study was conducted in the field of UX, focusing on investigating the SIS at Shobak University College. It is the first proposed study to assess the system's UX. To achieve this, the author designed a questionnaire to investigate students' perceptions of the system and their experience using it, presenting the system as a case study.

2 Literature Review

Higher education institutions in developing countries have become primarily dependent on computer systems to manage the administrative and academic aspects, and the SIS is considered one of the vital used systems [21]. Despite of the widespread use of SIS in the academic environment, it

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is important to evaluate these systems on an ongoing basis to increase their productivity and effectiveness [15]. Studies that have examined the usability of educational software have emphasized that developers must have a comprehensive understanding of the end user's needs to build the systems [31]-[36]. Besides that, from the perspective of human-computer interaction, defining the usability level of a SIS is a major consideration for systems development [24]. According to previous studies, some concentrate on SIS development, whilst others explore SIS regarding usability, UX, and perceptions. The authors [1] have pointed the development and design to implement a complex of the SIS. The motivation behind the study was to identify the main points that should be taken into consideration in the SIS design and development stages. The results of the study indicated that the new SIS is highly valuable and meet the university's academic policies. In addition to that, the researchers in the study [22] built a SIS for the faculty, explaining the steps to develop the system effectively to replace the old one. They pointed out that the new system may contribute to obtain new knowledge in this field, usability, and improving planning and scheduling. Usability is the study that links between systems and users, tasks, and expectations within the realm of practical application [37]. In terms of SIS usability, the authors in [28] evaluated the usability requirements of an SIS. They used several tasks to guide users in operating the system. The results revealed that interactive design, task completion efficiency, and interactivity affect the usability of the system. A similar study was conducted at Near East University to examine the usability of the SIS. Results concluded recommendations for improving the user interface and enhancing the attractiveness of the system [34]. The author of study [21] reported that designing a useful SIS system is crucial when managing the administrative and academic aspects of universities. To confirm the importance of the SIS at the level of students, instructors, and administrators. The author in [12] conducted a study at Kalinga State University to evaluate the performance of the existing SISs for improvement. The author used observations and interview methods to clarify the perceptions of students, instructors, and administrators. Based on the evaluation results, the current system was improved by including additional functions that meet the needs of users. As mentioned in [20] Usability is related to the functional part of the system. UX pertains how users interact with the system that includes their emotional and attitudes [20]. The authors in [6] have pointed out that the UX is concerned with comprehending users, their interests, requirements, and their strengths and weaknesses. They emphasized that investigating the UX enhances users' interaction with the system and heightens their perceptions. According to [13] they mentioned that UX encompasses the users' perception of usability, which assess the usefulness and effectiveness of the system from the users' point of view. Therefore, it is important to discover measurements for a successful and effective UX. In this aspect, several frameworks have been proposed for designing and evaluating UX, the author in [23]created a User Experience Questionnaire (UEQ) that assess UX. The questionnaire includes six scales that measure usability across six dimensions, these are: attractiveness, efficiency, perspicuity, dependability, stimulation, and novelty to provide a comprehensive representation of the UX. The authors in [4] examined students' perceptions and evaluate the UX of the SIS currently implemented at a higher education institution in Kuwait. Results indicated that the students had a slightly favorable UX towards the SIS. Similarly, in [25], [11] they have applied the UEQ to assess UX.

3 Method

To achieve the study objective, the researcher developed and modified the questionnaire as a research tool according to the questionnaire developed by [23]. The author used the six dimensions of user experience in a different way based on the previous study, following their recommendations to evaluate the user experience of interactive systems. The questionnaire consisted of six parts which investigate students' UX with the SIS and composed of 20 questions were formulated in Arabic to be suitable for the sample. All the answers are designed with a five-category Likert-type scale. The five categories of answers are Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1), to respond to all questions.

Table 1: Correlation between dimensions and the total score, including Cronbach alpha coefficients for each dimension.

Dimension	Attractiveness	Efficiency	Perspicuity	Dependability	Stimulation	Novelty	Cronbach's Alpha
Attractiveness	1						0.86
Efficiency	0.71**	1					0.89
Perspicuity	0.70**	0.81**	1				0.89
Dependability	0.56**	0.73**	0.71**	1			0.84
Stimulation	0.65**	0.57**	0.56**	0.72**	1		0.91
Novelty	0.54**	0.52**	0.53**	0.67**	0.80**	1	0.92
Total	0.84**	0.87**	0.87**	0.85**	0.83**	0.78**	0.96

$p < 0.01$

The Cronbach Alpha method was used to assess the questionnaire's internal consistency after it was administered to a pilot sample of 50 students from outside the study sample. As shown in Table 1, the Cronbach Alpha for the total score is (0.96), and reliability coefficients for the dimensions range from 0.84 to 0.92. We assessed the scale's construction validity and internal consistency reliability by computing correlation coefficients between items and their dimensions and between dimensions. The results were as follows: the correlation coefficients between the questionnaire dimensions and the scale's overall score were calculated and reported in Table 1.

Table 2: Correlation coefficients of questionnaire items with dimensions and overall score.

Dimension Name	Item Number	Dimension	Total
Attractiveness	A1	0.83**	0.66**
	A2	0.88**	0.71**
	A3	0.87**	0.79**
	A4	0.75**	0.67**
Efficiency	E1	0.88**	0.75**
	E2	0.91**	0.78**
	E3	0.93**	0.82**
Perspicuity	P1	0.82**	0.78**
	P2	0.89**	0.81**
	P3	0.89**	0.71**
	P4	0.91**	0.78**
Dependability	D1	0.89**	0.75**
	D2	0.88**	0.77**
	D3	0.86**	0.72**
Stimulation	S1	0.90**	0.78**
	S2	0.94**	0.79**
	S3	0.93**	0.75**
Novelty	N1	0.94**	0.76**
	N2	0.94**	0.74**
	N3	0.91**	0.69**

$p < 0.01$

The correlations between the questionnaire's dimensions and the overall score ranged from 0.78 to 0.87, while the correlation between the questionnaire's dimensions ranged from 0.52 to 0.81. Table 2 shows the correlations between each item and the dimension to which it belongs, as well as the scale's total score. The values of the correlation coefficients of the items with their dimension ranged between 0.75 to 0.94, which is greater than the values of the correlation coefficients between the items with the total score, which ranged between 0.66 and 0.82, indicating the validity of the questionnaire's internal structure, the independence of the dimensions, and the possibility of using the dimensions scores. Accordingly, the questionnaire was reliable and broadly applicable.

To describe the degree of students' responses to the questions, the author adopts the following standard: the degrees are categorized as high when the mean value is ≥ 3.67, moderate when the mean value is between 2.33 and 3.66, and low when the mean value is ≤ 2.32.The range is calculated as (5 - 1) / 3 = 1.33. To analyze the study data means and standard deviations were calculated by SPSS version 24. The sample for this study was drawn from the students at Shoubak University College, a college of Al-Balqa Applied University in Jordan. The college had a total student enrollment of 567, from which a random sample of 150 students was selected using a probabilistic sampling method to ensure representativeness. These students were chosen to participate in the study, which involved completing an electronic questionnaire distributed via institutional email. The survey period lasted for two weeks, and a total of 144 valid responses were obtained, yielding a response rate of 96%. This sample size provides a robust basis for generalizing the findings to the broader population of students who use the SIS at Shoubak University College.

4 Result and Discussion

There are many studies that have addressed the impact of technology on students' perceptions of systems, but research that specifically focuses on studying the user experience of the used SIS is still limited. The majority of previous studies have focused on factors such as academic performance or technological efficiency, but student perception and user experience of these systems have not been adequately investigated. Therefore, this study seeks to fill this gap by investigating the user experience of the student information system in a higher education environment. Accordingly, the data was analyzed, and the means, standard deviations (SD), and degree of students' response for each item within the dimensions were calculated, as shown in Tables 3 to 8.

Table 3: Means, Standard Deviation, and degree of Attractiveness Dimension(A) Items.

No.	Items	Mean	Std. Deviation	Degree
A1	The design of the system's screens is exciting	4.26	0.842	High
A2	The system is enjoyable to use	4.28	0.815	High
A3	I find the interface of the system attractive	4.16	0.913	High
A4	The system is user-friendly	4.33	0.775	High

To investigate the attractiveness dimension, four items were used and are listed in Table 3. The items of this dimension are referred to whether the system appears appealing and enjoyable to the user. Students' responses analysis demonstrated that the attractiveness of SIS is recognized in table 3. Result can be interpreted as affirmative, indicating that attractiveness is generally excellently received among students. The average mean value of attractiveness is 4.15, its ranking came in the lowest place among the six dimensions. Aesthetics is a

collection of precepts underlying and guiding that Pertains to a design's attractiveness. There are many aspects related to visual design such as consistency, color, association, pattern, scale, and visual significance that contribute to users' engagement by helping them perform appropriate system functions smoothly [7]. Consequently, system designers must be concerned with using aesthetics to enhance usability, innovation, and attractiveness when designing systems [17].

Three items were used to investigate the efficiency dimension of SIS as shown in Table 4. The items of this dimension are referred to the capacity of users to perform their tasks expeditiously and without unnecessary effort. Efficiency positively affects the system quality, by evaluating how quickly users complete their tasks [30]. The overall mean value for this dimension is 4.36, which indicates the efficiency of SIS and the students' agreement on its efficiency. The efficiency dimension was ranked second among the six dimensions.

Table 4: Means, Standard Deviation and Rank of Efficiency Dimension (E) items

No.	Items	Mean	Std. Deviation	Degree
E1	The system's commands are performed rapidly	4.28	0.848	High
E2	I find the system meets my needs	4.39	0.878	High
E3	I find the system is effective	4.40	0.822	High

Table 5 shows that four items were used to investigate perspicuity. Perspicuity indicates that the SIS is clear, simple, easy to use, easy to learn, and familiar to user. This dimension was ranked the fifth of the dimensions with an overall mean value of 4.29, which indicated that the Perspicuity of the SIS was recognized, suggesting that the system is generally easy to use and learn by students. According to [27], a well design enhances learnability and usability by enabling users to quickly understand system interfaces without the need for formal training. Authors in [2] pointed out that providing appropriate training and guidance to the students on how to use the systems are the responsibility of educational institutions. As a result, training and guidance are critical issues for educational institutions to achieve optimal use of technology by students.

Three items were utilized to investigate dependability which relates to the system's predictability, security, and meeting user expectations as shown in Table 6. The items of this dimension are pointed to the system reliability, security, and accuracy. The students provided excellent responses to this dimension, with a mean value score 4.46, indicating that students highly agree that the SIS is trustworthy. The ranking of this dimension among the six dimensions is first. The level of trust that users place in a system is often determined by Dependability, which is a non-functional characteristic of the system. To better enhance Dependability, the author indicated in [9] that it can be defined as the ability to avoid system failures more frequent than is acceptable. Dependable software often receives praise from its users, so in the system development life cycle, great importance must be given to this dimension and emphasis must be placed on design integration for dependability [26].

Table 5: : Means, Standard Deviation, and degree of perspicuity Dimension(P) Items.

No.	Items	Mean	Std. Deviation	Degree
P1	The system is easy to understand	4.40	0.693	High
P2	The system is easy to learn	4.45	0.708	High
P3	The system does not require training	4.12	0.953	High
P4	The system can be used without needing help from others	4.18	0.973	High

Table 6: Means, Standard Deviation, and degree of Dependability Dimension(D) Items.

No.	Items	Mean	Std. Deviation	Degree
D1	The system carries out my tasks accurately	4.34	0.795	High
D2	The system is reliable and meets my expectations	4.51	0.648	High
D3	I am interacting with a secure system	4.54	0.635	High

The stimulation dimension was also investigated using three items as shown Table 7. The items of this dimension measure the system whether its use is motivating, exciting, and interesting. The students provided high responses to this dimension, with mean value score 4.35, this dimension ranked third among the six dimensions. Based on the result, the students agreed that the system is stimulating. The authors in [8], [19] indicated that motivation and excitement play a role in increasing students' attitudes toward using the system.

The last dimension is novelty which investigates the system in terms of whether its design is innovative and creative. Three items were utilized to investigate novelty as shown in Table 8. The students gave excellent reactions to this dimension, with a mean score 4.30, this dimension ranked fourth among the six dimensions. In general, the students agreed that the system is novel. Innovation, creation, and invention are further aspects of novelty that redound to UX [3]. Affirmative novelty can promote user involvement, delight, and overall contentment [32]. A great UX requires innovation, creativity, and an understanding of the user's desires. However, the usability of the system and the user's needs must be considered to ensure that innovation and creativity in system design contribute positively to the user experience [5].

Table 7: Means, Standard Deviation, and degree of Stimulation Dimension(S) Items.

No.	Items	Mean	Std. Deviation	Degree
S1	I find the system motivating for pursuing my academic matters	4.39	0.730	High
S2	I think the system is interesting	4.35	0.778	High
S3	The quality of operations in the system stimulates me to use it	4.31	0.796	High

Table 8: Means, Standard Deviation, and degree of Novelty Dimension(N) Items.

No.	Items	Mean	Std. Deviation	Degree
N1	I find the system in use is innovative	4.28	0.761	High
N2	I find the system in use is creative	4.29	0.792	High
N3	Technically, the system is sophisticated and advanced	4.32	0.833	High

Figure 1 shows a comparison of the six dimensions to investigate UX. To indicate the level of the six dimensions of UX, the mean values were used: 4.46 for Dependability, 4.36 for Efficiency, 4.35 for Stimulation, 4.30 for Novelty, 4.29 for Perspicuity, and 4.26 for Attractiveness. The overall average for the six dimensions is 4.37 indicating that the SIS is held in high esteem by the students.

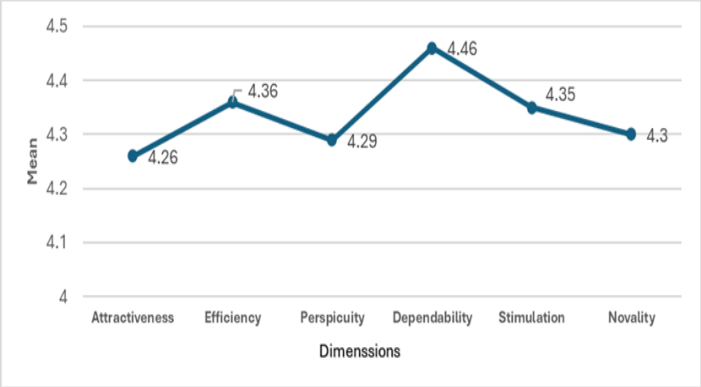

Figure 1: Comparing of Mean Values of the six dimensions for UX investigation.

According to the investigation findings, students held a favorable perception of the SIS. The results of the study shed light on the assessment of the SIS and were generally positive. Results showed that students have an affirmative UX. The system's Dependability, Efficiency, and Stimulation have been ranked higher than Perspicuity, Novelty, and Attractiveness. The overall average for the six dimensions is 4.37, which indicates that the SIS was highly appropriate for students. However, the study's result supplies some indication for UX designers, developers, and management of universities to ensure the continuous use of the SIS. In light of comparing the results of this study with previous studies, the researcher believes that the slight superiority of the study is mainly due to the nature of the tool used to collect data. Although all studies relied on the questionnaire as the main tool. The tool used in this study may have been clearer and more comprehensive, which led to a more accurate understanding of the questions by the participants. Also, it is possible that the questionnaire was modified to better suit the culture and local context of the participants, which enhanced the accuracy of the extracted data, which may explain the relative superiority of this study compared to previous studies. Despite the valuable results of the study, there are some limitations that require further studies to address them. The selected sample is not representative of all colleges affiliated with Al-Balaq Applied University. The continued use of the SIS may be subject to factors other than the factors used in this study.

5 Conclusion

There is an increasing interest in higher education institutions in developing countries in using SIS's, and there is a need to ensure that these provided systems meet students' expectations, which in turn lead to the continued use of these systems. Therefore, the current study examined the UX of the SIS, by analyzing students' perceptions. To achieve the goal of the study, the strengths and weaknesses of the design, usability, and UX of the SIS currently in operation at Shoubak University College were examined according to six basic variables for successful systems. Based on the results, the participants have a favorable impression of the currently used SIS. As for the UX dimensions, the results revealed that dependability, efficiency, and stimulation received somewhat higher ratings compared to the rest of the remaining user experience areas, which are attractiveness, novelty, and perspicuity. In general, the results indicated that there is general satisfaction with the SIS currently in use. System designers and developers must work to improve the attractiveness of the system, such as designing the system screens in a more attractive way, as well as providing users with training content to clarify how to use the system and providing attractive features to implement system operations. In addition, designers and developers must follow ongoing developments in the field of human computer interaction technology; to benefit from the advantages provided by this technology, and to avoid the disadvantages that may result from it. Future work should focus on the importance of the process of continuous evaluation of SIS's and conducting largescale research in other colleges and compare the results using the tool used in this study, in order to develop innovative systems equipped with

smart functions that contribute to increasing student interactions and productivity. Also, conduct further studies to investigate other diminssions that may play a role in improving the user experience of using SIS. Currently, students rely on accessing the SIS through mobile devices, so higher education institutions must guide the relevant parties to design these systems in accordance with mobile devices and ensure access to the systems through multiple platforms. This study highlights the importance of conducting UX evaluations of the SIS on a regular basis. Moreover, the results of this study also contribute to the state-of-the-art studies related to the student's UX of SISs in higher education institutions and their continued use, as well as anticipating solutions for decision-makers in developing strategies that foster the creation of innovative systems that contribute to increasing student interactions and productivity, which enhances their academic achievements.

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