

ACCEPTANCE OF THE BLOOD BANK INFORMATION SYSTEM (BBIS) AT HOSPITAL RAJA PEREMPUAN ZAINAB II, KOTA BAHRU, KELANTAN: AN APPLICATION OF THE UTAUT MODEL

Rohana Yusof¹, Abdul Hanan Abdullah² and Salimah Abdullah^{3*}

¹Ms, Universiti Kuala Lumpur Malaysian Institute of Industrial Technology, Malaysia,
rohanay@unikl.edu.my

²Prof. Dr, Universiti Teknologi Malaysia, Malaysia, hanan@utm.my

³Dr, Hospital Raja Perempuan Zainab II, Kelantan, Malaysia, drhjhsalimah@gmail.com

*Corresponding author

Abstract

Management of the Hospital Raja Perempuan Zainab II (HRPZ II) has taken the initiative to improve the system of blood collection and processing by developing the Blood Bank Information System (BBIS). This system enables the data from blood screening to be automatically linked to the original donor providing the hospital blood center with important information on good and high risk donors. The unified theory of acceptance and use of technology (UTAUT) was used to study the user acceptance of the BBIS. Data was analyzed with Statistical Package for Social Science (SPSS) version 20. This research showed significant positive relationship between Performance Expectancy (PE), Effort Expectancy (EE), Social influence (SI) and Facilitating Conditions (FC) on overall BBIS usage behaviour (BIU). These findings will generate important information to the HRPZ II management in facilitating effective BBIS usage.

Keywords: User Acceptance, UTAUT, Blood Bank Information System, Hospital Raja Perempuan Zainab II, Kelantan.

1. INTRODUCTION

Hospital Raja Perempuan Zainab II (HRPZ II) in Kota Bahru Kelantan is a government hospital and is the biggest in the state of Kelantan. The pathology department of this hospital functions as the blood bank for the state of Kelantan and performs blood screening from donors where dozens of tests are performed on each sample to establish blood type and test for transfusion transmissible diseases (TTD). The manual blood donation processing at HRPZ II creates difficulties in matching blood screening results to the original donors resulting in late identification of high risk donors and inaccurate statistics on blood donation process which inhibits the blood bank quality management and continuous improvement programs.

To overcome this problem, the management of HRPZ II collaborated with Faculty of Computer Science and Information System, Universiti Teknologi Malaysia (FSKSM, UTM) in developing an integrated computer system for the blood donation process named Blood Bank Information System (BBIS) (Auzir, 2007). The BBIS integrates the blood donation process from registration, blood screening until tagging of the blood. The BBIS not only allows anonymity during blood screening but provide the hospital with fast and accurate information on the status of donors. High risks donors will be automatically identified and deferred upon registration. This not only reduces the risk of blood contamination from TTD but will also reduce cost in term of time saving and cost associated with errors. Reports and statistics related to the blood bank can also be retrieved easily for accurate information to generate better planning and management of the blood bank. The system is currently in full use and works continuously with interruption to the system only happens when the internet is

down.

A good healthcare IT system cannot be a success without the end users acceptance. The users of the BBIS system consist of hospital attendances, nurses, student nurses, doctors, laboratory personnel and technicians. With the relatively diverse users' backgrounds, a user acceptance study on the BBIS is essential to facilitate the HRPZ II management in achieving maximum and effective system usage.

2. LITERATURE

Computerization of the healthcare process has benefited the health community (Urschitz, M. et. al. 1998). A computerize system improve the hospitals' data management systems by automatically collecting, displaying and storing data for further processing. It also generates time and cost saving by improving the reliability and accuracy of the documentation process. In the blood donation process, computerization increases the accuracy and efficiency of the process which translates into transfusion safety (Katz et. al. 2007).

A good healthcare IT application with optimal technical capability can only be successful with good user acceptance (Zheng et.al. 2007). Individual acceptance of information technologies is a crucial factor in determining IT success. It has been shown that professionals are resistance to use available systems that could generate significant performance gains (Nickerson R.S. 1999). Some factors that can affect user acceptance are system design, workplace norms and individual differences.

In explaining information technology (IT) and information systems (IS) acceptance and usage, the technology acceptance model (TAM) introduce by Davis (1986) is widely used. Over the past two decades TAM has been tested and at times modified by researchers. TAM provides a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions. It suggests that perceive ease of use (PEOU) and perceived usefulness are the two important factors explaining system use (Masron M. & Hussein R. 2008). PEOU is define as "the degree to which a person believes that using particular system is free from effort" and perceive usefulness is define as "the degree to which a person believes that using a particular system would enhance his or her job performance"(Davis 1989). External factors such as system characteristics, user characteristics and training affect PEOU and perceived usefulness.

The unified theory of acceptance and use of technology (UTAUT) model was developed by Venkatesh, Morris and Davis (2003). It can be considered as a developed version of the TAM model. The UTAUT consist of four key constructs which are Performance Expectancy (PE), Effort Expectancy (EE), Social influence (SI) and Facilitating Conditions (FC) that are direct determinants of usage behaviour (BIU) (Venkatesh et al., 2003)

Performance Expectancy is defined as the degree to which and individual believes using the system will help him to attain benefits in job performance. The construct Effort Expectancy is explained as the degree of ease associate with the use of the system. Meanwhile, the degree to which and individual perceives that important others believe he or she should use the new system is defined as Social Influence. Lastly the construct Facilitating Condition is described as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of system (Venkatesh et al., 2003).

3. RESEARCH MODEL AND HYPOTHESIS

3.1 Research Model

Figure 1. Illustrates the research model for the user acceptance of BBIS using the UTAUT model.

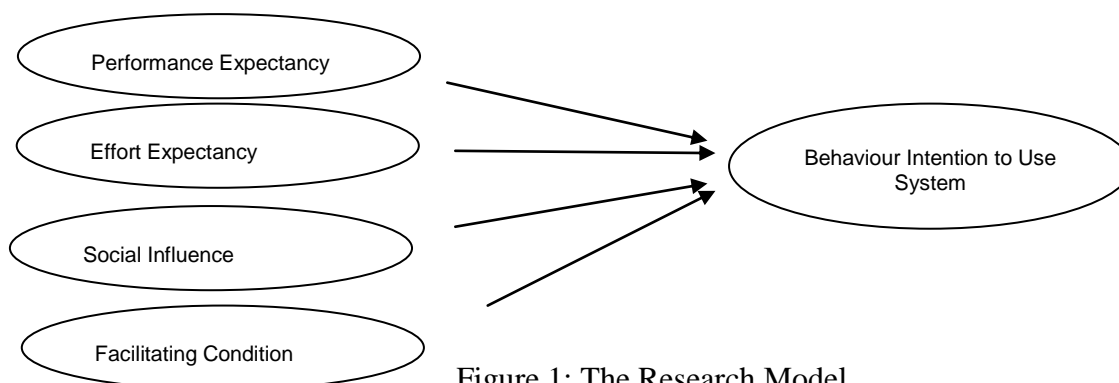


Figure 1: The Research Model

3.2 Hypotheses

In determining the relationship between PE, EE, SI, FC and BIU, four hypotheses need to be tested as below

Hypothesis A

Ho: Performance Expectancy has a positive effect on BBIS usage.

Hypothesis B

Ho: Effort Expectancy has a positive effect on BBIS usage.

Hypothesis C

Ho: Social Influence will have a positive effect on BBIS usage.

Hypothesis D

Ho: Facilitating Conditions will have a positive effect on BBIS usage.

4. METHODOLOGY

A questionnaire- based survey was the approach used to collect data on the UTAUT study of the BBIS. The questionnaire was designed to capture data on Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition and system Usage. All questionnaire items will be measured in a ten point Linkert-like scale with '1' as strongly disagree and '10' as strongly agree. The items used to measure the constructs were mostly adopted from relevant previous study and translated into Malaysian Language (Venkatesh et al., 2003). The questionnaire also consists of a demographic information section. The respondents to the survey were all individuals using the BBIS which include doctors, nurses, student nurses, laboratory personnel, technicians and hospital attendance.

The data gathered was analyzed using SPSS version 20 software. Data collected will be subjected to a number of checks to be performed at various stages to ensure quality of data and the quality of data input. The descriptive analysis, reliability test, regression analysis will be done and any additional analysis required to test the model will also be performed.

5. RESULT AND ANALYSIS

5.1 Demographic Profile

Part one of the questionnaire is related to the respondent's demographic profile. The respondent's demographic profile was divided into four categories, which were age, gender, position and duration of service (years). The details of the demographic profile are shown in Table 1.

Table1: Demographic profile of the user acceptance study on the BBIS at HRPZII.

Variable	Details
Gender	Frequency %
Male	8 24.2
Female	25 75.8
Position	Frequency %
Doctors	5 15.1
Nurses	9 27.3
Medical Lab Technologist	8 24.2
Technician	6 18.2
Support Staff	5 15.1
Age (years)	Mean = 38.8966 Std. Deviation = 7.90725 Min= 27 Max = 57
Duration of service at HRPZII (years)	Mean = 7.0968 Std. Deviation = 5.99641 Min = 1 Max = 30

The survey indicated that the majority of respondents were female with 75.8% while male were only 24.2%

of total respondents. This data corresponded with the position data where majority of the respondents were nurses with 27.3% followed by medical laboratory technologist with 24.2 %, technicians with 18.2% , doctors with 15.1% and support staff with 15.1%.

According to this survey, the average age of respondent is 39 years with the youngest respondent age of 27 years and oldest respondent age was 57 years. The average duration of service at HRPZII for the respondents was 7 years with the longest respondent service of 30 years.

5.2 Reliability and Validity

Reliability relates to the consistency of results over a period of time. If a research instrument has a Cronbach's alpha greater than 0.7, it indicates that the research instrument is reliable. The result in table 2 indicated that the Cronbach's Alpha for all 5 constructs were above 0.70 with the lowest being FC at 0.707 and the highest is PE at 0.896. Therefore, the reliability of the constructs was confirmed.

Table 2: Reliability of the Constructs

UTAUT Constructs	Cronbach's Alpha	Number of Items
Performance Expectancy	0.896	4
Effort Expectancy	0.796	4
Social Influence	0.786	4
Facilitating Conditions	0.707	4
Bahaviour Intention To Use	0.842	4

From the analysis using Kaiser-Meyer-Olkin (KMO) and Bartlett's test, the result of the KMO measure of sampling adequacy is 0.817 which indicate this model is valid since the value is greater than 0.5. The statistic test for Bartlett's test of sphericity was significant ($p= 0.000$; d.f. = 171). This result supports the Kaiser-Meyer-Olkin value which indicates that the questionnaires are valid.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.817
Bartlett's Test of Sphericity	Approx. Chi-Square	550.060
	df	171
	Sig.	.000

5.3 Constructs Analysis

Descriptive analysis using frequency and percentage was conducted on the constructs in order to provide a richer understanding of the respondents' perception with respect to PE, EE, SI, FC and BI. The Linkert scale of 1-5 will be counted as a low score and the scale of 6- 10 are considered as a high score for the construct. The summary of the descriptive analysis is shown in Table 4 below.

Table 4: Descriptive analysis of the constructs

Construct	Low score (1-5)		High Score (6-10)		Mean	Std. Deviation
	frequency	%	frequency	%		
PE	12	36.4	21	63.6	5.6894	1.88542
EE	10	30.3	23	69.7	5.6515	1.76217
SI	10	30.3	23	69.7	6.2955	1.87026
FC	18	54.5	15	45.5	5.2803	1.79709
BI	12	36.4	21	63.6	5.7172	2.32158

From the descriptive analysis the average score for all construct are moderate high with the highest score for Social Influence (6.2955) and the lowest score for Facilitating Conditions (5.2803). The constructs analysis showed that the respondents tend to believe that BBIS is useful in enhancing their performance (63.6%). The respondents (69.7%) also strongly agree that it is easy to become skillful with the BBIS. A high score for Social Influence (69.7%) indicated that the respondents were encouraged to use the system by the management of HRPZII. However, the lower score for Facilitating Condition (45.5%) showed that respondents needed more resources to support their use of BBIS. The descriptive statistics also support the respondents' willingness to use the BBIS (63.6%).

5.4 Correlation Analysis

Spearman correlation was carried out to study the relationship between constructs in order to test the four hypotheses in this research. The correlation result between independents variables (PE, EE, SI and FC) and the dependent variable (BI) is as in table 5 below:

Table 5: Spearman Correlation data for all constructs.

		PE	EE	SI	FC	BI
Spearman's rho	PE	1.000	0.794	0.835	0.820	0.855
	EE	0.794	1.000	0.867	0.809	0.822
	SI	0.835	0.867	1.000	0.775	0.827
	FC	0.820	0.809	0.775	1.000	0.898
	BI	0.855	0.822	0.827	0.898	1.000

- The Sig. (2-tailed) value for all data is 0.000 and N = 33

The result in Table 5 indicated a significant positive relationship (Spearman's rho value > 0.80) between all the dependent variables Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions and Behavioral Intention with a p-value less than alpha value of 0.05. Therefore these findings support all four hypotheses.

6. CONCLUSION AND RECOMMENDATION

From the descriptive analysis of the constructs, it can be deduced that the respondents agreed that the BBIS is relatively easy to use and its usage will enhance their performance. The management of HRPZII encouragement on the BBIS usage is also reflected in the respondents' high score for the Social Influence construct. This research also indicated that more effort should be done on improving the environment to support the usage of BBIS in term of resources such as computer hardware and staff training.

The research finding of this study confirms that Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions are positively related to Behavioral Intention to use BBIS at HRPZII. In conclusion all four hypotheses are supported. Therefore from the UTAUT model, the user acceptance of the BBIS is relatively good among HRPZII staff that used it. The encouraging result of this study should be a positive respond for the management to further expand the usage of BBIS to other blood bank facilities.

For future research a more comprehensive study on the degree of acceptance between frequent and non-frequent user of BBIS can be conducted. This new study will provide insight on the different level of user acceptant of BBIS between the varieties of users.

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