Investigation on the Benefits and Satisfaction Degree of the Electronic Official Document On-line Submission and Approval System—A Case Study of a Medical Center in Southern Taiwan

Hsiu-Wei Hung¹, Chia-Mei Hsia¹, Shih-Yu Chen¹, Yi-Chen Wu¹, Lin-Kun Wu² and I-Chen Lee¹

1. Department of Healthcare Administration and Medical Informatics, Kaohsiung Medical University (KMU), Kaohsiung 807, Taiwan

2. Administration and Quality Assurance Center, Kaohsiung Medical University Hospital (KMUH), Kaohsiung 807, Taiwan

Abstract: Purpose: The aim of the study was to investigate the actual benefits of the electronic official document online submission and approval system and the satisfaction of hospital staff in a medical center in southern Taiwan, and to find out whether there are any differences between medical institutions and general government personnel. Methods: A cross-sectional study was conducted to investigate satisfactory outcome with questionnaires. The subjects were administrators, healthcare professionals and medical personnel of a medical center in the southern part of Taiwan who had signed electronic documents online. A total of 395 questionnaires were sent out, 147 of which were valid, and the rate of collecting data survey was 37%. We analyzed with SPSS version 20. Results: The official document approval system was mainly used by administrative units and contractors, accounting for more than 50% of users. Besides, the frequency of use was at least more than once a week. As for the user's perception of operating system, most people thought that it is easier to choose the format of official document and to set up the duty agent on leave, but in the part of the signing and approval process setting or modifying, it was considered more difficult, accounting for 38.1%. In terms of perceptual usefulness, the average value was 3.81, which showed that the user agreed that the system has met the needs of daily official documents. When some users of service area encountered problems with their use, the clerical staff were able to provide services immediately and have the professional ability to resolve problems, in order to agree to the majority, accounting for 53.7%. In addition, nearly 60% of users rated the official document system positively, with an average of 3.84 satisfaction, which was higher than the certified value of 3, conforming to the standards for satisfaction with the use of official documents. In addition, the role authorization, perceptual easy-to-use and service area were significant ($p < 0.05$). The perceptual usefulness of Subordinate units was also significant ($p = 0.016$). The frequency of use, perceptual easy-to-use, perceptual usefulness, service area and satisfaction were significantly different ($p < 0.05$). The correlation coefficient between perceptual usefulness and user satisfaction was 0.833, indicating that there was a high correlation. The daily usage frequency of contractors was higher than supervisors. However, supervisors had the highest frequency of use every quarter ($p = 0.135$). There was no significant difference between contractors and supervisors in the frequency of use. Conclusion: It is suggested that education and training on the operation of the electronic official document on-line submission and approval system should be conducted, which can enhance the education and training of supervisors and medical personnel. Continually, invite supervisors and medical personnel to provide advices on the official document system as a reference for future improvements of the system.

Key words: Electronic official document, on-line approval system, user satisfaction.

1. Introduction

Electronic official documents are an important tool

for administrative personnel to carry out business, handle official records, and communicate with internal and external organs. The procedures of handling official documents also represent administrative efficiency. In the past, documents were processed and delivered in a paper-based and manual manner.

Corresponding author: Lin-Kun Wu, Leader of Administration and Quality Assurance Center, research field: medical management.

However, since the development of capital communications, the technology of capital communications has been applied to administrative operations. Gradually, the various agencies are using computerization and network systems to handle cumbersome official documents, and to promote the online submission and approval system of official documents, manual conversion to electronic way, greatly improve the quality of document management and administrative efficiency [1].

The on-line submission and approval of the official document includes document management, document production, and submission procedures, etc. Through computerization and network, documents can be quickly transmitted, exchanged and received between the various organs at any time and places, which make workflow easier for staff to communicate and coordinate with each other in order for effectively simplify the management and operation process [2-4]. In addition, the official document approval can be transmitted online under security certification for approval [5]. Therefore, electronic official documents can shorten the time of document transmission and document signature. Besides, submission and approval is not subject to the limitation of time and space. The electronic certification is used to sign the electronic seal, to ensure the security and to strengthen the information security [6].

The most essential success factors of submitting and approving documents online are the support and input of senior supervisors, the formulation of complete plans, and the implementation strategies, more importantly, the arrangement of staff education and training to cultivate good information literacy. Establish a complete security verification system, information quality management and service level, and also have an appropriate incentive system and good communication, so that employees can have more confidence and identity when using electronic document system. In turn, they are willing to accept the use of the new system and increase the satisfaction

of the users [7-11].

The quality of information (such as accuracy, security, timeliness, convenience, importance, etc.) and the quality of service (including ability to solve problems immediately, communication skills, and attach importance to the needs of users, etc.) are the most direct responses in the process of using official documents. As a consequence, it has an impact on the satisfaction evaluation of the system. According to the research results, perceptual usefulness, perceptual easy-to-use, knowledge of information system and degree of system acceptance, the study has a positive and significant effect on user satisfaction [4, 12, 13]. The design of the electronic official document system is user-friendly and straightforward. It can make users feel easy to use, and it will greatly help to improve users' satisfaction and willingness to use [14]. In terms of the acceptance of science and technology of administrators, there is a significant positive correlation between the degree of acceptance of science and technology and the satisfaction degree of the use of electronic official document system. Accordingly, it can be seen that the degree of acceptance of science and technology can predict the satisfaction degree of use of electronic official document system [15].

The effectiveness or satisfaction of the introduction of electronic official documents by relevant organizations is more than that of public institutions, such as government agencies or schools, and less research has been done by medical institutions in this regard. Therefore, the purpose of this study was to investigate the effectiveness of a medical center in southern Taiwan in promoting the official documents to electronic online submission and approval and the satisfaction of hospital staff with electronic official documents in order to understand whether there is any difference in satisfaction and benefits between medical institutions and general government agencies on the introduction of electronic document system.

2. Research Methods

2.1 Research Outline

This research was a cross-sectional study. Based on the scientific and technological acceptable model theory framework, we further discussed on the benefits and satisfaction of a medical center in the southern Taiwan before and after the integration of the electronic document system. Users' attitudes towards information systems were significantly influenced by "perceptual usefulness" and "perceptual easy-to-use" in the technology acceptance model. In the successful information system model, service area also affected user satisfaction [12]. With respect to explore the differences between users and their attitudes towards electronic documents, as well as their impact on their use satisfaction, as shown in Fig. 1.

A questionnaire survey was conducted, and the benefits before and after the introduction of the electronic document system were analyzed from the database of the medical center.

2.2 Questionnaire Design

Based on the research of Huang [12] and the clerical team of the General Affairs department of Taipei University of the Arts, a structured questionnaire was designed as a data collection tool. It included basic personal information as well as views on online electronic official documents, the details as follows:

(1) Personal basic information

There were three variables, one was the subordinate unit, the other was the main role in the electronic official document approval, and the average frequency of using the system.

(2) Acknowledgement of the electronic official document on-line submission and approval system

This part consisted of "perceptual usefulness" and "perceptual easy-to-use", as well as service area and the overall evaluation of the system.

The scale was measured with Likert scale. The five-level scale was classified as "strongly agree", "agree", "neither agree nor disagree", "disagree" and "strongly disagree of perceptual usefulness", "Service area" and "Evaluation degree", which was given in order of 5 points, 4 points, 3 points, 2 points, and 1 point. The higher the score, the higher the positive attitude for online signing of electronic documents.

The item of "perceptual easy-to-use" was classified as "very simple", "simple", "neutral", "difficult", and "very difficult", in order to give 5 points, 4 points, 3 points, 2 points, and 1 point. The higher the score was, the easier it was to use the electronic official document online submission and approval system.

2.3 Analysis of Reliability and Validity

The pre-test of the questionnaire was conducted from October 3rd, 2017 to October 5th, 2017. A total of 21 colleagues from the Medical Center were selected for the test. The reliability and validity of the

Fig. 1 Research diagram.

Remark: Refer to Huang [12].

first draft of the questionnaire was analyzed, and the Cronbach's α coefficient was 0.692, which was in accordance with the test. According to the reliability and validity test, the questions and options of the first draft questionnaire were revised to be issued as formal questionnaires.

2.4 Questionnaire Distribution and Collection

A two-week questionnaire survey was conducted between October 11th, 2017 and October 25th, 2017. The subjects of the survey were administrators, healthcare professionals, and medical personnel who had used electronic official document at a medical center in the southern Taiwan. A total of 395 online questionnaires were sent out, 147 of which were collected, 147 were credible, and the collecting rate was 37%.

2.5 Data Processing and Analysis

This study was analyzed with SPSS version 20. The methods included narrative statistics, reliability and validity analysis, independent sample *t*-test, Chi-square test, Pearson product-moment correlation coefficient, single factor ANOVA, and significant level $\alpha = 0.05$.

3. Results

3.1 Basic Characteristics of the Sample

Subjects of the study were selected as the main ethnic group in a medical center in the southern part of the country. The general information is shown in Table 1. The majority of respondents were administrators, accounting for 50.3%, and the main roles in the electronic official document system were primarily contractors, accounting for 50.3%. The usage frequency was at a maximum rate of 36.7% per day, followed by 31.3% per week, and then 68% heavy users had been used at least once a week proportionately.

3.2 Descriptive Statistical Analysis of the Scale

(1) Perceptual easy-to-use analysis on the operating

difficulty of subject's perception of the official document system

The items of perceptual easy-to-use are described in Table 2, which has predominantly analyzed the difficulty of proceeding of the subject in the process of operating the electronic official document submission and approval system. The result is as shown in Table 3.

According to the results of the study, the majority (36.8%) of the subjects chose the format of the electronic official document to be simple. However, in the part of setting or modifying the submission and approval process, the present dominant subjects considered to be difficult, accounting for 38.1%, with an average of 2.79. This was lower than the average of 3.07 of the results in the survey report on the use of the electronic official document system at National Taipei University of the Arts (the clerical team, department of General Affairs, Taipei National University of the Arts, 2015). As a result, the representative users were less familiar with the choice of document format. On the other hand, when the system operation of the duty agent set up the leave of absence, the largest number was no comment, accounting for 46.9%. Secondly, 29.9% of the subjects considered easy-to-use, which has shown users still think the operation is simple in the part of using the document system to operate work.

(2) Perceptual usefulness analysis on the subjects, who believe that the official document system has met the needs for the daily official document operations

The items of perceptual useful are described in Table 4. The significant analysis is whether the electronic official document on-line submission and approval system meets the operational requirements of the official documents. The result is as shown in Table 5.

According to the results of the study, the subjects believed that the approval system could ameliorate the efficiency of documents processing, reduce the burden of document procedures, and the function of the system has met the needs of daily document routine. It

Table 1 Basic information of the subjects ($n = 147$).

	Variable item	Number of people	Percentage (%)
Subordinate unit			
	Healthcare professionals	21	14.3
	Medical personnel	52	35.4
	Administrative unit	74	50.3
Role authorization			
	Registration	28	19.0
	Supervisor	45	30.6
	Contractor	74	50.3
Usage frequency of the electronic official document system			
	Quarterly use	19	12.9
	Monthly use	28	19.0
	Weekly use	46	31.3
	Daily use	54	36.7

Table 2 Perceptual easy-to-use items.

(1) When handling a document, know which form of document to choose, such as document signing order, request for approval, and draft.
(2) Submit and approval process settings or modifications.
(3) Setting up a duty agent on leave. |
|--|

Table 3 Analysis of perceptual easy-to-use results.

Topic	Number of people (%)	Average
Know which form of document to choose		3.1
Very difficult	4 (2.7)	
Very easy	6 (4.1)	
Difficult	38 (25.9)	
Easy	48 (32.7)	
Neither easy nor difficult	51 (34.7)	
Submission and approval process settings or modifications		2.79
Very easy	5 (3.4)	
Very difficult	9 (6.1)	
Easy	33 (22.4)	
Neither easy nor difficult	44 (29.9)	
Difficult	56 (38.1)	
Setting up a duty agent on leave		3.14
Very difficult	4 (2.7)	
Very easy	5 (3.4)	
Difficult	25 (17.0)	
Easy	44 (29.9)	
Neither easy nor difficult	69 (46.9)	

was also more flexible in proceeding documents and assisting to keep track of the flow of documents. Therefore, as shown in Table 5, most users agreed that on-line submission and approval system of the electronic official documents was more convenient than paper-based approval for requests. The average

score of perceptual usefulness was calculated to be 3.81, which was higher than the average of 3, and approaching 4 closed to satisfactory state. The result indicated that it has met the essential needs, but was lower than the average perceptual usefulness of the study on the impact of user perception and

Table 4 Perceptual usefulness items.

(1) I think the online official document approval system will help to improve the efficiency of document processing.
(2) The online official document approval system can help me to reduce the burden of handling documents.
(3) The function of the system meets the needs of my daily routine processing operations.
(4) I think it is easier to sign a document online than paper-based document.
(5) I think the process management of the system is helpful to keep track of the flow of documents.
(6) I think it is more flexible in procedures of official documents in terms of approval online.
(7) I have a certain degree of familiarity with the operation of the system, enough to meet the needs of daily document routine.

Table 5 Perceptual usefulness result analysis.

Topic	Number of people (%)	Average
Official document system will help to improve the efficiency of document processing		4.05
Strongly disagree	2 (1.4)	
Disagree	6 (4.1)	
Neither agree nor disagree	15 (10.2)	
Strongly agree	40 (27.2)	
Agree	84 (57.1)	
Official document system will help to reduce the burden of handling documents		3.69
Strongly disagree	4 (2.7)	
Disagree	16 (10.9)	
Strongly agree	25 (17)	
Neither agree nor disagree	26 (17.7)	
Agree	76 (51.7)	
The function of the system meets the needs of daily document routine		3.69
Strongly disagree	1 (0.7)	
Disagree	16 (10.9)	
Strongly agree	21 (14.3)	
Neither agree nor disagree	32 (21.8)	
Agree	77 (52.4)	
It is easier to sign a document online than paper-based documents.		3.79
Strongly disagree	2 (1.4)	
Disagree	17 (11.6)	
Neither agree nor disagree	24 (16.3)	
Strongly agree	33 (22.4)	
Agree	71 (48.3)	
The process management of the system is helpful to keep track of the flow of documents.		4.27
Strongly disagree	0 (0.0)	
Disagree	3 (2.0)	
Neither agree nor disagree	8 (5.4)	
Strongly agree	53 (36.1)	
Agree	83 (56.5)	
More flexible in the processing of official documents		3.78
Strongly disagree	0 (0.0)	
Disagree	16 (10.9)	
Strongly agree	29 (19.7)	
Neither agree nor disagree	30 (20.4)	
Agree	72 (49)	

Table 5 to be continued

Users are familiar with the operation of the system and can meet the needs of daily document routine	3.41
Strongly disagree	3 (2)
Strongly agree	10 (6.8)
Disagree	23 (15.6)
Neither agree nor disagree	41 (27.9)
Agree	70 (47.6)

information system cognition on user satisfaction in the official document system [13]. Accordingly, the result has represented that the electronic official on-line submission and approval system has met the needs of daily document routine.

(3) Service area analysis of whether or not the clerical team can assist in solving the problems related to the operation of the official document system

As described in Table 6, this study mainly analyzed subjects' opinions that in the course of dealing with the official document whether the clerical teams are able to assist in resolving issues, and the result has been shown in Table 7.

According to the results of the study, most users agreed that the clerical team could provide services immediately when they encountered related issues of approval system, and the clerical team has shown a certain professional ability to resolve problems of the users. Even in the section whether users think clerical

staff has the expertise to solve user' problems, no subjects filled out options with "disagree." They responded with "agree" particularly, accounting for 53.7%. Therefore, the professional competence of the clerical staff in the official document system is recognized by most of the subjects.

(4) Satisfaction analysis of the subjects' evaluation of the electronic official document system

The satisfaction items are described in Table 8. The main analysis is whether the evaluation of official documents approval system is positive or not, and the result is shown in Table 9.

According to the results of Table 9, the majority of respondents rated the official document and online submission and approval system as positive, accounting for 59.9%. As a result, nearly 60% of the users agreed with the use of the online submission and approval system. The average value was 3.84, which was higher than the average value of 3, and approaching

Table 6 Service area items.

(1) When I encounter document system related issues, clerical staff can provide immediate service.
(2) The clerical staff can show professional ability to solve my problems.

Table 7 Service area result analysis.

Topic	Number of people (%)	Average
When user encounter document system related problems, clerical staff can provide services immediately		3.95
Strongly disagree	1 (0.7)	
Disagree	8 (5.4)	
Neither agree nor disagree	24 (16.3)	
Strongly agree	35 (23.8)	
Agree	79 (53.7)	
The clerical staff have the professional ability to solve users' problems		3.95
Strongly disagree	0	
Disagree	5 (3.4)	
Neither agree nor disagree	30 (20.4)	
Strongly agree	33 (22.4)	
Agree	79 (53.7)	

Table 8 Satisfaction degree.

Overall, my comments on the “electronic official document submission and approval system” are positive.

Table 9 Satisfaction result analysis.

Topic	Number of people (%)	Average
Evaluation of the official document approval system		3.84
Strongly disagree	3 (2.0)	
Disagree	6 (4.1)	
Strongly agree	24 (16.3)	
Neither agree nor disagree	26 (17.7)	
Agree	88 (59.9)	

to 4 closed to the satisfactory state. This result expressed compliance with basic evaluation requirements. Compared with the impact of perception and information system cognition on user satisfaction, the overall average user satisfaction was 3.89 [13], which was similar to the results of this study. Therefore, it represented that most users evaluated the official document system as positive.

3.3 Using *t*-Test to Analyze the Satisfaction Degree of the Official Document Online Approval System

According to the results of the study, the overall satisfaction degree of the official document online submission and approval system was dependent on Likert scale. Therefore, the certified value was assumed to be 3, which was in line with the standard for the satisfaction degree of the official document system. The average value of service satisfaction of official document system was 3.84, that was higher than the certified value, approaching to 4 closed to the satisfactory state. This result indicated that it conformed to the standard of satisfaction with the use of official documents. The result is described in Table 10.

Table 10 One-sample T-test.

	Certified value = 3						
	<i>T</i>	df	Statistical significance	Average deviation	Average	Standard deviation	Standard error average
Satisfaction with the official document online submission and approval system	12.522	146	0.000	0.844	3.84	0.817	0.067

3.4 Analysis of the Overall Evaluation of Variables and Perceptual Easy-to-Use, Perceptual Usefulness, Service Area, and Satisfaction

Analysis of whether there are differences between different variables in ANOVA. In this study, we used the subordinate unit, the role authorization and the frequency of use to demonstrate perceptual easy-to-use, perceptual usefulness, service area, and overall satisfaction of the statistical dimension. The premise was that there was no difference between the variables for the statistical dimension of satisfactions.

According to role authorization, contractors, supervisors and registration are divided into three variables to verify the test. The result is described in Table 11 and 12. The three variables were significant in terms of “perceptual easy-to-use” and “service area”. The average number of contractors of “perceptual easy-to-use” was 9.5 highest, and the average of supervisors 8.24 was the lowest. The average number of contractors and supervisors of “service area” was 8.27 and 7.4 respectively, but there was no significant difference between “perceptual usefulness” and “satisfaction”.

Table 11 The differences of role authorization variable in perceptual usefulness and perceptual easy-to-use.

	Sample number (<i>N</i>)	Perceptual usefulness score	Perceptual easy-to-use score
		Mean $\pm$ sd	Mean $\pm$ sd
Registration	28	25.92 $\pm$ 4.72	9.04 $\pm$ 1.79
Supervisor	45	27.04 $\pm$ 4.64	8.24 $\pm$ 1.88
Contractor	74	26.73 $\pm$ 4.70	9.50 $\pm$ 2.22
Total	147	26.67 $\pm$ 4.676	9.03 $\pm$ 2.10
* <i>p</i> value		<i>p</i> =0.608	* <i>p</i> =0.006

Table 12 The differences of role authorization in service area and satisfaction.

	Sample number (<i>N</i>)	Service area score	Satisfaction score
		Mean $\pm$ sd	Mean $\pm$ sd
Registration	28	7.71 $\pm$ 1.78	3.71 $\pm$ 0.89
Supervisor	45	7.40 $\pm$ 1.60	3.84 $\pm$ 0.76
Contractor	74	8.27 $\pm$ 1.28	3.89 $\pm$ 0.82
Total	147	7.90 $\pm$ 1.52	3.84 $\pm$ 0.81
* <i>p</i> value		* <i>p</i> =0.008	<i>p</i> =0.622

Table 13 The differences of subordinate unit variable in perceptual usefulness and perceptual easy-to-use.

	Sample number (<i>N</i>)	Perceptual usefulness score	Perceptual easy-to-use score
		Mean $\pm$ sd	Mean $\pm$ sd
Healthcare unit	21	26.14 $\pm$ 4.57	8.23 $\pm$ 1.81
Medical unit	52	25.83 $\pm$ 4.64	8.67 $\pm$ 2.10
Administrative unit	74	27.42 $\pm$ 4.66	9.50 $\pm$ 2.09
Total	147	26.67 $\pm$ 4.676	9.02 $\pm$ 2.10
* <i>p</i> value		<i>p</i> =0.146	* <i>p</i> =0.016

Table 14 The differences in service area and satisfaction.

	Sample number (<i>N</i>)	Service area score	Satisfaction score
		Mean $\pm$ sd	Mean $\pm$ sd
Healthcare unit	21	7.48 $\pm$ 1.40	3.86 $\pm$ 0.85
Medical unit	52	7.651 $\pm$ 1.72	3.77 $\pm$ 0.75
Administrative unit	74	8.19 $\pm$ 1.37	3.89 $\pm$ 0.85
Total	147	7.90 $\pm$ 1.52	3.84 $\pm$ 0.81
* <i>p</i> value		<i>p</i> =0.060	<i>p</i> =0.709

Furthermore, these variables were divided into administrative units, healthcare units and medical units. The results are as shown in Tables 13 and 14. The three variables were significant in “perceptual usefulness”. The average value of administrative units was 9.5 highest, and the average of medical unit was 8.23 lowest. There was no significant difference among “perceptual usefulness”, “service area”, and “satisfaction”.

Divided by frequency of use into daily, weekly, monthly and quarterly use of four variables to

examine the results of the configuration as described in Tables 15 and 16, there were significant differences among “perceptual easy-to-easy”, “perceptual usefulness”, “service area” and “satisfaction”. The average of daily use was the highest, and that of quarterly use was the lowest. Consequently, there was a significant correlation between satisfaction and frequency of use.

Further analysis of daily users’ rights and their working units, the daily users’ roles are dominated by the contractors (46.3%), as shown in Table 17. The

majority of daily users are administrative units (70.4%), which is shown in Table 18.

Table 15 The differences between perceptual easy-to-use and perceptual usefulness of usage frequency variable.

	Sample number (<i>N</i>)	Perceptual usefulness score	Perceptual easy-to-use score
		Mean $\pm$ sd	Mean $\pm$ sd
Quarterly use	19	23.79 $\pm$ 4.76	7.79 $\pm$ 2.07
Monthly use	28	25.86 $\pm$ 4.05	8.82 $\pm$ 2.12
Weekly use	46	27.13 $\pm$ 4.79	9.09 $\pm$ 2.17
Daily use	54	27.72 $\pm$ 4.47	9.52 $\pm$ 1.90
Total	147	26.67 $\pm$ 4.67	9.03 $\pm$ 2.10
* <i>p</i> value		* <i>p</i> =0.009	* <i>p</i> =0.019

Table 16 The differences of frequency variable in service area and satisfaction.

	Sample number (<i>N</i>)	Service area score	Satisfaction score
		Mean $\pm$ sd	Mean $\pm$ sd
Quarterly use	19	6.53 $\pm$ 1.38	3.37 $\pm$ 1.01
Monthly use	28	8.04 $\pm$ 1.42	3.75 $\pm$ 0.58
Weekly use	46	8.02 $\pm$ 1.68	3.91 $\pm$ 0.83
Daily use	54	8.20 $\pm$ 1.25	4.00 $\pm$ 0.77
Total	147	7.90 $\pm$ 1.52	3.84 $\pm$ 0.87
* <i>p</i> value		* <i>p</i> =0.000	* <i>p</i> =0.026

Table 17 Analysis of role authorization and frequency of use.

Frequency of use	Role authorization (Number of people)			
	Contractor	Supervisor	Registration	Total
Quarterly use	7(36.8)	10(52.6)	2(10.5)	19
Monthly use	16(57.1)	7(25)	5(17.9)	28
Weekly use	26(56.5)	10(21.7)	10(21.7)	46
Daily use	25(46.3)	18(33.3)	11(20.4)	54
Total	74(50.3)	45(30.6)	28(19)	147

Table 18 Analysis of the subordinate unit and the frequency of use.

Frequency of use	Subordinate units (Number of people)			
	Administrative units	Healthcare units	Medical units	Total
Quarterly use	3(15.8)	4(21.1)	12(63.2)	19
Monthly use	11(39.3)	5(17.9)	12(42.9)	28
Weekly use	22(47.8)	6(13)	18(39.1)	46
Daily use	38(70.4)	6(11.1)	10(18.5)	54
Total	74(50.3)	21(14.3)	52(35.4)	147

3.5 Analysis of the Relationship among “Perceptual Easy-to-Use”, “Perceptual Usefulness”, “Service Area” and “User Satisfaction”

“Perceptual easy-to-use”, “perceptual usefulness”, “service area” and “satisfaction” of the user are shown in Table 19. The correlation coefficient between perceptual usefulness and user satisfaction was

0.833**, and the significance was 0.000, indicating that there was a high correlation between perceptual usefulness and user satisfaction. The relationship between service area and user satisfaction was 0.519, and the significance was 0.000, indicating that there was a moderate correlation between service area and user satisfaction.

Table 19 Analysis of the correlation between each aspect with user satisfaction.

	Perceptual easy-to-use	Perceptual usefulness	Service area
Perceptual easy-to-use			
Pearson correlation	1	0.440**	0.390**
Significance (two-tailed test)		0.000	0.000
Number of people	147	147	147
Perceptual usefulness			
Pearson correlation	0.440**	1	0.474**
Significance (two-tailed test)	0.000		0.000
Number of people	147	147	147
Service area			
Pearson correlation	0.390**	0.474**	1
Significance (two-tailed test)	0.000	0.000	
Number of people	147	147	147
Satisfaction			
Pearson correlation	0.357**	0.833**	0.519**
Significance (two-tailed test)	0.000	0.000	0.000
Number of people	147	147	147

** At a significant level of 0.01 (two-tailed test), the correlation is significant.

4. Discussion

The main purpose of this study was to investigate the benefits, users' satisfaction, and system function requirement suggestions of implementing the official document online approval system to a medical center in the south area.

There were 147 supportable questionnaires in this study. The survey was scored through Likert Scale. According to actual feelings of the subjects, from the five levels of "strongly agree", "agree", "neither agree nor disagree", "disagree", and "strongly disagree", each of them was given a score of 5, 4, 3, 2, and 1 respectively. On the basis of the total score, we calculated the average score to obtain the analysis results. The higher the average score, the higher the satisfaction. In addition to the average numerical analysis of each item in the questionnaire, the quantitative analysis of the difference was carried out based on the background differences of the user, including subordinate units, role authorization, and the frequency of use.

4.1 User Perception of the Electronic Official Document Online Submission and Approval System in the Hospital

In the empirical analysis of descriptive statistics,

hospital staff had a good clear-sightedness of the use on the official document system, and had a high correlation in which hospital staff sense more about "perceptual usefulness" than "perceptual easy-to-use." There was a strong sense of acknowledgement of the official document approval system to improve the efficiency of document processing, but a weaker recognition of easy-to-use on the document system. In addition, from "perceptual easy-to-use" questions, those with the highest average ranking were "setting up a job agent while on leave", and those with the lowest ranking were "verification of procedure settings or modifications." Sort the lowest questions from "perceptual usefulness", users were familiar with system operations and could meet the needs of daily document routine. All of the above reflected that most hospital staff were slightly unfamiliar with the operation of the official document system. Hospitals should increase the number of document system operations in the staff training courses, and strengthen the hospital staff on proficiency in the operation and function of the official document system, and improve the efficiency of the official document procedures further.

4.2 User Satisfaction of the Online Submission and

Approval System for Hospital Official Documents

In this experimental analysis of descriptive statistics, the user satisfaction degree of hospital personnel to the official document system was also biased toward the middle and upper good degree (the average value was 3.84, which was higher than the certified value, approaching 4 closed to the satisfactory state). In the question of service satisfaction of hospital staff, “when users have related problems, clerical staff are able to provide services immediately” and “clerical staff have professional skills to solve user problems”. It can be seen that the clerical staff can immediately use their professional ability to answer the problems encountered by hospital staff in dealing with official duties and official documents, and to assist hospital personnel in using the official document system to handle official documents more productively.

4.3 The Different Background Variables of Hospital Staff Have Some Significant Effects on the Different Aspects

4.3.1 Subordinate Units

Divided into administrative units, healthcare units and medical units, different units of the official document system of “perceptual usefulness” demonstrated significance, the positive influence of “administrative unit” on the “perceptual usefulness” of the official document system was higher than other units. The results showed that the “perceptual usefulness” cognitive level of the “administrative unit” personnel in the official document system was higher than other units. In contrast to the impact of user perception and information system cognition on user satisfaction in the official document systems a case study of the military of the Republic of China [10], the cognitive level of “administrative units” in “perceptual easy-to-use” and “satisfaction” was higher.

4.3.2 Role Authorization

According to role authorization, it was divided into contractors, supervisors and registration. The significance of “perceptual easy-to-use” and “service

area” in the official document system represented different roles of authority. Among them, the “perceptual easy-to-use” and “service area” of “contractors” have shown a higher positive influence on the document system than other authority position. From the results, we can see that the “perceptual easy-to-use” and “service” of “contractors” to the official document system were higher than the other roles of authority. Compared with the survey report on the use of the electronic document system of Taipei National University of the Arts (clerical Section, General Affairs Department, 2015), “supervisors”, including secretary has a higher positive influence on the “perceptual easy-to-use” than other authority roles. It is different from the results of this study.

4.3.3 Frequency of Use of the Electronic Official Documents

According to the frequency of use, they were divided into daily use, weekly use, monthly use and quarterly use. There were significant differences in the “perceptual easy-to-use”, “perceptual usefulness”, “service area” and “satisfaction” in the official document system in terms of the frequency of use. The average of “daily use” was the highest, and the average of “quarterly use” was the lowest, so the satisfaction between these aspects was positively correlated with the frequency of use.

4.4 Benefits before and after Implementation of the Official Document On-line Submission and Approval System

The number of hours for hospital staff to deal with official documents was 9.429 days. After the implementation of the online approval system, the spending time was 5.241 days less than 14.67 days before the implementation, which greatly improved the efficiency of submission and approval official documents in hospital. Since June, 2016, the hospital began to introduce documents on-line until the end of September, 2017, a total of 12,290 official documents were adopted to on-line submission and approval

system. Based on an average of 10 pages (including attachments) per official document, $12,290 \times 10 = 122,900$ indicated that the introduction of the online submission and approval system has saved the hospital at least 122,900 copies of paper.

In addition to saving paper costs, there are also savings in manpower, postage, and so on. For file management, there are no longer large number of paper-based documents after the official documents have been submitted and approved on-line. This means that file managers or clerical managers do not have to keep buying new iron cabinets and folders to store documents, nor do they need to always find space to store documents, which will greatly reduce hospital costs, and reduce environmental pollution and waste energy,

In the usage frequency of official document system, daily users' perceptual easy-to-use, perceptual usefulness, service area and satisfaction degree are higher than that of quarterly users. Perceptual usefulness has positive correlation with user satisfaction, service area and user satisfaction have positive correlation. It can be inferred that:

(1) For daily users on the official document system, since they used more often and they are familiar with the system operations, therefore, the system is more useful and easy to use.

(2) Those who use the system on a daily basis have more frequent contact with the clerical staff when they encounter problems, therefore, they are more satisfied with the service of the clerical team and thus show higher satisfaction with the system as a whole. Therefore, it is inferred that the staff on the clerical team have a higher level of service, which is also the key factor to satisfy with the system.

4.5 Suggestion

(1) Education and training in the operation of the official document system can be strengthened for supervisors and medical personnel.

(2) Invite supervisors and medical personnel to

provide advice on the document system for future system improvement.

Acknowledgments

The authors thank to I.-Chen Lee, associate professor and Shih-Feng Weng, assistant professor at Kaohsiung Medical University and other experts for their suggestions and guidance. We also want to thank Lin-Kun Wu, Information Management Office, Kaohsiung Medical University Hospital for her great support.

References

- [1] Lee, C. J. 1998. "Promoting Electronic/Networked Government to Create Competitive Advantage." *Research, Development and Evaluation Commission Report* 42: 24-34.
- [2] Mao, L. C. 2004. "A Study of Critical Successful Factors for the Electronic Document-Focused on the Colleges in Taiwan." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=0>.
- [3] Sung, Y. H. 2007. *Practice and Research on Electronic Government*. Taipei city: Sun, Yun-Suan Foundation.
- [4] Lee, Y. H. 2013. "A Research on Satisfaction of Using Document On-line Submission and Approval System: A Case of Ministry of National Defense." Master thesis retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=2>.
- [5] Sung, Y. H., and Lin, W. Y. 2008. "Expanding Document On-Line Submission/Approval for Energy Conservation, Paper Reduction and Information Security." *Research, Development and Evaluation Commission Bimonthly Periodical* 32 (5): 96-102.
- [6] Tsai, S. T. 2009. "Promotion Strategy and Efficiency of On-line Official Document." *Research, Development and Evaluation Commission Bimonthly Periodical* 33 (6): 91-6.
- [7] Lee, J. Y. 2013. "The Evaluation of the Implementation of On-line Document Approval in Electronic Document System at National Taipei University: Users' Perspectives." Unpublished master thesis, National Taipei University, New Taipei City.
- [8] Chen, H. J. 2016. "Implementing On-line Approval System for Official Documents: A Case Study of Government Agency A." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=3>.

- [9] Liu, C. C. 2011. "Official Documents On-line Submission and Approval System of Ministry of Examination, R.O.C (Taiwan) to Promote the Sharing of Experiences." *Ministry of Examination Quarterly Periodical* 1 (1): 137-48.
- [10] Tsai, S. T. 2010. "Strategies and Measures of On-line Document Approval." *Archives Quarterly* 9 (3): 41-51.
- [11] Chien, S. C. 2009. "The Critical Success Factor that impetus the Workflow Management System for Electronic Official Documents: A Case of Study on Government Institutions." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=8>.
- [12] Huang, Y. H. 2015. "A Study on the Satisfaction toward a Document On-line Submission and Approval System: Based on the Case of Elementary Schools in Changhua County." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=4>.
- [13] Yang, S. W. 2017. "The Influence of User's Perception and information System Cognition on User Satisfaction in Document System: Taking the National Army of the Republic of China as an Example." Retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=5>.
- [14] Lai, I. P. 2015. "Analyzing User Behavior and Effect with TAM on Air Force to Import Electronic Document System." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=10>.
- [15] Hou, C. F. 2014. "A Study on the Relationship between Technology Acceptance and Satisfactions of Electronic Document System for Kaohsiung Elementary School Administrative personnel." Master thesis, retrieved from <https://ndltd.ncl.edu.tw/cgi-bin/g32/gswweb.cgi/ccd=E3sV2s/record?r1=1&h1=9>.