The Development of the Web-Based Claim System in Higher Academic Institution

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Abstract

This study focuses on the development of the web-based claim system, which had previously been implemented manually. The development of this system is motivated due to the fact that the manual claim process is tedious and it is difficult for the decision maker to trace prior claims made by the respective individual. Hence, there is a slim chance to control the budget allocated for the specific activity or individual. To overcome these deficiencies, a web-based claim system is seen as an appropriate solution. Assisted by the System Development Life Cycle (SDLC) methodology, this system is developed using the ASP.Net and SQL Server to cater the recording and reporting of the claim process. The system, known as e-claim, aims to provide a platform for user in higher academic institution to process their claim automatically and to assist management in making timely and accurate decision. This paper will discuss in detail the development of the system from the requirement gathering until the design phase.

Index Terms—*Web-based system, decision support system, e-claim*

1. Introduction

Over the years, the Tunku Puteri Intan Safinaz School of Accountancy (TISSA-UUM), Universiti Utara Malaysia (UUM) has relied on a manual-based information system in handling claims made by its staffs. The manual-based environment has many disadvantages in speed, accuracy, and the cost involved [1]. The information supplied on a paper claim form, for instance, may not complete and, thus, will not be processed for payment. Incomplete form will then be returned to the claimant for completion of the required items, thereby, lengthening the claim process.

The information in a manual-based environment is also not organized in a format that decision makers can readily use to derive any meaningful information. Alternatively, if the forms are processed using a computer-based information system, these common issues can be resolved or minimized to a great extent. This study, therefore, focuses on the development of a web-based claim system that is devoted to assist management in making an informed decision. This system will help management to retrieve data from a database and analyze them to provide useful and explicit information for decision making. Nevertheless, this system is developed to support the decision-making process, rather than to render a decision and fulfill a unique requirement of claim process system in higher education institutions.

The remainder of this paper is organized as follows. Section two discusses on the background of claim system which include the history and the proposed system. Section three focuses the methods embedded in the study, including the stages involved in the system development life cycle. Section four discusses on the web-based system framework and the development tools. Section five explains the integration of claim data with the monitoring and controlling of the financial and staff activities. The paper concludes with the study's limitations in the final section.

2. Background

A. The history

The TISSA-UUM has been practicing a manual-based claim system since the UUM establishment on 16 February 1984. Using this practice, any employees willing to claim are required to complete and submit their paper-based claim forms. The claim will then be processed manually. The manual claim process is illustrated in a flow chart shown in Figure 1.

Nonetheless, advances in technology, with more powerful and user-friendly capabilities for data retrieval and database management [2], provide users an opportunity to develop a relatively effective system that supports a variety of management-related functions and also decisions. Web-based claim system is one of great importance in higher education institutions.
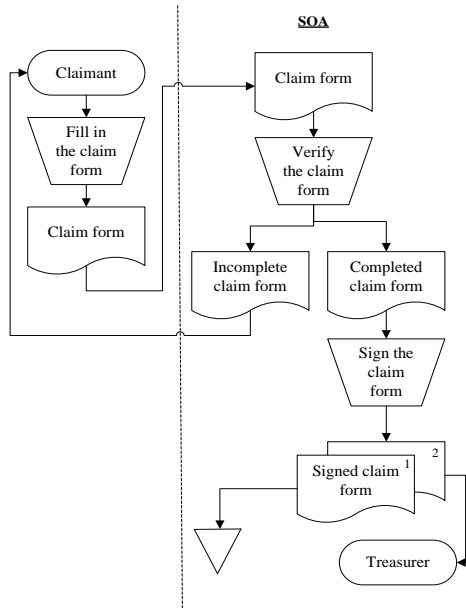
Figure 1: Manual-Based Claim Process

B. The Proposed System

A web-based claim system is an interactive, flexible, and adaptable computer-based information system, specially developed for supporting the solution of a non-structured management problem in improving decision making [3]. This e-claim assists decision makers to use data, knowledge, and communications technology to identify problems and make decisions to solve those problems [4]. E-claim has been one of the best tools to assist decision making [5] at the organizational level [6].
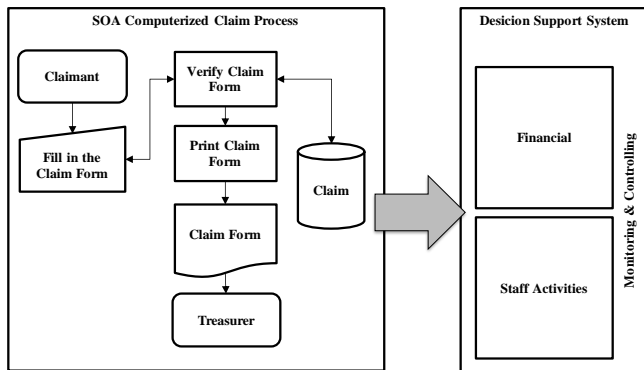

Figure 2: Computerized-Based Claim Process

The system in this study is for web-based environment implementation. Hence, e-claim system assists claimants to complete their online claim regardless of time and space boundaries. The computerized claim process is illustrated in a flow chart shown in in Figure 2.

The e-claim system is specifically developed to: (1) make the process "user friendly" for claimants and those who assist them; (2) make the claim process efficient; (3) assist decision makers on a real-time basis; and (4) improve the management's effectiveness of decision making. This system assists decision makers in monitoring and controlling the financial and staff activities.

Financial Activities. Funds are generally allocated to the School based on vots. Examples of vots include salary and wages, travelling and transportation, rental, maintenance and minor repair services, and accessories and equipment. Thus, any claims related to travelling, for instance, will be made out from the travelling and transportation's vot. A good spending plan reflects the way the School spends the money. E-claim system helps the School to monitor and control all the funds allocated to and spent by the School. It is importance for the School to ensure that the allocated funds are spent wisely and are made use by the staffs over the year. This is because the funds to be allocated by the University to the School in the next year are always based on the total amount spent in the preceding year. Hence, the budget of School that fails to spend the allocated funds will be decreased to the amount that was actually used in the preceding year.

Staffs Activities. The School can use e-claim system to monitor and control the work of its employees. For instance, each employee is allowed to go to a conference only twice in a year. Hence, an application by the employee (who has been to the conferences twice) intending to attend another conference in that year will be rejected. While this allows management to maintain their transparency and accountability, justice for all employees can be assured. In addition, by reviewing the employees' claims for a certain period of time, the School is able to identify which employees are actively involved in School activities.

3. Methods

The system's development involves five phases using system development life cycle (SDLC) suggested by Romney and Steinbart [7] (see Figure 3). These processes are: system analysis, conceptual design, physical design, implementation and conversion, and operations and maintenance.
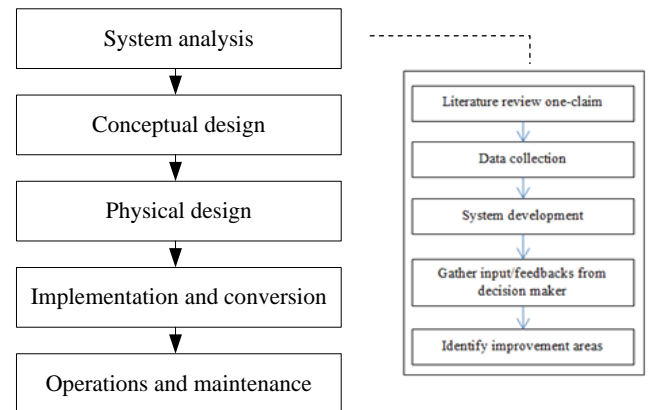

Figure 3: System Development Life Cycle

SYSTEM ANALYSIS. During system analysis, the goal of the project is defined, the nature and the scope of the project are specified, and the end-user information needs are identified and documented. We use TISSA-UUM as our case study. The unit of analysis is an individual, where the TISSA-UUM staffs are our key informants. Before developing the system, we review a literature review on DSS to obtain an in-depth understanding of DSS and its related applications. Data collection involves gathering information from varied sources such as from written documentations (i.e., primary data) and interviews (i.e., secondary data). Interviews are carried out with the TISSA-UUM management team to gain all necessary information about the claim process, including the design features they would like to have in the system.

CONCEPTUAL DESIGN. In conceptual design, the desired features (such as screen layouts) and of the system is identified and analyzed. This process is essential in meeting the user needs. In this phase, the logical and physical designs are being developed to satisfy the functional requirements of the system. Figure 4 shows the entity relationship of the e-claim system.
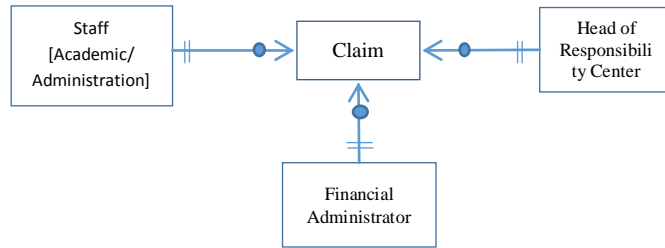

Figure 4: Entity relationship of E-claim system

PHYSICAL DESIGN. It involves the translation of the broad, user oriented requirements of the conceptual design into detailed specifications that are used to code and test the computer programs. Figure 5 shows some of the coding writing in developing the e-claim system.

```
If list.Count > 0 Then
For i = 0 To list.Count - 1
table1.Clear()
table1 = CType(list(i), Hashtable)
lTuntutanId = "Kod Tuntutan : " & table1.Item("ID").ToString() & "<br />PTJ : "
If lstTuntutanId = "" Then
lstTuntutanId = table1.Item("ID").ToString() & "|"
Else
lstTuntutanId = lstTuntutanId & table1.Item("ID").ToString() & "|"
End If
list1 = DataAccess.GetInstance().QueryForList("GetMainClaim", table1.Item("ID").ToString())
If list1.Count > 0 Then
table = CType(list1(0), Hashtable)
strPtj = _gClass.GetDataString("ptj", "tblPtj", "id", CDec(table.Item("pendahuluan"))
_elaunHarian = table.Item("elaunHarian").ToString()
elaunHarianKecil = CDec(table.Item("elaunHarian"))
_elaunMakan = table.Item("elaunMakan").ToString()
elaunMakanKecil = CDec(table.Item("elaunMakan"))
sarapan = CDec(table.Item("sarapan"))
makanTengahari = CDec(table.Item("makanTengahari"))
makanMalam = CDec(table.Item("makanMalam"))
_layakTuntut = CInt(table.Item("layakTuntut").ToString())
_elaunLayakTuntut = CInt(table.Item("elaunlayakTuntut").ToString())
bCount = CInt((_tujuan.Length) / 40)
End If

If bCount > 0 Then
'Response.Write("bCount : " & bCount)
For c = 1 To bCount
strBreak = strBreak & "<br>"
Next
End If
```

Figure 5: System's codes

IMPLEMENTATION AND CONVERSION. During the implementation and conversion stage, all the elements and activities of the system are brought together into operation. System testing has been performed across the system environment to ensure the correctness of the system and it completeness. The testing incorporates the client-side application, server-side application and the hardware. At this stage, the system documentation is ready. We

survey 38 respondents to test the e-claim system consists of 30 academicians and 8 administrators, both from various levels of position.

OPERATIONS AND MAINTENANCE. The system is periodically assessed to ensure that it does not become obsolete. Modifications are made as soon as problems arise and new needs become evident. This system has been put into operation since 1st January 2014. Since its implementation, the users' feedbacks are accumulated from time to time for future improvement of the system.
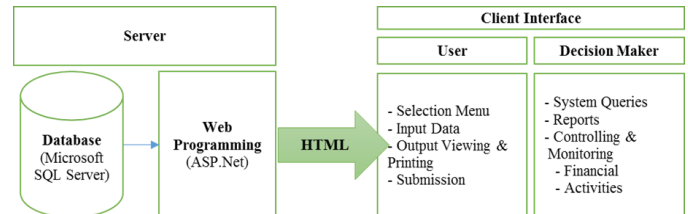

Figure 6: Web-Based Framework for E-Claim System

4. System Framework and Development Tools

System Framework

To make the system accessible and to provide mechanisms to manage content, the web-based system framework has been utilized as it has been well established and constantly improves from time to time. In addition, it also possible to run the system in any type of machines and operating systems as well as improves the accuracy of information and shortens the processing time. The framework for the e-claim system is represented in Figure 6. This framework consists of database, web programming and user interfaces.

Database is the place in which all of the claim data will be stored. It enabled the database operations to be activated throughout the system. Web programming has been placed in the layer between the database and the system interface. It has been encoded based on the requirements that have been specified in the system analysis phase. The user interface has been designed for easy interaction between the user and the system. There are two types of users that have been identified i.e. the claimant and the head of the department (decision maker) who are going to approve the claim. There are various tasks have been integrated in the system in order to fulfill the specific user needs including generating the reports.

Development Tools

In order to develop a web-based application, it requires the right platforms and tools of web development. In this project, firstly, the focus of the development is to solve the problems of expenditure tracking among academicians with minimal cost of IT expenditure. Therefore, the free open source systems, such as WAMP (Windows, Apache, MySQL, and PHP), LAMP (Linux, Apache, MySQL, and PHP) and Microsoft.NET [5], are considered to develop the system. The open source systems developer introduces a concept of source code sharing in order to overcome few limitations in open source systems environment. The combination of programming languages allows developer to utilize a variety protocols and formats as well as to avoid constraints on the specific languages [8]. It is also can increase the performance (speed and size), protection on intellectual property and safety [5]. The development of system also considers the utilization of related interfaces including Common Gateway Interface (CGI), Simple Common Gateway Interface (SCGI), Server Side Includes (SSI), Active Server Pages (ASP), and Server Application Programming Interface (API) [9].

Secondly, the development of interactive web-server is to manage both dynamic and static content of web. The development requires

developer to utilize the interactive web-server interfaces that consists the element of HyperText Markup Language (HTML) documents such as images, tables, and linked-object and text files. HTML is a language for World Wide Web (www) clients. These interfaces are communicated via HyperText Transfer Protocol (HTTP). The HTTP server receives a request message from HTTP client and response to the messages [10].

The following is a brief explanation of some of the selected languages:

• .Net CLR language also known as the Common Language Specification (CLS). Previously .Net is known as Visual Basic. Compatibility with the CLS standards ensures that our language is completely interoperable with others programming to the CLS, no matter what language is being used.

• PHP is a server-side scripting language. The language suitable for web development and able to embed HTML into PHP code. PHP code is executed with a command-line interface (CLI) and appropriate for standalone graphical applications implementation.

• Java is an object-oriented programming language. The flexibility of the languages allows the developer to run the system in all platforms that support by Java regardless of computer architecture

As for our project development [11], the Microsoft.NET is the best environment to be chosen due to the need and ability of the languages to interact with the requirements. In addition, the e-claim system as decision support system application can be developed via local host without internet access [12].

5. Implementation, Testing and Monitoring

The execution of web-based framework of e-claim system by applying appropriate development tools is developed along with the methodology stated [13]. The claim process has been closely analyzed in order to develop a user-friendly system by embracing all the essential features to maneuver claimants and system administrator. Figure 7 & 8 illustrates the claim form while figure 9 displays total claims claimed throughout the year.
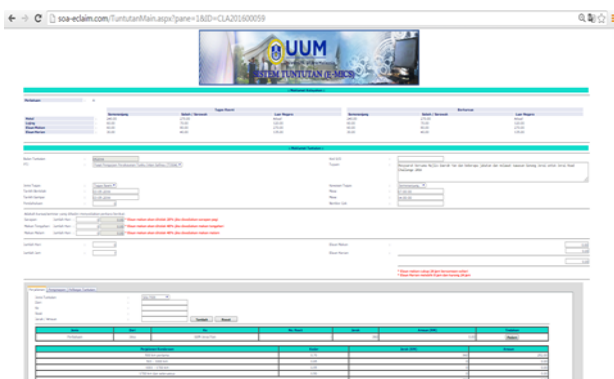

Figure 7: Interface to show list of claim by claimant
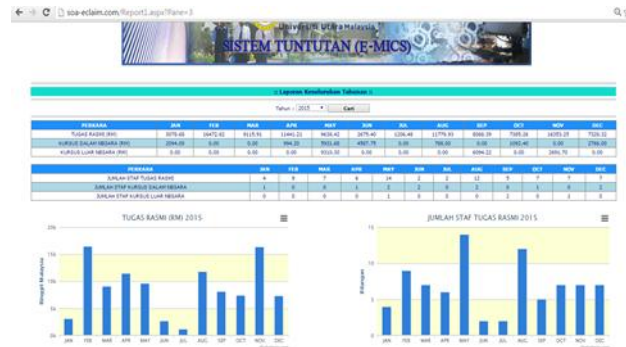

Figure 8: Interface for claim form

Figure 9: Total funds claimed and numbers of claimants for official duty throughout year 2015.

As explained in the previous section, instead of the claim process, this system also introduces the support system which could help the head of responsibility center in monitoring and controlling the TISSA-UUM financial and staff activities. To integrate the claim data with the monitoring and controlling activities, the following stages are followed. In Stage I, the decision maker has to set up the allocation of funds for each of the vots' categories. This amount can either be automatically generated based on the annual budgets or manually allocated for a particular month or year [14].

In Stage II, the data which were previously entered online by the claimant are obtained from the database. In Stage III, the statistical analysis is conducted to produce the desired output for decision maker use [15]. Based on the output, the head of the department is able to review and analyze the real-time expenses and allocation of the department resources, including both financial and staff activities. At this stage, the total expenses incurred can be monitored and compared to the budgets allocated (see second step in the preceding paragraph). The analysis can also be expanded based on the decision maker needs.

Finally, in Stage IV the output obtained from the previous analysis can be used for future organization's planning. The issues identified can be highlighted and can also be used as an input in the first stage of this activity.

On the conversion stage, a test was conducted to validate the accuracy and completeness of the e-claim system. Table 1 shows the number of surveys on the accuracy of the claims.

Table 1: Result of accuracy testing

Claim type	Total claimants	Accurate	%	Not accurate	%
Official duty	25	19	76	6	24
Seminar/Course	13	10	77	3	23
Total	**38**	**29**	**76**	**9**	**24**

The results found that overall claims, official duty and seminar/course, are accurate approximately 76% tallied to manual calculation. Only 24% of the claims show that there are some errors in claim calculation. Further investigation found that most of the errors (non-accurate issues) are due to claimants wrongly enter the required field such as on the total kilometer for mileage, claimants key in '150km' instead of 150 only and incomplete details for claim such as forget to select the location (peninsular, Sabah/Sarawak or oversea) of official duty or seminar/course. Hence, the system must be updated to control those issues to avoid unnecessary errors or incomplete forms. There also suggestions to display more note in the claim forms and upon incomplete forms submission, the incomplete prompt menu is needed.

For completeness survey, we divide the respondents into two groups, 15 of them tested the administration menu and the rest tested the

completeness of claim management. Table 2 shows the result of e-claim system on completeness.

Table 2: Result of completeness test

Administration Menu		Complete		Not Complete	
N=10		**n**	**%**	**n**	**%**
1. User maintenance		8	*80*	2	*20*
2. Claim maintenance		9	*90*	1	*10*
3. Allowance maintenance					
a. Meal		10	*100*	0	*0*
b. Lodging/Hotel		10	*100*	0	*0*
c. Mileage		10	*100*	0	*0*
d. Replacement fare		4	*40*	6	*60*
e. Other claims		6	*60*	4	*40*
4. Various administration report		8	*80*	2	*20*
Claim Management		**Complete**		**Not Complete**	
N=23		**n**	**%**	**n**	**%**
1. User maintenance		23	*100*	0	*0*
2. User/claim qualification		23	*100*	0	*0*
3. Claim details		20	*87*	3	*13*
4. Meal allowance		23	*100*	0	*0*
5. Travelling allowance		15	*65*	8	*35*
6. Lodging allowance		23	*100*	0	*0*
7. Other allowance		12	*52*	11	*48*
8. Advance claim		23	*100*	0	*0*
9. Claim statement		20	*87*	3	*13*

The completeness survey is evaluate whether the e-claim system provide a complete function of claim process for the claimants as well as the administrator of the claim. This survey used the experience of respondents in using the e-claim system to evaluate the completeness of the claiming process. On the administrator menu, the incomplete functions are at menu of replacement fares and other claims, which are 60% and 40% respectively of the respondents, claimed that the system is lacking of several functions such as insufficient location of flight fares and the system did not include fare for trains and busses. While the incomplete function in administrator menu has caused incomplete functions in claim management menu simultaneously. 35% of respondents claimed that in completing the claim form, they couldn't find certain replacement fares in travelling allowance menu. Almost half of the respondents (48%) agreed that the other claims should be added with few other claims such hotel taxes, seminar/course fees and allow other claims to be added in claim form. Hence, the result of surveys gave sufficient inputs to the developer in updating the e-claim system and complete the cycle of development in the planned time.

6. Conclusion

This study is conducted to develop a web-based claim system in TISSA-UUM, one of the departments in higher academic institution. The previous manual system was totally being replaced by this system. The implementation of the system significantly helps the school's management in order to monitoring and controlling the financial and staff activities. The latest technologies used to develop this system will provide users with rapid access to any information regarding the claim history and various reports. This system can be easily accessed anytime, anywhere online. The use of the online database also will provide secured and controlled data environment, thus increasing the reliability of the output.

As the technology rapidly change, this system is still in needs for future improvement. From time to time it needs to be coped with the latest web and mobile technology. Although this system can be accessed from any browser, it is however still having a limitation to be easily access by mobile devices. It has not yet been responsive to the size of the any devices, which will be our next improvement for the system.

References

[1] Taiwo, J.N. Effect Of Ict On Accounting Information System And Organisational Performance: The Application Of Information And Communication Technology On Accounting Information System. European Journal of Business and Social Sciences, 5(2) (2016) 1-15.

[2] Boubeta-Pulg, J, Ortiz, G. & Medina-Bulo, I, A Model-driven Approach for Faciliting User-friendly Design of Complex Event Patterns, Expert Systems With Applications, 41(2) (2014) 445 -456.

[3] Shakeel PM, Baskar S, Dhulipala VS, Mishra S, Jaber MM., "Maintaining security and privacy in health care system using learning based Deep-Q-Networks", Journal of medical systems, 2018 Oct 1;42(10):186.https://doi.org/10.1007/s10916-018-1045-z

[4] Velmurugan, M.S., & Narayanasamy, K. Application of decision support system in e-commerce. Communications of the IBIMA, 5 (2008) 156-169.

[5] Ahmad F., Saman, M.Y., Mohamad Noor, N.M., & Othman, A. DSS for tendering process: Integrating statistical single-criteria model with MCDM models. IEEE International Symposium on Signal Processing and Information Technology, (2007) 863-868.

[6] Shakeel PM, Baskar S, Dhulipala VS, Jaber MM., "Cloud based framework for diagnosis of diabetes mellitus using K-means clustering", Health information science and systems, 2018 Dec 1;6(1):16.https://doi.org/10.1007/s13755-018-0054-0

[7] Romney, M., & Steinbart, P. Accounting Information Systems (10th Ed). (2006) New Jersey, NJ: Pearson Prentice Hall.

[8] Ford, S., Wells, D., & Wells, N. (1997, 9 1). Web programming languages.

[9] MuhammedShafi. P,Selvakumar.S*, Mohamed Shakeel.P, "An Efficient Optimal Fuzzy C Means (OFCM) Algorithm with Particle Swarm Optimization (PSO) To Analyze and Predict Crime Data", Journal of Advanced Research in Dynamic and Control Systems, Issue: 06,2018, Pages: 699-707

[10] Hippel, E. V., & Krogh, G. V. Open source software and "the private-collective" innovation model: Issue for organization science. Organization Science, 14(2) (2003). 209-223.

[11] Wang, J., Duncan, D., Shi, Z. & Zhang, B, Web-based Set Analysis Toolkit (WebGesttalt), Nucleic Acids Research, 41 (2013) 77-83.

[12] Turban, E. Decision Support and Expert Systems, 4th ed., (1995) Prentice-Hall, Englewood Cliffs, NJ.

[13] Marginean, N., Sirbu, J., & Racovitan, D. Decision trees-A perspective of electronic deisional support. Annales Universitatis Apulensis Series Oeconomica, 12(2) (2010) 631-637.

[14] Shakeel PM. Neural Networks Based Prediction Of Wind Energy Using Pitch Angle Control. International Journal of Innovations in Scientific and Engineering Research (IJISER). 2014;1(1):33-7.

[15] P. Mohamed Shakeel; Tarek E. El. Tobely; Haytham Al-Feel; Gunasekaran Manogaran; S. Baskar., "Neural Network Based Brain Tumor Detection Using Wireless Infrared Imaging Sensor", IEEE Access, 2019, Page(s): 1