



URGAMS: Unfunded Research Application Management System Implemented UCD Theory

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ABSTRACT

Information Technology (IT) have taken business from traditional method to new modern advance forms. In deep, the wider view of IT including development, use of computer software, system, network and maintenance. This also including process and distribution of knowledge. Therefore IT effected the growth and plays a keys role in certain organization nowadays [1]. Unfunded Research Grants Application Management System (URGAMS) is an online proposal approval system where the case study has been done at UiTM Terengganu. Currently, they are using the manual process of the reviewer submitting the proposal application of unfunded research and getting approval from the reviewer and coordinator. In addition, this system will ease the researcher on submitting the proposal application of the unfunded research through online to get the approval of the research from the reviewer and the coordinator of Research Management Unit (RMU). Furthermore, the user who will use this system is the administrator, the researcher, the reviewer and the RMU's coordinator. The Waterfall Model is used for this project where this model has been modified to The Adapted Waterfall Model. Adapted Waterfall Model is used for the requirement analysis, design, and implementation and testing for this project. The objectives of this project are to identify the current process and problem in managing the Unfunded Research in UiTM (Terengganu), to design and develop the system of Unfunded Research Grant Application Management System (URGAMS) and to evaluate the usability and functionality of the purposed system. The system has been testing by two (2) experts where the expert consists of the lectures that expert on the system field and thirty (30) respondents were selected to do user testing for this system. The highest mean is 4.57 has been achieved for the consistency evaluation on user testing. Through the development of this system, it is hoped that URGAMS will provide the best solution to manage the problem faced by the researcher in UiTM Terengganu where the researcher can submit the proposal application online and get the approval faster rather than the manual process.

Key words: Management System, Proposal Application, User-Centered Design, Unfunded Research, Waterfall Model.

1. INTRODUCTION

Nowadays, many university and industries with an inclination toward research and development have been collaborating on research projects based on legally established funding schemes or through direct funding to an individual with mutual interest. Besides these usually financed research projects, researchers at “Universiti Teknologi Mara (UiTM)”

are also conducting projects that are not funded by any formal research grant or financial support including grants from Malaysia or international governmental and non-government agencies or foundations, or funding from business or private entities. Therefore, there is a need to formalize the official registration of unfunded research projects conducted by UiTM researchers at UiTM.

Above all, Unfunded Research Project is actually referring to any research project that is conducted independently by UiTM researchers without any financial supported by the legal funding source.

Every university has its own unit which manage the research grant. In UiTM Terengganu, Research Management Unit (RMU) is a unit that responsible for helping and managing the approved research grant and the unit is under Research, Industry Linkages and Alumni Department (PJI&A). Formerly, RMU was known as Unit Research, Development and Commercialization (URDC). PJI&A is managed directly by the Research Management Institute (RMI) at UiTM Shah Alam.

1.1 Business Process

Currently, Unfunded Research is running manually without any computerized system in applying the approval of the proposal. This current process involves several parties such as researcher, reviewer, RMU staff and RMU coordinator. Figure 1 shows the current business process while Table 1 shows summary of current business problem on submitting proposal application of unfunded research.

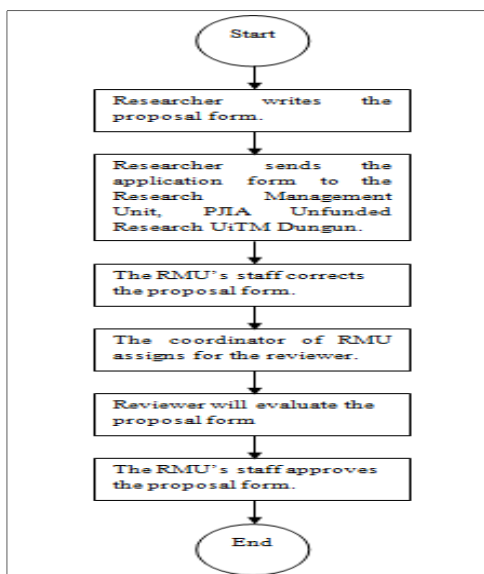


Figure 1: Current Business Process for Unfunded Research

Table 1: Summary of current Business Problem

Researcher	Action	RMU Staff	Action	RMU Coordinator	Action	Reviewer
Form43 (Research Registration Without Grants Form).	Both form will be send to →	Checking the form whether it is complete or not.	Form39 will be send to →	Endorse the proposal.	Form39 will be send to →	Review the proposal.
	1	Sorting the form by the field.	2		3	Evaluate the proposal in the Form45 (Evaluation Form).
Form39 (Unfunded Research Form).	←	Form 43 will be kept as the record.			Form39 & Form45 will be send to	Approve the proposal.
Updates the proposal	The form will be send to		←	Approve the proposal.		
			→			
		6				

From Figure 1 and Table 1, several processes had been identified contribute to problems that make the process of applying approval become inefficient and ineffectiveness.

1.2 Problem Statement

One of the problems that have been arising due to the current manual process is the time taken for the approval of the proposal from the coordinator of RMU and the reviewer of the proposal. In other word, the longer time taken to approve the proposal of research will then affect the duration and plan framework of the research. This is because the proposal will be send manually from the researcher and end to the reviewer. Sometime, the staff, coordinator and reviewer did not alert about incoming new proposal. In this case, the system developed enhance the process by helping helping the researcher, staff, coordinator and reviewer in sending and communicating about the proposal via online.

The other problem is the difficulties in tracking the status of

the proposal where the researcher cannot track the progress of the proposal. The progress of the process is important to make sure that the process is on track. The tracking status on the system allows the researcher to monitor any action that has been taken on the issue. According to [2], once the issue has been submitted, the organization needs to know who is responsible for solving the query. This problem can be solved with the development of the system that including the tracking status where the researcher can know the progress of the proposal approval. So, the researcher can keep tracks with the proposal progress through the system.

Lastly, the problem with the current system is RMU's staffs have the difficulties in generating statistical report of the research that have been delivered. Report is very important for the organization to see the functionality of the organization thus management reporting acts as an important role in a current business environment which it gives a clear picture to executive teams about the financial health of an organization [3]. Hence, the data of the submitting research may not be recorded systematically. Other than that, the data of reviewers did not recorded computerized where the data is very useful in matching and assigning specific reviewers for each of proposal submission. The development of the system will enable the RMU's staff to generate the report of the research every month and record data of each reviewers systematically. Moreover, the development of the system will enhance the productivity of the business process.

1.3 Objective

There are three objectives in this project, which are:

- i. To identify the current process and problem in managing the Unfunded Research in UiTM (Terengganu).
- ii. To design and develop the system in order to keep track the progress and managing the process of approval of unfunded research in RMU
- iii. To evaluate the usability and functionality of the purposed system.

2. RELATED WORKS

[4] states that the main point on literature review is to get the understanding and get some ideas from the research that have been existing and discuss the specific topic or the study area and present the knowledge from the research in the form of the report. Furthermore, a literature review will include the source from journals, books and articles that related to the topic. This would help in getting the overall picture of the process of developing the system.

2.1 Web-based Application System

Nowadays, the whole process of management and all the functions especially in college and university use an online system of general management. It includes record

management, cultivating scheme management, course management, grade management, degree management and various types of management. Every department that involves in the system has the specific respective information requirement. Hence, there are links of diversified information that connects among them [5]. This can be one of proves of how importance web-based application on Management Information System (MIS). Hence, Web Based Application can be used as a connection medium which can help information transfer occur faster and more effectively.

2.2 Research Application Management System

Research is a detailed study of a subject, especially in order to discover new information or reach a new understanding and ideas. The research may be in the field of scientific or medical research while the application can be referring as an official request for something, usually in writing. The research application management system is a web-based system that allows applicant of the research to be made online. Besides, in the scientific institution, research management is the responsibility of research directors, programmers and project leaders, and scientist which is supported by administrative staff.

2.3 User-Centered Design

User-centered design (UCD) is a methodology and philosophy in which the needs, goals, and success of the end user are considered. The term is used most frequently in connection with computer information system design. However, it can be applied to system, object or product intended for human use [6]. In line with that, [6] stated that UCD is an approach values the human needs, capabilities of users, and behaviour of users first before designs to accommodate those needs, capabilities, and ways of behaving for the sake of the system. Thus, expert's agreed that UCD is an approach to interactive system development which focus on making system usable and it is multi-disciplinary activity. Figure 2 shows the UCD principle applied in features of the system. There are three principles chosen which are learnability, flexibility and robustness.

Table 2: User Centered Design principle reflect with system features

Features	Learnability	Flexibility	Robustness
Login	/	/	/
Proposal Application	/	/	/
Status Proposal	/	/	/
Contact Us	/	X	/
Calendar	/	X	/
Dashboard	/	/	/
Reporting	/	/	/

3. METHODOLOGY

The Waterfall model will be used as the methodology to develop the URGAMS. In the Waterfall Model, one phase needs to be completed before starting the next phase which is the reasons why it is known as a sequential software development [8].

Adapted Waterfall Model is used by modifying the real Waterfall Model in order to fulfill all requirement of the project. This is done by excluding maintenance phase due to the phase is not suitable since it requires a longer time frame. The model is the plan-driven process which allows the schedule of the URGAMS to be properly planning for each phase to produce the expected result. Figure 2 shows the phase in Adaptive Waterfall Model.

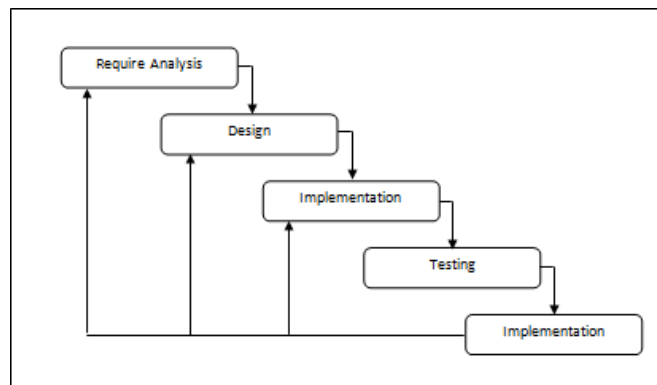


Figure 2: Adapted Waterfall Model

4. RESULT AND DISCUSSION

The evaluation has to be made in order to get the feedback from the user of the system especially expert user about the system. Furthermore, the expert will give comments and suggestion about the system that has been developed. Hence, the comments and suggestion that has been given by the expert evaluation can be used in order to improve the system in the future. URGAMS was tested by thirty respondents and the results were recorded. Six (6) construct were used for evaluation purpose which are UCD Theory, Usability, Ease of Use, Satisfaction, Efficiency and Consistency.

4.1 Expert Testing

Based on the expert evaluation regarding the UCD of the system, Expert 1 commented that the interface should be upgraded because it is too simple and the suggestion on the user centered is to remains the consistency of the system and try to add more information. However, Expert 2 commented that the User Centered Design is okay and the expert is satisfied with it.

Based on the expert evaluation regarding the usability of the system, Expert 1 mentioned that the system lack of process where the system should include the process. As for example, the system should include checking process. The other

suggestion by Expert 1 was the process of the system should be completed properly. However, the comment by the Expert 2 says that the system is okay and Expert 2 suggest that the system should allow the researcher to upload the proposal details and coordinator can download the detail of the proposal.

Based on the expert evaluation regarding the ease of use of the system, Expert 1 mentioned that the system is lack of instruction where it could have confused the user of the system so the Expert 1 suggest that the system should have more instruction as a guide to the user. On the other hands, the Expert 2 commented that the title should be underline and the Expert 2 suggest that the status statement have to be changed to the action statement.

Based on the expert evaluation regarding the satisfaction of the system, overall, both of the experts are satisfied with the system.

Both on the expert evaluation regarding the efficiency of the system., both of the experts said that efficiency of the system is okay but Expert 2 added that the system should be sorted by the date of the latest proposal application. Hence, Expert 2 also suggested that the list of research history should be updated.

Based on the expert evaluation regarding the consistency of the system, Expert 1 mentioned that the system used suitable and consistency color. The Expert 1 suggest that the system should add underline at the name of the researcher and sorting or divide the list of researcher based on status active and inactive. On the other hands, the Expert 2 satisfied with the system but suggested for changing coloring from grey and black to black only. Table 3 shows summary of expert evaluation.

Table 3: Summary of expert evaluation

CONSTRUCT	Expert 1	Expert 2
UCD	<p>Comment: Interface should be upgraded because it is too simple</p> <p>Suggestion: Remains the consistency of the system and try to add more information</p>	<p>Comment: okay.</p> <p>Suggestion: none</p>
Usability	<p>Comment: System lack of process where the system should include the process. As for example, the system should include checking process</p> <p>Suggestion: The process of the system should be completed properly</p>	<p>Comment: Satisfied</p> <p>Suggestion: System should allow researcher to upload the proposal details and coordinator can download the detail of the proposal.</p>
Ease of use	<p>Comment: System is lack of instruction where it can have confused the user of the system.</p> <p>Suggestion: The system should have more instruction as a guide to the user</p>	<p>Comment: title should be underlined</p> <p>Suggestion: status statement has to be changed to the action statement.</p>
Satisfaction	<p>Comment: Satisfied</p>	<p>Comment: Satisfied</p>
Efficiency	<p>Comment: Satisfied</p> <p>Suggestion: Sorting date by the latest application</p>	<p>Comment: Satisfied</p> <p>Suggestion: List of research history</p>
Consistency	<p>Comment: Fine color.</p> <p>Suggestion: Try to put underline for the name of researcher and sorting or divide the list of researcher based on status active and inactive</p>	<p>Comment: Satisfied</p> <p>Suggestion: Black and grey color change to black color only.</p>

4.2 Mean

Figure 3 shows the graph of the respondent analysis for all construct that for the mean. It consists of six items which consists of User Centered Design (UCD), usefulness, ease of use, satisfaction, efficiency and consistency. Based on the result, the mean for the UCD is 4.41, usefulness is 4.41, ease of use is 4.29, satisfaction is 4.0, and efficiency is 4.25 and

lastly mean for consistency is 4.57. Then the highest mean is consistency. Hence, the system reflects that respondents are agreed the system provides consistency from the start of the system to the end. However according to [9] Satisfaction is a most important construct because it evaluates satisfaction of the system amongst users.

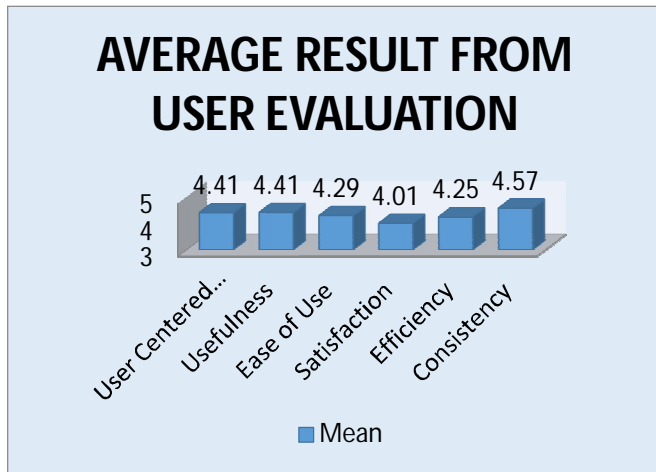


Figure 4:: Average Result of User Evaluation

5. CONCLUSION

As a conclusion this system gives the benefits to the researcher where the researcher do not have to apply for the research approval manually by using hardcopy form. Hence, this system enhance the process of approval proposal systematically and effectively. Even the research meets all the objective mentioned above, but there some limitations need to be concerned in future. The limitations that exist in this system are there is no date for each proposal has been updated whether the proposal has approved or disapproved by the coordinator. Thus, the researcher did not get the information when the proposal has been reached to the coordinator. In addition, there is no notification for all users about the status of the proposal. So, the coordinator and the reviewer did not get the updates about the latest proposal that has been sent. Hence, the coordinator and the reviewer have to go to the proposal list to see the latest proposal that has been sent. Thus it is much recommended to continue the further enhancement for this system to make it more efficient, effective and more functional. Overall, this system gives significant value and advantages to the users involved.

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