

**Requirements validation techniques :A case of prototype of the Technical
Institute for Administration**

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Abstract

requirements validation techniques (RVTs) play important role to detect possible defects in the requirements (functional, non-functional). Prototypes are good way to demonstrate the requirements and help stakeholders discover problems. The key advantage of a prototyping-based methodology is that it very quickly provides a system for the users to interact with, even if it is not initially ready for widespread organizational use. The proposed web application has been tested based on the usability, System quality has a considerable effect on ease of use and does directly influence the users' intention to use the TIAS in the future. The analysis indicates that the attractiveness of the user interface, performance and the functionalities are critical success factors of TIAS acceptance. the mean of intention to use and ease of use are respectively 3.77 and 3.54 on a 5-point Likert scale. These results show that TIAS is well accepted in general.

Keywords

requirements validation, requirements validation techniques, prototyping, technology acceptance model, system quality

Introduction

1.0

1.1 requirement validation

Requirement validation is defined as the methods in which examine the requirements document in order to ensure a right definition for the software. Also the validation ensures

that the requirements specification will be correct, complete and consistent set, it will be welcomed according to the customer needs. It is normal to discover incomplete and ambiguous requirements in the requirements specification [1].

1.2 Requirements validation techniques

It is very important that we understand and represent the requirements for any software system without consuming more time . if we were able to specify the mistakes in early stage that means we will save time and effort. the goal of requirements validation techniques does not prove the requirements are correct but instead it is to specify and correct all wrongs during the requirements validation process, which covering stages following Requirements review ,Prototyping , Model validation , testing [2].

1.3 prototyping

“A software prototype is a partial implementation constructed primarily to enable customers, users, or developers to learn more about a problem or its solution” [3].

The prototype is a simplified model of a proposed system that is built to communicate answers to specific questions about a proposed system [4].

prototype helps software engineers to identify and understand the stakeholders requirements , as well as helps stakeholders to discover problems . In addition it facilitates other activities such as system designing and user interface development . It allows for stakeholders to participate in the process of validation. Prototype comes in different forms, from diagrams [5].

the team must meet the needs and desires of the user when the development is complete. specifying the problems, should not only use techniques like surveys, focus groups, interviews etc., it should also be reflected on users through simulation prototype to user requirements. The purpose of the research to explain what are the advantages and disadvantages of prototypes techniques . The aim of this study is to validate the requirements for system of the Technical Institute for Administration (TIAS).

2.0 Research methodology

Qualitative research methodology is used to investigate above mentioned research question for expected results from this study. rich literature in the form of books, journals and research articles are also be consulted for identifying the good prototype. Most organization create multiple prototypes for example, they create diagram on paper then they develop this prototype by using high level language [2].

3.0 Approaches to prototyping

Prototyping used to give an overview of the requirements being imposed or implemented in the system. It is very difficult for the non - technical to understand how it can be transformed the requirements into the executable form of system . It is also, prototyping helps to identify the errors, and helps in deleting errors from the requirements document. Also, most organization create multiple prototypes for example , they create diagram on paper then they develop this prototype by using high level language .

Informal communication is an important factor in the requirements of the prototyping, and this factor reduces the loss of trust between team and users because the interactions is very important to build relationships among individuals during the validation period . the team can also build trust with customers if the primarily prototype achieves their requirements. the trust factor is important and influential on prototyping [6].

Several of researchers used the Usability Guidelines for the assessment online services. Assessment of the site is a very important step in the information system, in this a move that aims to enhance the quality of the site [7].

3.1 prototyping types

There are two types of prototyping :-

3.1.1 Throw-away prototyping

throw -away prototype has limited functionality and is used in the discrimination and the development requirements is understandable bad Also, it helps to clarify the requirements and assess the possible risk of the operation. It is not a final prototype of the system but is developed in the early stages of the basic stages of the experiment then canceled. In this model, the Working Group develop the requirements and it becomes difficult to understand by customers even the requirements become clearly that there is no development in this prototype, if the customers and developers accepted the requirements after that the prototype will be canceled [3].

3.1.2 Evolutionary Prototyping

it is another kind of prototyping in a way that we can improve the requirements which will be smooth for the customers to understand and it will get priority. Objective of evolutionary prototyping is to build a good system that can be used by the user, this part should have the whole quality branches that is available in the final step. It is so important that the developers have less speak with customers. quality branches that have evolve evolutionary prototyping such as maintainability, design quality, and performance. Evolutionary prototype can be implemented in the time that we will not be able to improve properties in advanced as an example here is the GUI (Graphical User Interface) system[3].

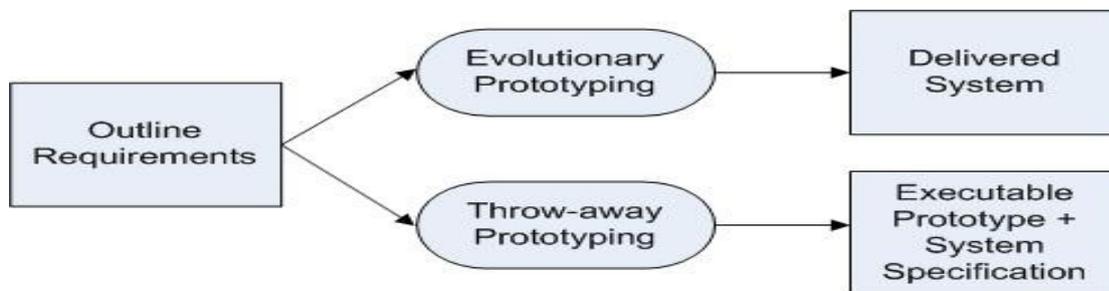


Figure -1 Approaches to Prototyping

3.2 Comparison of Prototyping Types

Throw-way prototype is quick develop but Evolutionary prototype is precisely developed ,so it takes more time .

Throw-way prototype is building difficult parts but Evolutionary prototype is building to understood the first part .

The goal of throw-away is executable prototype and system specification but goal of evolutionary prototype is delivered system [2],[8].

3.3 Prototyping activities

3.3.1 Choose prototype testers

The best testers are users who are fairly experienced and who have the ability to use new systems. End-users who do various jobs should be involved so that various areas of system functionality will be covered.

3.3.2 Develop test scenarios

Careful planning requires the development of several scenarios for testing, which provides extensive coverage of the requirements. End-users shouldn't just play around with the system as this may never exercise critical system features.

3.3.3 Execute scenarios

The users of the system work, usually on their own, to attempt the system by carrying out the planned scenarios.

3.3.4 Document problems

It's usually best to define some type of electronic or paper problem report shape which users fill in when they facing a problem [9].

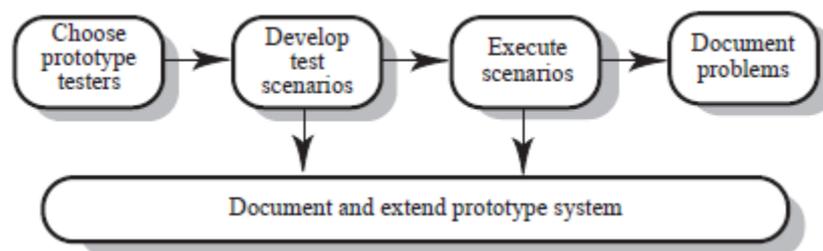


Figure -2 Prototyping activities

3.4 Advantages

- Prototype helps stakeholders to imagine the developed software system .
- prototype helps stakeholder to understand the requirements and specifying the problems, or some matters which need for some additions.
- The prototypes developed through the requirements validation stage perhaps it is used for system testing later. This typical way ensures correct final developed system .
- We can see in some of the companies that the kind of executable prototype is used as a stop-gap system, the best definition of the stop-gap systems is the system that

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we can deliver it to customer when a delay occurs in the final stage of implementation while in that time when the final is developed and ready to be installed we can replace the executable prototype system, while the prototype that is being developed in the requirements validation can be transferred into executable prototype system.

- prototyping has the most important effect on information sharing among various customers who exchange information . They can make a discussion to correct the errors they found in the requirements of their systems [2],[6].

3.5 Disadvantages

- prototype is also too expensive because the company will need to buy the software and training people . It is also time-consuming activity.
- we can draw prototype on a paper and this method is cheap .But we also need standard private records in order to keep for future Signal. paper prototypes in the same way can't be transformed into programs once they are merged into requirements documents after accomplish validation process.
- cost of drafting guide for prototype should be added to the requirements' validation costs [2],[10].

4.0 Results

This study carried out upon 30 respondents " lecturers and students of computer systems department " to validate of requirements in this prototype (TIA), each of whom received a brief explanation regarding the usage and the user interface of the prototype. Intention to use, Ease of use and System Quality (SQ) these three concepts stem directly from the Technology Acceptance Model (TAM)[11][12].

Is there a relationship between intention to use and the items of system quality by another is there a relationship between ease of use and quality of the system.

The data gathered via a questionnaire and this questionnaire include users demographic such as gender " male %55 and %45 female" The study depended age indicator to determine percentage of lecturers %30 and students %70 . The evaluation is intended to collect data on users' opinion regarding the TIA prototype usability. A 5-point Likert scale anchored by "Strongly Disagree" (1) and Strongly Agree (5) was used The tool use in the description and analysis of data is a program SPSS version 15.

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Based on opinion poll upon thirty from users of this website, the mean of intention to use and ease of use are respectively 3.77 and 3.54 on a 5-point Likert scale. These results show that TIAS is well accepted in general.

the Kendall rank correlation coefficient, commonly referred to as Kendall's tau (τ) coefficient, is a statistic used to measure the association between two measured quantities. but may be calculated exactly for small samples; for larger samples[13].

Table1 Kendall Correlation Coefficients between System Quality items, intention and ease to use

	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5	SQ-6
Intention to use	* -0.519	* -0.444	* -0.319	* 0.453	-0.142	* -0.358
Ease of use	0.213	* -0.430	** 0.856	* -0.362	0.280	* 0.464

Table 1 indicates that 5 items of system quality are significantly correlated with intention. 4 items are significantly correlated with ease of use. The presence of sufficient functionalities (SQ-4), performance (SQ-6) and the quality of the interface (SQ-2 and SQ-3) are the most important dimensions of system quality, correlating strongly with ease of use and intention to use. Brief, this study conclude the performance, functionalities, and the attractiveness of the user interface should receive special attention to improve the TIAS.

5.0 Conclusion

To ensure reach a successful conclusion, the team must meet the needs and desires of the user when the development is complete. To achieve this goal, should not only use techniques like surveys, focus groups, interviews etc., it should also be reflected on users through simulation prototype to user requirements. this step help to saving the cost and time. Prototyping has many advantages if you compare with other requirements validation techniques. It is easy to use, and can be used in small and large corporations. requirement prototyping is useful for big corporations because these corporations can use stop-gap system. this study interested in two sides: validation of requirements for prototype of (TIA) and testing a predictive acceptance model that can help us in improving the functions this website. The future work of this study improve requirements "non-functional" like usability and performance, add some functional, such as a forum for the exchange of information and idea among users. upload to

help lecturers add lectures upon this website as well as add links such as Iraq virtual science library.

6.0 References

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Appendix

Questionnaire

The Technical Institute of Administration “system”

SECTION A:

Demographic Background

Please kindly tick (✓) your answers to the given statements.

Gender :

Male. Female.

Age:

18-25 Years old. 26-33 Years old. 34-41 Years old.

42-49 Years old. Above 49 Years old.

SECTION B

Please check the appropriate column. The numbers 1 to 5 represent the following:

1= Strongly Disagree. 2= Disagree. 3= Not Sure.

4= Agree. 5= Strongly Agree.

Question		1	2	3	4	5
Intention to Use						
1	I intend to use this website when I need any information about my study in the future.	<input type="checkbox"/>				
2	I will probably use the website/software again if I have to do my assignments	<input type="checkbox"/>				
Ease of Use						
1	It was simple to use this website	<input type="checkbox"/>				
2	I feel comfortable using this website	<input type="checkbox"/>				
3	I believe I became productive quickly using this website	<input type="checkbox"/>				

System Quality						
1	The information (such as online help, online messages, and other documentation) provided with this website is clear	<input type="checkbox"/>				
2	The interface of this website is pleasant	<input type="checkbox"/>				
3	It is easy to move from one page to another	<input type="checkbox"/>				
4	This website has all the functions and capabilities I expect it to have	<input type="checkbox"/>				
5	The website contains sufficient hyperlinks to navigate	<input type="checkbox"/>				
6	the website working properly	<input type="checkbox"/>				