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CUSTOMIZATION OF REQUIREMENTS MODELING TOOL FOR SOFTWARE ENGINEERING EDUCATION

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CUSTOMIZATION OF REQUIREMENTS MODELING TOOL FOR SOFTWARE ENGINEERING EDUCATION

EGIA ROSI SUBHIYAKTO

A thesis submitted

in fulfillment of the requirements for the degree of

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2014

DECLARATION

I declare that this thesis entitle "Customization Requirements Modeling Tool for Software Engineering Education" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not currently submitted in candidature of any other degree.

Signature   : …………………………

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I hereby declare that I have read through this project report and in my opinion this project report is sufficient in terms of scope and quality for the award of the degree of Master of Computer Science (Software Engineering and Intelligence).

Signature   : …………………………..

Name   : Dr. Sharifah Sakinah Binti Syed Ahmad

Date   :   January 2014

DEDICATION

Special thanks I dedicated to my parents who giving me full support and motivation throughout my project. Thanks to all my best friends that always support me when I working on this project.

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ABSTRACT

In the developing a software, there is a part of modeling the requirements. Modeling the requirements usefully to communicate all stakeholders and as a blueprint. There are modeling tools used to model the requirements such as Rational Rose, Enterprise Architect, Magic Draw, StarUML, ArgoUML, UML Designer, etc. Modeling tools that available gets more complicated to use and when compared majority tools more emphasis on modeling for industrial rather than education. In this study perform the customization tool for software engineering education and evaluate effectiveness the custom tool. The research methodology in this study is questionnaire, interview and literature review related with the study. The custom tool focus only on use case diagram including use case elements and use case description. Development the system start with elicited the requirements of the system, hardware requirements, and software requirements. The testing stage performed to get evaluation from the system developed. In the testing performed test the functional of the system. Evaluation obtained that the system usefulness, easy to use, and easy to learning. Besides, software engineering students are involved satisfied with the system.

ABSTRAK

Dalam membangunkan perisian, terdapat sebahagian daripada model keperluan. Memodelkan keperluan berguna untuk berkomunikasi semua pemegang kepentingan dan sebagai cetak biru. Terdapat alat pemodelan digunakan untuk memodelkan keperluan seperti Rasional Rose, Enterprise Architect , Draw Magic, StarUML , ArgoUML , UML Designer, dan lain-lain. Alat pemodelan yang terdapat mendapat lebih rumit untuk digunakan dan alat majoriti berbanding penekanan pada peragaan bagi industri dan bukan daripada pendidikan. Dalam kajian ini melaksanakan alat penyesuaian untuk pendidikan kejuruteraan perisian dan menilai keberkesanan alat adat. Metodologi kajian dalam kajian ini adalah soal selidik, temu bual dan kajian literatur yang berkaitan dengan kajian. Alat adat memberi tumpuan hanya pada rajah kes termasuk unsur-unsur penggunaan kes dan Penerangan penggunaan kes. Pembangunan sistem bermula dengan mencungkil keperluan sistem, keperluan perkakasan dan keperluan perisian. Peringkat ujian yang dijalankan untuk mendapatkan penilaian dari sistem yang dibangunkan. Dalam ujian yang dilakukan ujian fungsi sistem ini. Penilaian diperolehi bahawa kegunaan sistem, mudah untuk digunakan , dan mudah untuk belajar . Selain itu, pelajar-pelajar kejuruteraan perisian yang terlibat berpuas hati dengan sistem.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Requirements modeling more focused on professional development rather than teaching (Alfert et al., 2004). An industrial instrument does not provide a theory that be needed for teaching (Dutoit et al., 2005). Industrial tools used by the student will have a positive impact to their professional careers. In an educational when students using a modeling tool as example Rational Rose, students will find some weakness in this tool. The weakness including user interface that complicated to be used this is caused many features which aims to drawing business.

In its growth requirements, modeling tools existing are expensive. The expensive tools are one of the constraints in the selection modeling tools for software engineering education.

1.2 Background of Study

In the development of Software Engineering, Educational problems can be said to be divided into two principal parts: University Education and Industrial Education (Mills, 1980). Both of them have the same methodologies and fundamental disciplines. However have different goals and characteristics, besides that there are differences in the level of the age, experience, background and ability.

Shaw (2000) identifies software developers have been educated in the traditional design: undergraduate and graduate programs, vocational program and in house training, and personal initiative in learning new techniques.

In the time of developing a software, there is a part of modeling the requirements that be needed. Currently be found some tools for modeling the requirements, even though majority tools more emphasis on modeling for industrial.

1.3 Problem Statement

1.3.1 Modeling tools that available complicated to be used

Modeling the requirements usefully to communicate to all stakeholders and as a blueprint, with the growing development of the software system also affect to tools that be used for modeling. Requirements modeling tools are commercial as example Rational Rose, Enterprise Architect, MagicDrawUML, MyEclipse, PowerDesigner, etc., and modeling tools are free as example StarUml, ArgoUML, UMLDesigner, WhiteStarUML, etc.

Modeling tools that available in the market gets more complicated and tough to use (Carrillo de Gea et al., 2012). Students usually using UML diagrams to requirements modeling with Rational Rose or ArgoUML (Boggs and Boggs, 2002). In the educational setting, it could be an obstacle because tools such as Rational Rose are designed for professional software engineers. In the Rational Rose, there is feature advanced functionality that allows UML models can be converted into code and converted back into UML models (Patterson, 2002). Functionality that mentioned, students are relatively get confused because device more complicated than a diagramming tool that simple like Visio.

1.3.2   Nice modeling tools that existing expensively

There are some nice modeling's tools are suitable for teaching but an expensive price. Tools for modeling based on (Carrillo de Gea et al., 2012) relatively expensive. This will have an impact on the buy of tools. Typically in an educational environment, buy tools will be done on a large scale considering the number of students in the educational institutions.

1.4   Research Questions

1.4.1   How to develop a customization modeling tool that efficiently for software engineering education?

1.4.2   How to evaluate the effectiveness tool that developed?

1.5   Objectives of the Study

Based on the research questions, two objectives are:

1.5.1   To develop a custom modeling tool for software engineering education

1.5.2   To evaluate the effectiveness develop tool in student learning of software engineering education

1.6   Scope of the Study

1.6.1   Focus only on use case elements, use case diagram, and use case description

1.6.2   This study will evaluate the effectiveness custom tool by software engineering students

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1.7   Significance of the study

1.7.1   Obtained a suitable custom tool to understand use case diagram that usefulness, easy to use, and ease to learning especially for novice software engineering students

1.7.2   Obtained a free tool for software engineering education

1.8   Outline of the Report

Chapter 1, Introduction, which describes the introduction about research, background, problem statement, research questions, objectives, scope and significance of the study

Chapter 2, Literature Review explains about software engineering education, and modeling tools for software engineering education. Book, journal, papers and internet source that are related are used

Chapter 3, Research Methodology describes research methodology to get data collection and procedures to reach the objectives

Chapter 4, Implementation, in this chapter explains about details of software and hardware requirements, analysis and design interface, and coding. This chapter presents implementation of developed customization modeling tool

Chapter 5, Testing and Evaluation, presents the analysis of the result and discussion about the result gathered from testing stage

Chapter 6, Conclusion, will explain summarizes the research achievement, concludes the research observations and highlights future research work

1.9 Summary

In this chapter describes the background, problem statement, research questions, objectives, scope, and the importance of the study. In the experience of the study describes simple condition software engineering education. Problem statement explains the current problem that have in modeling tools primarily for software engineering education. Research questions contain questions that related with the problem statement. Objective of the study constitute the object from the problem statement, and scope is limitation of the study.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

Literature review explains the summary and essence from books, journals, papers, internet sources, handouts or lecture notes that related. Issues about software engineering education, requirements engineering, requirements modeling tools, and Unified Modeling Language (UML) each diagram will be studied and analyzed. Subsequently would be focused on facts and findings.

2.2   Fact and Findings

This chapter will be described more details about software engineering education; requirements engineering, requirements modeling tools, and UML (Unified Modeling Language) and each diagram. The described and discussions will be explained based on that study has been conducted.

2.2.1   Software Engineering Education

Software engineering education is one of parts in the software engineering that focused to an educational environment. With software engineering education, students are expected to meet the challenge and can plunge into the industry with ease.

In reality, students sparse have the chance to participate on all phase's software process. This is cause students be haven't motivated to meet the requirements, work in accordance with the time limit, interfere with the quality of the final products, and take part in the deployment and maintenance (Liu, 2009).

Malik and Zafar (2012) establish software engineering educational problems are ignoring work cultural in software engineering courses and formal methods in software engineering teaching. The fact that classroom as media software engineering teaching is ineffective learning model; difficulties faced in training distributed software development and used peer review that restricted practice on software design project.

(Liu, 2009) find out that students get more experience the development of software and their procedures, and students can also implement and documentation the techniques of software development if there combination between research and teaching in software engineering education. In another study (Memon et al., 2012) that aimed identify research gap in requirements engineering education found that necessary to teaching problem structuring and requirements engineering analysis. Besides, traditional university infrastructure and narrow resources, lecturers cannot be training student to solving requirements engineering problem.

Software engineering education approaches that the general are lecture based paradigm (attending lecture, tutorials, reading, and assignments) and a course project. The main problem lecture based model such as students be a passive listener and passive in the learning process (Garg and Varma, 2007). Based on research case study method that applied in (Garg and Varma, 2007) students can give answers and viewpoint based on their experiences in accordance with hypothetical or a real problem. Usually case study process divides into two sections

like individual and teamwork. Students can analyze with various solutions. From this research got that case study approach more efficient rather than lecture based model.

2.2.2 Requirements Engineering (RE)

Requirements Engineering (RE) is a discipline mostly driven by uncertainty, since it is influenced by the customer domain or the development process model used (Méndez Fernández et al., 2012).

Requirements engineering would be useful to students primarily requirements engineering teaching at universities as essential to entering the workforce (Memon et al., 2012). Requirements engineering education have an objective to students in understanding process requirements engineering include tools and method that available. Besides, must be conducted analysis, specifying, validating, and managing requirements with good quality as proviso to testing and validating the requirements (Rosca, 2000).

Viewpoints, concepts, stakeholders terminology and goals constitute are the things that must be understood in the requirements engineering. The aims Requirements engineering must concern with epistemology, phenomenology, and ontology (Nuseibeh and Easterbrook, 2000). Epistemology is a trust from stakeholders; phenomenology is all questions relating to the observations made in the world, and ontology is all questions objectively stated correctly.

Requirements engineering has a section to determine functional requirements and non-functional requirements. Sommerville (2011) explain that functional requirements are what the system should do. Functional requirements hinge on software that will be developed, what are expected by the users, and when