UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Information and Communication Technology

TOOL ENHANCEMENT FOR COLLABORATIVE SOFTWARE ENGINEERING EDUCATION

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MCS (Software Engineering and Intelligence)

2014

BORANG PENGESAHAN STATUS THESIS*

JUDUL : TOOL ENHANCEMENT FOR COLLABORATIVE SOFTWARE ENGINEERING EDUCATION

SESI PENGAJIAN : 2013 - 2014

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TOOL ENHANCEMENT FOR COLLABORATIVE SOFTWARE ENGINEERING EDUCATION

Danang Wahyu Utomo

A thesis submitted

in fulfillment of the requirement for the degree of

Master of Computer Science (Software Engineering and Intelligence)

Faculty of Information and Communication Technology

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2014

DECLARATION

I declare that this thesis entitle –TOOL ENHANCEMENT FOR COLLABORATIVE 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 concurrently submitted in candidature of any other degree.

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APPROVAL

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. Sabrina Ahmad

Date : January 2014

DEDICATION

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

ACKNOWLEDGEMENT

Alhamdulillah, all praises to Allah for the strengths and the blessing in completing this project entitle: _Tool Enhancement for Collaborative Software Engineering Education‘. Firstly, the most grateful to my supervisor: Dr Sabrina Ahmad for all suggestions throughout this project.

I gratefully acknowledme the funding received from Universitas Dian Nuswantoro (UDINUS) Semarang, Dr. Ir. Edi Noersasongko, Dr. Abdul Syukur and Dr. Kusni Ingsih who helped sponsor this study.

Thanks to my best comrades, Andita Suci Pratiwi, Egi John, Ramadhan Rakhmat Sani, and Prajanto Wahyu Adi. I am also very thankful to Prof. Nana Suryana Herman, Mr. Affandy, Mr. Sriyanto, mobility student from UDINUS, PPI UTeM and all colleagues who given all their kindness, support and motivation during study.

Finally, I‘m indebted to my family, especially my blessed parents, Mr. Farhani and Mrs Siti Fatimah, to my brother Rais Pambudi Utomo, and my beloved Elly Dyah Hapsari for being there to give me uncountable love, prayer, and encouragement.

ABSTRACT

Software development can be done by people have different background in various environments. Recent researches indicate that collaborative software development is important for student. Individual expected to work together become teamwork. The teamwork expected to understand collaborative software development include methods and tools in project development. Student with lack experience and communication skill is major problem in the collaborative software development. Teamwork skills are important in collaborative software development. Discussion and assessment component is a method to develop teamwork skill. This study performed develop collaborative tool that can support collaborative work of student. Apply assessment component in the collaborative tool to assess individual and team work. In testing and evaluation phase, the result indicates that the collaborative tool can be used to support collaborative work of student and to evaluate individual and team work skill.

ABSTRAK

Pembangunan perisian boleh dilakukan oleh orang-orang mempunyai latar belakang yang berbeza dalam pelbagai persekitaran. Kajian terkini menunjukkan bahawa pembangunan perisian kerjasama adalah penting bagi pelajar. Individu dijangka bekerjasama menjadi kerja berpasukan. Tim kerja dijangka untuk memahami pembangunan perisian kerjasama termasuk kaedah dan alat-alat dalam pembangunan projek. Pelajar yang mempunyai pengalaman dan kemahiran kekurangan komunikasi adalah masalah utama dalam pembangunan perisian kerjasama. Kemahiran kerja berpasukan adalah penting dalam pembangunan perisian kerjasama. Perbincangan dan penilaian komponen adalah satu kaedah untuk membangunkan kemahiran kerja berpasukan. Kajian ini dilakukan membangunkan alat kerjasama yang boleh menyokong kerja usaha pelajar. Memohon komponen penilaian dalam alat kerjasama untuk menilai kerja individu dan pasukan. Dalam ujian dan fasa penilaian, keputusan kajian menunjukkan bahawa alat kerjasama boleh digunakan untuk menyokong kerja usaha pelajar dan menilai kemahiran kerja individu dan pasukan.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Software development can be done by people with have different background in various environment. Recent researches in software engineering indicate the importance of collaboration of software development. Among individuals, developers (or can be called instructor) of senior project work together become teamwork on software development activities. The teamwork expected to understand collaborative software development and methods and tools that emphasized in project development.

In software engineering education, educational issues for collaborative software development is one aspect of student project development. The aspect focuses on how to encourage teamwork, how to monitor student work, and maintain collaborative effort in the project development.

1.2 Background of Study

In software development, collaboration is an important role in the student environment. Student can practice a comprehensive training such as receive the senior project course on collaborative software development. Recent publications indicate the lack of student ability such as how to communicate and how to collaborate with other in project development. Lacks of communication skill can be caused by less participate in the meeting, discussion and forum in the group. Student with poor communication can be cause misunderstanding when they participate in group discussion. Among student and stakeholder may lack connections in the agenda when introduce the issues. It can be cause, student avoid group meeting because fear to interact and discuss with stakeholder. On the

other hand, instructors are needed to teach and learn collaborative work in the team. Instructor should understanding method and tool to facilitate student in the collaborative software development.

Teamwork skills are important for student in the collaborative software development. Several research focus on how to develop teamwork skill during collaborative work. Collaborative work of student is one of method to develop teamwork skill. In group, student expected to work and discuss together with other member to encourage communication skill. Discussion and assessment component can be used to support collaborative work of student and assess student and teamwork skill.

1.3 Problem Statement

1. Student lack experience and communication skill in the project development

   Lack experience and communication is major problem in the group discussion. Sometimes, students avoid discussion during project development. Student with lower experience fear to presents an idea to the stakeholder.

2. Collaborative tool are still focus only individual or teamwork performance.

   In online activities, collaborative tool still manage student performance or teamwork performance. For example, reputation model used to measure contribution of individual in online activities

1.4 Research Question

1. How collaborative work is carried out?
2. What are the components of tool that able to support collaborative work?

1.5 Objectives of the Study

1. To develop collaborative tool that support collaborative work of software engineering.

2. To conduct discussion and assessment component of collaborative work among individual and teamwork in the collaborative tool.

1.6 Scope of the Study

1. This study will involve individual and teamwork to conduct collaborative software development.
2. Focus only collaborative work of student.

1.7 Significance of the Study

Collaborative work can be applied in the development of collaborative tool. Communication among student can be done in a short time with collaborative tool.

1.8 Project Report Overview

Chapter 1, Introduction, describe information about the research. Outline of background of the study, problem statement, research question, objective, scope, and significance of the study.

Chapter 2, Literature review, explains more details about collaborative software engineering education and assessment collaborative work.

Chapter 3, Methodology, discuss the methodology will be used in this study. Discuss detail of type of research, research method, data collection and proposed assessment approach to achieve the objectives with technique.

Chapter 4, Implementation, explains more details about problem analysis, design and coding.

Chapter 5, Testing and Evaluation, explain the process of testing and evaluation for all implementation.

Chapter 6, Conclusion, describes about conclusion, suggestion, and recommendation for future work.

1.9 Summary

This chapter describe about introduction of collaborative software engineering education for undergraduate course. Explain about background of the study, problem statement, research question, objective, scope and significance of the study. Collaborative software engineering education will introduce collaborative software engineering among student.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Software development can be done by people have different background that work in various environment. Recent researches in software engineering indicate the importance of collaboration of software development. Among individuals, developers or can be called instructor of senior project work together become teamwork on software development activities (Kilamo et al., 2012). The teamwork expected to understand collaborative software development and methods and tools that emphasized in project development (Chen and Chong, 2011).

In software engineering education, educational issues for collaborative software development is one aspect of student project development. The aspect focuses on how to encourage teamwork, how to monitor student work, and maintain collaborative effort in the project development(Chen and Chong, 2011).

2.2 Fact and Finding

This chapter will describe about software engineering education. This section describes more details about collaborative software engineering education, teaching and learning collaborative software engineering, and assessing collaborative work.

2.2.1 Software Engineering Education

Software engineering involves individual and teamwork to achieve common goal in the software development. Student as an individual involved in software engineering to work in team and apply their knowledge and experience during software engineering course. Chen and Chong (2011) stated that the importance of software engineering

education is teamwork training. Collaboration and training should be emphasized in project development in order for student to experience in real project. Among course, project the software engineering education allow student work in teams and expected to complete their tasks of software development.

Wang (2009) stated that team, leadership, ethic, and profession can be affected in software engineering. Software engineering education may be focus on technical. Sometimes, non-technical part such as team, leadership, ethic, and profession lack of awareness. New student not understand that development of software is teamwork. Student should share an idea during software development in the team. A team leader should excellent in the team. Team leader expected to understand responsibility and commitment in order to guide the team. Some student is not capable to learn responsibility and commitment.

Commonly, students need a learner within learning and training process. Instructor as a learner aims to encourage student during project. Instructors not only learn how to conduct software development, but also monitor student during work in teams. The problem is student present idea to stakeholder without discuss with instructor and other member, student do not complete the tasks of project development. Based on the problem, instructor should teach student to prepare the requirement of project, learn about collaborative work with other member and how to communicate with stakeholder during discussion. Hadar et al., (2008) tells software development can be affected by human aspect. Characteristics of student makes differ in the discussion. It can be cause misunderstanding with other member during discussion. In addition to, some student avoid adapting with new habits and behavior.

Recent publication indicate senior project development involve school and industrial. Chen and Chong (2011) schools join with industrial for student to experience in

real project. Students collaborate with other to develop software for company. Students also interact with stakeholder to discuss the needs of the company. Moreno et al., (2012) tells software engineering education with industry is a challenge. They focus on conducted study between academia and industry that identify mismatch between software engineering education and industry, especially the needs of industry. Both student and instructor should know –which industrial practices taught to student".

Another problem of software engineering education is industrial strength project. Liu (2009) stated that software project cannot be finished by one or two student. Student should work in team to finish their project. The main problem of project is recruiting new member. New member expected have some experience in the project, highly motivated, and highly skill.

2.2.2 Collaborative Software Engineering Education

Recent publications indicate development of software done in teams. Individuals work together become teamwork and should understanding the team in collaborative software engineering. The team not only understands methods and tools are used in development but also the teamwork. The team expected to understand collaborative development and methods and tools that emphasized in software development. However, student lack experience and education in collaborative software development. Mead (2009) stated that working group can be used to address issues in a team environment.

Kilamo et al., (2012) stated that software is created by people in varying environment. Developers and members are expected join in group to collaborative work on software development. Collaborative work is crucial problem how to understand methods and tools, how to collaborate with other to achieve goal. Favela and Peña-Mora (2001) tell us about student lack experience in communication during discussion. Sometimes, student may avoid discussion when collaborate in the project development. Student started with

poor communication and coordination because fear to speak in discussion forum. In addition to, student with higher experience handle all development activities. It can be cause student with lower experience fear to collaborate with them. Communication and collaboration is critical issue for student in training of senior project (Chen, 2009). Chen and Chong (2011) stated that student lack knowledge and experience in collaborative software development. Poor communication in the discussion can be affect to stakeholder. Lacking communication skill, can be caused misunderstanding with stakeholder, so stakeholder give negative evaluation for student. In addition to, misunderstanding can discourage stakeholder from discussion with student.

There are many solution methods and tools in order to address communication issue in the collaborative software development. Methods and tools should support communication and coordination. Chen (2009) present communication and coordination is critical issue for student in senior project. Student should working and learning together with other member. The difference characteristics can be cause misunderstanding during discussion. Meeting can addresses critical communication, coordination and participation. They introduce Meeting Flow Approach for student final year focus on group project. Chen and Chong (2011) also use Meeting Flow Approach to address educational issues such as how to encourage teamwork, how to formalize stakeholder, how to monitor students work.

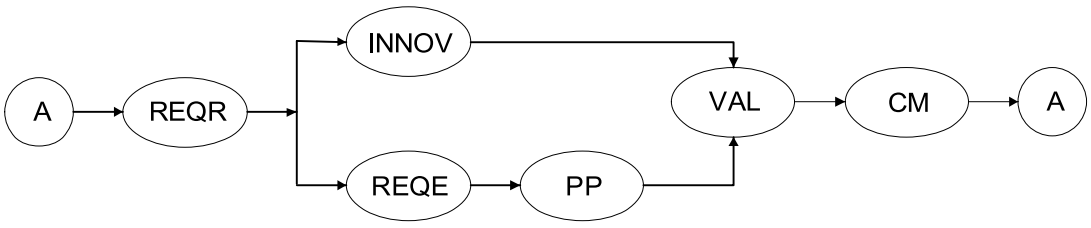

Figure 2.1 Flow Model (Chen, 2009)

Meeting flow model describes development cycle to build the system. Meeting flow model consists of elicit requirement, schedule time, tasks, control and validation during development cycle.

Educational issues can be motivation for effective collaborative development. In order to measure the approach, they use quantitative investigation to examine benefit of the approach that applied in the project development. Chen and Teng (2011) stated that student apply their knowledge in the senior project. Sometimes, students do not know how to collaborate in the project development. Hence, instructor needed to address how to encourage collaboration and how to ensure collaboration effort. They use Meeting Flow System (MFS) based on (Chen, 2009). Meeting involved interaction of people and sharing knowledge. MFS concept focuses on meeting to guide collaborative work.

Students need learning and training during project development. Xueyun and Zihui (2010) stated training of teamwork during project can use leisure education. Sometimes, education focuses on knowledge and skill, ignored human aspect such as human care. They use leisure education to enhance learning and creativity of student. Leisure education need professional person to conduct professional development. Professional person should take responsibility during professional development. These educations also give student interest of learning such as joy of learning.

Human aspect is an important part of collaboration software engineering education. The difference of characteristics, multiple perspectives of project, experience and skill is a major problem in the collaborative work. Hadar et al., (2008) tell about collaborative learning. Collaborative learning gives students topic of interest and construct knowledge. They build theoretical framework based on existing theories of effective collaborative learning. The framework enhance process and reduce the losses of collaborative learning such as student should speak in the group, overload of information can cause

misunderstanding of discussion result and negative evaluation can cause student avoid discussion in the group.

Gallardo et al., (2012) tell about development of collaborative tool to support collaborative modeling task. Society needs communication and collaboration in the different task of learning spaces. They focus on specific type of groupware. They use model-driven method for construction of modeling groupware. Model-driven method based on 3 framework such as a methodological framework, conceptual framework and technological framework. The method can be used to address groupware programming and collaborative modeling tool in the project. They use eclipse platform to show how collaborative modeling tools can be systematized by model driven method. However, this method has deficiencies that several aspects are not covered in this method. The aspects such as specific of collaboration, shared context and human-computer interaction issue. Gallardo et al., (2013) stated that the approach should cover the aspect. They use CIAM methodology that support modeling of collaboration and interactive issue. CIAM elements were integrated in the spacEclipse method to support modeling and interactive groupware. The spacEclipse method is model driven approach based on three frameworks above. Each framework used to support collaborative modeling task.

Favela and Peña-Mora (2001) several tools consist of supporting software development collaboration, communication, coordination to address poor communication and enhance coordinating between teamwork. Also, the tool can avoid mismatch of interaction in the same time. CLanubile et al., (2010) stated that people collaborating to develop software. Collaborative work aims to enable effective development. They tell communication tools and technologies for improved collaboration. Several tools provide communication tools, trackers, build tools, modeler. So, people can choose tools for software project. For example, SourceForge provide mailing list forum for communication.