ADOPTING SELECTED SOFTWARE ENGINEERING PRACTICES
IN THE PEKA ONLINE MANAGEMENT SYSTEM DEVELOPMENT

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Alhamdulillah, this is for beloved father, mother and siblings.

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ABSTRACT

Adoption of suitable software engineering practices in the development of software product is crucially important to ensure project success. Still, there is quite number of organization choose not to adopt any of the practices in software project development. This report use a software project of PeKA online management system development as a case study case. This project does not only aim in developing and testing the web PeKA online management system but also to apply selected Software Engineering practices in the development of the system. The engineering practices adopted varies from standard used, document produced, development model used, modelling technique used and testing technique opted. To ensure SE practices to be adopted are suitable with project requirements, development environments and scope, careful selection is made on each software engineering practices. After a thorough system study, Software Development Methodology selected for the system development is prototyping. The project methodology consists of phases from project planning until testing of the project. Other selected SE practices implemented are design modelling using Unified Modelling Language, using naming convention in design implementation and IEEE standard on document produced. At the end of the project, Software Requirements Specification, Software Design, Description and Software Test Cases Documentation are produced. In addition, a complete working PeKA online management system is also produced using PHP and HTML programming language. Post project development, project closure is conducted. In which during this project closure, the impact of SE practices to organization is gathered. Overall, most of the Selected SE practices adopted is proven to ease and guide in implementing better software development proses.

ABSTRAK

Penggunaan amalan kejuruteraan perisian yang sesuai adalah amat penting bagi memastikan kejayaan projek. Walau bagaimanapun, masih ada beberapa organisasi yang memilih untuk tidak mengunakan mana-mana amalan kejuruteraan perisisan dalam pembangunan projek perisian yang diusahakan mereka. Laporan ini menggunakan pembangunan projek sistem pengurusan dalam talian PeKA sebagai kes untuk dikaji. Projek ini tidak hanya bertujuan untuk membina dan menguji sistem pengurusan dalam talian PeKA, tetapi juga untuk memastikan penggunaan amalan kejuruteraan perisian terpilih dalam pembangunan sistem tersebut. Pemilihan yang cermat dijalankan bagi memastikan amalan kerjuruteraan perisian yangdipilih adalah sesuai bagi projek mengikut keperluan projek, persekitaran pembangunan dan skop projek. Setelah, kajian menyeluruh keatas sistem dilakukan, metodologi pembangunan perisian yang dipilih ialah prototaip. Fasa dalam metodologi prototaip ini terdiri daripada fasa perancangan projek hingga fasa pengujian projek. Selain dari itu, amalan kejuruteraan perisian yang juda dimplementasikan ialah permodelan rekabentuk menggunakan U*nified Modelling Language,* dan Standrad IEEE dalam dokumen yang dihasilkan. Di akhir projek, dokumen *Software Requirements Specification, Software Design, Description* dan *Software Test Cases* dihasilkan. Disamping itu, sistem pengurusan dalam talian PeKA yang lengkap dihasilkan dengan menggunakan bahasa pemprosesan *PHP* dan *HTML.* Selepas pembangunan projek, penutupan projek dijalankan, dimana impak implementasi amalan-amalan kejuruteraan terpilih ini terhadap organisasi dikumpulkan. Secara keseluruhannya, kebanyakkan amalan-amalan kejuruteraan yang digunakan terbukti memudahkan dan menjadi panduan dalam mengimplementasi proses membina perisian yang lebih baik.

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LIST OF ABBREVIATIONS

AIX   -   Advanced Interactive eXecutive

ANSI/EIA   -   The American National Standards Institute/Electronic Industries Alliance

ASWARA   -   Akademi Seni Budaya dan Warisan

CMMI   -   CMMI

CRC   -   Class Responsibility and Collaboration

CSS   -   Cascading Style Sheets

DBMS   -   Database Management Syste

DCL   -   Data Control Language

DDL   -   Data Definition Language

DML   -   Data Manipulation Language

eLI   -   Sistem Pengurusan Latihan Industri

ELE   -   Extracurricular Learning Experience

GUI   -   Graphical User Interface

HEP   -   Hal Ehwal Pelajar (Student Welfare Department)

HTML   -   Hypertext Markup Language

IBM   -   International Business Machines

ID   -   Identifier

IEEE   -   Institute of Electrical and Electronics Engineers

IMS   -   Internship Management System

ISO/IEC   -   International Organization for Standardization and the International

MIS   -   Management Information System

MS   -   Microsoft

MySQL   -   My Structured Query Language

OMG   -   OMG - Object Management Group

PeKA   -   Program Perkembangan Kemahiran Artistik

PHP   -   Hypertext Preprocessor

RAD	-	Rapid Application Development
RDBMS	-	Relational Database Management System
SDD	-	Software Design Description
SDLC	-	Software Development Lifecycle
SDM	-	Software Development Methodology
SE	-	Software Engineering
SIMS	-	Student Information Management System
SIS	-	Student Information System
SQL	-	Structured Query Language
SRS	-	Software Requirement Specification
STC	-	Software Test Case Documentation
TPS	-	Transactional Processing System
UC	-	Use Case
UI	-	User Interfaces
UiTM	-	Universiti Teknologi Mara
UML	-	Unified Modelling Language
UTHM	-	Universiti Tun Hussein Onn

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CHAPTER 1

PROJECT OVERVIEW

1.1   Introduction

Incorporating information technology elements in businesses nowadays has become compulsory for businesses. An information system has a subset of three types; Transactional Processing System (TPS), Management Information System (MIS), and Expert System [1]. Example of MIS system is inventory system, schedule appointment system, human resource system and student information system. When it comes to business management that involves thousands of data to be managed, the data processing and other function of computers has becoming more important to increase level of efficiency and ease the management process.

This project focuses on developing a system that would be able to ease current managerial process for student in ASWARA regarding their activities outside of teaching and learning in classes called the Program Perkembangan Kemahiran Artistik (PeKA). The PeKA is compulsory to be completed by ASWARA students to ensure that they are eligible to graduate. The PeKA program allow students to be recognized and asses based on their involvement in events or outside activities

related to their study field that take place after formal learning. Student will report any PeKA activities into the system and lecturer will then give approval and asses the activities so that appropriate marks can be awarded to the students. This chapter shall discuss the background study of the project including scope, objectives, importance and deliverables of the project.

1.2 Company Background

Previously known as Akademi Seni Kebangsaan (ASK) established in 1994, it is now called as Akademi Seni Budaya dan Warisan Kebangsaan (ASWARA) is the only higher education institute in performing arts field that are fully supported by the Government of Malaysia under the Ministry of Culture and Tourism. With vision of "To become an institutional center for education and training for art, culture, and national heritage that is recognized by the national, regional, and international levels.", ASWARA aims to become a leading institution of higher learning by providing services such learning and teaching, research, academic publication and professional advice in the field of art, culture and heritage. ASWARA has established their own department of information technology to address on all their information technology needs. Besides providing support to enables staff in effectively using IT resources, develop and operates network to enable effective communication within ASWARA, this department is also in charge of developing and maintaining in-house system to efficiently, collect, store and display data.

1.3   Background of Problem

PeKA program is intended to give students extra credit as well as giving recognition to student's involvement on events or activities outside of formal learning hour or any students involvement to improve their personal-skill. It is compulsory for students to complete the PeKA within their duration of study which is within three years. Each student must complete 100 credit hours' worth of activities that are able to add value or improve skills obtained during formal learning in the classes. Another compulsory part of PeKA is filling out log book (*Buku Perkembangan Kemahiran Artistik*) that records the student activities in details.

Currently PeKA management is manually handled and recorded. The PeKA management involved set of process which start from student application of the activities or event they have attend to submitting the form, the management shall then ensure all the information are true before proceed submitting form to lecturer for the student to be given approval and mark. The PeKA log book is also submitted by students manually, and requires faculty and supervisors verification.

This manually carried out process does not only consume large of effort but also time. Each activities and log book submission will have to go through administration before it could be assigned to the lecturer for approval. Due to the many steps involve in PeKA management, students tends to report activities at the very last minutes causing a sudden massive application form for PeKA activities to be processed at the end of semester. This is proved to be inconvenient to administrator as well as lecturers to process the application.

Another issue is regarding the manners of record being kept. By using manual form for managerial process, data is not stored in database. This creates issues in record tracking, record acquiring and data loss vulnerability. This manually data handling process generally take more time. Involved parties in the PeKA program

find it hard to keep track on activities that have been processed or approved. This inefficient ways of keeping records also contributes to inconsistency of gathered information such as the events or activities organizer as students that attend same events or activities might enter records in different manners.

Besides that, the ASWARA IT division also follows a minimum number of software engineering standards in the development of their project. No document of Software Requirement Specification (SRS), Software Design Document (SDD) or Testing Document is produced. In the development of previous project, there is also no specific SDM used even though basic phase of software development is followed such as requirement elicitation, system design, and coding.

ASWARA IT division itself is a unit that aims in providing better services. This includes in incorporating more technology and its services in its business. Thus a lot of changes are being made in its business operation which is currently in development such as E-Stor and E-Directory program, an online system for PeKA is parallel action to the unit mission. According to Rahmad Sukor dan Mohd Subhi, such system could help in solving problems of analyzing an overall complex problem by creating more effective and efficient procedure involving presenting complete data comprehensively that could be printed out and sent through email or facsimile in faster and more complete manners [2].

1.4   Project Objectives

The objective of this study is as listed below:

(1) To analyze the requirement needed for web PeKA online management subsystem

(2) To design a web PeKA online management subsystem and its database

(3) To develop a web PeKA online management subsystem and its database

(4) To test on web PeKA online management subsystem.

(5) To apply selected Software Engineering (SE) practices to fulfill the above objectives.

1.5   Project Scope

The aim of this project is to develop a web PeKA online management subsystem with implementation of suitable selected SE practices. Project is estimated to be completed within 4 months and will involve three (3) system developers.

The system to be developed consists of three (3) users. The users involved in the system are students, lecturers, and administrator. The system consists of five modules namely Login, Manage Event and Organizer, Manage PeKA application by student; manage PeKA application by lecturer and Administrator module. All five modules are covered in this project from requirement gathering, programming and testing. The testing to be conducted is unit testing only.

The development of the project would also be implemented with Software Engineering (SE) practices from usage of development methodology of prototyping and documents standard of IEEE. Documents to be produced are Software Requirements Specification (SRS), Software design Documentation (SDD) and Software Test Documentation (STC). SE practices implemented are then studied and knowledge is shared within the organization.

1.6   Project Deliverables

Deliverables from this project is as listed and described in table 1.1 below

Table 1.1: Project deliverables.

Deliverables	Description
PeKA system	A working online PeKA management system that meets requirement specified
Software Requirement Specification (SRS)	A document that describe system specification using UML notation
Software Design Description (SDD)	A document that describes the design of the application.
Software Test Case Documentation (STC)	A Document where test case for requirement is identified.

1.7   Project Schedule

The duration of the project is within four (4) months from project initiation to project implementation. The detail of project scheduling is displayed in appendix A.

1.8   Chapter Summary

This chapter introduces preliminary understanding on what the project would be about. Incorporating technologies in businesses nowadays would be inevitable, thus the project should be able to support the management of PeKA program. System developed will be used by ASWARA students, staff and lecturers. In this chapter

problem background, project scope, objectives, and schedule are defined. The following chapter will discuss on the literature review that is being done for the project.

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