Factor Criteria Metric (FCM) for Requirements Analysis Phase in the Development of Management Information Systems

Chew Wei Yin

Supervised by
Associate Professor Dr. Ow Siew Hock

Associate Professor Dr. Ow Siew Hock



This project is submitted to Faculty of Computer Science and Information Technology

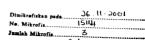
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Declaration

I declare that this thesis is my own work and has not been submitted in any form for

another degree or diploma at any university or other institute of tertiary education.

Information derived from the published and unpublished work of others has been

acknowledged in the text and a list of references is given.

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Abstract

This project establishes a way to measure a characteristic of a product and a characteristic of a process involved in the requirements analysis phase for the development of management information systems (MISs) by adapting and enhancing McCall's Factor Criteria Metric (FCM) model. The two selected characteristics are the understandability of a software requirements specification (SRS) and effectiveness of a requirements gathering interview (RGI). To define the measurement for these two characteristics, a structure of factors, criteria, checklists and metrics for the characteristics of the products and processes is established based on McCall's FCM model. In addition, a software tool, FCMware, is developed to implement the established structure. The developers of the MISs can use the FCMware to determine the extent to which the products and processes in the development of MISs exhibit a certain characteristic. A survey form is designed to elicit the opinions on the appropriateness of the suggested FCM for the understandability of an SRS and effectiveness of an RGI. The survey is conducted with the software engineering professionals. The finalised FCM for the understandability of an SRS and effectiveness of an RGI is then established based on their opinions. Another outcome of this project is the determination of an appropriate grading scheme for the understandability of an SRS. Thirty projects by the students of the Faculty of Computer Science and Information Technology University of Malaya are selected for this case study. For each project, the FCMware is used to obtain the understandability score of its SRS (0%-100%). The understandability score for each project is graded with three suggested grading schemes. These grading schemes grade the understandability as Very Poor,

Poor, Acceptable, Good and Excellent. For each project, each understandability grade obtained with each grading scheme is compared with the final product quality grade. The grading scheme that grades the most of the understandability scores closest to the respective final product quality grade is the most appropriate grading scheme for the understandability of an SRS.

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List of Abbreviations

ADO ActiveX Data Objects

API Application Program Interface

DBMS Database Management Systems

DI Degree of Influence, for FPA

DoD Department of Defense, United States of America

DSN Data Source Name

E-R Entity-Relationship

FCM Factor Criteria Metric

FP Function Point

FPA Function Point Analysis

GSC General System Characteristic, for FPA

GUI Graphical User Interface

IEEE Institute of Electrical and Electronic Engineers (USA)

ISO International Standards Organisation

ISO 9126 Standard for software product evaluation, approved in 1992

MIS Management Information System

ODBC Open Database Connectivity

RGI

Requirements Gathering Interview

SRS Software Requirements Specification

SQL Structured Query Language

SQM Software Quality Metrics

TDI Total Degree of Influence, for FPA

UFC Unadjusted Function Count, for FPA

VAF Value Adjustment Factor, for FPA

VB6 Microsoft Visual Basic 6.0 Enterprise Edition

WIMP Windows, Icon, Menu, Pointer