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

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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 Information derived from the published and unpublished work of others has been acknowledged in the text and a list of references is given.

Chew Wei Yin

May 2000

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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