Chapter 1

Introduction
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1.1 Problem Domain

The requirements analysis involves the co-operation between the software developer, client and future users to elicit the requirements and later to specify the requirements. The requirements must be captured in the correct manner so that subsequent software development phases that include design and implementation can be carried out smoothly. Hence, the requirements analysis is an important phase in the software development. Thus, more research should be conducted in methods to ensure that the requirements are captured correctly.

Jalote [1991] states that the quality of the intermediate products in the development process is of interest because the quality of the intermediate products can be used to predict or get some idea on the quality of the final product. Therefore, high quality intermediate products lead to a high quality final product. This applies to processes as well. Therefore, both high quality intermediate products and high quality intermediate processes are important to ensure a high quality final product. To ensure high quality intermediate products and processes, measurements must be performed on them. If the defined standard or quality is not meet, corrective actions must be taken. However, the number of software metrics designed for the products and processes of the requirements analysis phase is limited [Jalote, 1991]. They include the function points analysis, number of errors found in a software requirements specification (SRS) and frequency of change request for the requirements. Thus, this project is carried out in hope that more
metrics for the products and processes especially of the requirements analysis phase can be enhanced, established and implemented.

Shepperd [1995] states that the measurement is becoming an increasingly accepted part of the software engineering. It is, however, not always well understood. Furthermore, most software developers do not measure, and sadly, most software developers have little desire to begin. This problem is cultural. The attempt to collect measures that were not collected before often lead to resistance and objection [Pressman, 1992]. Therefore, the 'do not have to do it since no one used to do it' culture must be eliminated to ensure high quality final product. The co-operation from the management and software developers is undoubtedly crucial to achieve this.

1.2 Objectives

The objectives of this project include establishing a structure of factors, criteria, checklists and metrics for the characteristics of the products and processes in the development of management information systems (MISs). McCall's Factor Criteria Metric (FCM) model is adapted and enhanced to establish this structure.

Another objective of this project is to determine the criteria, checklists and metrics (according to the established structure) for two factors, namely, the understandability of an SRS and effectiveness of a requirements gathering interview (RGI). McCall's FCM model and Boehm's software quality model are used as guidelines to suggest these criteria and checklists. Another objective is to determine an appropriate grading scheme for the level of understandability of an SRS.
The objectives of this project also include developing a software tool, FCMware, to implement the suggested structure of factors, criteria, checklists and metrics. The developers of the MISs can use the FCMware to determine the extent to which the products and processes in the development of the MISs exhibit certain characteristic or factor. It automates the computation of a factor score for a development project.

1.3 Tasks

The tasks carried out for this project are as follows:

i. Perform literature review on the topics related to the software quality models, software metrics for the requirements analysis phase, requirements analysis phase, SRS and RGI.

ii. Determine a structure of factors, criteria, checklists and metrics for the characteristics of the products and processes in the development of MISs.

iii. Determine the criteria and checklists for the understandability of an SRS.

iv. Determine the criteria and checklists for the effectiveness of an RGI.

v. Prepare a survey form to elicit the opinions on the suggested criteria and checklists for the understandability of an SRS and effectiveness of an RGI.

vi. Conduct the surveys.

vii. Analyse the survey results and make adjustments to the suggested criteria and checklists for the understandability of an SRS.

viii. Analyse the survey results and make adjustments to the suggested criteria and checklists for the effectiveness of an RGI.

ix. Determine the grading schemes for the score of the understandability of an SRS.
x. Design a case study to determine the most appropriate grading scheme for the level of understandability of an SRS.

xi. Conduct the case studies.

xii. Analyse the case study results and select the most appropriate grading scheme for the level of understandability of an SRS.

xiii. Develop the software tool, FCMware, to support the suggested structure of factors, criteria, checklists and metrics for the characteristics of the products and processes in the development of MISs.

1.4 Contents of Report

Chapter 1 Introduction, gives an introduction to this project. It states the problem domain, objectives of this project and tasks carried out to complete this project.

Chapter 2 Literature Review, explains the literature review done on the software quality, software quality models, software metrics, software metrics for requirements analysis, and requirements analysis.

Chapter 3 Establishment of Factors-Criteria-Metrics Structure, identifies the structure of factors, criteria, checklists and metrics for the characteristics of the products and processes in the development of MISs by adapting McCall’s FCM model. This chapter defines the terms: factor, criterion, checklist and metric. It also states the statement score metric, criterion score metric and factor score metric. In addition, it shows the structure of and relationships among a factor, its criteria and checklists.
Chapter 4 Establishment of Factor Criteria Metric (FCM), specifies a way to measure the understandability of an SRS and effectiveness of an RGI. This is done by using the established factors-criteria-metrics structure explained in Chapter 3. It describes the suggested criteria and checklists for the understandability of an SRS and effectiveness of an RGI. It also describes the suggested grading schemes for the understandability of an SRS. This chapter highlights the design of the survey form to elicit the opinions on the suggested criteria and checklists for the understandability of an SRS and effectiveness of an RGI. This chapter explains the design of the case study to determine an appropriate grading scheme for the level of understandability of an SRS. The finalised FCM for the understandability of an SRS and effectiveness of an RGI are also described.

Chapter 5 Development of FCWare, describes the development of a measurement tool that implements the factors-criteria-metrics structure explained in Chapter 3. This chapter focuses on the requirements analysis, design, implementation and testing of the FCWare.

Chapter 6 Discussion and Conclusion, presents discussions on the related issues and draws conclusions from the project outcomes.