Chapter 6

Discussion and Conclusion

Chapter 6 Discussion and Conclusion

This chapter discusses the problems encountered during the establishment of the Factor Criteria Metric (FCM) for the understandability of a software requirements specification (SRS) and effectiveness of a requirements gathering interview (RGI). The limitations and weaknesses of the established FCM and the future enhancements for the established FCM are also discussed. This chapter also discusses the problems encountered during the development of FCMware. The system strength of, limitations and weaknesses of as well as the future enhancements for the FCMware are discussed as well.

6.1 Establishment of Factor Criteria Metric

(a) Problems Encountered

A survey form was designed to elicit opinions on the appropriateness of the suggested criteria and checklists for the understandability of an SRS and effectiveness of an RGI. Of the total of 50 survey forms distributed to the participants, 22 participants (44.0%) responded. One set of the returned survey forms is discarded because it is incomplete. Hence, 21 sets of the returned survey forms were used for analysis. As some of the survey participants were too busy to fill in the survey form or could not be contacted at all, it was not possible and was difficult to obtain the full support and co-operation from these participants.

To determine an appropriate grading scheme for the level of understandability of an SRS, case studies on thirty projects have been carried out. Although an attempt was made to conduct the case studies in the software companies, it was not successful. This is because the requirements documents are confidential and proprietary to the customers. Therefore, thirty projects of the students of the Faculty of Computer Science and Information Technology University of Malaya were used in the case study. These are not the best study objects because some of them do not have separate SRSs. The chapter on the requirements analysis for these projects is scored using the FCMware instead. Therefore, the outcome of the case study may not be accurate.

(b) Limitations and Weaknesses

There are a number of limitations and weaknesses in the established FCM. They include the following:

i. There are limited statements in the checklists for both the understandability of an SRS and effectiveness of an RGI.

ii. The criteria for both the factors are assumed to be equally important and assigned the same weight.

iii. The statements of a checklist are assumed to be equally important and assigned the same weight.

iv. The Grading Scheme 1 may not be the most appropriate grading scheme for the level of understandability of an SRS. The case study results may be inaccurate because some of the projects do not have separate and complete SRSs.

(c) Future Enhancements

With reference to the limitations and weaknesses discussed in the previous section, it is hoped that further research should highlight on the following issues:

i. The establishment of thorough checklists for the understandability of an SRS and effectiveness of an RGI.

ii. The categorisation of the statements of a checklist. For example, the statements to check the completeness of an RGI can be categorised as before the interview, during the interview and after the interview.

iii. The determination of an appropriate weight for each criterion for the understandability of an SRS and effectiveness of an RGI.

iv. The determination of an appropriate weight for each statement of each checklist for the understandability of an SRS and effectiveness of an RGI.

v. The determination of an appropriate grading scheme for the level of effectiveness of an RGI.

vi. The establishment of the criteria, checklists and grading schemes for other characteristics of the products and processes in the development of MISs. The examples of these characteristics include the correctness of the design specification, effectiveness of coding and thoroughness of testing.

6.2 Development of FCMware

(a) Problems Encountered

The following are the problems encountered during the development of FCMware:

i. In the report on a factor, its criteria and checklists generated by Crystal Report 7.0, the factor is displayed in the first line. Its first criterion is displayed in the second line. The checklist for this criterion is displayed below it. The next criterion follows and so on. The factor, its criteria and checklists cannot be displayed in a tabular format due to the tool constraint.

ii. The maximum number of statements of a checklist must be determined. This is because the number of the grid needed to display a checklist in the FCMware must be determined. VB6 cannot add or remove a grid at run time.

(b) System Strengths

i. Ease of Use

The FCMware is an application designed with the graphical user interface using the concept of WIMP. It looks and feels like the standard Windows applications. There is no need to type any command to execute a function. The FCMware also provides shortcuts to the frequent tasks and hence, is an easy-to-use measurement tool.

ii. Authorisation and Authentication

The administrator provides every user with a user login ID and password. The FCMware allows only the authorised users to access the system. Every user accesses the projects that he or she has right to only. A maximum of three login attempts is given.

iii. Informative Messages

The FCMware provides error messages when a user or an administrator attempts to perform illegal actions. It also provides messages after a certain task has been completed. These messages enable a user and an administrator to understand what is currently going on and keep them informed of what has been done.

iv. System Transparency

The system transparency refers to the situation where the users and the administrator do not need to know the following:

- where the database resides
- the database structure
- the system architecture
- the database management system
- anything related to the underlying system built

(c) System Limitations and Weaknesses

The FCMware has some limitations and weaknesses due to time and development tool constraints. These limitations and weaknesses are discussed as follows:

i. Reports

The reports for the FCMware are generated by Crystal Reports 7.0. These reports look for the FCMware database with path. For example, C:\FCMware\database. They are called from VB6 with path as well. Therefore, the files for these reports and FCMware database must be placed in the folder and drive similar to the development folder and drive. In other words, FCMware must be installed in C:\FCMware. The generation of

these reports is slow. The time required to display a report with an Intel Pentium II processor is currently less than ten seconds. When more records are stored in the database, the time taken to generate the reports will increase correspondingly.

ii. Grading Scheme

A factor score is assigned one of the five grades, namely Very Poor, Poor, Acceptable, Good and Excellent. The FCMware does not allow an administrator to create a grading scheme with other grades such as a grading scheme with three grades, namely Bad, Acceptable and Good.

iii. Checklist

FCMware allows a maximum of thirty statements in a checklist. If a thorough research on both the factors are carried out, there may be more than thirty statements in a checklist.

iv. Criterion

If an administrator adds a new statement into the checklist for a factor, the stored criterion score for a project is not updated accordingly in the database until a user updates the fulfillness of the statements in that particular checklist for the project.

v. Database

The data stored in the FCMware database are not secured because they are stored in plain text format and not in encrypted format.

(d) Future Enhancements

With reference to the limitations and weaknesses discussed in the previous section, it is hoped that the following ideas can be considered in the future:

i. To improve on the grading scheme for factor, the maintain grading scheme module in the FCMware Administrator can be enhanced to enable an administrator to add new grades and to delete the existing grades from the grading scheme.

ii. The maintain FCM module in the FCMware Administrator can be enhanced to enable an administrator to determine the sequence in which the statements of a checklist would be displayed. This would require a function to be incorporated into FCMware to enable an administrator to change the position of the statements of a checklist. The FCMware currently displays the statements of a checklist in the ascending order.

iii. The FCMware can be enhanced to enable a user and an administrator to select the fields to be displayed in a report. For example, a user can select the fields to be displayed in a report including criterion description, whether criterion is compulsory and/or criterion weight.

6.3 Conclusions

This project presents a study on the criteria and checklists for two factors, namely, the understandability of an SRS and effectiveness of an RGI. The survey results indicate that all the suggested criteria for both the factors are appropriate. The results also show that all the suggested statements for the understandability of an SRS are appropriate. For the effectiveness of an RGI, it is found that only one of all the suggested statements

is inappropriate. For the criteria for the understandability of an SRS, the survey results indicate that conciseness is a normal criterion and consistency is a compulsory criterion, as suggested in this research (i.e. 50% of the suggestions matches with the survey results). For the criteria for the effectiveness of an RGI, the survey results match with the suggestions recommended in this research totally. For the statements for the understandability of an SRS, the survey results match with 75% of the suggestions recommended in this research. For the statements for the effectiveness of an RGI, it shows a 94.1% match. Hence, it can be concluded that the survey results agree with most of the suggested criteria and checklists for both the factors. The grading scheme for the understandability of an SRS has been determined based on the case studies done on thirty projects.

The established FCM for these two factors enable the MIS developer to measure the understandability of an SRS and effectiveness of an RGI. The developer can determine whether an SRS or RGI is of the desired quality to proceed to the next development activity. If no, it is revised until it is.

In addition, a measurement tool, FCMware has been developed to support the established FCM for the understandability of an SRS and effectiveness of an RGI. This tool automates the computation of a factor score for a development project. The FCMware has achieved and fulfilled the stated system requirements. Although the measurement tool has a number of limitations and weaknesses that need to be improved and enhanced, it is certainly a simple and easy-to-use tool for the MIS developers to determine the understandability of an SRS and effectiveness of an RGI.