COMP8173 Assignment

13 September 2013

Introduction

The purpose of this assignment is to help you develop an understanding of:

- The application of PSM and its use in decision making; and
- The CMMI® and its application in benchmarking processes through the use of a SCAMPI^{SM} class A appraisal.

To complete the PSM part of this assignment, you need to read the case study in Appendix B of the PSM Textbook (pages 199 – 238). Refer to the PDF file titled **COMP8173 Assignment – Measurement Case Study 130913** if you do not have access to the PSM Textbook.

PSM questions worth a total of 22 marks:

1. In dot point form, summarise Thompson's critical software development information needs. What information needs did the IPT identify additional to those already known by Thompson? ***(2 Marks)***
2. The combined information needs of Thompson and the IPT should allow you to develop an early indication of some of the measures that might be used to address them. Using the ICM Table, construct a table showing the information needs mapped to the appropriate Information Categories, Measurable Concepts and Prospective Measures. ***(2 Marks)***
3. A basic interpretation of Figure B-6 is that more personnel are required. However, there is more that can be interpreted from the information shown. What other significant interpretation(s) can you derive from the Figure? What concern does your interpretation lead to and what sort of impacts do you think are likely? ***(2 Marks)***
4. Cooper and Thompson had enacted a measurement approach to confirm that many problems concerning performance were due to the developers' inexperience with SQL. Thompson decided to bring in additional expertise to address the SQL issue. How could this issue have been avoided in the first place? In your answer discuss whether PSM could help to address such information needs *(hint: refer to the Prospective Measures in the ICM Table)*. ***(2 Marks)***
5. Cooper's strategy for indicating progress with the Personnel Information CI enabled a more detailed and accurate view of progress. What problems did her approach alleviate? ***(2 Marks)***
6. Which of the indicators presented in the case study provided Thompson and Cooper with leading information and which ones provided them with lagging information? Justify your answer by using the PSM Analysis Model. ***(2 Marks)***
7. Using the ICM Table, indicate which 3 to 5 measures you consider to be the most important for maintaining control of a project similar in nature to the MAPS Projects. Justify your answer *(hint: use the PSM Analysis Model to identify the value of the measures in addressing the project's information needs proactively)*. ***(2 Marks)***
8. Using the Measurement Information Model as a work-aid and the Measurement Specification template, develop the Measurement Specifications of the measures identified in the Figures B-6 and B-14. ***(6 Marks)***
9. If you were the project manager of a project similar to the MAPS Project, how would you establish an effective measurement program? ***(2 Marks)***

CMMI® and SCAMPI℠ questions worth a total of 28 Marks:

10. Provide a brief analysis of the types and sizes of organisations (including a percentage breakdown of the main organisation types and sizes) that are embarking on CMMI® based improvement programs *(hint refer to the CMMI® Institute's latest report on the* ***Process Maturity Profile*** *when formulating your response)*. ***(2 Marks)***

11. Briefly identify and quantify the main benefits that have been reported by organisations in implementing CMMI® based improvement programs. ***(2 Marks)***

12. Identify and describe the generally accepted representations of the CMMI®. In your answer, list the categorisations/groupings of the 22 process areas under each representation and explain why they are categorised/grouped in that way. ***(2 Marks)***

13. Explain the similarities and differences between the terms 'capability' and 'maturity'. Describe the components of the CMMI® that are required, expected and informative. ***(2 Marks)***

14. Why is SP3.2 in the Project Planning process area important when estimating and planning a project? ***(2 Marks)***

15. Which specific practice under which process area identifies the need to maintain bi-directional traceability between requirements and project work products? What would bi-directional traceability allow a project to do? ***(2 Marks)***

16. Which specific practices under which process area describe what should be done when mitigating risks? Describe the typical mitigation actions that are available for most projects. Which project risks would typically be mitigated? ***(2 Marks)***

17. Explain the significance of SP3.1 in the Requirements Development process area. In your answer, don't just focus on the establishment of operational concepts and scenarios but also explain how these are used throughout the engineering lifecycle. ***(2 Marks)***

18. Explain the difference between verification and validation. In your answer provide examples of verification and validation activities. ***(2 Marks)***

19. Describe the significance of conducting peer reviews when identifying and removing defects. In your response, discuss the importance of each specific practice under Specific Goal 2 of the Verification process area. ***(4 Marks)***

20. Evaluate the evidence under the following SCAMPI℠ A appraisal scenario to characterise SP1.4 in the Requirements Management process area using the SCAMPI℠ A practice characterisation scale. Identify the corresponding strength(s) or weakness(es) associated with the characterisation you have assigned to the specific practice. Justify your answer based on your evaluation of the evidence provided, the specific practice statement, and the typical work products for the specific practice. In evaluating the evidence, consider all informative material written under the specific practice including notes, examples and subpractices. ***(6 Marks)***

    The project being appraised provided the following evidence:

    In an interview session, the systems engineering manager, states that the project uses Telelogic DOORS (a requirements traceability and management tool) to manage changes to the system requirements. He states that the project had started using DOORS 12 months into the project. Previously, the project was using Excel spreadsheets and Word documents which were managed and controlled within the project's file structure in Windows.

    In a separate interview session, both the software and hardware engineers confirm the previous use of Excel, Word and Windows for documenting and storing project requirements. When asked how bi-directional trace between requirements was established (if at all), the software engineer states that he attempted to establish 'some sort of trace' in an Excel spreadsheet he created when the total number of requirements grew to a point where he 'couldn't remember what was related to what anymore'. He estimates that this happened about six months into the project.

    The hardware engineer states that he understands the project is about 2 years old (he has been on the project for a little less that 12 months) and still has about 2 years until they deliver the system to the customer. When asked about requirements traceability, the hardware engineer says that his predecessor never bothered to include the hardware requirements in the original Excel spreadsheet since the hardware requirements were less than 10% of the total number of system requirements. He

said that the project's hardware responsibilities were to buy off-the-shelf hardware components so that the software (according to him '…the main scope of work we're being paid for') could be hosted onto it and delivered to the customer as a complete system.

When asked about the current status of hardware requirements, he said that along with the software requirements, the DOORS implementation effort rebaselined all project requirements (including software and hardware system requirements) to assure current status, and were inserted into the DOORS database 'all at once'.

Both the engineers confirmed that since then, the project has been exclusively using DOORS to manage its requirements including additions, deletions, modification and derived requirements.

When asked about bi-directional traceability, the engineers state that their DOORS requirements database automatically establishes traceability between the customer's Function and Performance Needs (FPN), the systems requirements (called the System Specification - SS), the hardware and software requirements (called the Hardware and Software Requirements Specification – HSRS) and the test cases in the System Test Procedures (STP). They said the system enables ready access of linkages between a higher level requirement and its subordinate requirements and vice versa.

During a system demonstration, the appraisal team witnesses the demonstration of the DOORS requirements database. The database is opened and the appraisal team is able to view the FPN, SS, HSRS and STP within the database. Each one is opened and three separate examples are examined to ensure appropriate traceability. The appraisal team is able to follow the trace from the FPN through to the STP and is able to confirm downward traceability. The team then follows the reverse trace back up to the FPN without any problems. As the appraisal team is conducting its checks, it notices that some requirements in the FPN are written in a red colour with a note appended to them while all the other requirements are blue. The appraisal team asks the engineer conducting the demonstration the significance of the colours. She states that the 'red' requirements throughout the FPN (there's a total of 25 'red' requirements out of a total of 549) are deleted ones. The deletions occurred about one month prior to the appraisal, during a milestone review (the System Definition Review) during which both the customer and the supplier agreed that these would be deleted from the current system baseline and deferred to a new as-yet unspecified future phase of the project. The appraisal team asks her to demonstrate how the impact to lower level requirements has been captured. She states that the impact has not yet been flowed down to the lower level requirements. She goes onto say that it is a database clean-up she has not yet had the time to implement.

As part of your documentation review, the appraisal team is able to confirm the existence of the previously used Excel spreadsheets and Word documents and the dates confirm those that were provided by the interviewees.

Assignment Value

This assignment is worth 50% of your final assessment.

Assignment Effort

Try to limit your effort to **25 - 30 hours** and the size of your paper to less than **15** A4 pages.

Please remember that the aim is not to produce a detailed research paper that is challenging to absorb but rather a straightforward easy-to-read briefing paper. You may use dot point formats to emphasise key issues and points. Remember to justify your answers.

Document Specifications

Acceptable fonts are limited to Arial, Helvetica or Times New Roman. Headings and titles must be no smaller than 12 point, normal body text must be no smaller than 10 point, and footnotes, references etc must be no smaller than 8 point.

Text and diagrams must be readable without the aid of magnification. All pages must be numbered.

Don't forget to include your name and student number.

Delivery

Please e-mail your assignment to pascal.rabbath@s-3.com.au by **5.00pm on Friday 11th October 2013**. Refer to COMP8173 Assignment in the e-mail title.