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Course: SEG 4105 Software Project Management

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Assignment #2

1)a)

- CPI: Cost Performance Index
- BCWP: Budgeted Cost of Work Performed
- BCWS: Budgeted Cost of Work Scheduled
- ACWP: Actual Cost of Work Performed
- SPI: Schedule Performance index
- CR: Critical Ratio

CPI = BCWP / ACWP

- BCWP = 5,000 + 11,000 + 12,000 = 28,000
- ACWP = 4,000 + 11,000 + 13,000 = 28,000
- CPI = 28,000 / 28,000 = 1

SPI = BCWP / BCWS

- BCWP = 28,000
- BCWS = 5,000 + 11,000 + 12,000 + 12,000 = 40,000
- SPI = 28,000 / 40,000 = 0.7

CR = CPI * SPI

- CPI = 1
- SPI = 0.7
- CR = 0.7

i) Budget: The prediction was a bit off in milestone A and C. In milestone A there was a difference of 1,000 comparing the actual cost and the planned cost. Similar to what happened in milestone C. However, overall (and considering CPI) the total planned cost and actual cost for the project (so far) stills the same, which is OK. It could have been better if CPI was bigger. In that case, BCWP would be bigger than ACWP. Meaning that the project had a better performance than the one predicted, that is, the project would be underbudget.

ii) Schedule: Similarly, to the budget, the prediction was a bit off in milestone A and B. In milestone A there was a difference of 1 month comparing the actual completion

data and the planned date. Similar to what happened in milestone C. However, our SPI measure was below 1 which means that the project is behind schedule.

iii) Overall health of the project: CPI is OK, but SPI is bad. Which means that the overall health of the project is not going well. We could also use the CR to determine that, a CR below 0.8 means that we have a problem, which is our case (CR < 0.8).

b)

- ECAC: Estimated Cost At Completion.
- ETAC: Estimated time At Completion.
- BAC: Budget at completion.

ECAC = BAC/CPI

- BAC = 5,000 + 11,000 + 12,000 + 12,000 + 11,000 = 51,000
- ECAC = 51,000 / 1 = 51,000

ETAC = Original Time / SPI

- Original Time = 30 (planned completion data month)
- ETAC = 30 / 0.7 = 42.86

Based on ETAC and ETAC the project is estimated to be finished in **42.86 months** and with a **cost of $51,000**.

2)a)

- B: Breakage.
- F: Fixes.
- E: Rework Effort.
- UT: Usage Time.
- C0: Critical Defects.
- C1: Normal Defects

Modularity = B/N

- B = 500 + 5000 + 300 = 5800 SLOC
- N = 20 + 100 + 20 = 140 defects
- Modularity = 5800/140 = **41.4 SLOC/defect**

b) Adaptability = E/N

- E = 5 + 30 + 15 = 50 man-days
- Adaptability = 50/140 = **0.36 man-days/defect**

c) Maturity = UT/(C0+C1)

- UT = 720 hours
- C0 + C1 = 20 + 100 = 120 defects
- Maturity = 720 / 120 = **6 hours/defect**

d) Maintainability = scrap ratio / rework ratio = (B / Total # of SLOC) / (E / Total # man-days to develop)

- We know that the software ended up with “15,000 SLOC” and required an effort of “300 man-days” to develop.
- Thus: Maintainability = (5800 SLOC / 15000 SLOC) / (50 man-days / 300 man-days) = **2.32**

3)a) Project velocity = sum of original estimates = sum of the user’s stories finished during the iteration = 3 + 7 + 6 + 5 + 10 + 10 + 8 = 49 man-days/iteration.

b) In the first iteration we had 2 calendar-week, that is, 10 working days. In the second iteration we have 2 calendar-week, but, as we have a long weekend, we have 9 working days.

If in 10 working days we have 49 man-days / iteration, in 9 working days we would have *x* man-days / iteration. Therefore:

- Working days Man-days / iteration
- 10 49
- 9 x
- 10x = 441
- x = 44.1 man-days / iteration (considering 9 working-days per 2 calendar weeks).

The time needed to complete the second iteration would be = 8 + 10 + 7 + 9 + 5 + 6 + 6 = 51 days. But, as our team would be able to complete only 44.1 man-days during that iteration, we would have 51-44.1 = 6.9 ≈ 7 days of incomplete work that would need to be delayed to the next iteration.

Therefore, the tasks that will make it to iteration two are **A1, A2, B1, C1 and D1, which sums up to 8 + 10 + 7 + 9 + 5 = 39. D2 would almost be able to be completed in that iteration**, but, nevertheless, it would also need to be postponed to the next iteration (as well as D3).

4)a) The riskiest things are the ones that are most likely to occur and that will cause greater damage, that is, more cost. Therefore, focusing on that is better than focusing on problems that will probably not occur or, if they occur, they will not cause serious problems. Not only that, but identifying a risk earlier in the project development would help to mitigate its negative consequences.

b) All phases (inception, elaboration, construction, transition) should focus primarily on the riskiest components. During the planning of the project, the risks should be identified. The project charter gives a rough idea of risk management, whereas the project plan together with the risk management plan give a more in-depth vision into the project’s risks.

c) By the end of the elaboration phase you will have a full prototype, full architecture and a complete project plan. But it’s during the implementation that we would be able to know whether or not we are able to deliver the risky components. That’s because, by this phase, the riskiest components will have already been addressed properly. Nonetheless, continuous risk management is still needed.

5) The ripple effect is when an error spreads to various different modules (artifacts) overtime, which then spreads to even more modules and so on. It is estimated that 30 to 50% of all project costs are consumed by rework. Rework is cause by either change or problems/mistakes. Therefore, we need to catch these problems as early as possible in order to reduce the impact of the ripple effect and reduce the overall cost of the project.