Lecture 8: Dynamics of Project Performance III

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1. Why is completion date more sensitive to quality than to other factors?

- Improving quality reduces the amount of work you have to do to complete the project.
- Because of the "undiscovered" nature of rework, the rework discovery time is added to the actual rework time required.

- Analogy with the example presented in the lecture by S. Eppinger: The main parameters of the signal flow diagram that models the die development process are test duration and probabilities of transitions: the completion date is most affected by the probability of transition of the first die design

2. Do conventional PM tools allow accounting for undiscovered rework?

- Only if during the planning phase a time buffer is added based on past experience / similar projects.
- An iteration can be added up front, in the planning. However, planning iterations tends to be more "enlarging the scope" than dealing with undiscovered rework.
- Estimate ECRs based on past experience. Use it to search / check for undiscovered errors.
- It's important to recognize it - need for metrics to quantify it.

3. Why does it matter? Does it matter whether we know about undiscovered rework or not? What are the consequences of undiscovered rework.

- Undiscovered rework is important because when it is discovered it influences the cost and schedule of the project. By discovering rework as early as possible you can take measures and tune the project accordingly.
- Unless you discover rework, you can't add resources in order to correct the situation. If rework is left to emerge then it may be too late to mitigate its impact on the project deadline.
- If you haven't discovered the rework you may start downstream work too soon.
- If you have to respect a project deadline, you may have to de-

scope or ship with bugs (if you don't admit a problem early).
- Plus, the cost of fixing a bug increases as the project moves downstream.

4. Do management incentives encourage the discovery of rework?

- Management always repeat that you have to find bugs and find them early but a bug is always a "black mark" - you have to keep them down all the time. Hardware engineers try to fix bugs without actually recording them, since these bugs are typically hard to eliminate / rework.
- Company culture / policy should encourage people to find and correct bugs. However, people tend to fix bugs but not report it unless they can't do otherwise.
- People usually find bugs outside of their subsystem. Such bugs sometimes represent such rare failure modes that are left into the product.
- Efficiency of gating process.

5. Why are projects subdivided into phases of work?

- Because they correspond to gate reviews, which helps manage the project.
- You can model the impact of concurrency and overlap between phases.
- Subdivision in phases is also driven by the specialization of labor (different phases may require different kind of staff)
- Phase is an opportunity to assess work done and adjust plan.
- Disproportionate increase in the cost of fixing errors as you move downstream.
- Sometimes the tasks are completely different (in terms of units of measure of task accomplishment and data) and hard to measure - hence the need for different phases.