

Is it better to distribute estimating to SME's across the organization or centralize it?

December 2011

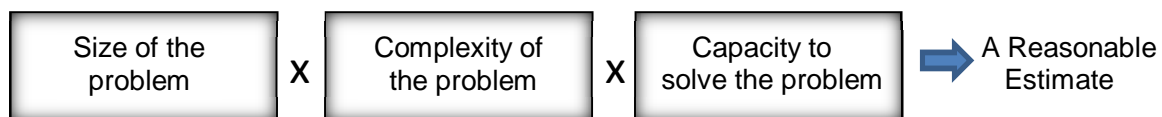
Scope of this Report

Our focus, as always, is to respond to the question at hand. That means making some assumptions:

- Estimating of software projects may include estimates of effort, cost, duration and defects.
- SME refers to those individuals that have direct knowledge/experience with the variables that would affect the estimate and responsibility for the delivery of the tasks being estimated.
- Some form of an automated estimating tool is being used

A Common Estimating Model

Any discussion around estimating should begin with a foundational understanding of what comprises a basic estimating model. The common software project estimating model is comprised of three components. In order to achieve a reasonable estimate, the model needs to solve for (1) the size of the problem, (2) the complexity of the problem and (3) the capacity (ability) of the software development team to design, develop and deploy a satisfactory solution to the problem



Sizing the problem domain should relate to the features or functions that are required by the end user (customer). Size indicators such as function points or use cases are acceptable measures of size. The complexity of the problem domain should address the technical issues dealing with such variables as logical and mathematical algorithms, data relationships, reusability, memory and performance requirements, code structures, etc.

Capacity to deliver is a measure of performance and may be based on a myriad of variables that are used to assess and quantify the team's ability to successfully develop a project/product of a certain size and complexity.

Within each of these components there are a number of parameters that are often analyzed in order to create a reasonable value for that component. Additionally, the interrelationship among the

components needs to be considered. The resulting estimating model can therefore become highly complex.

Estimating Best Practices

As we explore and evaluate the pros and cons of the two estimating process alternatives under consideration, centralization or SME based estimating, it is helpful to understand what comprises estimating best practices. One of the industry accepted models of best practices is the Software Engineering Institute (SEI) CMMI. The SEI lists the requirements for good estimating to include the following:

- An historical database of project experiences
- Structured processes for estimating product size and reuse
- Mechanisms for extrapolating benchmark characteristics of past projects
- Audit trails
- Integrity in dealing with dictated costs and schedules
- Data collection and feedback processes to foster correct data interpretation

This of course is not a complete list, but we can use it as one measure of estimating done right. 'Done right' may be interpreted as - the most knowledgeable statement you can make at a particular point in time in regards to project effort, cost, duration and defects. An estimate is neither accurate nor inaccurate, it is simply an estimate. How the information from an estimate is used and presented is important to the successful management and delivery of a software product.

A Word about Automation

It should be assumed that those organizations that are serious about estimating will be using some type of software estimating tool. This could vary from a relatively simple excel spreadsheet based estimating model to a high end commercial software package requiring skilled practitioners.

Automation, along with a well-defined process, allows for greater consistency with how estimates are being done and ensuring the consistency with how estimates are produced across the various work products in an organization.

It is not uncommon for organizations to develop simple excel based estimating models. These can initially be useful as organizations begin to mature their estimating practices and the use of an automated model helps to promote consistency in how estimates are produced. However, in order to achieve a higher level of estimating maturity, it will be necessary for the organization to advance to a commercial grade estimating tool. This will require extensive training on the tool and the development of a mature estimating process. Additionally, these tools often require a certain amount of calibration in order to produce the desired results.

Centralizing the Estimating Process

Centralization may be described as dedicated resources supporting the estimating function throughout the organization. The individuals in the group are well versed in the estimating models, practices and

principals as well as experts with the automated estimating tools. Oftentimes these groups or teams are set up as a Center of Excellence, offering their services to project teams.

The decision to centralize the estimating practices is independent of the organizational size. For a small IT shop, the responsibilities associated with estimating could fall to a single individual. In a larger organization, a centralized estimating function may be a team of estimators.

There are several advantages to establishing a centralized estimating practice. A centralized estimating service is somewhat removed from the 'political' pressure often associated with project team level estimates. Estimates are thought to be created from a more objective perspective. They are not as influenced by customer demands to meet unrealistic timeframes or exaggerated scope increases. They are more likely to produce a realistic estimate because they maintain a greater degree of objectivity.

Another potential advantage with centralization is that the centers resources are dedicated to performing multiple estimates across the organization. As such, they develop a high degree of proficiency with the automated estimating tools used in their estimating practice. These tools can be very complex and require training and frequent utilization in order to learn how they perform and how they can be effectively calibrated to fit the given estimating situation.

The watch words in any successful estimating practice are consistency and credibility. Here again, a centralized estimating facility is more likely to perform in a consistent manner through the continued execution of established estimating practices. Because of their consistency and knowledge, customers are more likely to view the resulting estimates as being credible and reliable.

Finally, an estimating center is more likely to create a common data base or repository of project data as they gather data on actuals and make adjustments to their initial estimates. By developing an historical database of project experiences they can then analyze that data and use the information to fine tune future estimates based on that project history. Many of the commercially available tools have the option of basing the generated estimates on a database of organizational project data.

Distributed Estimating Practices

As stated above, SMEs are those individuals that have direct knowledge/experience with the variables that would affect the estimate. This may include the project manager, technical leads and/or architects. They are usually directly responsible for the delivery of the tasks being estimated. We can assume that as professionals, they understand and use the organizations standard estimating models and processes. In addition, they have access to the software estimating tools that are available.

A large advantage that the individual SMEs have is their familiarity with the project requirements and the project environment they are developing in. This enables them to understand the finer details of the features and functions and, theoretically, produce a more accurate assessment as to the size and the complexity of the deliverable being produced. They can use these insights, such as domain experience and knowledge of the maturity of the assigned resources, to fine tune the estimating model.

Estimating at the project level truly aligns estimate and delivery accountability. A good project manager can use their estimates to guide and direct the development effort. As necessary, mid-course corrective estimates can be generated and adjustments made to schedules or resources as required. Additionally,

since SMEs and project managers are on the front line they have an established relationship with their customer and they can engage that customer in the decision making process using input from the estimate(s) to manage and set expectations.

When estimating practices are distributed they are most likely being performed by a project manager along with selected team members. These are the individuals that are directly responsible and accountable for the success of the project. On the one hand, this could drive a positive behavior that would suggest that they are going to make every attempt to be as precise and realistic in the planning, estimating and executing of the project. However, this may not always be the case.

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“ There are many reasons why estimates are wrong that have nothing to do with the work being done. Software engineers are often overoptimistic by nature—it’s easy to be very positive about a project before doing any of the work, and it’s easy to ignore problems that may come up later. It’s very tempting to pad estimates, since they lead to longer schedules and less pressure”.

Unfortunately, with most tools the “fine tuning” that SMEs can use to get better estimates can also be used to produce any number they care to think of. Centralizing access to key parameters values maximizes control and, hence, consistency (although, of course, sometimes even centralized teams can be subject to business or political pressures).

A Word About Agile

In a development environment that has implemented agile techniques and methods the consideration of a centralized estimating activity may be a non-starter. Traditional estimating methods give way to agile techniques such as frequent re-prioritizing of work items (product backlog), constant planning (sprint planning), and estimating (velocity). The very nature of an agile project –

‘Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.’

- changes how we think about applying familiar estimating techniques and how we demonstrate progress to our customers. Perhaps there is no role for centralized estimation if agile teams are tackling separate, unrelated tasks but if several agile teams are working on different, related parts of the same project then some sort of, perhaps aggregated, estimation is essential.

So, is it better to distribute estimating to SME’s across the organization or centralize it? The answer most often would be centralization. The key factors in a successful estimate include objectivity of the estimate, proficiency in the use of automated testing tools, the ability to capture and analyze a large representative grouping of project data for use in future estimates, and finally, credibility with the resulting estimate. These characteristics can be present in both centralized and distributed estimating scenarios, but they are more likely to occur in an estimating center.

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