Work Distribution Modelling

Mike Watson: Obsideo Technologies

Work Distribution Modelling (WDM) is a form of parametric estimating. In its ideal form it requires three components to work:

- a model of the current project based upon a structure used in many previous similar projects
- data about previous projects
- data about the current project

From the model, the project manager can obtain accurate estimates of effort, broken down phase by phase across the project.

Two examples of 'standard' project models with their standard distributions of work effort (hence the name) from different industries are given here:

1. Ship-building (super-tankers):

Stage	% of total effort
Lay the keel	6%
Build hull	28%
Build decks	15%
Install engines	12%
Build superstructure	15%
Fitting out	20%
Commissioning	6%

2. Traditional IT Systems development:

Stage	% of total effort
Feasibility Study	7%
Requirements Definition	12%
Business System Design	8%
Computer System Design	8%
Technical Specs	6%
Code and Test	35%
System Test	7%
User Acceptance Test	5%
Implementation	12%

In the IT example, the most common time in the lifecycle at which an estimate is required is at the end of Feasibility Study. So, the actual time taken to complete the Feasibility Study, can be used to estimate the likely effort for the remaining phases.

Therefore, if the Feasibility Study consumed 14 staff-weeks of effort, the rest of the project is likely to require 186 staff-weeks, distributed across the project as follows:

Stage	Effort, in staff weeks
Feasibility Study	14 (from the actual time consumed)
Requirements Definition	24
Business System Design	16
Computer System Design	16
Technical Specs	12
Code and Test	70
System Test	14
User Acceptance Test	10
Implementation	24

Of course the best way to compile a WDM is from actual data collected during many projects that have all followed the same technical structure. In this way an organisation can build a library of WDMs that apply to a wide range of project types, based upon the tools, techniques, standards, work processes and so on that prevail in the organisation.

However, there is a way of producing at least an initial model without waiting for the actual data to build up. This method is called the Delphi Technique, and it is a well-known way of arriving at a consensus.

To operate the Delphi Technique, one person is assigned the role of coordinator and as many people as possible, with some experience of following the standard model, are asked to contribute their experience.

The method is applied as follows:

- the coordinator publishes a detailed description of the contents of the phases in the model to be constructed, so that all participants in the method start with a common understanding of the standard work breakdown.
- the coordinator asks the participants to estimate what they think the distribution of effort across the standard phases usually consists of. This estimate is carried out privately, i.e. with no discussion between the participants.
- the participants send their estimates to the coordinator, who collates them, and then publishes all the estimates to all the participants. There is likely to be a variation around a common point, reflecting the experience of the participants.
- there is a meeting at which the participants discuss the estimates at the outer fringes of the common model. The coordinator must identify which estimates are based upon genuine experience, which are guesswork, and which might indicate the need for a non-standard model (some of the participants might conduct 'strange' projects, which will require special WDMs).
- after the meeting the coordinator invites the participants to re-estimate, based upon the discussions. This second round brings the standard model closer together.

- the coordinator publishes a model based upon the second round of estimates, and all participants agree to use it for estimating, but to let the coordinator know how it turned out in practise.
- the coordinator may also publish models for the other 'uncommon' project approaches, with the same request to be informed about actual use.
- the coordinator must collect feedback and analyse it to ensure that the model(s) grow with experience.
- if the organisation introduces new processes or tools then the models may require review and revision.

Using WDMs to estimate projects at the outset is so useful that it is a shame if an organisation thinks it cannot consider the technique until it has collected years of real data. Using the Delphi Technique to generate some 'starter' models can get a disciplined approach to project estimating up and running quickly. Of course, if the organisation has no 'standard' models to follow in the first place then the whole concept of estimating is reduced to guesswork.