TITLE: "TAKING THE MYSTERY OUT OF ESTIMATING"

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"Most estimating errors are errors of omission, not commission. It is what we forget to estimate that gets us into trouble."
- Bryce's Law

INTRODUCTION

Estimating is one of the most controversial subjects in Project Management, particularly in the IT community. There are some people who have turned the subject into a cryptic science involving esoteric techniques bearing a close resemblance to "voodoo."

In reality, there is nothing magical to estimating whatsoever. It is simply a prediction of the amount of time and costs needed to complete a project, either in part or in full. Such a prediction is based on the facts as we know them at a given moment in time and should not be based on any cryptic estimating guidelines. True, guidelines can provide assistance in formulating an estimate, but the bottom-line estimate must be made by the human being. Let me explain why.

TIME AND TYPES OF ESTIMATES

First, we should look at time differently than what is commonly referred to as "man hours." Instead, we should be interested in the amount of time needed to directly perform a given task, which is referred to as "Direct Time." Interferences from our work effort, such as meetings and personal breaks, should also be noted, and referred to as "Indirect Time." Both "Direct" and "Indirect" make up what we call "Available Time" representing the total number of hours available to work in a day ("Unavailable Time" represents planned absences such as vacations). Under this scenario, estimates should be prepared in "Direct Hours" only. Yet, when we calculate schedules, we will consider the "Indirect Time."

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ESTIMATING GUIDELINES?

$$t = \sum_{X=1}^{n} \frac{BfD + \left(\frac{A}{K} - MAD_x\right)}{AWS + \left(BMT\left(\frac{AmF}{PLO} - H\right)_x\right)} + y^2 + TT$$

LEGEND:

BfD =

Total project estimate (expressed in joules, ergs, or man hours)

A _ MAD
K =

Ratio of total effect on project or posterior mastication and dactyl recoil

A = Total mass of posterior
K = Duration (in hours or days) of mastication and recoil
MAD = Factor allowing for offset of individual morale and discipline

AWS = Average Working Speed of individual X

BMT = (Provided by IE Department)

FACTOR TO ALLOW FOR PROBLEM IDENTIFICATION AND RESOLUTION

AmF
PLO =

The ratio of current probability of personnel and termination or dismissal

AmF = An arbitrary value for individual X, either 1 or 0
PLO = The change in current budget allocation for personnel, as affected by the inverse to the quarterly change in the Cost of Living Index provided by the U.S. Department of Labor.

H = The number of holidays contained in the estimate period, including or excluding, as may be necessary, the preceding and succeeding days

Y = An unknown factor provided by management, best approximated \ through the use of a Quija board, dart board, Yahtze, or various and sundry other games of chance

TT = The measure of time for the lapse between final compilation and production schedule date. Usually negative.

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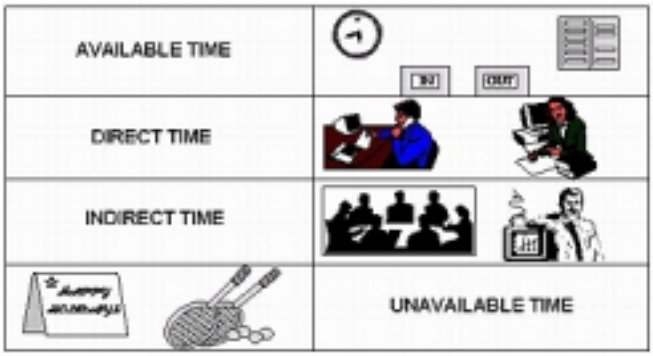
We refer to the relationship between "Direct" and "Indirect" as an "Effectiveness Rate," which is expressed as a percentage representing the average amount of time in a day spent on direct assignments. This concept of time is derived from the construction industry in the 1950's. At the time, it was observed construction workers were 25% "effective" (in an eight hour day, the worker is doing two hours of direct work). We have employed this same technique in IT organizations around the world and have found they typically average a 70% "effectiveness rate" (approximately five direct hours in an eight hour day).

Two things ned to be made clear: first, "Effectiveness Rate" varies from person-to-person and group-to-group; second, "Effectiveness Rate" is NOT an efficiency rating (for example, someone could have a low effectiveness rate yet be your most productive worker). I could go into more detail regarding the characteristics of time, but let's not digress.



EFFECTIVENESS RATE = DIRECT DIVIDED BY (DIRECT + INDIRECT)

Under the "PRIDE" Methodologies for IRM, there are two types of estimates serving different purposes. The "Order-of-Magnitude" (OOM) estimate is for an entire project and to make "go", "no-go" or "modify" types of project decisions. In contrast, the "Detail" estimate is for a given phase in a project and is an expression of the worker's personal commitment to the work.

Although "OOM" and "Detail" estimates serve different purposes, they are similar in many ways. For example, both are expressed in "Direct Hours" and both are based on a certain level of detail.

THE MORE WE KNOW, THE BETTER OUR ESTIMATE WILL BE

In construction, estimates are based on building or assembling materials in a project. To do so, architectural drawings (blueprints) are needed specifying the types of materials needed in the project, along with their dimensions. From this, we can calculate the amount of time necessary to assemble the materials in a prescribed sequence. We refer to this as "Bill of Materials" estimating for we are considering all of the parts in the product. The manufacturing industry follows an identical approach; as they design their product, they break it into its "bill of materials" and then calculate the amount of time needed to assemble them.

TYPES OF ESTIMATES

	ORDER-OF-MAGNITUDE	DETAIL
PURPOSE	BASIS FOR PROJECT DECISIONS	EXPRESSION OF PERSONAL COMMITMENT
PREPARED BY	PROJECT MANAGEMENT OR PROJECT TEAM	INDIVIDUAL(S) ASSIGNED TO PERFORM THE WORK
WHEN PREPARED	END OF PHASE	BEGINNING OF PHASE
SCOPE	THROUGH THE END OF THE PROJECT	THROUGH THE END OF THE PHASE
LEVEL OF DETAIL	FOR ALL PHASES WITHIN A PROJECT	FOR ALL ACTIVITIES WITHIN A PHASE
SKILL LEVEL	AVERAGE	UNIQUE TO WORKER CONSIDERED

ALL ESTIMATES ARE EXPRESSED IN DIRECT TIME

This same approach can be applied in the world of Information Resource Management (IRM). For example, when designing either a major system or a single program, consideration should be given to the "bill of materials" in the product to be produced, e.g., sub-systems, procedures, programs, modules, inputs, outputs, files, records, and data elements. Of these components, we must ask:

* How many resources do we have to create from scratch (new)?

* How many resources can we re-use without modification (shared resources)?

* How many resources are shared resources requiring modification and to what degree?

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As an example:

IRM RESOURCE	NEW	MODIFY	RE-USE
SYSTEM	1		
SUB-SYSTEMS	14		
ADMIN PROC	23		
COMP PROC	13		
PROGRAMS	28		
MODULES	33	10	112
INPUTS	17	5	
OUTPUTS	37	13	
FILES	56	5	43
RECORDS	250	50	306
DATA ELEMENTS	60	257	

Of course we will have to consider the dimensions and scope of each resource (e.g., complicated or simple) but this "Bill of Materials" approach takes the mystery out of estimating. Too often estimates are missed simply because we do not understand the complexity of the product we are building. Inevitably, something is forgotten and the targeted estimate is missed. If we are to build some sort of estimating guideline, it should be based on the amount of time it takes to define a data element, design a file, etc. In other words, the estimating guidelines address the average amount of "Direct" time needed to create/modify/re-use an information resource. Coupled with this should be consideration for the skill level of the human resource charged with implementing the work. For example, an expert will perform a job faster than a novice. In an "OOM" estimate, we might not know who the human resources will be (we want to simply make a project decision) and, as such we might use an average skill level in our calculations.

One might ask, "How do we prepare an OOM estimate at the beginning of a project if we do not yet know the dimensions of a system; don't we have a 'Chicken and Egg' problem here?" The answer is No, you cannot. For any project, there must be an exploratory phase to determine the scope of the project; a "Feasibility Study" whereby requirements are specified and a complete "rough design" produced describing all of the resources in the design. Following this, one of the last activities of the Feasibility Study should then be to produce an OOM estimate for the remainder of the project.

COMMITMENT - THE REAL PROBLEM

There is a natural human tendency to avoid making estimates because they represent commitments, and people tend to shy away from commitments when they are not sure of the facts. Nevertheless, little progress would be made if we never attempted to plan for the future.

Under the "PRIDE" approach, it is the worker and not the manager, who prepares the "Detail" estimate for a specific phase in a project. As mentioned above, the worker considers the level of detail for the assignment (the "bill of materials") and then prepares an estimate to accomplish the work. For comparative purposes, the worker may also want to review the "OOM" estimate when preparing the "Detail" estimate.

When completed, the "Detail" estimate is reviewed with the Project Manager prior to acceptance. At this time, the worker must be prepared to rationalize the estimate. The Project Manager then has the option to:

* Accept the estimate as submitted.

* Ask it be to revised.

* Reject the estimate - the Project Manager may then decide to use another worker or re-evaluate the assignment altogether.

Bottom-line, the Project Manager is seeking commitment from the worker to the project which is a very scary concept to some people today (particularly consultants). It means we must be responsible in the preparation of the estimate and professional in performing the work within the estimate.

Whereas the worker produces the estimate, the Project Manager calculates the schedule based on the worker's "effectiveness rate" (but I'll leave Project Scheduling to another time).

As the worker proceeds on an assignment, he/she posts time against the estimate and routinely updates the "Estimate to Do" (ETD) on their time sheet/screen representing the amount of time needed to complete a given assignment. If all goes well, the worker simply deducts the actual amount of time spent on an assignment against the estimate until it has been completed. However, if the assignment goes faster or slower than expected, the ETD should be updated accordingly which, in turn, signals to the Project Manager a change in the project schedule is needed.

Both the "Detail" estimate and "Estimate to Do" seek commitment from the worker and are an important part of the "PRIDE" Mini-Project Manager Concept where we try to manage "from the bottom-up, not just top-down"; for information, see:
http://www.phmainstreet.com/mba/pride/pmmeth.htm#minipm

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CONCLUSION

Estimating is actually not a complicated process. There are two considerations though: the degree of complexity in an assignment and the worker's commitment. The complexity issue is addressed by the "bill of materials" concept and the commitment issue is addressed by having the worker participate in the estimating process.

Estimating guidelines are helpful but they are not a panacea. The biggest danger with guidelines is when people abdicate commitment to the estimate via the guidelines. In other words, if the estimate goes sour, they blame the guidelines and not themselves, thus, the guidelines become a scapegoat for estimate failures. Regardless of how good your estimating guidelines are, they are just that: a "guideline." Guidelines don't make commitments, people do.

By the way, I despise the word "guesstimate" as this implies a simple guess without knowing all of the facts. Under the "PRIDE" approach to project estimating, this is simply not done.

For additional information on "PRIDE" Estimating, see:

http://www.phmainstreet.com/mba/pride/pm20.htm

END

"PRIDE" Special Subject Bulletins can be found at the "PRIDE Methodologies for IRM Discussion Group" at:

http://groups.yahoo.com/group/mbapride/

You are welcome to join this group if you are so inclined.