

Requirements and Goals—Position Paper

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We Don't Really Know the Goal When We Start

The most serious shortcoming in the naïve waterfall model is that the designer often has a vague, incompletely specified goal, or primary objective, hence quite vague requirements. In such cases:

The hardest part of design is deciding what to design.

As a summer student working at a large missile company, I once was set to work designing and building a little information system for keeping track of the 10,000 drawings for a radar subsystem, and the update status of each.

After a couple of weeks, I had a working version. I proudly presented a sample output report to my client.

"That's fine—it is what I asked for—but could you change it so that...?" Each morning for the next four weeks, I presented my client the report, revised to accommodate the previous day's request. And each morning he studied the product report and asked for another system revision, using the same polite mantra.

It was a simple system (implemented on punched card machines) and the revisions were conceptually simple. The most comprehensive change was to list the drawings sorted by, and indented to show, goes-into level and order, where level was a single 0-10 digit in the card. Other refinements included multi-level subtotals, with exceptions, of course, and the marking of various remarkable values with asterisks.

For a while, this was very frustrating. "Why can't he make up his mind as to what he wants? Why can't he tell me all at once, instead of one bit a day?"

Then, slowly, I came to realize that perhaps the most useful service I was performing for my client was helping him *decide* what he wanted.

Well, today the software engineering discipline is much more sophisticated. We recognize that rapid prototyping is an essential tool for formulating precise requirements. Not only is the design process iterative, the design-goal-setting process is itself iterative.

This sophistication in software engineering does not forestall, nor noticeably impede, the numerous references in the literature to the "product requirements" **as a normal given** for a design process. I would assert that the case when one knows complete product requirements up front is the **rare exception**, not the norm:

A chief service of a designer is helping the client discover what he wants designed.

Perhaps software engineering is the most sophisticated of the design disciplines in this respect. At least, the concept of rapid prototyping has a name and a recognized value there, where it does not always have the same status in computer design and in building architecture. Nevertheless, I see the same goal iteration happening in these design fields.

Increasingly, designers build simulators for computers and virtual-reality walkthroughs for buildings as rapid prototypes to drive goal convergence. I think goal iteration is an inherent part of the design process.