5.1 Going in Circles vs. Feedback Loops

And then, all of a sudden, Winnie-the-Pooh stopped again, and licked the tip of his nose in a cooling manner, for he was feeling more hot and anxious than ever in his life before. There were four animals in front of them!

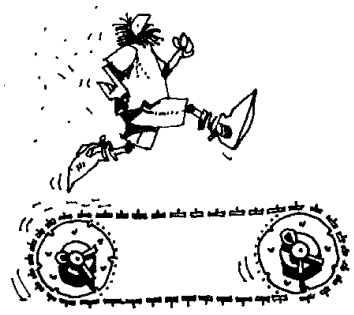
'Do you see, Piglet? Look at their tracks! Three, as it were, Woozles and one, as it was, Wizzle. Another Woozle has joined them!'

- A. A. Milne, Winnie-the-Pooh.

Purpose

To describe feedback systems in TQM and ISO 9000 QM, and discuss how these can improve design practice.

Going in circles



'Going in circles' is a universal metaphor for working hard and getting nowhere, rendered with consummate charm in the story of Pooh and Piglet following their own tracks around the Spiney Wood, filled with anticipation and trepidation as to what they were following.

'Going in circles' seems such a common experience that we have many names for this activity:

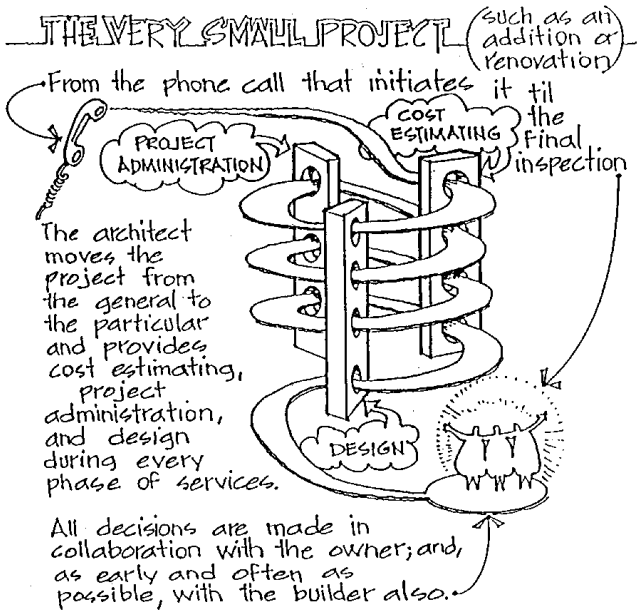
- Running in place
- Being in the squirrel cage
- Chasing our tail

and so on.

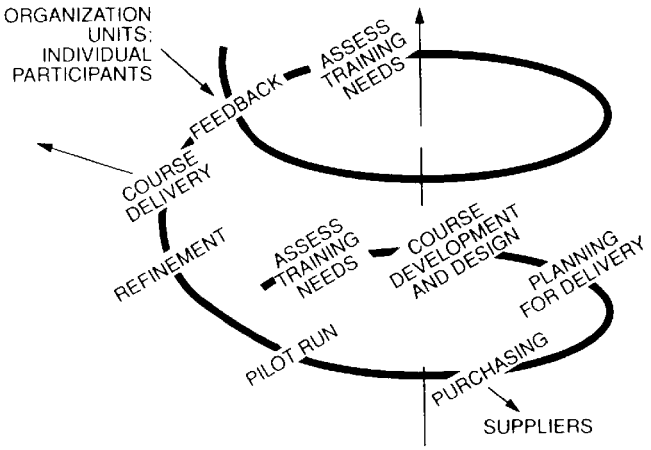
They all mean the same thing: we go through a cycle of work; start and complete a project, and we do not appear to have learned anything from the process; we are back where we started.

The iterative process

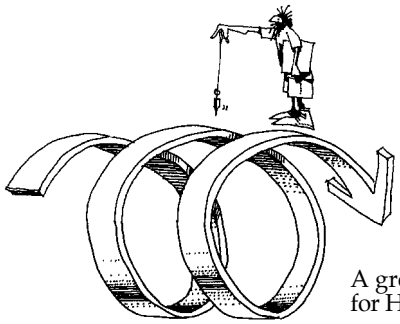
To be sure, 'going in circles' can be a very positive - perhaps even vital - aspect of the design process. We call this 'iterative'; it *is* the way we design. James Franklin has captured this concept admirably in a spiral diagram, shown opposite. [109] If we use this idea of a spiral to describe the iterative process, when we come back around to the 'same place', we actually have moved forward, by the distance between loops in the spiral.



Dr. Juran also uses the spiral as a way of explaining what he calls 'the spiral of progress in quality' (110). Here is one of his diagrams:



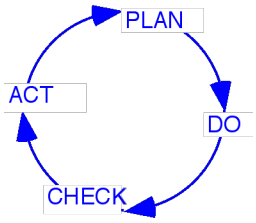
We can think usefully about feedback in this way: What we learn from our experience can be measured by the pitch of the spiral. If it is very tight, we really are only going in circles; if it is open, we have made progress as we went around.



A great leap forward for Herman

PDCA Cycle

A key tool in every system of quality management is the feedback loop; in its simplest form the "PDCA" cycle, introduced in Chapter 4.2.



The PDCA Cycle forms the basis for team efforts in problem solving. It represents the four steps necessary in addressing a desired system or process change.

1 **PLAN** - Plan a change aimed at an improvement in the design process. What could be the most important accomplishment of the quality improvement team? What changes in office practice might be desirable? What data can be gathered to study the change? Is new data needed? If yes, plan to record this new data, decide how you will use it, and in what process.

2 **DO** - Carry out the change or the test, preferably on a small scale. Search for data on hand that could answer the questions in Step 1.

3 **CHECK** - Check the results to see what was accomplished or learned. Observe or monitor the effects of the change.

4 **ACT** - Adopt the change, or abandon it if the results are not useful. Try the cycle again, with accumulated knowledge.

Feedback in process flow

If you turn back to the flowchart example on page 151, you will see a number of arrows that 'go back' to some previous step. In a flowchart, these mean that some step hasn't been satisfactorily completed (the test result was 'no'), and the process has to be repeated to get it right.

I made the comment there that 'design may be necessarily iterative, but should not be more iterative than necessary'.

It is obvious when one looks at that flowchart that failing to catch a problem at any one stage will both delay the progress and add unnecessary cost.

The flowchart process is one of the most widely used tools in both TQM and ISO 9000 to improve quality through feedback. This tool can be used to graphically describe any process in any industry, but obviously its use should be restricted to those processes where some real benefit can be gained by creating the flowchart.

How do we know which processes those are? One good way to start is to identify the processes which aren't working as well as you would like them to, or those which annoy you. It is in these situations where you are most likely to learn something new about the processes by flowcharting them: flaws in the way the process is operating, or critical points where you should be testing the process but aren't.

Setting up a flowchart

Here are the steps for setting up this analysis:

1 Identify problem processes.
2 Prioritize and select processes to study.
3 Prepare flowchart of first process.
4 Identify all critical points for success of the process.
5 Describe these points:
   - What is the test of adequacy at that point?
   - Who is responsible for testing adequacy?
   - Does that person know their responsibility?
   - Are the tests being carried out?
   - If not, why not?
   - If so, what is happening with the results?
6 Check that the flowchart shows these decision points, and what happens if there is a negative result. If it does not, revise the flowchart.
7 Continue this process until the flowchart is complete and accurately shows what *should* be happening.

At the end of this process the problem will be sharpened and clarified, and the solution may be apparent.

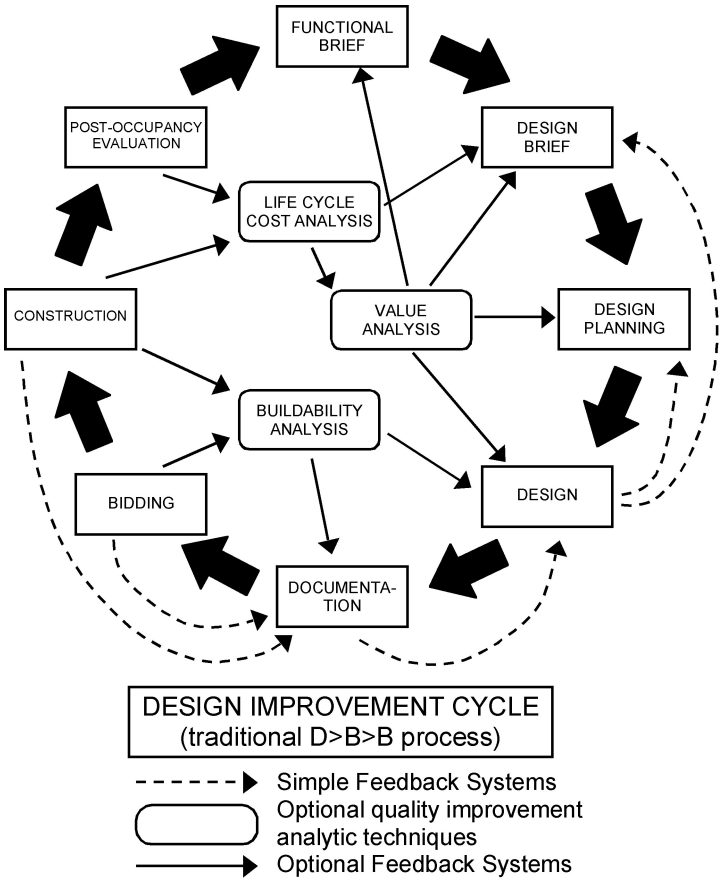
Application of the feedback cycle

The feedback wheel can be used to good effect to study certain relationships. As just one example of that, I did some work for a state governmental client to help them better understand the consequences of varying procurement methods, shown below.

Traditional procurement model

This model presumes a normal 'full services' design contract, with the design professional responsible for contract administration.

Note the importance of post-occupancy evaluation (POE) in this cycle. It is the key activity that bridges the gap between construction and writing the program for the next project.



All risk conditions are either internal to this cycle or external to it. Examples of internal risk conditions are inadequate briefing or inappropriate selection of materials. Examples of external risk conditions are inclement weather and political changes.

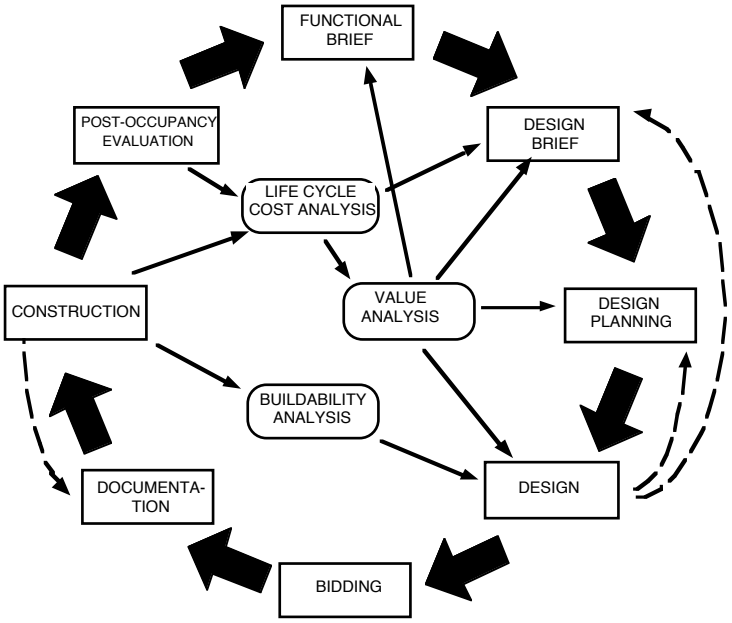
Normally this process starts at the top, with a statement of a client's needs, and progresses around the cycle. Traditionally the weakest link in this cycle is POE (post-occupancy evaluation). Key reasons for this weakness are a failure by all parties to the process to realize the importance of POE in design improvement, and (consequently) no provision in anyone's brief to provide for collection or analysis of POE data.

Design > document & build model

This model is middle ground between the traditional model and design-build.

In it, the client engages the architect to do the design, then the project is bid, and a team responsible to the contractor does the documentation.

This model is very much the norm in Japan.



DESIGN IMPROVEMENT CYCLE (D>D&B process)

Simple Feedback Systems

Optional quality improvement analytic techniques

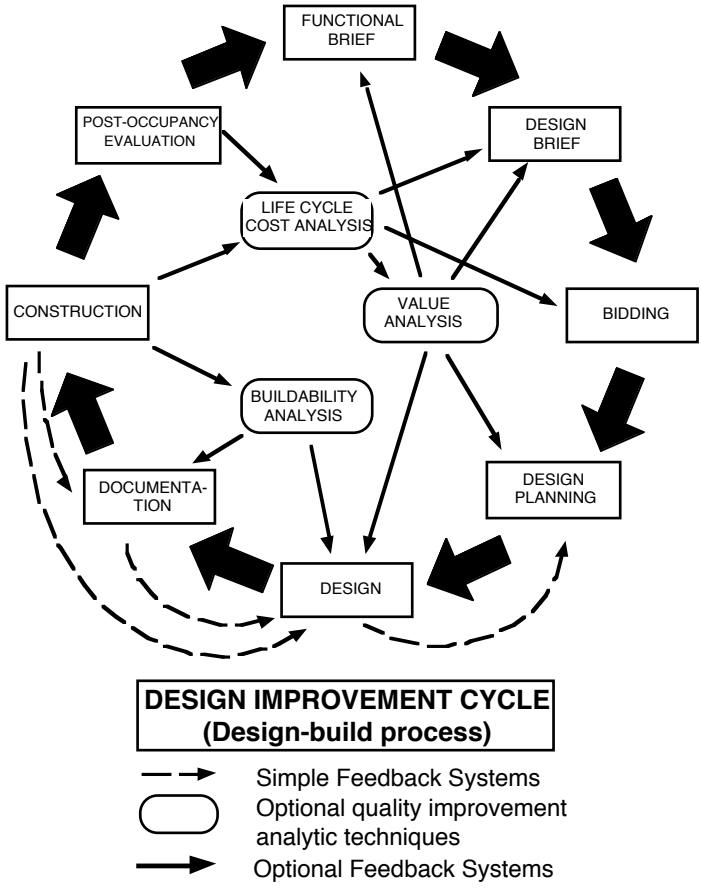
Optional Feedback Systems (must be provided by client in this model)

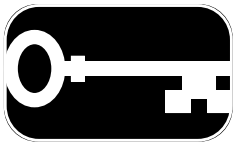
From a feedback process perspective, the Design > Document & Build model is the weakest of the three common systems. This is because the functional connections do not exist as they do in either the traditional D > B > B system (where feedback loop integrity can be maintained by the design team, through construction inspection) or Design/Build, where feedback loop integrity can be maintained by the builder. As a result, in the D > D&B model, the client has the fundamental responsibility for maintaining the design improvement feedback loop, since the client has structured a system which interrupts the loop.

The only way this feedback loop can be completed is either for the client to faithfully provide the feedback, or to ensure that the design team has access to, and input into, the document/build decision-making process as well as the outcome (results) of that process. This limitation has important consequences in structuring effective long-term risk management programs.

Design/build model

Note how the sequence of activities has changed from the two previous diagrams.





The difference between going in circles and feedback loops is that the latter comes back to a new and better starting point, through structured self-education.

The POE connection

The risk management studies above showed how POE was critical to completing the feedback loop, and that in the D>D>B model, this information was generally inaccessible to both the design team and the documentation team, thus creating a problem for all parties in the transfer of education gained through experience.

Fortunately the whole field of POE is beginning to be recognized as an important specialist skill for design professionals.

What we need, however, is a mental shift that drives every designer back to 'the scene of the crime' a year or two after

completion to see how the building is aging and whether the inmates are happy. There is a masterful reference available on POE; see *Resources* at the end of this Part 5.

Feedback & corporate memory

It is my personal view that the retention of what I call 'corporate memory' is one of the most important aspects of the education-through-feedback process for design professionals. It is the subject of the next chapter.

Chapter 5.1 Summary Checklist

- ✓ Process feedback, as an action to prevent repetition of past mistakes, is a requirement of both TQM and ISO 9000.
- ✓ The iterative process is either going in circles or a continuous improvement feedback loop, depending on where you are when you come around again.
- ✓ Flowcharting a process that could be improved is one of the best ways to discover the sources of the problem and point toward the solution.
- ✓ POE is necessary to complete the feedback cycle.