

# What Do You Really Want To Do?

## An Introduction to Function Analysis

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Whether you call it "black box thinking," "function analysis," or "the why question", challenging the problem statement is one of the most powerful of all creative techniques. Each method that uses this technique has its own lessons for problem solvers. As you learn to apply these various insights you will find yourself and the teams you lead more flexible and insightful in their creativity. Somehow, clearly separating the intention from concrete solutions makes the mind more effective and creative

### Function vs Object

In the field of Value Engineering, the function of something is what it does, not what it is. If one decides that the function of a coffee cup is to "transport liquid", brainstorming ways to transport liquid leads to more and more useful ideas than brainstorming ways to improve a coffee cup.

This "technique" has been widely recommended in various ways. In the field of Value Engineering, this "function analysis" has evolved to a very powerful tool, with various methods for making it more effective.

### Defining as Verb and Noun

One trick for function analysis is using a simple two word phrase, a verb and a noun, (doing something to something), such as resist wear, support shelf, inform customer, transport liquid. It also helps if you can verify when the function is being accomplished and even better when you can measure it, such as support weight (how many pounds) or transport liquid (how many gallons, how fast, how far). Also, more general verbs and nouns seem to encourage greater creativity.

### Basic vs Supporting

One of the first distinctions to emerge from Value Engineering was between what you were basically trying to do, and doing it better. The basic function of a car might be to transport the driver, but there are other supporting functions that many customers want such as fuel efficiency, comfort, safety, transporting passengers, transporting luggage, etc. For the basic function a motorcycle might be enough. So the difference in cost between your automobile and an ten year old motorbike is for comfort, safety, etc. Most of the cost of products and most of the sales power is in

### The Pendulum Swings

Construction specialists attempting to reduce the cost of a new corporate headquarters building, proposed replacing the atrium's 10 story spiral staircase with a 10 story brass pendulum. While it sounds like a crazy idea, suggesting executives sliding down the brass pole, the architect who designed the staircase was impressed. The owner was delighted and would have paid twice as much for the pendulum, but the cost was reduced by two thirds, saving half a million dollars.

While it would have taken quite a bit of creativity to think up this idea if the team had focused on reducing the cost of the staircase, the team had asked what the staircase was supposed to do. Realizing that the staircase was designed to impress visitors to the building, the team brainstormed ways to impress visitors, and selected the pendulum idea from a list of other good alternatives.

these supporting functions. Focusing on basic function often enables you to shift to a whole new paradigm. Supporting function creativity improves the existing design.

### **Functions have Functions**

Although a coffee cup may have as its function holding liquid, that function has a function, which is to transport the liquid. We do that to put the coffee into us. In order to stay awake. In order to do our job better. In order to make more money. In order to afford more stuff. In order to live a better life. And so on.

It is possible to build a linkage between any function of an object or activity all the way back to our intrinsic needs. This has sometimes been called the "Seven Why's," recommending that you ask "Why" repeatedly until you get the ultimate answer.

The advantage of this method is that you can get a better grasp on the problem. Is you choose a way to perform a function like hold liquid that does not allow a higher level function like transport liquid, you have an unusable idea. Also, problems solvers can look over this "Ladder of Abstraction" to choose the level of function at which to aim the creativity. It is rarely the highest or the lowest.

### **Why, not Why**

The question "Why" has two possible types of answers, **cause** and **intention**, which can cause real problems in applying this technique.

Applying creativity to getting your intention can be far more powerful than focusing on cause. This focus on cause has limited the success of many quality programs.

In a public seminar in India we invited people to share technical problems for the attendees to address. One engineer discussed the problems they were having plating a shaft in the transmission of a motorbike. The reason they were having trouble is because it was a complex process which plants knew how to do in Japan (where the design was done), but was outside the range of tooling and expertise in India.

When they looked at the intention, the plating was applied to resist the abrasion of the drive belt slipping on the shaft. It quickly became obvious that they could just make the belt less abrasive and eliminate the plating, and the quality problems along with it.

It is not that analyzing the cause never works, but so many people get trapped in cause analysis when there may be a much better way out.

### **The Black Box: Ignore How It Works**

This is very similar to "Black Box Thinking," a term that came about during World War II when pilots would ask how some new device worked, they were told: "Look, it's a black box. When you do this, it does this. You don't need to know how it works!"

As systems people designed systems, they found it quite useful to be able to specify systems components without worrying how to make them work, and using components designed by others without figuring out how they were designed. When they began to discuss the internal workings of a system component, they called it "white box" thinking.

### **Functional Fixation**

Years ago, a group of researchers discovered that many people have a tendency to strongly associate a thing to a particular use, or function, and, as a result have difficulty perceiving ideas which involve associating the thing with an alternative use. For example, people were placed in a room and asked to tie together two strings which were hanging from the ceiling. It did not take too long to discover that if you grabbed one string, you could not quite get close enough to the second string to grab it and tie it. The trick the experimenter expected was to tie a weight to one string, start it swinging, go over and grab the second string, wait for the first string to swing into reach, then tie them together. In the room was a pair of pliers, which had a near perfect weight for the problem. People who had been asked to use the pliers as pliers in a previous experiment were far less likely to spot this solution than the ones who had not had that association reinforced.