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Authors: Joseph A. De Feo

4.3. The Juran Quality by Design Model

Modern, structured quality design is the methodology used to plan both features that respond to customers' needs and the process to be used to make those features. "Quality by Design" refers to the product or service development processes in organizations. Note the dual responsibility of those who plan: to provide the features to meet customer needs and to provide the process to meet operational needs. In times past, the idea that product design stopped at understanding the features that a product should have was the blissful domain of marketers, salespeople, and research and development people. But this new dual responsibility requires that the excitement generated by understanding the features and customer needs be tempered in the fire of operational understanding.

That is, can the processes make the required features without generating waste? To answer this question requires understanding both the current processes' capabilities and customer specifications. If the current processes cannot meet the requirement, modern design must include finding alternative processes that are capable to meet the need.

The Juran Trilogy points out that the word "quality" incorporates two meanings: first, the presence of features that create customer satisfaction; second, freedom from failures regarding those features is also needed. In short, failures in features create dissatisfactions.

1. Removing failures is the purpose of quality improvement.
2. Creating features is the purpose of Quality by Design.

Kano, Juran, and others have long ago agreed that the absence of failures, that is, no customer dissatisfaction, may not lead us to the belief that satisfaction is thus in hand. We can readily conclude that dissatisfaction goes down as failures are removed. We cannot conclude that satisfaction is therefore going up, because the removal of irritants does not lead to satisfaction—it leads to less dissatisfaction.

It is only the presence of features that creates satisfaction. Satisfaction and dissatisfaction are not co-opposite terms. It is amazing how many organizations fail to grasp this point. Let's take, for example, the typical "bingo card" seen in many hotels. These are replete with "closed-ended" questions. For example, they ask, "How well do you like this on a scale of 1 to 5?" They do not ask, "How well do you like this?" This is the exact opposite of the question "How well don't you like it?" Therefore, any so-called satisfaction rating that does not allow for open-ended questioning such as "What should we do that we are not already doing?" or "Is there someone who provides a service we do not offer?" will always fall into a one-sided dimension of quality understanding. What, then, does a composite score of 3.5 for one branch in a chain of hotels really mean compared to another branch scoring 4.0? It means little. Their so-called satisfaction indices are really dissatisfaction indices.

So we arrive at the basic fundamental of what quality really is. As stated in **Chap. 1**, Universal Principles of Quality Management, the authors adopted a definition that Juran had postulated long before: "quality" means fitness for use, and we now have extended it to "fitness for purpose." Let's explore this concept.

First, the definition of "fitness for use" takes into account both dimensions of quality—the presence of features and the absence of failures. The sticky points are these: Who gets to decide what "fitness" means? Who decides what "purpose" means? The user decides what "use" means, and the user decides what "fitness" means. Any other answer is bound to lead to argument and misunderstanding. Providers rarely win here. Users, especially society at large, generally always win. For example, take yourself as a consumer. Did you ever use a screwdriver as a pry bar to open a paint can? Of course you did. Did you ever use it to punch holes into a jar lid so your child could catch bugs? Of course you did. Did you ever use it as a chisel to remove some wood, or metal that was in the way of a job you were doing around the house? Of course you did. Now wait just a moment ... a screwdriver's intended use is to drive screws!

So the word "use" has two components,*intended* use and *actual* use. When the user utilizes it in the intended way, both the provider and the user are satisfied. Conformance to specification and fitness for purpose match. But what about when the user uses it in the nonintended way, as in the screwdriver example? What, then, regarding specifications and fitness?

To delve even deeper, how does the user actually use the product? What need is it meeting for the user? Here we find another juncture: the user can create artful new uses for a product. For example:

> *2000 Uses for WD-40.*WD-40 was formulated years ago to meet the needs of the U.S. space program. Not many know the origins of the brand name. "WD" refers to water displacement, and 40 is simply the 40th recipe the company came up with. But as the product moved into the consumer market, all kinds of new uses were uncovered by the users. People claimed it was excellent for removing scuff marks from flooring. They claimed it could easily remove price stickers from lamps, inspection stickers from windshields, and bubble gum from children's hair. The company delighted in all this. But the company didn't release all those clever new uses for public consumption. People also claimed that if they sprayed bait or lures with it, they caught more fish. Those with arthritis swore that a quick spray on a stiff elbow gave them relief. Let's not go too far. What about use where the product obviously cannot work? In Latin there is a word for this: ab-use (abuse), where the prefix "ab" simply means "not."

Some examples will help: back to the screwdriver. You could argue that using the screwdriver as a pry bar, chisel, or punch is abuse of its original designed purpose. But clearly many manufacturers have provided a product that can withstand this abuse, and so use then falls back into the "intended" column (whether this came as a result of lawsuits or from some other source). Further, a look at commercial aircraft "black boxes" (which are orange, by the way), show that they clearly survive in circumstances where the aircraft do not survive. Understanding of use in all its forms is what modern design seeks to achieve.

Last, modern design and planning, as we see over and over, seeks to create features in response to understanding customer needs. We are referring to customer-driven features. The sum of all features is the new product, service, or process.

A different type of product planning in which features meeting no stated need are put out for users to explore is beyond the scope of this chapter. 3M's Post-it Notes and the Internet are examples where we collectively did not voice needs, but which we cannot imagine life without them, once we embraced their features.