Quality: Developing Process Metrics

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Abstract. This session will enable your ability to improve quality through process metrics. When one thinks of quality, it's one thing to measure widgets for conformance to a spec, but what if there is a need to measure a process? This session will introduce a simple matrix that can be very helpful in assisting individuals in their efforts to measure processes to improve quality.

Why This Topic? As if no one has really noticed, there just isn't as much manufacturing as there once was in the US. It appears that our economy is becoming more service oriented. As this shifting appears that it will continue for some time, we must make sure that we can measure the quality levels of service. Based upon first hand experience within a large service oriented company, it appears that this competency is not present on a wide scale.

Why Measure in the First Place? Most professionals are aware of the reasons we measure. We've heard the adage, what gets measured get fixed. There is truth in that statement. Most, if not all improvement models have provisions for measurement and analysis. Two models readily come to mind, the Baldrige National Quality Award, and ISO 9000.

The Baldrige National Quality Award (BNQA) actually has measurement and analysis showing up in multiple areas. It first shows up in section 4.1, Measurement, Analysis, and Review of Organizational Performance. It shows up again in section 6.1, Value Creation Processes. It shows up with a very strong presence in section 7.0, Business Results. As Baldrige is an end-to-end model, it is imperative that one be able to measure processes to satisfy the requirements of the criteria.

BNQA wants to know that an organization is measuring. But, they are not just after measurement for the sake of measuring. When they ask about determining the effectiveness of processes, they expect measurements here that are capable of showing that processes are indeed delivering value. At the end of the day, they want to see measurements coming together so that the processes that add value are delivering business results that are supporting the organizations strategy.

ISO 9000 has a section devoted to measurement and analysis as well, section 8. One particular sub-section, 8.2.3, Monitoring and Measurement of Processes, actually puts the certificate holder in a position to demonstrate that their "processes are capable of achieving planned results".

Typical views of processes will not enable this requirement of ISO to be met. With the statement, "processes are capable", they add a layer of differentiation that is being addressed in this paper. They start to create an expectation that one is capable of controlling a process, not just the output.

Process Discussion. To be able to control a process, there may need to be a shifting in mindsets. Many people think that a process is controlled by simply tracking the output of a process. Although valuable information can be obtained by tracking the output, this does not control the process.

A process is designed to facilitate a deliverable on a repeatable basis. A process is a roadmap to success, giving knowledgeable individuals the important steps at arriving at a deliverable.

A process is designed for repeatability. If situations come up that impact repeatability, one must be able to respond, and make changes as necessary. More often, emphasis is placed on a process output than upon the individual process steps. If all of the emphasis is placed on the output, how does one know what part of the process needs to be addressed?

There are two fundamental aspects of processes and their associated outputs. First, process output quality can not be mandated. Regardless of how hard senior management tries to will something to happen, to see improvement in a critical metric, it will not happen. Management needs to understand the other fundamental aspect, that processes are not controlled by tracking the output of a process.

Simply tracking a process output is not demonstrating control over that process. Tracking a process output is beneficial. It lets one know if progress is, or is not, being made toward meeting a goal. At times there appears to be this dream state associated output tracking. If we do a better job of tracking the critical measures, they will get better. Figure 1 gives a depiction of this traditional notion.

Figure 1.

It isn't until one understands that a process consists of steps that are executed that improvement can take place. Once this understanding is achieved, then one can start to understand that processes are controlled by controlling process steps. If control is put on the process steps, the quality of the output will follow. Figure 2. shows a depiction of this concept.

Figure 2.

Once it is clearly understood that execution of process steps will control output quality, then one can start to understand that output quality will never exceed the quality level of the process steps. Then, with this understanding in place, one can start to determine the relationship between process steps and the process output. This is typically done through correlational analysis.

Metrics Identification Techniques. So, how does one identify metrics associated with the process steps? Keep in mind, identified metrics should:

- be controllable
- should help with business decisions
- should drive change

The tool that will be presented is a simple matrix. The matrix is shown in Figure 3.

Section	Item	Discussion	Measure

Figure 3.

The Section cells capture the specific location within the document that is being measured. This simple gives traceability to the metric. It will expedite the location of any given metric. This is a simple step that is often overlooked.

The Item cells will be populated by that which will be measured. This is typically part of a noun/verb relationship. For example, this is where measurements can be taken on the person executing the process step. The contents relate to whether or not a task is done correctly. This will give insight as to how well a process step is, or is not, working.

The Discussion section is the "so-what" behind each measurement. This is where we state what we are going to do with each measurement. This is often overlooked as many metrics end up being generated that have no relationship to the process or to the output. This is where we document the benefit of having the metric, and potentially what will be done when this metric starts going in the wrong direction.

The last section to populate is the measure. Don't loose sight of the fact that metrics are derived from data. There are instances where process data can be a metric. There may be more benefit gained from taking multiple data elements, conducting a mathematical computation, and deriving a metric. Metrics many times are more insightful than simple datapoint metrics.

This section is critical as it facilitates the reproducibility and repeatability of the metric. This section can capture the data system, data owner, the numerator, and the denominator. This is the section that enables continuity of the measurement system.

Wrap-up. In conclusion, don't loose sight of the fact that process measurement precedes process improvement. Also, don't forget that a process outlines instructions. The way in which these instructions are followed can be measured.

When one starts, start simply. Don't try to "boil the ocean". Stay focused to differentiate between the vital few and the trivial many.

References

Baldrige National Quality Award program, *Criteria for Performance Excellence*, 2005

International Organization for Standardization, *Quality Management Systems – Requirements*, 9001:2000