STATEMENT OF WORK

4

Assignment 4

CSE 6329-002 – Spring, 2018

**DMAIC and Root Cause Analysis**

**Summary**

The purpose of this assignment is for you to learn how to use the DMAIC method and, in particular, root cause analysis to find the underlying cause(s) of a quality or productivity problem and to identify solutions. The problem is as follows: the customer is complaining that **software failures are occurring more often** than in the past and these **problems are taking too long to fix**. This is causing some customers to switch to a different software provider, so company management is very concerned about this problem. **There are ten Supplementary Handouts (SH1 – SH10) that provide further information.**

## Supplementary Material

There are a number of supplementary handouts (SH1 – SH10) related to this assignment that describe various facts that have been gathered about the problem. Part of your job will be to examine this material and form an understanding of the processes used to develop and maintain the software (to respond to customer problems).

## Overview of work to be performed

A DMAIC plan has been developed and is in the midst of being performed (see separate template). Your job is to continue that plan, completing key elements of the Define, Measure, Analyze and Improve steps and placing them into the template. From the information contained in the supplementary material you will define what’s most important to the customer in the form of two CTQs (critical to quality measures). To measure these things you will describe the software customer support process in the form of a swim lane diagram. To analyze you will do a root cause analysis and develop a causal model of what factors contribute to the problem. You will identify the three most important root causes and do a more detailed flow analysis of three sub-processes - those most directly related to the three causes. (Note that the root causes and related sub-processes may be from any part of the organization.) Finally, you will suggest improvements (eliminating waste, improving value added, reducing excess work in process, and all the other concepts discussed in this course).

The class notes provide an introduction to root cause analysis techniques as well as information on the DMAIC process, causal models, cycle time reduction, value added, and other such concepts. Further details about root cause analysis techniques can be found in Andersen.

A separate template file contains the current draft of the DMAIC plan that has been developed for this situation. Your job will be to complete the indicated sections of that plan. The plan has the following file name:

**A04 CSE6329 2018sp - DMAIC Template.docx**

**1.0 Work to be Performed for This Assignment**

* 1. **(DEFINE)** Identify two ***CTQs*** (critical to quality measures) that measure the factors most important to the customer. Explain exactly what you will measure for each – the base measures and compound measures required. Hint: these may be used in your final recommendation to assess the effectiveness of your suggestions for improvement.
  2. **(MEASURE)** Explain the process involved in responding to a customer problem. Do this by describing the ***process flow*** using a ***swim lane diagram***. You may also use other diagrams such as flow charts or control flow diagrams. The swim lane diagram should **show all the organizations and people** involved in responding to and correcting a customer problem and the time required for each step, thus showing the overall time line. Here are the recommended steps for doing this:
     1. **Organizations.** Examine all of the handouts to identify all of the people involved, what organization they are in, and what role they each play in the process. Produce a simple table listing each organization or role and summarizing what each of them does.
     2. **Process Flow.** Determine the order in which things happen and the dependencies. This may be done with a control flow diagram or flow chart.
     3. **Process Flow.** Use the information gathered to produce a swim lane diagram.
     4. Analyze the diagrams to determine places in the process where there are delays (excess work in process), work tasks that do not add value or that constitute unnecessary rework, excessively complex processes, and other factors that affect quality, cost or cycle time. You will use this information to help with the ANALYZE step.
  3. **(ANALYZE)** Use ***two or more of the techniques*** discussed in the class lecture on ***root cause analysis*** (or you may use other techniques discussed in Andersen) to ***analyze the various possible causes*** and reach a conclusion about what are the root causes of the customer’s problem. 
     1. There should be at least three causes that you consider to be a root causes, although you may find more than three. Some of these causes are likely to be more important than others. You should discuss the order in which these things should be addressed and which ones should have the biggest impact.
     2. In doing this analysis, you are not limited to the customer support process described in the swim lane diagram. For example, if you determine that the root cause is in another part of the organization’s process, that’s fine.
  4. **(ANALYZE)** Produce a ***cause map (causal model)*** showing all factors that contribute to the customer’s problem. This will include all root causes and all intermediate steps leading to the problem.
  5. **(ANALYZE)** Identify the ***three most important root causes*** and, for each, produce a ***flow diagram*** of the sub-process that must be improved to fix that root cause. The sub-process may be part of the customer support process or may come from another part of the organization’s overall process. See handout SH10 for an example of how to draw a sub-process.
  6. **(IMPROVE)** Explain your ***recommendations*,** based on your assessment of the problem and analysis of the root causes. You may explain improvements in words and should also show how you would change the flow diagrams identified in the previous step. See handout SH10 for an example of how to show your recommendation for changing a sub-process.

**2.0 Hints**

It is not necessary to use any statistical analysis techniques for this assignment, but you are free to do so if you wish.

**3.0 Deliverables**

**3.1** You will turn in a single Word file containing your DMAIC plan/status report. The file name will be:

**A4 CSE6329 2018sp - DMAIC last first.docx**

In other words, replace the word “template” with your last and first names (if you are working with a team mate, show the last name and first initial of teach team member, in alphabetical order). Note that all diagrams, flowgraphs, etc. should appear in the DMAIC plan. However, if you must reduce the size in order to make it fit on one page, see the next deliverable.

**3.2** You may turn in a zip file containing all the diagrams included in the report in their full resolution, if you found it necessary to reduce their size to fit on one page in the DMAIC document. This will enable us to examine these diagrams more closely, if necessary. The file name will be:

**A4 CSE6329 2018sp - Diagrams last first.zip**

You may draw these other diagrams in Word, PowerPoint, or any other tool you find convenient.

***NOTE: This is the ONLY time in this course where you may turn in a zip file as part of an assignment, and this zip file is optional – use only if you have a large diagram to submit.***

***REMEMBER TO PUT COMPLETE THE COVER SHEET [first page of the template]***