

IMPROVEMENT SKILLS CONSULTING LTD.

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*“Simply, improvement...”*



# Managing by Numbers: Statistical Thinking

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*“There are lies, damned lies and statistics”. [B. Disraeli]*

## Data Rich – Information Poor

Most organisations are overwhelmed by data, some of which gets analysed and turned into more useful reports, but all too often senior and front-line managers simply don't have the skills to get real insight from the data.

Perhaps some managers are “scared of the maths”, others may not have the time and yet others may not see data analysis and interpretation as part of their role. Add to that the manipulation of data by the media and the political spin put on “official statistics” and it's no wonder managing by numbers gets a bad press.

The good news is that you don't need to be a mathematical or statistical genius in order to get real insight from data. There are some well-established techniques that can help managers, at all levels, get more value out of data and enable them to make better quality decisions.

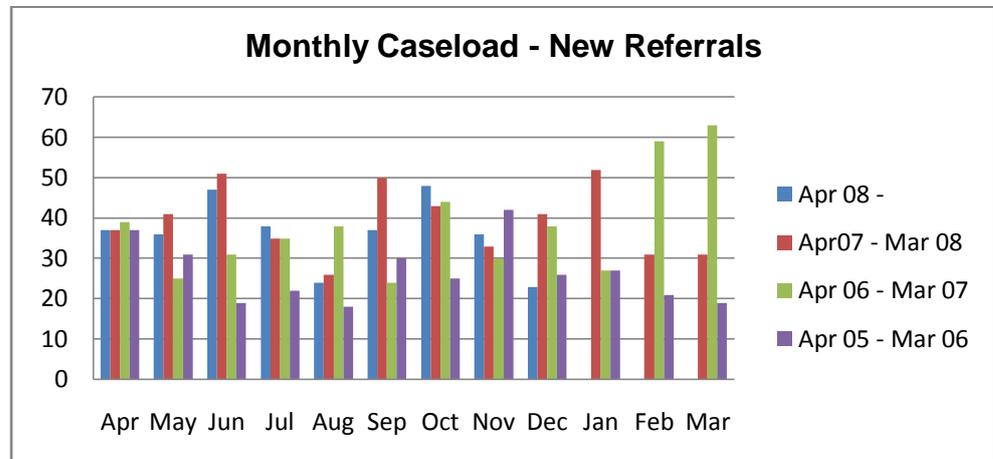
In some service organisations these skills may be learned as part of an implementation of Six Sigma, or (increasingly) Lean-Sigma. Many manufacturing organisations will, however, have been applying Statistical Process Control (SPC) for many years in their production areas and it's a natural step to adopt SPC in managing the business and support functions.

In this article we want to introduce the use of Control Charts; one of the basic tools to help managers understand and improve performance. We'll use an example from a recent assignment.

## Example: Is our workload increasing?

Senior managers at a client asked us to help them understand why the workload in a particular team was increasing (at least that was their perception of what was happening).

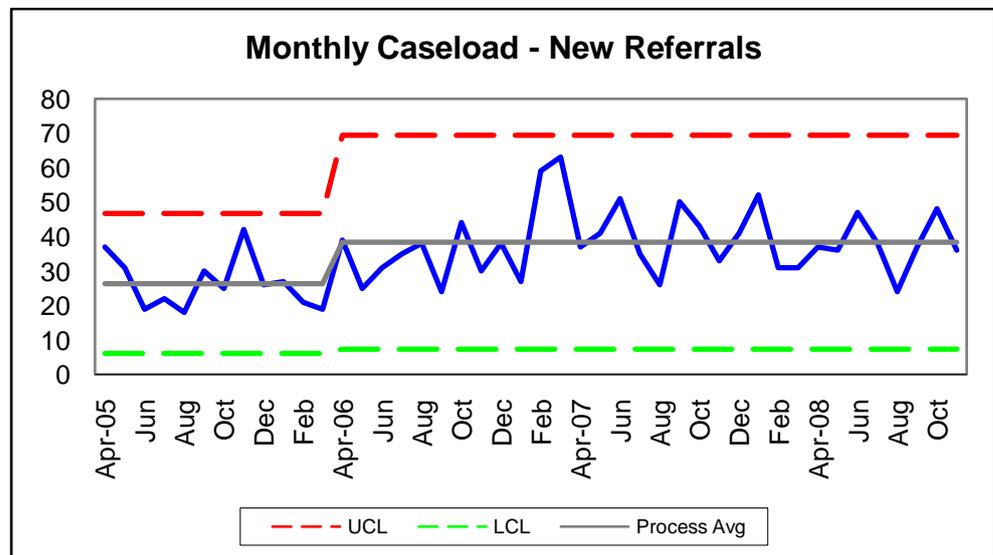
We were presented with nearly four years' worth of data which managers would typically present in a bar chart, as below.



So, what can you conclude from that? Probably not a lot! You might say that the caseload appeared to increase throughout 06-07, but that was 2 years ago and it's difficult to say that it's still increasing.

If you want to understand any trends in "time series data", you have to use line graphs ("Run Charts" in SPC terminology). Better still; an SPC Control Chart will highlight the real variation in the process.

We've presented the same data as a Control Chart below:



This shows the process average during 05-06 was 26 and from April 06 onwards was 38. Interestingly, there was almost twice as much variation in the process after April 06, as shown by the increased width of the Upper and Lower Control Limit lines (UCL, LCL).

So, there is no evidence that the caseload is increasing, despite management's perceptions. There was a change at the beginning of 06-07 and it is known that new legislation was implemented at that time and this caused the increase in caseload, which has subsequently stabilised at a higher monthly level.

This is just one simple example where, if the right statistical tools are used, management can gain much more insight into the performance of the organisation and, potentially, avoid making the wrong decisions. In this case, there is no justification for changing staffing levels to cope with the caseload.

## What is SPC?

SPC enables a judgement to be made about whether or not a process is in statistical control, and therefore to determine whether or not to take corrective action. It is used to improve performance by reducing process variation. There are two types of variation:

- Common Cause
- Special Cause (or assignable cause)

Common Causes are numerous and always present. Cumulatively, they produce a stable, repeatable and predictable pattern of variation in the output of a process. The level of common causes can usually only be reduced by making major changes to the process itself; i.e. they are within the control of management. They include factors such as the capability of equipment, the level of training given to staff, and the choice and specification of paperwork/materials used in the process.

Special Causes arise from time to time, with an unstable and unpredictable pattern. They are however, often within the control of staff or work-teams, for example in setting up and following procedures, using the correct paperwork or information. They generally only affect a minority of people, equipment, procedures or materials.

A Control Chart is the main tool used in SPC to give a visual representation of process performance based on data collected from the process. It is an important tool in SPC and helps to identify statistically significant variation in the process so that corrective action can be taken.

The Control Chart provides guidance on when to take action (thus avoiding the possibility of allowing errors to be produced) and when not to take action (thus avoiding the possibility of over-adjusting or over-reacting). At its simplest, when data points fall between the two Control Limits it means the process is showing Common Cause variation. Data points falling outside these limits mean Special Causes have occurred. There are also some rules about patterns of data points which can also indicate Special Causes are present.

## Improving performance

There are only two ways to show that performance has improved:

- Either the process average has changed (moved higher or lower), or
- The process variation has reduced (the UCL & LCL lines are closer together)

If you can't show one or other of these, then you can't say that performance has improved!

So, management's task is to challenge Process Owners and operators to change the level of performance and/or reduce the amount of variation. Simple.

## Our track record

If you have lots of performance data but not much "insight" and are uncertain whether or not you are improving things, we can help.

Our consultants have been helping organisations in the private and public sectors to manage and improve their processes for nearly two decades. We have supported European Quality Award winners in their approach to process management.

We are not wedded to a particular methodology. We help clients identify their improvement goals and then develop an approach to achieve these; invariably ensuring their people develop the skills to make further improvements themselves.

Please contact us for more information about how we can help you to manage and improve your processes, based on managing by numbers and statistical thinking.

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