We have a Problem!

How often do you hear the above statement in your working life?

However, ‘problem’ can mean different things in different situations:

- is it that something unusual has happened when you were least expecting it, leading to consequences that must be dealt with now?

- it has been discovered that a competitor’s product is considered to be far superior. Your product or service functions as designed; it is simply no longer good enough for your customers.

- You need to create a new approach to your products or services in order to make a significant leap forward

- It may simply be that a decision is required. You are at a crossroads and face several options.

Thus the word ‘problem’ can have many meanings.

…….and yet we use the single word.

Why worry about one word? After all, we understand the context and deal with it.

There is a common thread to all ‘problems’, no matter what type – we need them removed and overcome.

By looking at the context of the ‘problem’ we can see that there is a relationship with time:

PAST – things gone wrong with current processes

PRESENT – the current process needs to be improved or a decision needs to be made

FUTURE – problems need to be prevented permanently

It is of interest to see where many business people spend their time. Some years ago it was discovered that engineers spent 80% of their time solving ‘things gone wrong’ and even more alarming, more than 50% of this time was spent solving things that were thought to have been solved. That is they were working on issues that should have been dealt with in the Past.

This leaves only 20% of their time for Present and Future issues. If a business is to move forward the Past must be dealt with to allow more time for Present/Future issues. The survey also found that in companies like Toyota and Honda, the use of time is reverse with only 20% of time being used on Past issues.

In the Six Sigma arena, it would typical of a business operating at a two/ three-sigma level to find most of its time spent putting out fires. Fires would be less prevalent for a four-sigma company allowing more time for dealing with moving a process forward. At the five-sigma level it is rare to experience a fire, processes are often best in class and a real change in thinking is required to move forward to achieve the elusive six-sigma level.

In the arena of business improvement, tools have been developed to deal with specific types of problem. Use the wrong tool and the 'problem' may be with you for longer than you would like.

Type of problem			Tools
Deviation from expectation. Cause unknown	**PAST**	**Correction**	Kepner Tregoe, G8D, R.I.S.E
Functionality/ performance of a product/process needs improving	**PRESENT**	**Improvement**	Design of experiments/ Six Sigma/ Ishikawa tools
A decision has to be made from several alternatives	**PRESENT**	**Decision**	Decision Analysis
Creativity needed to move forward	**FUTURE**	**Invention**	TRIZ – Theory of Inventive Problem Solving

Correction

'Felix qui potuit rerum cognoscere causas'
'Happy is he who can find out the causes of things' (Virgil)

Despite Engineers spending much of their time correcting 'things gone wrong', we live in a culture that are often poor at solving correction type problems. The reasons for this are:

- Incorrectly describing the problem
- A quick fix mentality
- No logical process
- Poor team participation
- Not identifying the real root cause
- Solving the 'wrong' problem
- Management impatience
- A lack of documentation
- Poor implementation of the solution

The key to good problem solving is a clear definition of the problem. Having such a definition some would say takes you half way to solving the problem. Poor definitions mean teams get sidetracked or the wrong problem gets addressed.

This is true even for project management where the acronym SMART starts with the need for a specific (S) objective.
Problem solving is fire-fighting and as a result places people under pressure. This can lead to the demand for a quick solution. These can sometimes be found, the symptoms disappear and everyone relaxes and walks away from the problem only to see the situation reoccur. It has been said that if you have people who are good fire-fighters in your organisation then get rid of them, because as long as they are with you there will always be fires. The result of good problem solving is that the fire is dealt with once and forever. That is the aim is for prevention. Unfortunately it is the fire-fighters who get the reputations not those who prevent fires.

Another way of looking at a correction situation is recognising the difference between Special Cause and Common Causes of variation.

Special Cause – sporadic, non-predictable events

Common Cause – present all the time, predictable

In the case of something gone wrong and we don't know why we are looking at Special Cause events.

It may be when something goes wrong that experience will quickly identify the root cause and it can be removed. However, it is often the case with some people who claim to be 'good' problems solvers that their methodology is somewhat hit and miss. They try one thing after another, hoping something will remove the symptoms. And sometimes it does. However, in many cases where the root cause is unknown there are better methodologies than simply guessing.

A popular technique is that of Five Whys. Simply put, once the problem has been defined, ask 'why' continually and the root cause will be revealed. In some cases this will work but often when the cause is unknown the answer to 'why' is 'don't know'.
At this point some would revert to a Cause and Effect diagram to identify all the possible causes of the problem and therefore suggest what might be the root cause. But faced with many possibilities this route may not be as decisive as the problem solver would like.
Once the simple routes have been exhausted then a more robust methodology like that of RISE can be very powerful.

RISE

RISE represents the four major steps in solving problems:

Recognition - What is the problem?
Investigation - Find the root cause
Solution - Fix the root cause permanently
Evaluation - What learning can be transferred elsewhere?

Once the problem has been clearly defined then data is collected.

It is said, in Physics, that anything can be described by four parameters:

Identity, Location, Time and Mass.

In RISE, the equivalents are:

What, Where, When and How Big

Answers to specific questions in each of these sections, lays the foundation for good problem solving. This is the start of creating a problem profile. Within this profile a boundary to the problem needs to be established.

Creating the boundary allows a comparison of what happened inside the boundary with that outside. If things that are unique to being within the boundary then the search for a root cause is narrowed. The next stage is to look at whether any changes have occurred for those things that are unique. Things that have not changed cannot be the root cause of this problem. Something must have changed otherwise the problem would not have appeared. At this point the problem solving team will have only a few changes to consider, and so the team can then use their knowledge to produce theories as to how the identified changes could have caused the problem as defined. This is a danger point where individuals can get fired up about their theory and are desperate to see if they are correct. If not restrained, at this point, then the whole team will fragment as each chases their own theory. This can be avoided by testing the theory against the facts. It soon becomes clear that although sounding plausible some theories simply do not match the facts. These can be put to one side whilst more likely theories are considered. Once potential theories have been identified then it is important that the theory is verified. The danger if there is only one theory at this stage is that people start to develop solutions and the theory may not be correct.

Verification will lead to one of two possible results:

1. the theory is verified. The root cause has been found.
2. the theory is not true. If verification delivers no root cause then the team must go back to the data.
    a. Could a theory be modified to better fit the facts?
    b. Are multiple rather than single causes?
    c. Has any new data come to light?
    d. Is the original data correct?

RISE has been used in many diverse and complex problem situations. There have been no occasions in the use of this methodology when a team has failed to reach the root cause, often at a time when all seem lost.

The key to the methodology is good data and identifying boundaries and changes.

A very simple example, of applying the RISE thinking, took place late one summer in my house.

My daughters came to me and claimed that the television was giving a poor picture. The set was five years old, had worked perfectly during that time and so it was unusual to have a poor picture. My daughters saw this as an opportunity to press for a new widescreen TV with surround sound. Not to be pressured I pointed that since we were in the middle of a thunderstorm then it was most likely that the reception had been affected. The thunderstorm passed, the picture was good again. The bank balance was spared.

However, a week or two later the same event happen – poor picture but this time there was no thunderstorm. I tried to convince my daughters that the storm, although not overhead, must be in the vicinity of the transmitter. They were not convinced; this had to be the time for a new TV. Applying problem solving thinking, I sought for the boundary. I suggested that my daughters turned the portable TV on that they had in their room on. Did this have a good picture? To my relief, the picture was also poor. So it cannot be the main TV that is the cause of the problem. The problem went, but only to reappear several times during the next week. The thunderstorm explanation couldn't keep being the explanation. So I asked my daughters whether they had noticed anything that was different when the TV reception was poor. After some time my younger daughter said that she had noticed that, when the picture was poor, the light was on in the study. What had the study light to do with TV reception? Well, the aerial passed over the study ceiling. This led to theories – perhaps the lighting wire had been moved alongside the aerial and when switched on caused interference. Verification was needed. Unfortunately, the two wires were some distance apart. Theory failed. At this point I asked myself what had changed in on or around the study lighting circuit. One thing I identified was that back in Spring I had decorated the room and had changed the light fitting. When I investigated the light fitting I discovered that the person who had put the TV signal booster in the house had used this light as the power source for the booster. When I had replaced the light fitting I had accidentally wired the booster such that when the light was on, the power to the booster was off, when the light was off, the power flowed to the booster. Why did this situation not appear before? As the nights became darker then the light in the study was turned on, something that had been unnecessary in the spring and summer.

A simple example but I would never have identified the root cause without the application of RISE thinking.

Improvement

There is much written about process improvement and it is often referred to as problem solving. I would prefer to keep the term problem solving for Correction and Special Cause problem solving using tools like RISE.

Process improvement is dealing with the present. The process has not gone wrong it simply needs to be better. Six Sigma addresses the issue of improvement very well using its DMAIC model. (RISE and PDSA (Plan, Do, Study, Act) could also be the steps for improvement).

D	Define	What is important?
M	Measure	How are we doing now?
A	Analyse	What are the opportunities for improvement?
I	Improve	What needs to be done?
C	Control	How do we guarantee performance?

Although a lot of Six Sigma training involves statistical methods, much of it has very specific usage and therefore may have limited use. The majority of processes can easily be improved using the simple tools (Pareto, Histogram, Run Chart etc) with some Lean thinking (identifying waste, value and non-value adding activities). Allied Signal reported that 80% of their early projects only required the simple tools.

An important factor in Six Sigma is the need to base decisions on facts and so data collection (Measure) plays a major part in the improvement process.

There are occasions when statistical methods can bring a great deal of insight into the process and possibilities for improvement. Design of Experiments is one such technique and it only appears to be ignorance of the methodology that stops a wider use of it. As organisations improve then the more complex methods start to be required.

A clear emphasis in the DMAIC model is that of the last step, Control, which emphasises the need to bring the improvement into the organisation and set up a mechanism to maintain the gains. (See also Evaluate in RISE). Some have gone beyond the ‘C’ and added ‘T’ for Transfer, to remind people that the greatest gain is not simply by improving the current process but by transferring the knowledge to other areas.

A danger of Six Sigma is that all improvement is seen to be a Six Sigma project and opportunities for smaller improvements are ignored in the drive to impact the bottom line.

Six Sigma has proved to be a powerful way of delivering and sustaining improvement.

Decision making

One of the ‘present’ tasks that management are called on to perform is that of taking decisions. Whenever a person reads their morning ‘mail’ they are faced with decisions. Some of the items may require immediate action, whilst others may need attention at a later date. This requires some sort of prioritisation. Priorities should be established in a way that reflects the impact of the issue on the organisation, the date by which it should be started or completed, and the consequences if no action is taken.

These three items should be scored as High/Medium or Low.

Issues that have high impact, are urgent and have serious consequences should be tackled first. (i.e. High, High, High). The rest of the situations should be addressed in their overall priority.

Where decisions could have a high impact on the organisation and there are several options for which there is no one clear choice then a formal decision making process should be employed.

As with Correction and Improvement it is necessary to have a clear and precise statement that describes the purpose and any constraints that must be observed. The next step is to list the criteria that need to be satisfied by the decision. If these are not satisfied then there is no point in going in that direction. Then, a list of the things that one 'would like' should be considered. These will become the differentiators of the options that fulfil the criteria that must be satisfied.

These 'would like' items can be ranked in terms of their importance since not ever item would have the same desirability.
At this point all possible choices can be assessed against each other with respect to the 'would like' criteria. The result would be an overall score indicating which option(s) best fit the identified criteria.

Creativity / Innovation

The steps described so far are formal in their application. There may be a time when creativity is required to help the organisation leap forward. Certainly the concept of Brainstorming can help here but this may be limited to people's knowledge and background. A relative newcomer to the area of creativity is that of TRIZ or The Theory of Inventive Problem Solving. In this case the 'problem' is not one of correction but of identifying possibilities in order to make new discoveries.

TRIZ was developed by a Russian, Genrich Altsheller, who looked at thousands of patents and identified a set of common ideas.

It is interesting that in the solutions proposed for correction and improvement the optimum solution is sort but this is only found after some compromise is reached. TRIZ looks at ways of achieving both requirements rather than creating a compromise. This often results is a radical new approach to design.

Summary

'We have a problem' may well be a common phrase but unless we understand exactly what sort of 'problem' are we faced with then the wrong approach may be taken. For correction the RISE methodology should be used. For improvement, Six Sigma is especially powerful and for innovation the application of TRIZ can lead to the development of unique solutions.

The key to success is to deal with the PAST, improve the PRESENT releasing resources to concentrate on the future.

Get the tools right and problems may become a thing of the past.