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Top Ten 2020 Skills Project

SKILL 1 - COMPLEX PROBLEM SOLVING

Identifying a complex problem

1. Complex Problem Solving

SKILL 1 - Complex problem solving

Identifying a complex problem

- Aim: Look at how you start to solve a complex problem
- Objectives
  - Understanding complexity
  - Identify a problem/problems
  - What is causing the problem/s?

- Content
  - Understand what complexity means, not a simple answer and one that needs analysing through a process.
  - Identifying the nature of the problem; defining the problem
  - fact-finding methods and to developing a clear picture.

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“Problems are only opportunities in work clothes”

Henry Kaiser (American industrialist)

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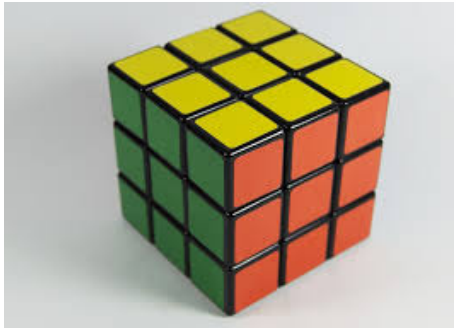
Having good, strong complex problem solving skills can make a huge difference to your career.

Problems are the centre of so many work environments:

- Problem for a client (internal or external)
- Supporting people who have problems
- Discovering new problems to solve

The problems can be large or small, simple or complex, and easy or difficult.



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What is complexity

When a problem is simple, the solution is easy. But when you can not identify the solution quickly then the problem is complex

So what is complexity?

In the Cambridge dictionary the definition of complexity is

"The state of having many parts and being difficult to understand or find an answer to."

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Understanding Complexity

What happens when the problem is complex, you will need to untangle the problem. There are many ways you can do this, but one of the best ways is to visualise the problem. Some of the best methods of visualising the problem are:

- Affinity Diagrams
- Cause and Effect Analysis
- Flow Charts
- Drill Down

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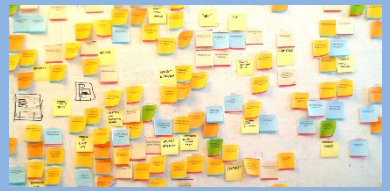
Affinity Diagrams



Japanese anthropologist Kawakita Jiro originally developed the affinity diagram – also known as the K-J Method or the affinity chart – in the 1960s.

It works on your organising Information and Ideas Into Common Themes, then hopefully you will see connections.

Step 1: Ideas on sticky notes

Step 2: Sort Ideas Into Themes

Step 3: Title Themes

Step 4: Develop Solutions

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Cause and Effect Analysis

Cause and Effect Analysis was developed by professor Kaoru Ishikawa, a pioneer of quality management, in the 1960s.

The diagrams created are known as Ishikawa Diagrams or Fishbone Diagrams.

It works on trying to find out the likely cause of the problem/s and put it down as line diagram.

Step 1: Identify the problem

Step 2: Highlight the factors Involved

Step 3: Identify possible causes

Step 4: Analyse the diagram

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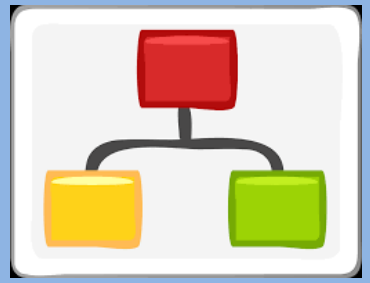
Flow Charts



Flowcharts were 1st used in the 1920s and ‘30s. In 1921, industrial engineers Frank and Lillian Gilbreth introduced the “Flow Process Chart” to the American Society of Mechanical Engineers (ASME).

Flow charts are diagrams showing the sequence of events.

Step 1 : Identify the problem

Step 2: Work through the sequence of events that might be causing the problem

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Drill Down

Drill Down is a simple way of breaking down complex problems into smaller parts.

Step 1 : Write the problem on the left-hand side of a large sheet of paper.

Step 2 : Write down the points that make up the details of the problem, ie. factors contributing to the problem. This process is called 'drilling down."

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Define the problem/s and what is causing the problem/s?

The biggest step is really *identifying what the actual problem is*, the problem actually could be a range of issues.

So you need to look at ways of defining the problem/problems.

Good problem definition is identifying the problem, not the symptoms.

Example, if a department performance is poor, you might think it is a problem with the individuals doing the work. If you examine further, the real issue might be a lack of training, or unreasonable workload. It is important to look at the problem from all angles and not jump to conclusions.

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There are many ways to help people identify the problem and the real cause. You need to look at the sort of questions that should be asked and below are a two techniques:

5 WHYS

ROOT CAUSE ANALYSIS

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5 WHYS

Sakichi Toyoda, the founder of Toyota Industries developed the technique in the 1930s.

5 Whys can be used for troubleshooting, quality improvement and problem solving, but it is most effective when used to solve simple or moderately difficult problems. When used for very complex problems it can lead to over-simplification.

This simple technique can often lead you quickly to the root(s) of a problem. The simplicity allows flexibility, and when combined with other methods can really help people identify the problem.

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5 WHYS

7 steps to the 5 whys

Step 1. Assemble a Team, Get people together.

Step 2. Define the Problem, See the problem, discuss it together and write a brief, clear problem statement that you all agree on.

Step 3. Ask the First "Why?", Ask the team why the problem is occurring

Step 4. Ask "Why?" Four More Times, With your 1st answer, ask four further "whys" in succession.

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5 WHYS

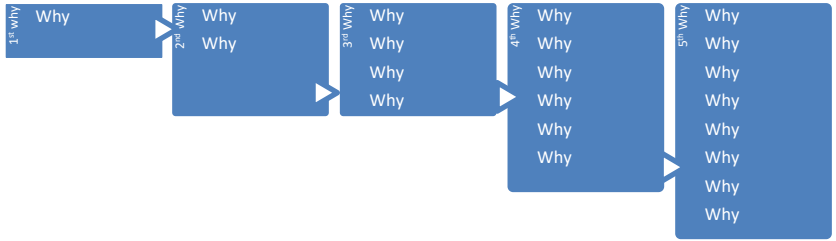
7 steps to the 5 whys (cont)

Step 4. Ask "Why?" Four More Times

There might 2 routes:

Single whys, when one answer

Multiply whys, for multiple answers



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5 WHYS

7 steps to the 5 whys (cont)

Step 5. Know When to Stop

5 Whys is really just a "rule of thumb". In some instances, you may need to go on and ask "why?" before you get to the root of the problem. In others, you may reach this point before you ask your fifth "why?", be careful that you've not stopped too soon, and give "knee-jerk" responses.

Do not stop asking "why?" until useful responses stop.

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5 WHYS

7 steps to the 5 whys (cont)

Step 6. Address the Root Cause(s)

After the 5 whys hopefully you have identified at least one true root cause; you need then to discuss and agree an action plan.

Step 7. Monitor Your Measures

Final step is to monitor the plan.

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ROOT CAUSE ANALYSIS

Root Cause Analysis (RCA) is a method to help people look at why the problem occurred in the first place. A sequence of steps to find the real cause of the problem.

So you need to consider:

- What happened.
- Why it happened.
- How to reduce the chances of it happening again.

RCA assumes one action in one area triggers an action in another, and another, and so on. By tracing back you can find out how it started.

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ROOT CAUSE ANALYSIS

Usually we find three basic types of causes:

- Physical
- Human
- Organisational

RCA looks at the causes. This often means that RCA reveals more than one root cause.

RCA has five steps to the process.

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ROOT CAUSE ANALYSIS

5 steps to the RCA

Step 1. Define the Problem, See the problem, discuss it together and write a brief, clear problem statement that you all agree on.

Step 2. Collect the data, Ask what proof there is of the problem? How long has the problem existed? What is the impact of the problem?

Step 3. What the cause might be, Identify possible causes. What led up to the problem? What conditions cause the problem to occur? What other problems surround the main problem?

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ROOT CAUSE ANALYSIS

5 steps to the RCA (cont)

Step 4. Identify the Root Cause(s), Why does the cause exist? What is the real reason why the problem occurs?

Step 5. Recommend Solutions, What can you do to prevent the problem from happening again? How can the solution be implemented? Who will be responsible for it and the risks?

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Conclusion

Complex problem solving is a skill, it leads to a number of steps to find a final solution for the problem. One of the best ways to help is to create a checklist like a CATWOE list:

C = CUSTOMERS Who benefits from it	A = ACTORS Who is involved	T = TRANSFORMATION What is at the centre	W = WORLD VIEW Bigger picture
	O = OWNER Who owns it	E = ENVIRONMENT Constraints	

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