Cause and Effect Analysis
Identifying the Likely Causes of Problems

(Also known as Cause and Effect Diagrams, Fishbone Diagrams, Ishikawa Diagrams, Herringbone Diagrams, and Fishikawa Diagrams.)

When you have a serious problem, it's important to explore all of the things that could cause it, before you start to think about a solution.

That way you can solve the problem completely, first time round, rather than just addressing part of it and having the problem run on and on.

Cause and Effect Analysis gives you a useful way of doing this. This diagram-based technique, which combines Brainstorming with a type of Mind Map, pushes you to consider all possible causes of a problem, rather than just the ones that are most obvious.

About the Tool

Cause and Effect Analysis was devised by professor Kaoru Ishikawa, a pioneer of quality management, in the 1960s. The technique was then published in his 1990 book, "Introduction to Quality Control."

The diagrams that you create with are known as Ishikawa Diagrams or Fishbone Diagrams (because a completed diagram can look like the skeleton of a fish).

Although it was originally developed as a quality control tool, you can use the technique just as well in other ways. For instance, you can use it to:

- Discover the root cause of a problem.
- Uncover bottlenecks in your processes.
- Identify where and why a process isn't working.

How to Use the Tool

Follow these steps to solve a problem with Cause and Effect Analysis:
Step 1: Identify the Problem

First, write down the exact problem you face. Where appropriate, identify who is involved, what the problem is, and when and where it occurs.

Then, write the problem in a box on the left-hand side of a large sheet of paper, and draw a line across the paper horizontally from the box. This arrangement, looking like the head and spine of a fish, gives you space to develop ideas.

Example:

In this simple example, a manager is having problems with an uncooperative branch office.

Figure 1 – Cause and Effect Analysis Example Step 1

(Click image to view full size.)

Tip 1:

Some people prefer to write the problem on the right-hand side of the piece of paper, and develop ideas in the space to the left. Use whichever approach you feel most comfortable with.

Tip 2:

It's important to define your problem correctly. CATWOE can help you do this – this asks you to look at the problem from the perspective of Customers, Actors in the process, the Transformation process, the overall World view, the process Owner, and Environmental constraints.

By considering all of these, you can develop a comprehensive understanding of the problem.

Step 2: Work Out the Major Factors Involved

Next, identify the factors that may be part of the problem. These may be
systems, equipment, materials, external forces, people involved with the problem, and so on.

Try to draw out as many of these as possible. As a starting point, you can use models such as the **McKinsey 7S Framework** (which offers you Strategy, Structure, Systems, Shared values, Skills, Style and Staff as factors that you can consider) or the **4Ps of Marketing** (which offers Product, Place, Price, and Promotion as possible factors).

**Brainstorm** any other factors that may affect the situation.

Then draw a line off the "spine" of the diagram for each factor, and label each line.

**Example:**

The manager identifies the following factors, and adds these to his diagram:

- Site.
- Task.
- People.
- Equipment.
- Control.

**Figure 2 – Cause and Effect Analysis Example Step 2**

(Click image to view full size.)
**Step 3: Identify Possible Causes**

Now, for each of the factors you considered in step 2, brainstorm possible causes of the problem that may be related to the factor.

Show these possible causes as shorter lines coming off the "bones" of the diagram. Where a cause is large or complex, then it may be best to break it down into sub-causes. Show these as lines coming off each cause line.

Example:

For each of the factors he identified in step 2, the manager brainstorms possible causes of the problem, and adds these to his diagram, as shown in figure 3.

Figure 3 – Cause and Effect Analysis Example Step 3

(Click image to view full size.)

**Step 4: Analyze Your Diagram**

By this stage you should have a diagram showing all of the possible causes of the problem that you can think of.

Depending on the complexity and importance of the problem, you can now investigate the most likely causes further. This may involve setting up investigations, carrying out surveys, and so on. These will be designed to test
which of these possible causes is actually contributing to the problem.

Example:

The manager has now finished his analysis. If he hadn't looked at the problem this way, he might have dealt with it by assuming that people in the branch office were "being difficult."

Instead he thinks that the best approach is to arrange a meeting with the Branch Manager. This would allow him to brief the manager fully on the new strategy, and talk through any problems that she may be experiencing.

Tip:

A useful way to use this technique with a team is to write all of the possible causes of the problem down on sticky notes. You can then group similar ones together on the diagram.

This approach is sometimes called CEDAC (Cause and Effect Diagram with Additional Cards) and was developed by Dr. Ryuji Fukuda, a Japanese expert on continuous improvement.

Key Points

Professor Kaoru Ishikawa created Cause and Effect Analysis in the 1960s. The technique uses a diagram-based approach for thinking through all of the possible causes of a problem. This helps you to carry out a thorough analysis of the situation.

There are four steps to using the tool.

1. Identify the problem.
2. Work out the major factors involved.
3. Identify possible causes.
4. Analyze your diagram.

You'll find this method is particularly useful when you're trying to solve complicated problems.

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