

# **Apply problem solving strategies**

## **LEARNER GUIDE**

Unit Standard 14927



# TABLE OF CONTENTS

<b>TABLE OF CONTENTS</b> .....	<b>i</b>
<b>PERSONAL INFORMATION</b> .....	Error! Bookmark not defined.
<b>INTRODUCTION</b> .....	Error! Bookmark not defined.
<b>UNIT STANDARD 14927</b> .....	Error! Bookmark not defined.
<b>SECTION 1: DEFINE AND ANALYSE THE PROBLEM</b> .....	<b>1</b>
Decisions And Problems.....	1
Problems and Opportunities .....	1
The Steps Involved In Problem Solving .....	2
Problems And Decision Making .....	3
Define The Problem .....	3
Collect Facts To Meet The Requirements Of The Problem.....	4
Facts Are Obtained From The Following Sources:.....	4
What Questions Should You Ask? .....	4
Verify The Information .....	5
Analyse The Problem .....	5
Formative Assessment 1.....	<b>Error! Bookmark not defined.</b>
Symptoms VS Causes .....	6
Restate The Problem.....	7
Determine Possible Courses Of Action .....	7
<b>SECTION 2: EVALUATE SOLUTIONS</b> .....	<b>8</b>
Problem Solving Techniques .....	8
Brainstorming.....	8
The Brainstorming Process .....	8
Mapping .....	9
Computer Modelling.....	10
Observation.....	10
Questionnaires.....	10
Experiments .....	10
Establish Criteria And Evaluate Possible Solutions Against The Criteria .....	10
Duration.....	10
Causes.....	10
Effects.....	11
Things That Can Influence Your Decision.....	11

Select The Solution.....	12
Decision Making Pitfalls To Avoid .....	12
<b>SECTION 3: IMPLEMENT THE SOLUTION .....</b>	<b>13</b>
Stakeholders Are Consulted .....	13
Monitor Implementation .....	13
Duration .....	14
Implication And Effects .....	14
Review The Solution.....	14
<b>SECTION 4: INEFFECTIVE WAYS OF SOLVING PROBLEMS.....</b>	<b>15</b>
<b>IMPROVE YOUR CRITICAL THINKING SKILLS.....</b>	<b>Error! Bookmark not defined.</b>
Ineffective Ways Of Handling Problems .....	15
It's Not My Problem .....	15
The Real Problem Is.....	15
As If I Didn't Have Enough Problems.....	15
Critical Thinking.....	16
Analytical Thinking .....	16
Synthesis when thinking.....	16
How to think when solving problems.....	16
Suggestions To Improve Your Individual Critical Thinking Ability.....	16

# SECTION 1: DEFINE AND ANALYSE THE PROBLEM

## Decisions and Problems

A decision is a choice between options and is a component of problem solving. A decision is also the action a manager or supervisor must take when the information is so incomplete that the answer does not suggest itself.

When thinking about problems, always remember the following:

**A problem is a deviation from what ought to be.**

**As far as problems are concerned, we should always be proactive and not just reactive.**

**Where there is no problem there can be no improvement.**

## Problems and Opportunities

**It is often said that 'there are no problems, only opportunities'.**

This is of course not always true, but it does emphasize the point that a problem should lead to positive thinking about what is to be done now, rather than to naming and blaming. By naming and blaming I mean that we should look at solutions to problems rather than looking for someone to blame.

## **Naming and blaming are actually a waste of time and energy.**

If a mistake has been made, the reasons for it should be analysed, to ensure that it does not happen again.

It sometimes happens that you will be faced with a continuous flow of problems and decisions. When this happens, you may feel utterly confused. This happens to all of us, that is why we all work at solving problems by following a plan.

## The Steps Involved in Problem Solving

Define the problem

Analyse it

Restate the problem

Identify alternative solutions

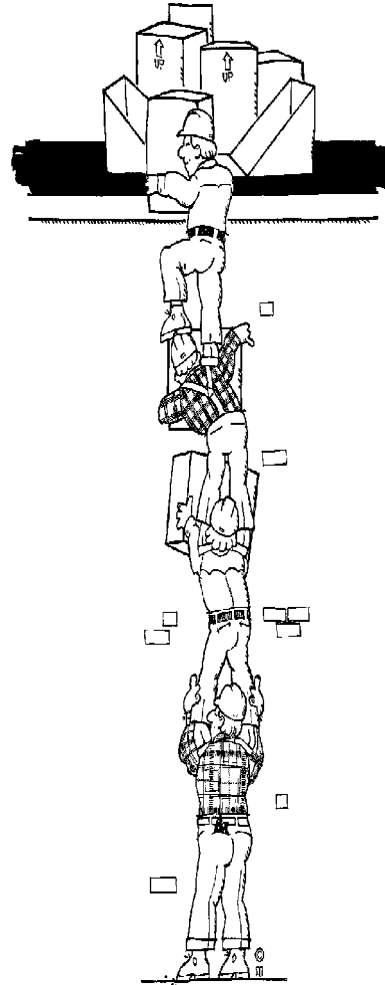
Evaluate alternatives

Select optimum solution

Implement it

Evaluate outcome

Modify solution or restate problem if desired outcome not achieved



## Problems and Decision Making

In order to identify and analyse a problem, you have to examine and identify the problem in terms of **problem type, problem parameters and possible causes**. In the workplace, problems occur almost daily. Some of these problems are relatively simple to handle with available tried and tested solutions, while others will take more effort and skill. Sometimes you will have to face a once-off unique problem. Such problems demand competent and effective solutions. Effective and competent decision-making should be based on a systematic problem-solving approach, and this is a skill that has to be learnt. You also have to take sufficient trouble to identify the **real** problem; instead of solving an **apparent** problem. If you do not identify the **real** problem at an early stage, you could make a bad decision, and this could lead to serious trouble.

### Define the Problem

The first step in decision making is called '**define the apparent problem**'.

Why do we call it the **apparent problem**? It is always difficult to see a problem as it really is – and not as we perceive it to be, based on our emotions, state of mind, subjectivity, prejudice, guesswork, or as we would 'like' to see it.

To try to bypass most of the human failings that come to the fore when making decisions, you must follow the above steps.

**Peter Drucker**, one of the most eminent and respected authors in management science, says,

**Effective decisions result from a systematic process, with clearly defined elements, that are handled in a distinct sequence of steps.**

- When making decisions you must take rational, logical action. You must not rush. You must pause, stand back and look at the problem from all angles.
- However, this does not mean that you should use more time than necessary.
- The size and urgency of the problem will probably dictate the length of time you would need to reach a decision.

## Collect Facts to Meet the Requirements of The Problem

**The person who is best at defining the nature of a problem, will be the one who will be the most successful at solving it.**

You need to collect facts that meet the requirements of the problem.

**A fact can be defined as a piece of verified information.**

### Facts Are Obtained from The Following Sources:

- Judicious **questioning** of eye witnesses.
- **Reading** reports, memoranda and letters, and interpreting them intelligently, seeking clarification if necessary.
- Investigating the problem where it is found, for instance, overcrowding could result in an unequal allocation of office space.
- **Opinions** are important. This is because the investigating person is not always able to obtain all the facts required. Opinions from trusted people who have credibility are a distinct advantage in problem-solving.
- **Feelings** fall into much the same category as opinions. We often get a feeling that we should defer judgement on a particular problem for a short time, although the facts clearly show that we could take legitimate action immediately. Later we realise that the feeling was right as the problem solved itself in a completely different and more satisfactory way.
- Find out **what is happening now** and or **what is likely to happen in the future**. If different people are involved, get both sides of the story and, where possible, check with a third party. Obtain written evidence wherever relevant. Do not rely on hearsay.
- Define **what is supposed to be happening** in terms of policies, procedures or results and contrast this with what is actually happening.
- Try to understand the attitudes and motivation of those concerned. Remember that people will see what has happened or happening, in terms of their own position. Obtain information about internal or external constraints that affect the situation

### What Questions Should You Ask?

To define a problem, you need to stop and ask yourself and any witnesses at least as many of the following questions as you can.

- What happened?
- Where did it occur?
- What should have happened?
- Is that a problem?
- How bad is the problem?
- What else is involved? Who or what is affected by it now?
- Who or what was responsible?
- Is it an isolated incident or is it likely to happen again?
- What are the consequences of ignoring the problem?

- How else can the problem be stated?
- Have similar problems existed - how were they solved?
- Why does it have to be solved?
- When does it have to be solved?
- What will it cost to solve the problem?
- Who should solve it?
- What is likely to happen when the problem is solved?
- Who will be affected?
- Are you being influenced by your own feelings about the situation?
- Is it a problem, or just a symptom?
- Is this problem linked to other situations?
- What other external factors should you take into account?

**One of the dilemmas of making decisions is knowing when you have enough facts.**

People go one of only two ways:

- Either they rush in and make a decision before they have collected all the facts,
- Or they waste too much time gathering information when a good decision could have been made without wasting too much time.

### **Verify the Information**

After you have gathered information, you have to verify the information.

**The key is which facts are relevant and which are incidental.**

To examine the facts adequately, be sure to separate what you **know** to be true from what you **think** is true. Always try to gather facts from more than one source. Check your information for accuracy and truthfulness.

We all have a tendency to want to solve a problem immediately because the pressure is on.

- A machine is down.
- A key person is absent or leaves suddenly.
- Materials don't arrive as promised from the supplier.
- Your neck is on the line!

**Take some time and thought to examine the facts first**

### **Analyse the Problem**

When you have the answers to most or all the above questions, think it through.

- **Analyse the facts.** Determine what is relevant and what is irrelevant.
- Establish the **cause or causes** of the problem.
- Do not be tempted to concentrate on symptoms rather than the causes. Dig into **what lies behind the problem.**
- Identify the **extent** of the problem – not all problems are of equal importance and the minor, single-incident problem has to be distinguished from the major, recurrent problem.
- Develop **theories** about the possible causes.
- You must be **objective** at this stage. Don't solve a problem that does not exist! Nothing can be more embarrassing than jumping to a conclusion based on misconceptions.

## Symptoms VS Causes

The most difficult task when defining a problem is being able to separate the **symptom** from the **cause**.

Headaches and fever are symptoms of flu, not the cause of the flu. In fact, it is the other way around – the flu causes headaches and fever! Doctoring the symptoms, in this case headache and fever, might make you feel better for a little while, but it will not make the flu go away.

Solving problems also works this way – if you try to solve the symptom, it might work for a little while, but the problem will still be there. The problem will not go away unless you solve the problem itself.

For example, if your telephone lines are always engaged, you may try to solve the problem by adding more phone lines. You could be treating the symptom. The real problem may be too many personal calls. Treating symptoms will never solve problems.

When you are responsible for solving problems, it will be your job to sort through the symptoms in order to find the **real, underlying cause of the problem**.

One way is to **list all the potential causes of the problem**. You may need to be somewhat creative, as the cause could be buried deep.

- When you feel that you have a comprehensive list of causes to a problem, sort through them. Use your intuition and experience and select the most likely causes to the problem.
- You have to be open minded, because often among the causes there may be some that are embarrassing or difficult for you to handle. A natural human tendency would be to put them aside and look for another cause with an easier solution.

## Examples

**Situation 1:** there is an increasing number of errors in handling of claims by the claims department. You have listed the following probable causes:

- There has been an increase in the number of claims that have to be processed daily
- There are many new staff members in the department.
- Care is not being taken when claims are checked for errors.
- Or perhaps it is that the same number of errors have always been made but are only now being noticed!

**Situation 2:** Absenteeism rate abnormally high for last month.

- Flu

- Low morale and motivation
- Increased workload.

Be careful when trying to solve absenteeism problems. **Absenteeism is a frequently occurring symptom of a problem and not the problem itself.** The problem usually lies somewhere else. Interestingly, many supervisors think of it as a problem in itself. Most people feel an obligation to go to work. They do not stay away for no reason, so there must be an underlying cause.

### **Restate the Problem**

Once you have gathered all the facts and analysed them and you are sure you are addressing a problem and not a symptom, restate the problem.

#### **Why?**

Once you have analysed the facts, the nature of the problem may have changed. By restating the problem, you will ensure that you are addressing the problem and not a symptom.

### **Determine Possible Courses of Action**

Once you have identified the components of the problem, you can consider possible courses of action. List the possible courses of action in the light of the factual analysis.

- What are the possible options? List as many as you can
- What are the likely end results of each of these?
- Which of them seems to be the best from all angles?

Where appropriate, use brainstorming and creative-thinking techniques to identify courses of action that may not be immediately evident.

## **SECTION 2: EVALUATE SOLUTIONS**

### **Problem Solving Techniques**

The purpose of using problem solving techniques is to organise the information you have gathered so that you can assess, compare and contrast solutions.

All the techniques described require you to ask questions such as:

- Why did it happen?
- Why did it happen at this office and not the other office?
- Why did it happen at the specific time and not a different time?
- What would happen if we do this?
- What would happen if we do that?

And any other questions you can think of.

When you are involved in problem-solving, you will find the following barriers to the problem-solving process:

- Tradition: we have always done things this way
- Competition: individual competition can stand in the way of creative problem-solving
- Lack of effort: it is not my problem
- Complacency: settling for the first easy solution that presents itself
- Insecurity: can lead to procrastination, where the problem is not addressed and solved.

Another purpose of problem solving techniques is to overcome these barriers.

### **Brainstorming**

This is a highly effective way of finding solutions to problems, provided you implement the process correctly.

It involves the generation of a large number of unconventional ideas whilst eliminating the usual tendencies to criticise or prematurely reject these unusual ideas.

### **The Brainstorming Process**

#### **Selection**

Select a topic for brainstorming and the members of the group. This would of course be the statement of the problem.

#### **The Problem**

The group is given advance notice of the problem in the form of a brief description of one or two sentences. The group facilitator discusses with the group a limited amount of background information relating to the problem.

#### **Warm-up session**

Members are introduced to the concepts of brainstorming in a relaxed manner.

The group discussion should try to identify the barriers of creative thinking and show how they can be overcome.

The purpose of brainstorming is to generate as many ideas as possible in a short period of time. It does not matter if the ideas are silly, this is actually the purpose of brainstorming.

When using brainstorming, creative thinking is very important, as is overcoming the barriers to creative problem-solving.

The actual brainstorming process is explained, together with the four rules of brainstorming:

- Free association: participants must state the first idea that came into their heads, no matter how silly or absurd it may seem.
- Clarification: the person whose idea it was can elaborate on the idea, or someone else can, as one idea leads to another. No evaluation of the idea is allowed at this time.
- Suspension of judgement: nobody is allowed to pass any comment on anyone else's ideas. This is not the purpose of brainstorming at all.
- Speed: brainstorming should happen as quickly as possible.

Short practice-runs will demonstrate how little time it takes to produce 50 to 100 ideas. At the end of the warm-up session, the original problem is restarted in as many ways as possible. For example, the problem of reduced profit could be redefined as how to beat competitors, or how to improve marketing. All statements are written down by the leader.

It should develop in a light-hearted, easy-going atmosphere. Brainstorming is a fun thing to do and it should be so for everyone.

## Brainstorm

The facilitator reads out the statements and calls for ideas. As they flow, they are numbered and written up on a large flipchart with a large felt-tip pen.

Each sheet is torn off when full and displayed elsewhere in the room. Freedom of expression should be encouraged. The ideas may number from 150 to 600, or more.

There should be pre-set timescale for this session.

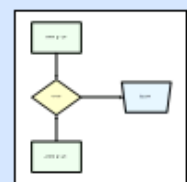
Now the solutions can be considered for practicality and so on.

## Mapping

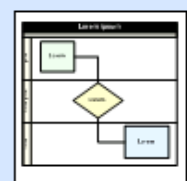
Mapping is similar to using a flow chart to generate solutions. You ask questions about the problem in order to generate ideas for solutions to the problem. Your questions should also highlight any relationships that may exist between the root cause of the problem, the problem itself and any symptoms that may occur.

Write down the questions and possible solutions. Then look for links between problems and solutions as well as symptoms and connect them with lines. Mapping is best done on a big piece of paper and is usually done in groups.

Incidentally, some of the most innovative products that have been created and produced was as a result of a combination between brainstorming and mapping. The waterbed was "invented" after a brainstorming session, where twenty ideas were written down in two columns of ten each, and lines used to link the ideas. One of the links was between water and bed and that is how a waterbed came into existence. You can see that mapping is similar to brainstorming, but it is more formalised.



Basic Flowchart (Metric)

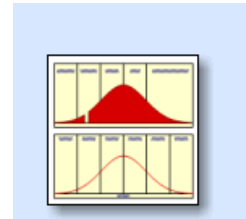


## Computer Modelling

Enter all the data that you have collected into a spreadsheet and sort the data in order to determine whether there are logical ways that connect them.

When you do this in a computer spreadsheet, the aim is to get a graphical representation of the sequence of events that lead to the problem. This can help you to understand where in the work process things started to go wrong.

You would sort the data according to the questions you asked and compare the possible solutions, possibly in the form of a graph.



## Observation

This entails observing the work process. You would watch the workers performing on a line where there are no problems as well as on a line where there are problems. Or if the vacuum cleaner is always breaking down, you would watch while the cleaner is using it. It might be something simple such as handling the vacuum cleaner too roughly or it might be the plug that is not connected properly. Observing the process would give you a better idea about the problem and possible solutions. While observing, you would write down possible solutions to the problem. Once back in the office, you can consider the solutions.

## Questionnaires

Draw up a questionnaire and circulate it to all the relevant parties, asking them for possible solutions to the problem. Your questionnaire would contain possible solutions that you have already thought of. You could then ask the relevant parties to nominate one or two of the solutions, or you could ask them to rank the solutions in order of importance. Once you get all the questionnaires back, you would collate all their answers and rate them according to the rankings. You could also leave a blank space for the parties that you send the questionnaire to where they can also give possible solutions to the problem.

## Experiments

This technique is more appropriate to a laboratory or a production line. When you conduct an experiment, you change what the workers are doing and then observe the consequences of the changes you implemented.

This technique will not be used often in an office environment.

## Establish Criteria and Evaluate Possible Solutions Against the Criteria

Once you have generated possible solutions by any of the previously mentioned methods, you have to establish the criteria for the solution. Consider the possibilities, listing **advantages** and **disadvantages**

## Duration

- How quickly do you have to find and implement a solution?
- How long will it take to implement the solution?

## Causes

- Will the solution cause other problems to appear?
- How will these problems be addressed?

## Effects

- Consider cross-cultural implications for example dress code, religious holidays, type of food and drink.
- Evaluate the immediate and future consequences both inside and outside the organization.
- Compare the cost of the solution with the benefits of implementing the solution.
- Assess how far the needs of those involved will be met and the extent to which your decisions will be acceptable.
- Be careful of creating precedents: will this solution create a situation where other departments will also want to implement the process, even when it does not really apply to that department.
- Consider also the implications of any internal and external constraints that might exist: is there anything in the company policy or legislation that might limit or restrict the implementation of the proposed solution.
- Ensure that all concerned participate in the evaluating and decision-making process. Note, however, that the degree of participation will depend on the nature of the problem and the participation procedures and management style of the organisation.
- Resources: when a solution is evaluated you have to consider its impact on scarce resources. A maximum payoff solution will not be an optimum solution if it requires the consumption of excessive staff time and attention, money, space, raw materials, and IT resources.
- The degree of disruption: an excellent theoretical solution may cause too much disruption within the organisation. Hence the organisation must appraise the consequences of implementing various solutions. Only when the benefits exceed the disruption costs should the solution be pursued

## Things That Can Influence Your Decision

- Tradition
- Cultural differences
- Self-interest
- Organisational factors, policy and precedents, legal aspects, practices and expectations
- Political views vs. logic
- Ease of execution
- Personality factors, attitudes, emotions, prejudices
- Time/urgency, organisational need, political need, personal need
- Pressure from peer group, need to please others
- Authority, expert opinion
- Generalisations, opinions, insufficient evidence or knowledge
- Facts
- Creativity and/or an urge to do something differently
- Experience: successful or unsuccessful

## Select the Solution

When you select a solution, you should ensure that:

- You have generated all the possible solutions
- You have removed the solutions that are obviously not workable
- You have considered all the consequences
- The solution meets the established criteria in terms of budget, resources available to you to implement the solution and also any legislative requirements.

**Often, there will be only one solution that meets all the criteria. When this is not the case, you should decide**

- Whether to choose the solution that meets the most important criteria, or
- Whether you have to generate more solutions

Do not expect the process to always produce a black and white solutions. Remember that Drucker says:

**A decision is a judgement.**

**It is a choice between alternatives.**

**It is rarely a choice between right and wrong.**

**It is at best a choice between almost right and probably wrong- but much more often a choice between two courses of action neither of which is more nearly right than the other.**

## Decision Making Pitfalls to Avoid

- **Deciding alone.** There are many benefits to consulting with others on a decision: gaining different perspectives, more resources to draw upon and more commitment to the decision by those consulted.
- **Every decision a major decision?** Not every decision requires a lengthy decision-making process. Don't get bogged down with minor problems. If they are minor, make a reasonable decision and move on.
- **"The last time I was wrong was when I thought I made a mistake".** No one is always right. If you have made a bad decision, admit it and get started on fixing it. Remember – it is impossible to force a bad decision into being a good one.
- **"Boy! I sure wish I hadn't".** Just the opposite of pitfall number 3. Because no one can be right all the time, don't waste your energy regretting bad decisions. Get on to current issues.
- **Failing to use past precedent.** Maybe the same problem has come up before and been effectively solved. Perhaps, if it has come up enough, there is a company policy that covers it.

## SECTION 3: IMPLEMENT THE SOLUTION

### Stakeholders Are Consulted

**A problem has not been solved until the decision has been implemented.**

Before you implement a solution, you have to discuss the matter with all the people involved, called the stakeholders.

This could include:

- The people doing the work,
- Their supervisor(s),
- Their manager,
- Your manager
- The finance department
- The HR department
- The people who helped you to determine the solution
- And anyone else that may be involved.

No solution will be implemented successfully without the approval and commitment of all the stakeholders. You need their cooperation if you want to ensure that the implementation of the solution will work. You also have to assign duties and responsibilities. Think carefully not only about how a thing is to be done (by whom, with what resources and then by when) but also about its impact on the people concerned and the extent to which they will cooperate. You will get less cooperation if you impose a solution. The best method is to arrange things so that everyone arrives jointly at a solution freely agreed to be the one best suited to the situation (the law of the situation again).

**Make sure that everyone who needs to know about the decision is informed.**

### Monitor Implementation

The implementation of the solution must always be monitored. You have to:

- Check on how effectively the decision is being implemented.
- Obtain the reactions of those affected.
- Take corrective action where necessary.

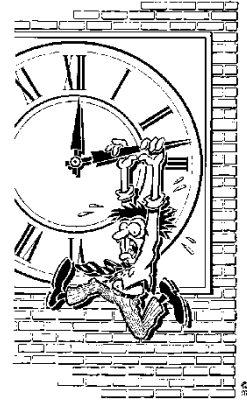
This implies that you will have to develop a control system whereby you can monitor the implementation of the solution.

## Duration

Before you implement the solution, you have to decide

- How long you are going to monitor the implementation: one week, one month, three months, etc.
- How often will you monitor the implementation: hourly, daily, weekly
- When will you review the monitoring process: after one week, two weeks, one month

Just as every problem will have its own unique solutions, the way you monitor the solutions will also vary. Some solutions will indeed have to be monitored hourly or daily, while others will require monthly monitoring.



## Implication and Effects

The purpose of monitoring the implementation of the solution is to determine whether the solution you selected is working.

- How will you monitor the implementation?
- Has the problem been solved?
- How can you prove this?
- Have other problems appeared as a result of the solution?
- Are the stakeholders committed to implementing the solution?
- Is the process working for them or has it led to unhappiness?

## Review the Solution

If the solution is not solving the problem, you have to repeat the problem-solving process in order to find a solution that works.

If the solution that you implemented is solving the problem, you have to determine:

- Whether the solution will work in similar instances in the rest of the organization
- Whether new systems have to be developed in order to implement the solution across the entire organization
- What practices and procedures have to be committed to paper for the implementation of the process across the organization?
- What records are required in order to report on the successful implementation of the solution?
- What records will be required to standardize the new process?

Most of the documentation, procedures and records required for the implementation of the new process will already be in place in the organization. You will have to find out what they are and then use them in your process. If the organization does not have a system for implementing new processes, you will have to develop such a system.

## SECTION 4: INEFFECTIVE WAYS OF SOLVING PROBLEMS

### Ineffective Ways of Handling Problems

#### It's not my problem

This is one of the most popular way that most people handle a problem – it's not mine, so I don't have to do anything about it. then, of course, they turn around and forget all about it. They do not see the need of advising someone else, such as their supervisor, of the problem.

This method of handling a problem is very damaging to the organisation that you work for. Even if it is not your specific problem, if the problem has been brought to your attention you have to ensure that it is brought to the attention of whoever is responsible. Imagine that your mother or father is ill and has to get to a hospital urgently. Your neighbour has a telephone but will not let you use it to call an ambulance, since it is not his problem. What would the consequences of his action be?

Now, imagine you have a problem with your salary which has not been paid into the bank. You approach the wages clerk who tells you that she had paid the money into the bank electronically. It's not her problem, you must go to the bank to sort it out. You go to the bank, where the cashier says it's not his problem, the money does not show on your account and they can't help you, you must go to the wages clerk at your organisation. And so, you go back and forth, and nobody wants to help you sort out the problem. Not a pleasant situation at all. In the same way that you would like to be helped, the customers of your organisation would also like to be helped, whether it's your problem or not.

**Solving a customer's problem is the responsibility of every employee in the organisation!!**

#### The Real Problem Is

What do we mean when we say this? Often, it means that we think our way of looking at the situation is correct and should prevail over other people's views. We describe our view as "real" to imply that other views are not, and that everyone should accept our view. This is of course incorrect, as our point of view could be totally wrong. That is why a problem has to be analysed and thought through properly before a decision is made.

We know that different specialists have different perceptions of the same situation. If a person takes the same problem to a friend, to a counsellor, to a doctor, to a tutor or to priest, each of those people will hear different problems in what that person says. In the same way, in a company, if the same data are given to the marketing director, the finance director and the production director, they will see different problems in them. They have different backgrounds, training and responsibilities, different ways of learning and knowing, and they are looking for different things. Which of these people is seeing the real problem? In the view of organizing the whole idea of a "real" problem is misleading.

Problems are neither real nor unreal; they are a view of a situation, just as a landscape painting represents one person's interpretation of a landscape. Complete objectivity is not available.

#### As If I Didn't Have Enough Problems

Problems do not always get solved, nor do we always want them to be. There can be situations that are problematic. The person with the problem is not sure what to do, and they feel anxious as to whether they will be able to deal with the situation at all.

**But at the same time, they may not really want to lose the problem.**

**A problem can be a way of giving meaning to our situation.**

## Critical Thinking

People take many natural bodily functions such as eating, sleeping, drinking etc. for granted. It is only rarely that we pause to consider how we think. There are times when we feel that our thinking is muddled, or we feel that we should have given more thought to handling a situation that did not turn out the way we anticipated. It pays to pause and consider how we think, because we can learn and apply patterns of thinking to advantage.

## Analytical Thinking

When analysis is used as a thinking process, people take apart the item under consideration, and study the parts to determine how they work together as a whole. Analysts assume that the whole is equal to the sum of the parts and, furthermore, assume that the whole can be explained in its parts. This is a valid argument when thinking about engines, mathematical and scientific problems with rigid cause and effect rules. But, when working with people this does not work. However, analysis can go a long way in developing a systematic approach towards the varied problems a manager encounters daily in his work situation.

## Synthesis when thinking

Synthesis is the opposite of analysis. Instead of taking something apart, through synthesis we combine things to form a complex whole. In synthetic thinking something that needs to be understood is not viewed in isolation, but as part of a larger system or environment. Thinking this way brings appreciation of the larger picture. We view the whole stage to gain understanding, not only of the individual player, but of how the role of that individual fits in with all the other roles. This complements analytical thinking.

## How to think when solving problems

In tackling problems, we need a mixture of both types of thinking. Viewing the unknown through analysis may give us most of the answers, but through synthesis, we view this answer against a larger, more complex backdrop. When tackling a problem, a judicious blend of both types of thinking raises various questions. Problem-solving tries to provide effective answers to the questions emerging from the analysis and synthesis. We should learn to be discriminating in answering the correct questions.

Peter Drucker has pointed out that the most common source of mistakes in making decisions is in the emphasis on finding the **correct answer, rather than the correct questions.**

## Suggestions to Improve Your Individual Critical Thinking Ability.

- **Information based on your own direct perceptions is usually more reliable than other sources.** However, your perceptions may be wrong due to your own preconceived ideas or prejudices. Things may not be what they seem, so keep an open mind and try to see things from the viewpoint of those who disagree with you.
- **Be careful about your assumptions.** You may have adopted them when you were less astute in your observations, but you continue to use them, despite the availability of new evidence. You may use them so automatically that you are not aware they have slipped into your reasoning processes. "We can't let Mavis handle this assignment, she's just a kid."
- **Test assumptions whenever possible.** Facts can only be deduced from facts. If your premise is wrong, your conclusions are likely to be wrong. "No family in this township is impoverished; we don't need a welfare program."
- **Avoid generalizations, particularly hasty ones or those based on too few observations or facts.** "There is no serious unemployment problem, just look at all job ads in the daily paper."

- **Be sensitive to the difference between facts and opinions.** Facts can be proven: the best ones repeatedly. Opinions, regardless of how strongly held and sincerely expressed, cannot be relied on. "I'll stake my reputation and my next pay cheque on this information; this source has been one hundred percent reliable in the past"
- **Logic may be the best tool we have for inferring the truth from facts.** Unfortunately, using logic can often lead to error because some words more than one meaning and will be interpreted differently by various team members.
- **Don't jump to conclusions.** Get all the pertinent facts first; if the facts are insufficient, go get more facts before making a decision. "The boss didn't object when I suggested we leave early, so it must be okay with her."
- **Tend to suspect precedents, rules, generalizations, or dictums** that seem to have truth all wrapped up.
- **Use quantifiable terms whenever possible because numbers can more accurately and more easily manipulated than words.** However, numbers can also be used to confuse and hide facts. Remember the warning about there being three major types of lies: lies, damn lies, and statistics.
- **Beware of analogies, similes, and metaphors.** They cannot prove; they can only illustrate someone's opinions. "He's as innocent as a new born babe."
- **Watch for illogical leaps.** An example of this is a statement such as "The most terrible wars in history have occurred since women gained the right to vote. "The events are not connected; event though one preceded the other.
- **Consider the source of the information.** The source person may consciously or subconsciously present opinions as through they were facts or have his or her objectivity clouded by his or her own system of values. "He wouldn't lie, he belongs to my church."
- **Question everything to uncover and validate facts.** Facts are essential to understand a problem, to evaluate proposed solutions, and to test results.
- **Strongly held value and benefits can alter perceptions and inhibit objective analysis and synthesis of facts.** "The captain just wouldn't make a mistake like that; he's a West Point graduate."
- **Break big problems into smaller, more manageable ones and solve the parts until the entire problem is solved**

Although you may start out with a hypothesis, when testing it, use Rudyard Kipling's **six honest serving men**:

- I keep six honest men serving
- (They taught me all I knew)
- Their names are What and Why and When
- And How and Where and Who.