60 Creative Problem Solving Techniques

(and how to use them)

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Table of Contents

Introduction

Why do we need creative problem solving?

Are you an optimist or a pessimist? Do you describe your glass as being half-full or half-empty?

Either way, I can say with some certainty that your business has either lots of problems – or lots of opportunities!

With all the forces operating today in Australia such as an aging work force, skilled-labour shortages, increased competition, globalisation, and energy constraints, for most businesses, it is simply not an option to stand still.

All businesses can benefit from increasing productivity, improving levels of customer service, reducing errors and waste, and getting products and services to customers quicker. But how can this be done - given that most people are already working very long hours? We are all spending so much time working in our business that we often don't think we have the time or energy to work on the business.

Work on the process – not the problem

There is lots of evidence to support the value of undertaking proper planning. In project management, this is often referred to as "front-end loading". In my own training courses, I see examples of this frequently. Suppose I give the first group of participants 30 minutes to complete a problem-solving activity. For the second group, I assign the same task and give the same overall time. The only difference is that I insist that the first 5 minutes only be used for planning and for the team to work out how they will solve the problem – rather than working on the problem itself. The difference between the two groups is usually dramatic. The second group is more likely to complete the task in the allotted time, have fewer arguments, and come up with a higher quality solution.

So, how can you use this "planning time" most effectively in your own business, team, or club? The good news is that there are lots well proven, structured tools and techniques that you can use to help you find and implement some creative solutions. But first, let's dismiss a few common myths about creativity and innovation.

MYTH 1: You can't learn creativity – you have to be born with it

I used to believe this myth. As an engineering student in the 1980's I would look at the amazing creations that the art students would come up with. It seemed like we lived in two different worlds – the creative and the logic. It was only much later that I realised that these two worlds could co-exist. The creative techniques described in this book all have a logical and methodical structure therefore they can be broken down into manageable parts that can be learnt. This really provides the best of both worlds. Our left-brain thinking can carefully design and structure activities that are logical and have been proven to work. Then, our right-brain thinking can be left to come up with new ideas that can dramatically improve our situation.

MYTH 2: Creativity and innovation are the same

These two terms are often used interchangeably and yet they are very different. Creativity refers to the process of idea generation. Innovation refers to the whole end-to-end process. Coming up with a great idea is not enough. Instead, to be successful at innovation, you need to:

- ❒ Have a good understanding of your customer's requirements.
- ❒ Have a good understanding of your current processes and practices.
- ❒ Identify areas that have the greatest problems (or opportunities for improvement).
- ❒ Generate lots of ideas to solve the problem (or realise an opportunity) – this is the creative phase.
- ❒ Select and refine a suitable solution.
- ❒ Implement the solution.

Therefore, innovation should be viewed as a process – not a single event.

The tools and techniques described in this book have been derived from many other books, Internet sites, and from my own consulting experiences.

About Simplex

Simplex is a creativity process developed by Min Basadur[1]. Rather than seeing creativity as a single straight-line process, Simplex sees it as the continuous cycle it should be. Completion and implementation of one cycle of creativity leads straight into the next cycle of creative improvement. The eight steps of Simplex are shown in the following diagram. The tools described in this book follow this structure.

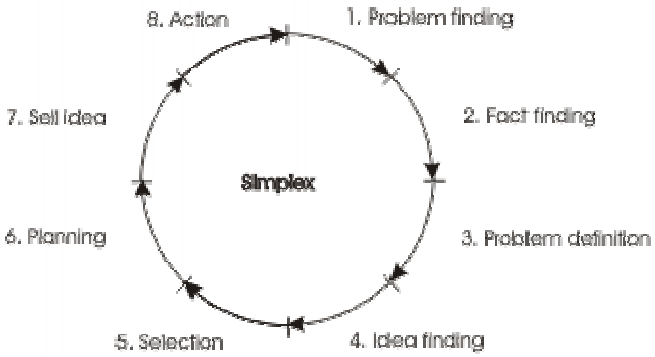


Figure 1: The Simplex Process

About the techniques

There is no single right way to make business improvements. If you spend a few hours searching the Internet or browsing through a few books on creativity and innovation and you will find hundreds of different methods. Many are variations or derivatives of a core set of commonly used methods. In this book you will find a set of practical and effective methods that you can use with your teams to help you get some fresh perspectives on your issues.

Complicated techniques that involve matrices and lots of number-crunching have been excluded. Instead, the emphasis is on techniques that can be used with small groups of participants in a short period of time.

Do you need an external facilitator?

Most of the techniques presented in this book require some level of facilitation. There are benefits in having an independent facilitator run your innovation sessions. Since they are not close to your business, external facilitators can more easily help you see your current situation, problems, and opportunities with a fresh perspective. If you choose to use an external facilitator, it is a good idea to scan through these techniques and discuss them with your facilitator prior to the session so that you can have a shared understanding of which ones will work the best in your situation.

If you prefer to facilitate these sessions yourself, I recommend starting with some of the simpler techniques first before trying the more difficult ones. You may find you only need to use a few techniques in order to come up with lots of fresh new ideas to revitalise your business. It is far better to do just one thing regularly over several years than attempt a lot of different methods in a flurry of enthusiasm – only to see it fade to nothing in a matter of weeks.

Step One: Problem Finding

Finding the right problem to solve is often the most difficult part of the innovation process. Sometimes the problem is obvious – but usually it helps to flush out and explore the problem further. Consider the following questions.

- ❒ What do your customers need and what would they want you to improve?
- ❒ What benefits would our customers see if we could help them?
- ❒ What small problems do we have now which could grow into bigger ones?
- ❒ What slows our work or makes it more difficult?
- ❒ What do we often fail to achieve?
- ❒ How can we improve quality?
- ❒ What are our competitors doing that we could do?
- ❒ What is frustrating and irritating?

Another way of looking at this phase is to explore the so called "itch". This can be done by generating a long list of perceived problems or opportunities, often re-stating similar ones in several different ways, and then looking for patterns and clusters with the mass in order to select one key "problem" to address.

1. Bug Listing

A bug list is simply a list of things that bug you! This can be a good warm up activity and can cover all sorts of areas – not just those related to your situation. For example, some bugs may be:

- ❒ A program on TV
- ❒ A piece of music
- ❒ Children making too much noise while you are watching the news
- ❒ Beer that's served too cold (or too warm)
- ❒ Offices that are too hot
- ❒ A talkative colleague
- ❒ Slow computers
- ❒ ….. and absolutely anything else!

Creating a Bug List

1. Get your team together
2. Ask them to think of all the things that bug them (you may need to give some of your examples first).
3. Write the bugs up on a flipchart or whiteboard.

4. Keep the process light-hearted and flexible – encourage humorous and far-out bugs as well as common ones.
5. Encourage bugs that are personal and very detailed. It may well be the most specific thinking you have ever done about precisely what small details in life bother you.

If done properly, your bug list should spark ideas in your mind for inventions, ideas, possible changes, etc.

2. Wish Listing

Similar to bug listing, wish listing takes a more optimistic view of the world.

Wish listing simply involves imagining what you would like to achieve along the lines of… 'I wish I could …". As you facilitate the wish listing session you can direct people's thoughts – wish listing about trivial things in their home life through to major wish lists at work.

Creating a Wish List

1. Get your team together
2. Ask them to think of something that they aspire to – a wish – and ask them to write it down.
3. Ask them to visualise their wish.
4. Ask them to think about what it will do for them and to spend a few minutes thinking about and listing all the benefits they will see if their wish comes true.
5. Now ask them to "zoom out" to drive this vision into the distance.
6. Ask them to imagine themselves walking towards their vision. What are all the steps they will need to achieve along the way? Ask them to write these steps down.
7. Up to now, this has been an individual activity. Invite people to share their wishes and the steps and discuss.

3. Voice of the Customer

The term "Voice of the Customer" simply means finding out – really finding out – what the customer wants and needs. Wants and needs can be very different. A customer may express a desire for some aspect of your product and service – this is their "wants". However, they may have many more underlying needs that even they aren't aware of. As a service provider, it is up to you to really understand your customer's goals, frustrations and concerns so that you can help them articulate their requirements.

In the Six Sigma Way[2], there are six steps in understanding the voice of the customer:

1. Identify the output or service situation – in other words, what is the product or service you are providing?
2. Identify the customer or customer segment. Perhaps you have different types of customers (for example, walk-in and phone-in). Clearly identify which customer segment you are describing the requirements for.

3. Review available data – this could be from complaints, surveys, comments or you may need to directly interview the customers. Don't guess.
4. Draft a requirements statement concisely listing what it is they want.
5. Validate the requirement by showing the draft to customers and staff and seeking their input. It may take several revisions to get this right, but the time you spend will be well worth it.
6. Refine and revise the requirement statement.

Why is finding the Voice of the Customer so Important?

Many people think they know what their customer's want – but often this does not reflect what the customer's actually need. Without this understanding, your attempts to find innovative solutions may well be a waste of time. You may find yourself spending a lot of time and energy fixing that really is of no concern to your customers.

4. SWOT Analysis

SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats.

SWOT techniques can be used by:

- ❒ Individuals - for development or career decisions
- ❒ Teams - for development and performance management
- ❒ Organizations for business planning and strategic decision making

A SWOT Analysis can be a good way to identify areas that might benefit from lots of new and creative ideas. For example, if your SWOT analysis shows that a weakness is the way you deal with telephone enquiries, this could be a good area to use one of the other tools such as brainstorming or the cause and effect diagram.

Performing a SWOT Analysis

1. List all your strengths that exist now. What are your advantages? Consider this from your point of view and that of others.
2. Then list all weaknesses that exist now. What can be improved? What should be avoided? Consider this from both internal and external perspective – is it possible others see weaknesses you do not? Are your competitors doing better? Be realistic and look for any unpleasant truths.
3. List all opportunities that may exist in the future. Opportunities are potential future strengths. What are the opportunities available to you?
4. Then list all threats that may exist in the future. Threats often come from external sources such as a new competitor, changes in government regulation, or changes in social or demographic patterns. Threats are potential future weaknesses.

5. Alternative Scenarios

An Alternative Scenario is simply a description of a plausible future. They can give you a deeper understanding of potential environments in which you might have to operate and what you may need to do in the future. This analysis also helps you to identify what environmental factors to monitor over time, so that when the environment shifts, you can recognize where it may be headed.

Developing Alternative Scenarios

1. Define the scope of your scenario – is it going involve the direction of the entire company, or just a functional department.
2. Identify the major environmental factors that may impact you. For example, suppose you need to decide on whether to develop a new business estate in a few years time. The major environmental factors affecting this might be: strength of the economy, interest rates, vacancy rates, and access (car parking, public transport).
3. Build four scenarios based on these environmental factors. To do this, use information available to you to identify four (or more) plausible and qualitatively different possibilities for each factor.
4. Assemble alternatives for each factors into internally consistent 'stories', with both a narrative and a table of key factors.
5. Identify your strengths, weaknesses, opportunities and risks for each scenario.

6. Brainstorming Problems

Brainstorming is a common and effective method of interactively getting lots of ideas from team members.

Brainstorming can be used in the Problem Finding phase to get lots of problems off people's chests and onto a whiteboard, flipchart or datashow.

Details of how to run a brainstorming session are shown at Classic Brainstorming on page 26.

Step Two: Fact Finding

The next phase is to locate as much information relating to the problem as possible. This gives you the depth of knowledge you need to:

- ❒ Use the best ideas your competitors have had
- ❒ Understand your customers needs in more detail
- ❒ Know what has already been tried
- ❒ Fully understand any processes, components, services or technologies that you may need to use
- ❒ Ensure that the benefits of solving the problem will be worth the effort you will put into it

This phase also involves assessing the quality of the information that you have. Here it is worth listing your assumptions and checking that they are correct.

7. Who, What, When, Why and How?

Need to find out some more information about your problem? Ask these questions: Who? What? When? Why? How?

Does this seem simplistic to you? Obvious? Common sense?

Never underestimate the power of these simple questions. They are the favored questions of consultants who charge thousands of dollars. Ask these questions well and you can truly uncover a wealth of knowledge and opportunity.

The biggest mistake people use in asking these questions is to launch into solution mode too quickly. They may ask one or two of these questions, assume they understand the problem (which they often don't) and then spend the rest of the time trying to "sell" their solution when they don't really understand the problem.

As Stephen Covey[3] says, "Seek first to understand, then to be understood".

Of course, you don't have to be restricted to these single syllable questions. Each one has many variations that you can explore. Try them out – and see how many questions you can ask before you give into temptation and start dishing out advice. See if you can hold a discussion where you only ask questions for ten minutes – you'll be amazed at what you can discover!

These questions can be used during the early stages of problem solving when you are gathering data, the checklist can be useful either as an informal or systematic way of generating lists of question that you can try to find answers for.

These questions can be used to encourage thought-provoking questions and can supplement many other techniques described in this book.

One of the major strengths of these questions is that the responses are usually facts, rather than actions or problems.

Try asking some of these variations of the classic Who, What, When, Why, How questions.

Who

- ❒ Who is affected by the problem?
- ❒ Who else has this problem?
- ❒ Who says it is a problem?
- ❒ Who would like a solution?
- ❒ Who would not like a solution?
- ❒ Who could prevent a solution?
- ❒ Who needs it solved more than you?

When

- ❒ When does it occur?
- ❒ When did it appear?
- ❒ When will it disappear?
- ❒ When do other people see your problem as a problem?
- ❒ When is the solution needed?
- ❒ When might it occur again?
- ❒ When will it get worse?
- ❒ When will it get better?

Where

- ❒ Where is it most noticeable?
- ❒ Where is it least noticeable?
- ❒ Where else does it exist?
- ❒ Where is the best place to begin looking for solutions?
- ❒ Where does it fit in the larger scheme of things?

Why

- ❒ Why is this situation a problem?
- ❒ Why do you want to solve it?
- ❒ Why don't you want to solve it?
- ❒ Why doesn't it go away?
- ❒ Why would someone else want to solve it?
- ❒ Why wouldn't someone else want to solve it?
- ❒ Why is it easy to solve?
- ❒ Why is it hard to solve?

What

- ❒ What do you know about it?
- ❒ What are its main strengths?
- ❒ What are its main weaknesses?
- ❒ What do you like about it?
- ❒ What do you dislike about it?
- ❒ What can be changed about it?
- ❒ What will it be like if it is solved?
- ❒ What have you done in the past with similar problems?
- ❒ What principles underlie it?
- ❒ What values underlie it?
- ❒ What assumptions are you making about it?
- ❒ What seems to be most important about it?
- ❒ What are the sub-problems?
- ❒ What are your major objectives in solving it?
- ❒ What else do you need to know?

How?

- ❒ How does this process work?
- ❒ How could the problem be occurring?
- ❒ How can we solve this problem?
- ❒ How can we best work together?
- ❒ How much could we save in fixing this problem?
- ❒ How much can we spend in fixing the problem?

8. Flowcharts

Flow-charts are easy to understand diagrams showing the different steps in a process and how they are inter-related. A key feature of most flow diagrams is the decision point (usually shown as a diamond) which can lead in different directions after the answer is given to the relevant question.

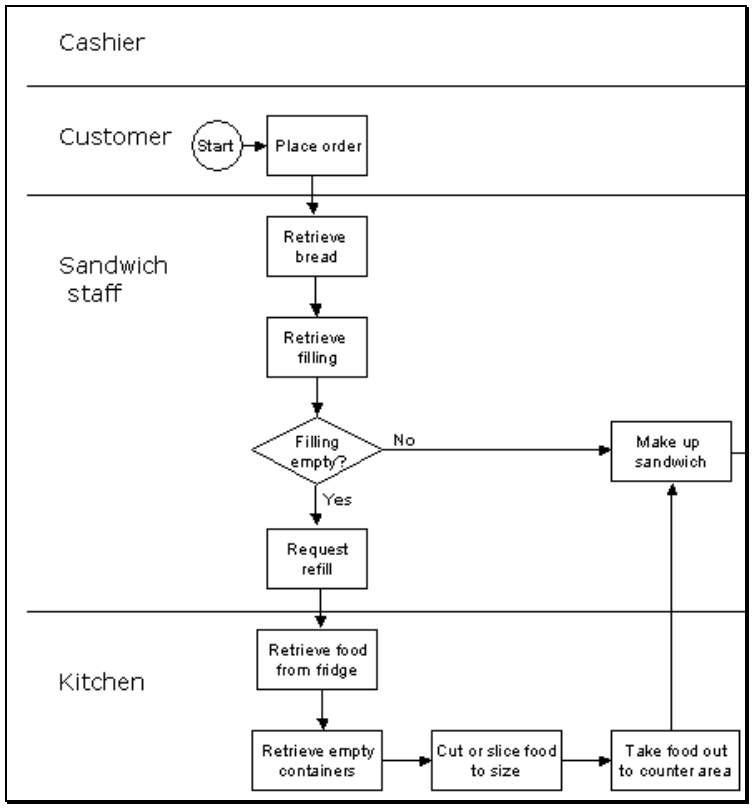
Flow-charts are useful early on in an improvement program as they can map what is currently happening (the "as-is" diagram). When preparing an "as-is" flow chart it is very important that you draw what you see happening – not what people tell you should be happening. Often they are very different things!

Once a flow-chart has been completed, it is an excellent visual tool for a team to look at and discuss. For example, you may choose to mark all the problem steps with a red dot to indicate an area worthy of further attention.

A completed flow-chart may look deceptively simple but the process of clarifying the steps and laying out the chart can become quite involved. If you are developing the flow chart yourself, consider starting with a smaller part of the process first. Just make sure that you clearly define the entry and exit points.

There are many flow chart software packages available such as Microsoft Visio however simple diagrams can be drawn by hand or using other software such as Microsoft PowerPoint.

A simple flow chart for a sandwich bar is shown below.



Step Three: Problem definition

At the start of step three, you have a rough idea of what the problem is and should have a good understanding of the facts relating to it. You should now develop the exact problem or problems you want to resolve.

It is important to scope the problem at the right level. If you try and solve problems that are too broad, then you will never have enough resources to fix them effectively. If you try to solve problems that are too trivial or narrow, you may end up fixing symptoms of a problem, rather than the problem itself.

This can be accomplished through brainstorm-like techniques eliciting as many questions as possible, and then clustering, combining, and choosing the question or questions that seem most stimulating.

Don't underestimate the value of this step. In our One Bite at a Time[4] programs, we consistently find that correctly defining the problem is often the most difficult part of the entire process. Once groups have a good problem definition statement, it makes the next steps much easier.

9. Goal Orientation

Goal orientation is a basic logical checklist for problem statements. The procedure is as follows:

1. Describe the problem by writing down a general description in as much detail as possible
2. List the needs implied by the problem, by outlining what you are trying to achieve
3. List the inherent difficulties that are preventing you from achieving your goal. For example if I am chopping down a tree, the hardness of its wood is an inherent difficulty because anyone chopping down that tree would have to deal with it.
4. List the external constraints that apply to this problem at this time. For example, I have promised to finish chopping down the tree for the owner by lunchtime today, is an external constraint because it is specific to this occasion.
5. Now write a clear problem statement that illustrates all these requirements, restrictions and hindrances.

'Inherent difficulties' and 'External constraints' are listed separately because the options for dealing with these two types of problem are likely to be very different: the options for solving tree-hardness are clearly of a very different kind from the option for dealing with my 'finish on time' promise.

10. Multiple Redefinition

Open-ended problems by definition are not well defined. Different stakeholders may have varying boundary perceptions. This method suggested by Tudor Rickards is designed to help you look at the problem from different perspectives. These are shown in the following table:

Perspective	Possible Question
Empathic	'There is usually more than one-way of looking at problems. You could also define this one as ….'
	'What would it be like to be in our customer's shoes?'
Analytic	'….but the main point of the problem is….'
	'What would the data tell us about the problem?'
Motivational	'What I would really like to do is….'
	'What are the benefits to you in fixing this problem?'
Magical	'If I could break all laws of reality (physical, social etc.) I would try to solve it by ….'
Metaphorical	'The problem put in another way could be likened to …'
Off-beat	'Another, even stranger, way of looking at it might be….'

To use this technique, try following this simple procedure:

1. Ask your group to note down on a sheet of paper an open-ended problem of importance to the team.
2. Ask each person to complete the above statements with reference to your particular problem. If nothing comes to mind for a particular statement, they can move on to the next statement and return to it later.
3. It can be useful to have a break at this stage to allow time for deliberation.
4. Return to your original definition. Have any of the redefinitions helped? Can you see the problem from a different angle? Write down any thoughts or ideas you have at this stage.

11. Other Peoples Definitions

Allowing other people to give their own perspectives or challenge your views provides an opportunity to further understand the problem. It is a very direct application of the basic creative principle of valuing differences:

1. The problem owner writes up on the flipchart a summary of the problem using the form 'How can we…' or 'How to…'
2. The participants ask the client any questions for clarification that occur to them. However it is important for them to avoid recommending solutions, offering explanations or making any judgements.
3. The client answers the questions factually, and avoids making any justifications or defences.
4. Each person (problem owner and participants) writes down privately their own attempts at expressing the essence of the problem in the same 'How can we…' /'How to…' format.

5. When everyone feels ready, all the ideas and thoughts are written up on the flipchart, explained and discussed.
6. Finally the problem owner decides on an ultimate version based on all the other versions and the discussion that has taken place. The problem owner has the last word!
7. The participants are actually operating as consultants and their assignment is not to decide how they would deal with the problem, but to help the problem owner settle on a perspective that is most helpful to her or him.

12. Paraphrasing Key Words

This method devised by Edward de Bono requires you to identify key words in the sentence, substitute them one at a time with other words that have the equivalent general meaning, and create different emphases and a different rhetoric. This may help to reveal assumptions and generate alternative perceptions.

For example, consider the broad problem statement: "We are under-using our copying resources." By using looking at synonyms for each of the key words in the problem statement you can see if one more accurately and realistically defines the problem.

We are under-using	copying	resources
We are over-capitalising	duplicating	capital
We are wasting	reprographic	property
We are squandering	remaking	machines and people
We are ignoring	transcribing	mechanisms
	facsimile	holdings
	mimicking	agency
	mirroring	investment
	reproducing	means
	mimeographing	belongings
	cloning	facility

13. Chunking

Chunking is a term used in NLP to describe the process of grouping items into larger or smaller groups (or "chunks") Chunking helps you to organise your thinking in order to better handle information.

In 1956, George A. Miller published a paper titled "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information"[5].

In it he argued that "the amount of information that we are able to receive, process, and remember" is limited to between 5 and 9 pieces of information at any one time.

"By organizing the stimulus input simultaneously into several dimensions," wrote Miller, "and successively into a sequence or chunks, we manage to break (or at least stretch) this informational bottleneck."

Chunking allows us to become more efficient at categorising information. Items can be classified into different groups moving from the general to the specific, and vice versa.

For example, we remember phone numbers by clustering the digits into familiar-length groups. By comparison, it's difficult to remember phone numbers from another country because they're chunked differently.

Chunking Up (becoming more general)

Let's take a simple object, say a basketball. Chunking up from this object we could get a basketball game. Chunking up further we could get sport, then exercise and fitness, and even to the health of the nation.

To chunk up,	ask
Part to whole	What is this part of?
Example to class	What class is this an example of?
An outcome	If I got this outcome, what else would that get for me?
A behaviour	What is the intention behind this behaviour?

Chunking Down (becoming more specific)

Let's take the example of someone going to a job interview. This could chunk down to the specific job that the interview is for, the resume that is taken to the interview, or what the candidate is wearing.

To chunk down,	ask
Whole to part	What is a part of this whole?
Class to example	What is an example of this class?
An outcome	What prevents me achieving this outcome?
A behaviour	What other behaviour would also satisfy this intention?

When to use Chunking

Chunking is one of the most important facilitation skills to learn. If someone gives you a suggestion that is too big or is a generalisation you can chunk it down into smaller, more manageable mini-tasks.

Alternatively, if you find that everyone is getting bogged down into too many details, chunk up to find the overall meaning or purpose to "get the big picture".

Chunking is also very useful to “scale” the problem statement to be a good size – something that is big enough to be challenging and worth fixing, yet small enough to have a reasonable chance of success.

14. Problem Definition Checklist

The focus and content of a problem statement can be adjusted and developed in a variety of ways. However, before moving to the next stages, it is worth checking that the problem statement really does reflect the problem you are trying to solve. Consider this checklist for your problem statement.

- ❒ Does the statement reflect a problem that the customer or staff want fixed? Is it clear who will gain from fixing the problem?
- ❒ Is it stated briefly and clearly?
- ❒ Is it specific?
- ❒ Is it measurable? Will you know when you have resolved this problem?
- ❒ Is if affirmative in its orientations?
- ❒ Does it take into account the “chunked up” benefits (for example, what are the benefits for the entire organisation, society, the environment).
- ❒ Does it refrain from specifying a cause of the problem? For example, “Insurance claims are slow because of inexperienced staff” is a poor statement because it assumes the cause of the problem. This statement would prevent people looking at broader causes.

Step Four: Idea Finding

This step requires you to generate as many ideas as possible. This is often the fun and energetic part of the whole innovation process. This section includes a range of techniques arranged into the following sub-categories.

- ❒ Personal – An idea to help you capture your own personal ideas.
- ❒ Assumptions – Techniques to help your team recognise their assumptions which can be limiting.
- ❒ Different Perspectives – We all look at the world through our own lens of personal experiences. These tools help your group step into different shoes and see the world in a different way.
- ❒ Brainstorming – The traditional brainstorming technique is provided along with several variations.
- ❒ Nominal Group – These techniques include a combination of interactive group exercises and quiet reflection to ensure you get lots of participation and lots of good ideas.
- ❒ Attributes – These techniques use the process of breaking a product or service into parts, changing some and re-assembling to create something new.
- ❒ Stimulus – These techniques use unexpected triggers to break us from our rigid thinking.
- ❒ Finding Causes of a Problem – As the title suggests, these techniques help to find the root cause of a problem – so you can fix the problem and not just the cause.

Are you receptive to new ideas?

Before we explore each of the techniques, it is worthwhile reflecting on whether you are all open to the new ideas that will eventuate. Some of the ideas may initially seem 'half baked' 'off the wall' or naïve. It is important to be respectful and open to all ideas as sometime the crazy ones can contain the seed of a 'prize' idea.

One way to do this is to paraphrase the idea. After someone offers their thoughts, repeat them back using your own words, but keeping as close as possible to the essence of their idea. For example, you could say 'so you're saying that ….'

Avoid evaluating at this stage - you are simply trying to establish a mutual starting point and understanding. Evaluation comes later.

You can then work towards transforming the idea into a workable solution. Divide your response into positive elements (pros), and negative elements (cons)

Pros should be precise and genuine. This acknowledges the contribution of the speaker and creates better understanding of the problems components.

Cons should be looked at one at a time, phrasing each one so that it encourages solutions. For example if the con is 'it's expensive' try saying 'how can we make it cheaper?' As you consider each con in turn, correcting it will transform the original idea. The final solution may barely resemble the original thought.

PERSONAL

Most of the techniques in this book are designed to be used by groups. However the one technique in this section is a great way for each person to individually record their own creative ideas.

15. Ideas Notebook

Ideas can “come to us” at different times and different locations. You might be driving to work, in the shower, walking the dog, or just about to fall asleep in bed.

An Ideas Notebook is simply a recording device that you can keep with you all day. Some people prefer a paper notebook while others prefer an electronic organiser. Whatever the format, the most important thing is that you have it with you all the time and it is very quick to jot down a few thoughts.

Routinely note down any ideas that transpire at unusual times, regardless of their relevance.

Idea notebooks are particularly useful at stimulating events such as training workshops, conferences, and meetings. The discussion at these events can often trigger ideas for a problem that you are trying to resolve.

ASSUMPTIONS

You may have heard the definition of assume: it makes an “ass” out of “u” and “me”. This is especially true if you are trying to come up with innovative solutions. Many people will have their own pre-conceived assumptions that put constraints and boundaries around your problem and therefore your solution. The techniques in this section aim to make these assumptions and boundaries more visible and therefore less restrictive.

16. Assumption Surfacing

The purpose of this technique is to make the assumptions about a particular problem more visible, to explore and discuss each assumption, and find ways to influence the assumptions.

How to surface assumptions

1. List all the assumptions people have about a problem.
2. Once you have a good list, ask people to rate each assumption on the impact that the assumption will have on your problem and its resolution. That is, which assumptions would you be relying on the most? Which assumptions are the most limiting to you?
3. For each of the highest impact assumptions, explore them further as follows:
    a. Challenge the assumption. Under what conditions would it not be true? How can we force it to be true?
    b. How likely is the assumption to occur?
    c. How much influence do we have over the assumption? It is totally within our control or is it controlled by external factors.
    d. Plot each of these high impact assumptions on the following matrix.

		What is the likelihood of occurring	
		Low	High
How much influence do we have?	High	**Medium**	**Pay attention**
	Low	**Least serious**	**Medium**

4. The assumptions in the High / High box are considered likely to occur and that we have more influence over. Therefore, pay attention to these assumptions.
    a. List ways to positively influence the assumption.

17. Escape Thinking

If you start getting the impression that a group is overly constrained by conventional thinking you can extend the ideas of Assumption Surfacing into more extreme Escape Thinking.

All of us were born without pre-conceived ideas about the world, but with experience, we come to recognize patterns and categorize the things and situations we see. By putting new experiences into established categories allows us to react rapidly to these new situations as not much time is needed for thought or analysis. However, the main disadvantage is that is that our thinking becomes limited. If we do not have a pigeonhole into which to put something we are looking at, sometimes just don't see it.

Edward de Bono provides an illustration of how we tend to assume that what already exists must remain. He suggests a game in which letters are presented one at a time and the goal is to form a word from these letters. The first letter is A. The second is T, so the word AT is formed. The next letter is R so we form RAT. E arrives, so we form RATE. G is next and we form GRATE. Then a T arrives, and at first most people try to fit it into GRATE, without success. It is only by rejecting the idea that the letters must stay in this order that a person is able to integrate the second T and form TARGET.

How to use Escape Thinking

One way to break away from these assumptions is to make provocative statements. For example, a hairdressing salon may state:

- ❒ We don't have a salon. This leads to ideas of hair cutting in other locations like parks, workplaces or homes.
- ❒ We don't use scissors. This could open people's minds to other ways to cut hair such as using a laser.
- ❒ We don't charge customers for their hair cuts. This could help people look for other ways of charging such as through advertising, sponsorship, or lifetime subscriptions.

Escape Thinking works well as an extension to Assumption Surfacing by encouraging to "escape" their thinking about each assumption.

18. Boundary Analysis

The problem boundary is defined as the imaginary line between what a problem is, must be, should be, or could be, and what it isn't, mustn't be, shouldn't be, or couldn't be.

Boundary Analysis approach works in two stages: first, by identifying the elements of the boundary; then seeing if the boundary is relevant.

A clear boundary gives everyone in the group and all stakeholders a clear understanding of what the problem is.

If the problem boundary has been provided by others, it will reflect their own biases and concerns and may in itself be part of the problem.

How to analyse the problem boundary

1. List the different dimensions of the problem. For example, if the statement is: "How to improve the mail room to make it more efficient", the dimensions could be:
    a. What does more efficient mean?
    b. Which mail room?
    c. Staffing
    d. Equipment
2. For each dimension, list the aspects that are in scope and the items that are out of scope. An example of this for the first three dimensions is shown below:

Dimension	In scope	Out of scope
Efficient	Reduce errors	Increase budget
	Quicker time	
Mail room	Head office, division A	All other divisions
		All other sites
		Increased office space
Staffing	Job allocation	Redundancies
	Rostering	Recruitment processes
	Training	More overtime
	Documentation for staff	

3. Once this table has been completed, discuss with all stakeholders if the boundaries for each item is relevant. Look for ways that the boundary can be relaxed. For example, management may have specified that no additional overtime is available, however the project team may be able to build a good business case that shows paying for some short-term overtime could result in much greater efficiency gains in the longer term.

19. Ideal Final Result

Ideal Final Result (IFR) is a description of the best possible solution for the problem situation, regardless of the resources or constraints of the original problem.

An Ideal Final result has:

- ❒ all the benefits,
- ❒ none of the disadvantages, and
- ❒ none of the costs of the original situation.

An Ideal Final result is an ideal system that is pure function because:

- ❒ it occupies no space,
- ❒ it has no weight,
- ❒ it requires no labor,
- ❒ it requires no maintenance,
- ❒ it delivers all the benefits without any disadvantages.

Using the Ideal Final Result method

1. Describe to the group what an IFR is. It may help to explain the reasons for thinking in this way – it helps to remove the psychological barriers many people have.
2. Discuss and record what the situation would look like as an IFR.
3. For each aspect of the IFR, ask the question: "how might we be able to achieve that"? If it is impossible (as most will be), ask the follow up question, "how can we get as close as possible to achieving this"?

For example, one aspect of the IFR from a team working in the insurance industry may be that "claims are processed instantly". If claims currently take 2 weeks, this may seem like an impossible goal. However, it may open people's thought to other solutions such as a self-service, automated computer system that provides near instantaneous results.

DIFFERENT PERSPECTIVES

It is natural that we all tend to see the world from our own perspective. It is easy to fall into the trap of believing that everyone else sees things in exactly the same way that we do. Of course, that is not the case. The techniques in this section help us see the problem and possible solutions from different perspectives.

20. Observer and Merged Viewpoints

A problem can be viewed from two distinctive viewpoints, an observers and a merged:

The observers viewpoint, is when a problem is approached with imagination and observation (the object being something you see or hear) with thoughts such as:

- ❒ Let's look at this objectively.
- ❒ We need to put this in perspective
- ❒ Just look at the facts
- ❒ Don't get emotional about this
- ❒ Take a step back and look at the big picture

The merged viewpoint is when you are the object or person involved. You then try and imagine what it would be like to be that object or person. You see, hear and feel as the subject would. People may say:

- ❒ What would it be like in her shoes?
- ❒ Let's look at it through his eyes.
- ❒ Imagine if you were that part as it moves through the factory.

The merged viewpoint is an involved state. You need to intellectually and emotionally become that object or person to experience its role and therefore getting ideas about how it may operate better.

Using Observer and Merged Viewpoints

1. With your group, identify the different objects or people involved in the process.
2. One by one, engage in a group discussion about what it would be like to be that person or object.
3. Another idea is to get each person to take on one role, privately think about how they might view the situation, and then act out a scenario to guide the group discussion.

21. Problem Reversal

Problem Reversal[6] is based on the view that the world is full of opposites and that any attribute, concept or idea is meaningless without its opposite.

Using Problem Reversal

Here are six ideas you can use to reverse the problem. Have some fun with the approach, write down all the thoughts that come from it, then later you can look back and see if any of the ideas have merit for further analysis.

1. State your problem in reverse. Change a positive statement into a negative one.

   For example, if you are dealing with customer service issues, list all the ways you could make customer service bad.

2. Figure out what everybody else is not doing.

   For example Dell builds their computers to order instead of holding inventory on as-built computers.

3. Use the "What If" Compass

   Ask what if …….. and add in one or more opposite actions. For example, what if we made it cheaper / more expensive? What if we made it bigger / smaller? What if it was simpler / more complex? What if we could personalise / de-personalise the experience?

4. Change the direction or location of your perspective

   Climb a ladder (safely) to look at your office space from above. Walk around the factory. Sit in the waiting area at reception and watch customers entering and leaving.

5. Flip-flop results

   Think about the results that you want and reverse them. Do you want increased sales? How could you go about decreasing them?

6. Turn defeat into victory or victory into defeat

   Look for the positive aspects in any bad situation. For example, if you just hear that you have lost a major client, list the benefits of engaging with new potential customers.

Reversing the Reversal

Problem reversal is a good way of getting people to think of ways of doing things badly and making the situation worse. If you can recognise why it has been made worse, then you can re-reverse it to identify ways in which the situation could be made better.

For example, we can sometimes be constrained in our thinking on ‘how to get rich’ but very little effort into ‘how not to become poor. By being forced to think about ‘what would make me poor?’ and then re-reversing that to say: ‘and so what would prevent me from becoming poor will give a very different perspective than directly addressing: ‘how to get rich?

22. Six Thinking Hats

Early in the 1980s Dr. Edward de Bono invented the Six Thinking Hats method.

- The white hat covers facts, figures, information needs and gaps.
- The red hat covers intuition, feelings and emotions.
- The black hat is the hat of judgment and caution.
- The yellow hat is concerned with the positive things that can happen both in the future or in the past.
- The green hat is the hat of creativity, alternatives, proposals, what is interesting, provocations and changes
- The blue hat is the overview or process control hat. It looks not at the subject itself but at the 'thinking' about the subject.

The central idea behind the Six Thinking Hats method, is to encourage people to consciously adopt different thinking modes.

23. Exaggeration

Often people have mindsets that are restricted by the scale of a problem. A solution that might be appropriate in a crisis may not be considered in more normal situations.

To test your assumptions about a problem, think about what would be appropriate if the problem were of a different order of magnitude. Exaggerated solutions can sometimes be applied directly, although more commonly they may suggest other ideas that would be acceptable.

For example, imagine you are looking for ways to prevent vandalism by youngsters. Someone suggests: ‘Keep them in after school’.

You could build on this idea by exaggerating it in various ways. For example, ‘Keep them in permanently’ that trigger the idea of giving them a permanent role (such as a school monitor). This could also be minimised to ‘Gentle restraint after school’ suggesting ideas such as an after school club that they may actually enjoy.

1. Define the problem to be addressed or the idea you need to develop
2. Make a list of all the component parts of the idea or if a problem, its objectives and constraints.
3. Choose one component from the list in 2.
4. Develop ways of exaggerating it (maximise or minimise) and note them on a separate sheet.
5. Note down all ideas you have from 4.
6. Repeat ad lib from step 3.

24. Analogies

You use an analogy when you say that something is like something else (in some respects but not in others). For example: a jumbo jet is like an albatross in that they both fly, they both have wings, they can both travel for a long way without landing, and both can sense where they are going; but they are unlike in that they have different means of propulsion, are made of different materials, etc.

Analogies are a key feature of many approaches to creativity. Often analogies are used very informally: 'This problem makes me think of X (analogy) - that suggests to me that maybe we could try Y (idea drawn from analogy X)'.

1. Identify the topic you want ideas for and try to find a core verb phrase that captures the essential functional nature of what you are looking for (for example, 'How to make X' or 'How to prevent Y').
2. Generate a list of items (people, situations, objects, processes, actions, places) that is 'like' it in some way.
3. Choose one of these analogies that seems interesting - preferably one from a different domain - a biological analogy for a mechanical problem for example.
4. Describe the analogy and look for ideas relevant to your problem.

BRAINSTORMING

25. Classic Brainstorming

Brainstorming is a common activity however it is often not done well. Unless it is well structured and facilitated, a brainstorming session can easily get sidetracked. Here are the steps to run a classic brainstorming session.

1. Arrange the meeting for a group of the right size and makeup (typically 5-20 people).
2. Write the initial topic on a flipchart or whiteboard. The better defined, and more clearly stated the problem, the better the session tends to be.
3. Make sure that everyone understands the problem or issue.
4. Review the ground rules
   - Avoid criticising ideas. All ideas are equally valid.
   - Aim for quantity – not quality. If you limit the number of ideas people will start to judge the ideas and only put in their 'best' or more often than not, the least radical and new.
   - Free-wheeling. Don't discuss or censor any ideas, keep the meeting flowing.
   - Encourage people to piggy-back on ideas to create new ones.
5. The facilitator should explain and enforce the rules and write down all the ideas as they occur (or use another person as the scribe).
6. Generate ideas - either in an unstructured way (anyone can say an idea at any time) or structure (going round the table, allowing people to pass if they have no new ideas).
7. Clarify and conclude the session. Ideas that are identical can be combined, all others should be kept. It is useful to get a consensus of which ideas should be looked at further or what the next action and timescale is.

Clarification of Ideas

Asking people to yell out ideas and then writing them up on the board is easiest part of brainstorming. The most difficult part can be controlling the direction of the discussion, encouraging equal participation and clarifying people's ideas.

The things that people say are often different from what they mean.

The following clarification techniques will help others understand what the point really means and it often helps the person speaking to organise their own thoughts as well.

These can be powerful questions and so it is important that they are asked with the intention of reaching a deep understanding of the idea.

The following table gives some examples of statements, and how they might be clarified.

Example.	Clarification Question
I'm inadequate.	To do what?
Things get me down.	What things?
I can deal with it.	How, specifically?
There is no respect here.	Who is not respecting whom? In what way?
I can't do any more work.	What is preventing you?
People should know better.	Who, exactly, says they should?
The photocopiers never work.	Are there any times when they are working? When specifically have you noticed that they are broken?
My manager lied to me again.	When and in what circumstances did the manager lie to you in the past?
I am late with the report because the photocopier broke down.	Is that the only reason?
I know what you are thinking.	How do you know that?

26. Value Brainstorming

This is a form of brainstorming where the process is the same – but the content is different. Instead of brainstorming issues, problems, or potential solutions, the group brainstorms a list of things they value.

Examples might be honesty, trustworthiness, recognition, etc.

Having a shared discussion of values is often a good way to start a change initiative because in general people value the same things. It is a good way of getting everyone on the "same page".

27. Imaginary Brainstorming

Imaginary Brainstorming also follows the same ground rules as Classic Brainstorming – but with an imaginary problem statement.

Consider the problem:

How do we process an insurance claim in half the time?

1. Identify the subject (who is acting), the verb (the action) and the object (what is being acted on).
2. List alternatives for each component as shown in the following table

Subject	Verb	Object
We	Process	An insurance claim
Children	Write	An assignment
The Prime Minister	Record	A proposal
Superman	Enter	A resume
Teachers	Present	A letter

1. Formulate a new problem statement, substituting one or more of the imaginary elements.

   For example: How do teachers write a resume in half the time.

2. Brainstorm ideas for the imaginary problem.
3. Apply ideas from the imaginary brainstorming back to the real problem statement.
4. Analyse all of the ideas (real, imaginary and combined) and take forward those of most interest.

28. RoleStorming

RoleStorming is an evolution of Brainstorming, where you take on another identity to view problems and solutions from a different standpoint. People may be less embarrassed and more willing to provide unusual or 'off the wall' ideas if they are presented by a nameless person.

1. Ask each person to invent an identity or use that of someone they know. They could also use a super hero such as the Incredible Hulk, Batman, James Bond, Wonder Woman, Sherlock Holmes, or Spiderman. Alternatively, you could pre-prepare some roles with background information and allocate one to each person.
2. Use traditional brainstorming as 'this person would suggest…..'

This technique is good for creating an atmosphere of light-hearted fun in which energy is high and fantasy and metaphor are acceptable.

This helps people to think outside of the norm and allows people to express more unusual ideas that they might not normally express.

29. Trigger Sessions

Trigger Sessions are a form of brainstorming. This is a good way of getting lots of ideas down with an inexperienced facilitator.

1. The problem owner defines the problem
2. Each member of group writes down his ideas in shorthand (2 minutes only)
3. One member reads out his list - others silently cross out ideas read out and write down "Hitch-hiked "ideas

4. The second member reads out his list of ideas not already covered, followed in turn by other members
5. The last member reads out his original list and his “Hitch-hiked” list and procedure is repeated counter current (ie, if there are 6 people, the order goes 1,2,3,4,5,6,5,4,3,2,1,2,3,4,5,6...)

Continue as long as people are writing down more hitch-hiked ideas. Everyone’s paper is then collected and can be typed up into a single list of ideas - all duplicates should have been crossed out during the session.

30. Brainwriting

BrainWriting is a technique similar to Brainstorming. However, instead of the ideas being called out, all ideas are recorded by the individual who thought of them. They are then passed on to the next person who uses them as a trigger for their own ideas. Examples of this include;

BrainWriting Pool

Each person, using Post-it notes or small cards, writes down ideas, and places them in the centre of the table. Everyone is free to pull out one or more of these ideas for inspiration. Team members can create new ideas, variations or piggyback on existing ideas.

As a variation on the BrainWriting Pool, the facilitator can pre-prepare the cards with headings on them and ask each person to write ideas relevant to that topic.

BrainWriting 6-3-5

The name Brainwriting 6-3-5 comes from the process of having 6 people write 3 ideas in 5 minutes. Each person has a blank 6-3-5 worksheet (below)

Problem Statement: How to...			
	Idea 1	Idea 2	Idea 3
1			
2			
3			
4			
5			
6			

Everyone writes the problem statement at the top of their worksheet (word for word from an agreed problem definition). They then write 3 ideas on the top row of the worksheet in 5 minutes in a complete and concise sentence (6-10 words). At the end of 5 minutes (or when everyone has finished writing) pass the worksheet to the person on your right. You then add three more ideas. The process continues until the worksheet is completed.

There will now be a total of 108 ideas on the 6 worksheets. These can now be assessed.

Idea Card Method

Each person, using Post-it notes or small cards, writes down ideas, and places them next to the person on his or her right. Each person draws a card from there neighbours pile as needed for inspiration. Once the idea has been used, it is passed on to the person on the right along with any new, variations or piggybacked ideas.

31. Force-Fit Game

The force-fit game was devised by Helmut Schlicksupp.

As a rule competition is avoided in creativity because it is potentially disruptive and can cause conflict. However, a small amount of pressure can benefit creativity. For the game to be useful, a light-hearted frame of mind is essential, with no significant losers.

1. Make up two groups, say A and B, with 2 – 8 individuals in each. The administrator should displays and reads out a problem statement. This is followed by the basic round, which consists of steps 2 – 4.
2. Group A proposes an idea distant to the problem (which the administrator records on a flipchart).
3. Group B spends 2 minutes developing a realistic solution founded on this remote idea (the administrator records the solution on the flip-chart).
4. If Group B's solution is plausible they gain a point in this round, if not the Group A obtains the point. (This appraisal must be kept light-hearted to avoid creating an atmosphere that is too competitive).
5. Although the groups could alternate roles after every round (steps 2-4), it would be quicker if they swapped every say, 5 rounds, this way Group A can contemplate their next remote idea whilst B are solving their previous one.
6. After a predefined period of time has lapsed (say 30 minutes), or a pre-agreed number of rounds, the game concludes and whichever group has the most points wins.
7. Afterwards the ideas are evaluated and appraised as required.
8. With a well-practiced group, the solution-generating step offers an opening to practice skilful speedy, off-the cuff use of creativity techniques.

32. Nominal Group Technique

Nominal Group Technique (Delbecq and Van de Ven (1971), is a structured from Brainstorming with up to 10 participants and an experienced facilitator (or up to 3-4 groups of up to 10 participants, with a spokesperson for each group and a single facilitator overall). With this technique, the generation of ideas is anonymous and in writing, rather than the interactive classic brainstorming method. This method is based on three fundamental, research-based principles:

- ‘Nominal’ Groups are thought to generate higher quality ideas than interacting groups. The method promotes a sense of involvement and motivation within the group.
- The ‘round robin’ element provides encouragement and equal opportunities for all members to contribute.
- Reliable communication requires that the recipient’s understanding of a message be checked with the sender, especially in the case of ‘new ideas’ being put forward. Checks for accurate communication are built into the technique.

1. The facilitator states the problem and participants are given up to 10 minutes to write down any initial ideas privately. The facilitator also writes down his own ideas.
2. Each person then reads out one idea that is written on a on a flip chart and numbered sequentially. This is repeated going around the groups until all ideas are exhausted and any duplicates are eliminated.
3. The ideas are worked through systematically and a discussion is held to clarify ideas and check communication. Discussions should be calm and controlled to aid clarification of the idea - they are not heated debates
4. A preliminary anonymous vote is taken.
5. Further discussion and voting, takes place if the voting is not consistent.

33. Nominal-Interacting Technique

The Nominal-Interacting Technique is so called as it alternates between ‘nominal’ and ‘interacting’ modes. The ‘nominal’ mode allows individual perspectives on the problem to be shared. Refreshment breaks occur at appropriate times when discussion between participants is relevant and helpful. Participants are encouraged to share opinions, exchange facts and challenge views, in contrast with the non-interactive ‘nominal group’ mode.

An example of how this might work is:

1. Outline the problem
2. Private, contemplation of ideas
3. Round-robin collation and displaying of ideas
4. Break (where differences of opinions are identified)
5. Whole group discusses the displayed ideas
6. Break (differences of opinion readdressed)
7. First attempt at prioritising ideas
8. Break (final differences of opinion within the group are addressed)
9. Final prioritisation of ideas

Votes are confidential, however individuals can request one another’s ranking and its justification

METHODS OF RECORDING IDEAS

34. Mind Mapping

Mind mapping, developed by Tony Buzan, also has been called 'spider diagrams' represents ideas, notes, information, etc. in far-reaching tree-diagrams.

To draw a mind-map:

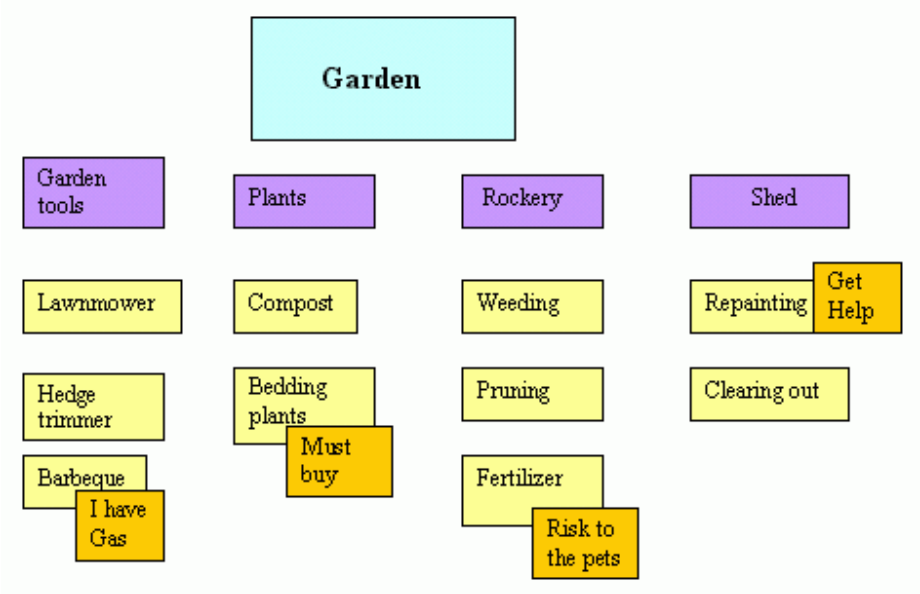
1. Layout a large sheet of paper in landscape and write a concise heading for the overall theme in the centre of the page.
2. For each major sub-topic or cluster of material, start a new major branch from the central theme, and label it.
3. Each sub-sub-topic or sub-cluster forms a subordinate branch to the appropriate main branch
4. Carry on in this way for ever finer sub-branches

It may be appropriate to put an item in more than one place, cross-link it to several other items or show relationships between items on different branches. Coding the colour, type of writing etc can do this. Alternatively you drawings in place of writing may help bring the diagram to life.

35. Card Story Boards

This is an 'idea' organizing' method using tree logic similar to Mindmapping.

Cards are arranged in a tabular format – a simple row of header cards (or possibly header and sub-header cards as in the example below), each with a column of idea cards below it, perhaps with added action or comment notes attached (index cards or Post-it slips could be used):



One possible approach is as follows:

1. The group leader describes the problem to the participants; they then suggest possible categories of solutions. These are written on cards and displayed as a row of ‘headers’.
2. The group leader selects a particular ‘header’ and participants write ideas relating to that header on cards. These idea-cards are displayed under the relevant header, followed by the leader posing provocative questions to prompt further idea-cards under that header. This process is repeated with other headers, until there is an adequate supply of ideas.
3. Now, rank the idea cards via a suitable voting method and prioritize them under each header (or sub-header). The best three in each category are discussed further, and ranked amongst themselves

36. Gallery method

The Gallery method is a mixture of physical and mental activity whilst generating ideas. The participants move past the ideas (as in an art gallery) rather than the ideas moving past the participants.

1. Position flip chart paper round the room, with the problem statement displayed so everyone can see it (groups should be between 5-7 people). The statement should be discussed briefly for clarification.
2. Each group member chooses a sheet and privately writes ideas onto it (they can write directly onto the sheets, or on post-its and stick these on the flip-charts). The writing should be large, clear and concise to enable other to read it easily.
3. When the group appears to be running low on ideas, they should be encouraged to take a break, walk around the room viewing ideas on the other flip charts and making notes. All participants should have the break at the same time, so that certain members of the groups do not feel that others are looking over their shoulder whilst they are still generating ideas.
4. Participants return to their own work areas and continue generating their own ideas or building on the ideas of others.
5. Ideas are then pooled together, sorted and classified.

37. KJ-Method

The KJ Method is similar to mind-mapping, except it uses nested clusters rather than a tree structure

1. Card making: all relevant facts and information are written on individual cards and collated (Post-its would do).
2. Grouping and naming: The cards are shuffled, spread out and read carefully. Cards that look as though they belong together should be grouped, ignoring any ‘oddities’. For each group write an apt title and place it on top of its group of cards. Repeat the group making, using new titles and any ‘oddities’ to create higher-level groups. If you have more than about 10 groups, repeat this iterative process at yet higher levels.

3. Redistribution: The cards are collected and reallocated in order than no one is given their own cards. One card is read out, and all contributors look through the cards in their own ‘hand’ of cards, and find any that seem to go with the one read out, so building a ‘group’. A name is selected for the set that clearly portrays the contents of the cards in the set, but is neither too broad nor a simple aggregation of the cards in the group
4. Chart making: Now that you have less than 10 groups, some of which may contain sub-groups, sub-sub-groups, etc arrange them carefully on a large sheet of paper in a spatial pattern that helps you to appreciate the overall picture.
5. Explanation: Now try to express what the chart means to you, writing notes as you go and being careful to differentiate personal interpretations from the facts contained in the chart. Ideas for the solution are often developed whilst explaining the structure of the problem.

Multiple Cycles, The basic cycle can be used to build up a problem-solving method through repetition.

A simple two-cycle version will do it once for problem definition and once for problem solution.

ATTRIBUTES

38. Attribute Listing

Attribute listing is a technique from the early 1930's which

- takes an existing product or system,
- breaks it into parts,
- identifies various ways of achieving each part, and then
- recombines these to identify new forms of the product or system.

A new kind of pen or project management method probably has much the same major functional elements as any other kind of pen or project management method, but with some important difference in the way the elements are achieved or put together. So to generate a new way of doing something, you could list all the key attributes of current approaches, and try to improve on some of them. So:

1. Identify the product or process you are dissatisfied with or wish to improve.
2. List its attributes. For a simple physical object like a pen, this might include: Material, Shape, Target market, Colours, Textures, etc.
3. Choose, say, 7-8 of these attributes that seem particularly interesting or important.
4. Identify alternative ways to achieve each attribute (e.g. different shapes: cylindrical cubic, multi-faceted….), either by conventional enquiry, or via any idea-generating technique.
5. Combine one or more of these alternative ways of achieving the required attributes, and see if you can come up with a new approach to the product or process you were working on.

A drawback of this approach is that it can generate a very large number of options. This can be addressed in two ways:

- Use intuition to select suitable or interesting combinations
- Use a random generator to produce random combinations

Either method can then be used to stimulate new ideas.

39. Circle of Opportunity

Circle of Opportunity is technique developed by Michael Michalko and is defined in detail in his book Thinkertoys.

The process involves trying to find a connection or association between two random attributes of an issue or problem.

1. State the Challenge
2. Draw a circle and number it like a clock (number 1 through 12)
3. Select any 12 attributes

4. Throw a pair of dice to select the first attribute
5. Throw a pair of dice to select the second attribute
6. Consider the attributes, both separately, and combined, to find an association between the two attributes.
7. Search for a link between your association and your challenge

40. SCAMPER

The SCAMPER technique (created by Bob Eberle and written about by Michael Michalko) in his book, Thinkertoys, will assist you in thinking of changes you can make to an existing product to create a new one via a checklist, these can either be used directly or as starting points for lateral thinking.

The changes SCAMPER stands for are:

S - Substitute - components, materials, people

C - Combine - mix, combine with other assemblies or services, integrate

A - Adapt - alter, change function, use part of another element

M - Modify - increase or reduce in scale, change shape, modify attributes (e.g. colour)

P - Put to another use

E - Eliminate - remove elements, simplify, reduce to core functionality

R - Reverse - turn inside out or upside down.

For example, imagine that you are a producer of computers and printers, and you are looking for new products.

- **Substitute** – use of high tech materials for specific markets – use high-speed components?
- **Combine** – integrate computer and printer, printer and scanner
- **Adapt** – put high quality ink in printer, use high quality paper
- **Modify** – produce different shape, size and design of printer and computer
- **Put to another use** – printers as photocopies or fax machines
- **Eliminate** – eliminate speakers, colour screens, colour ink etc…
- **Reverse** – make computer desks as well as computers and printers, or computer chairs etc…

Many of the ideas may be unfeasible or may not suit the equipment used by the manufacturer, but some ideas could be good starting points for discussion of new products.

41. Morphological Forced Connections

The general use of a matrix in Creativity and Innovation is often known as a "Morphological" method. One method of attribute listing is contained in The Universal

Traveler which authors Koberg and Bagnall call "Morphological Forced Connections". They give the following rules for their "foolproof invention-finding scheme" along with an example showing how their scheme works. Here it is:

1. List the attributes of the situation.
2. Below each attribute, place as many alternates as you can think of
3. When completed, make many random runs through the alternates, picking up a different one from each column and assembling the combinations into entirely new forms of your original subject.

After all, inventions are often new ways of combining old bits and pieces.

Shape / Cylinder	Material	Cap	Ink Source
Faceted	Metal	Attached Cap	No Cartridge
Square	Glass	No Cap	Permanent
Beaded	Wood	Retracts	Paper Cartridge
Sculptured	Paper	Cleaning Cap	Cartridge made of ink

Example Invention: An environmental Cube Pen; one corner writes, leaving six faces for ads, calendars, photos, etc. using only wood and paper...

STIMULUS

42. Excursions

Outside excursions are where you ask the group to go outside and ask them to focus on something that grabs their attention. They then need to talk about this object when they return. It is best if they asked lots of questions about life as that object, what its role is, how it feels etc without linking it to the problem. Take everyone though this, possibly taking notes, and then remind them of the problem and the facilitator goes over the comments made whilst they in/out listen to link back to the problem.

Excursions can also become imaginary. For example, people could be asked to describe their:

- Favourite vacation
- Favourite activity
- Favourite place
- Favourite smell & associations that go with it
- Most rewarding experience
- Favourite sound & associations that go with it.
- Component excursions

It is sometimes very effective to get the resources to be various components of the problem. For example, when looking at "How to get a seal around a moving wire" one person could be the wire, another the seal, another gas trying to get through the seal etc.

43. Random Stimuli

Several authors on creativity recommend the use of random stimuli of various kinds, which suggests there is a fundamental significance for being open to possibilities from everywhere. Although the concept is often used informally, a formal approach may look like this:

1. Identify your criteria for ideas. What is the problem you would like to solve or opportunity you would like to take?
2. Pick a stimulus at random, by looking or listening to everything around you indoors and outdoors, something that catches your attention, opening a newspaper, dictionary, catalogue, book of pictures, throwing a dice at random or any other method that appeals to you.
3. Relate this random stimulus back to your original problem.
4. Should a random stimulus fail to work, pick another and keep trying.

You can also combine two random words. Try to create an unusual phrase, for example if you observed a school and a plane flying overhead, that might yield phrases such ‘flying school’ or ‘teaching flying’. You could free associate further phrase combinations from the one created so ‘flying school’ might generate ‘elevated learning’, etc.

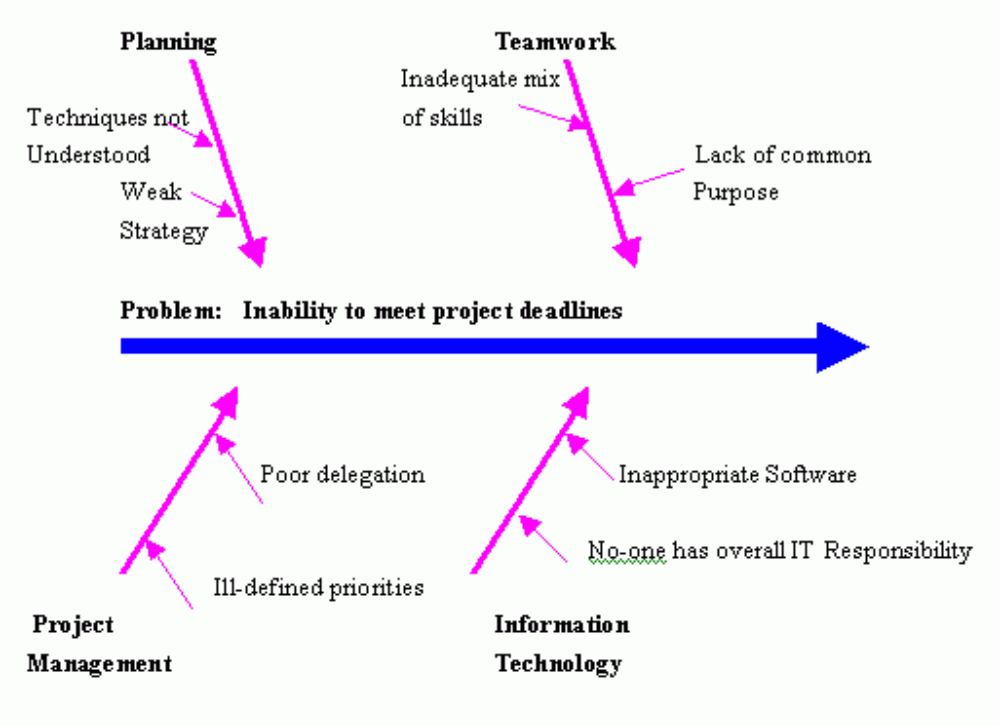
FINDING CAUSES OF A PROBLEM

44. Fishbone Diagram

The fishbone diagram (see below) originally developed by Professor Kaoru Ishikawa, is often referred to as an Ishikawa Diagram. The technique can help to structure the process of identifying possible causes of a problem.

The diagram encourages the development of an in depth and objective representation ensuring all participants keep on track. It discourages partial or premature solutions, and shows the relative importance and inter-relationships between different parts of a problem.

The method is ideally organized over a number of meetings, enabling the team to become deeply immersed in the problem. Fresh suggestions regarding possible causes can arise during the break and members are more likely to forget who originated every idea, thus making subsequent discussions less inhibited.



The procedure is as follows:

1. On a broad sheet of paper, draw a long arrow horizontally across the middle of the page pointing to the right, and label the arrowhead with the title of the issue to be explained. This is the 'backbone' of the 'fish'.
2. Draw spurs coming off the 'backbone' at about 45 degrees, one for every likely cause of the problem that the group can think of and label each at its outer end. Add sub-spurs to represent subsidiary causes. Highlight any causes that appear more than once – they may be significant.

3. Ideally, it is eventually re-drawn so that position along the backbone reflects the relative importance of the different parts of the problem, with the most important at the head end.
4. Circle anything that seems to be a ‘key’ cause, so you can concentrate on it subsequently.

45. Why Why Why

This is a very simple technique to use – yet it can be extremely powerful.

For any given problem, keep asking “why”:

- Why did A happen? Because of B.
- Why did B happen? Because of C.
- Why did C happen? Because of D.
- And so on.

Step Five: Selection & Evaluation

Once you have come up with a variety of possible solutions to your problem, it's time to decide on the best one. The top solution may be obvious, if it is not, then it is important to think through the criteria you will use to select the best idea.

When you have chosen an idea and developed it as far as possible, then it is essential to evaluate it to see if it is good enough to be worth using. It is important not to let your ego get in the way of common sense. If your idea does not give big enough benefit, then either see if you can generate more ideas, or restart the whole process. You can waste years of your life developing creative ideas that no one wants.

46. Anonymous Voting

The reason for using anonymity in a creativity method is to encourage participants to feel safe enough to take creative risks. It is useful for groups that have significant pressures or anxieties between participants. It is a basic feature of all nominal group methods and is an excellent way of protecting people against accidental or unintentional inter-personal pressures, in climates where there is basic goodwill towards differences of viewpoint, and a commitment to respecting them.

The method assumes that you start with a publicly visible list of perhaps 30-100 serially numbered ideas from some idea generation process.

1. The leader indicates the length of short-list each member is to produce (usually 5-9 items or 10-15% of the number of ideas on the list), and the ranking convention (e.g. 'A' is most preferred, followed by 'B', 'C', etc.).
2. Members privately select their own short-list of ideas. They write each idea they select on a card with its serial list number.
3. They decide how they want to order the ideas on their short list, and write the appropriate rank letter ('A', 'B', 'C', … etc.) on each card.
4. The cards are handed in face down to the leader, who gathers everybody's cards, shuffles them, and tallies the votes on a flip-chart by idea number. In this way, the vote remains anonymous.

47. Comparison tables

The table below shows a method of comparing small numbers of alternatives in terms of multiple properties (e.g. as used in many of the 'best buy' magazines).

An alternative option of a series of imaginary holidays appears on the left of the table, with a series of criteria along the top (happy kids, low cost, etc.) on which they are to be compared in order of importance to the decision maker (as indicated by the 'weight' to be attached to each criterion). The main body of the table contains raw and weighted scores for each alternative on each criterion. This comparison uses ratings from 1 to 5 (the 'raw score' columns), plus a numerical 'weight' for each criterion (also 1 to 5), so that weighted scores can in theory go from 1 (raw score = 1; weight=1) to 25 (raw score = 5; weight = 5).

Options	Happy Kids (weight=5)		Low Cost (weight=3)		Happy Adults (weight=2)		Easy Travel (weight=1)		Totals	
	Raw score	Weighted score: x5	Raw score	Weighted Score: x3	Raw score	Weighted score: x2	Raw score	Weighted score: x1	Sum of raw scores	Sum of weighted score
Walking Holiday	1	5	3	9	4	8	4	4	12	26
Cruise Holiday	2	10	1	3	2	4	3	3	8	20
Beach Holiday	4	20	1	3	3	6	2	2	10	31
Stay at home	1	5	5	15	2	4	5	5	13	29
Holiday Camp	5	25	1	3	1	2	2	2	9	32

During the final comparison, the ‘weighted value’ of a given option on a given criterion is the raw score for that option on that criterion, multiplied by the weight of that criterion.

Such technicalities can make it quite difficult to see what going on unless one option is ‘head and shoulders’ above the rest. Sensitivity to slight changes also makes this an easy method to ‘rig’ so as to manufacture an impressive-looking self-objective case that seems to support an option that you happen to be in favour of!

48. Do Nothing

We often make the assumption that something must be done about a particular issue / problem, but what happens if we "do nothing"? Stop and think for a while, either alone or as a group, about the outcomes if nothing were done.

This usually leads to one of three possible outcomes;

- The problem doesn't need to be solved
- You will have a better idea of the benefits of solving the problem
- You will have generated some alternative problems to solve

49. Snowball Technique

This involves concentrating groups of ideas pertaining to the same problem and assigning them a theme.

1. One slip of paper (or ‘post-its’) is used per idea generated or possible solution offered

2. A meeting is set up of up to 5 people. The slips of paper are viewed and then grouped ‘like with like’.
3. Duplicates can be created if the idea/solution is relevant to more than one group
4. Patterns and relationships in the groups are observed

50. Successive Element Integration

Successive Element Integration generates solutions by gradually developing all ideas into lists of ideas – a form of constructive evaluation, allowing every idea a value.

1. A group of approximately 6 individually jot down their own list of ideas for solving a specific problem
2. Two members of each group read out one of their ideas, the remaining members try to integrate the two offered ideas into a third idea (this is added to the overall list)
3. A third member of the group offers an idea, which is integrated by the other members of the group with the previous ideas to create a fourth idea. This stage is repeated until all ideas are exhausted and detailed on the overall list.
4. Overall, this is a good method for generating ideas
5. In the latter stages of idea generating, the ‘best of ideas’ can be integrated with each other to create a list of exceptional ideas

The advantages of this method are

- The skill of building upon other peoples ideas
- Encourages constructive convergence
- Ensures all ideas are carefully considered

51. Sticking Dots

A popular, quick method for determining priorities by voting.

1. Ideas are itemised clearly on a flip chart (or similar aid).
2. Nameless voting tends to work best.
3. Give each group a different coloured set of dots, i.e. group A have red dots.
4. Give each individual or group a number of dots (say 10 each)
5. Allow the group time to deliberate over the ideas they wish to vote for.
6. Once all the groups are ready, one person from the group sticks their dots by their preferred top ideas.
7. In some variations, there is no maximum number of votes an individual / group can give to one idea.
8. Once all the dots are placed, all the groups enter into a discussion on any patterns, and general observations.
9. A short-list of the top 5 is made

This is not a deeply analytic method, but a short, sharp measure of the current thinking of the task in hand

52. Plusses Potentials and Concerns

Plusses, potentials and concerns are a technique that constructively evaluates an idea.

The development of each idea is quite time consuming and therefore the technique is more appropriate for use on a short-list of ideas than for general screening of large numbers of ideas.

Prepare your ideas into a form such as: 'What I see myself/us doing is…' Then list:

1. 3 or more 'plusses' (Strong points)
2. 3 or more 'potentials' (Spin-offs, researchable possibilities, etc)
3. Your 'concerns' about the idea, using the layout: 'How to…?' And putting them in order of importance.
4. Starting with the most important idea make notes on how you can overcome each concern (or at least the main ones).
5. Taking into account step 4, try to improve your original idea: for instance:
    - How to get people to understand it and become enthusiastic for it
    - Its advantages and disadvantages (and how to surmount the disadvantages);
    - The resources required (people, materials, money…)
    - How to pre-test it (e.g. are there particular times or locations you might use?)
    - How to identify when implementation is complete
6. In order to keep the momentum going, put in place the opening steps of a suitable action plan, with at least one step to be done within the next day.

Step Six: Planning

Now you have selected an idea, and are confident that your idea is worthwhile, this is the time to plan its implementation. The best way of doing this is to set this out as an Action Plan, which lays out the Who, What, When, Where, Why and How of making it work. For large projects it may be worth using more formal planning techniques.

53. Develop a POWERful solution

Use the acronym "POWER" to develop the selected solution into something more robust. POWER is short for:

- Postives - what's good about the idea?
- Objections - what's bad about it?
- What else? - what does it remind you of?
- Enhancements - how can what's good about it be made better?
- Remedies - how can the things that are bad about it be corrected?

54. Negative Brainstorming

Negative (or Reverse) brainstorming requires a significant level of effort analysing a final short-list (rather the initial mass) of existing ideas. Negative brainstorming consists of a conventional BrainStorming session (or any other suitable idea-generation method) that is applied to questions such as: 'What could go wrong with this project?'

Often referred to as the 'tear-down' method, because of its negativity can be advantageous and seen in a positive light when training implementers to deal with hostile criticism. However, even this example needs to be followed up with a constructive debrief to ensure the implementer feels encouraged and secure.

1. Brainstorm Displaying a comment such as 'How not to solve the problem, i.e. how to really mess up implementing project X' will generate much humour and unexpected ideas (which should be noted)
2. Identify a cluster i.e. comments said in different ways that mean the same thing 'Staff only'; 'don't tell non-staff', reverse the cluster to give a single positive comment e.g. 'tell those involved'
3. Repeat step 2, ad lib as you go

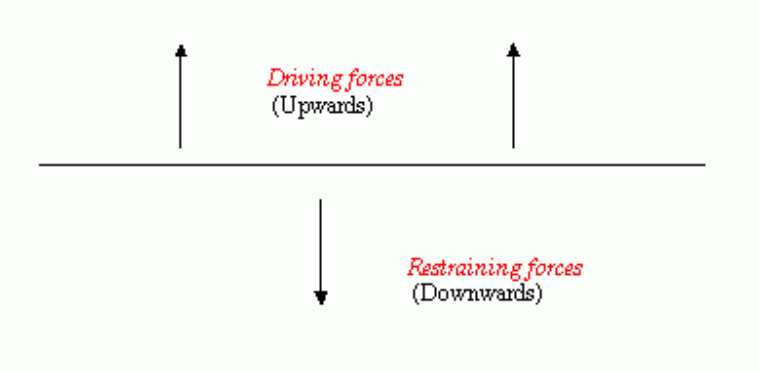
As a variation to this method, you can plot the ideas into a matrix. On one dimension is the question "How likely is this to occur?" On the other dimension is the question "If this did occur, how bad would the impact be?"

55. Force-Field Analysis

Force-field analysis is a technique developed by Kurt Lewin (1890-1947), a pioneer in the field of social sciences, and characterises the conflicting forces in a situation. The recommended approach to this method is to outline the points involved in a problematic

situations at the problem exploration stage, followed by recognising factors likely to help or hinder at the action planning and implementation stages.

1. Members of the group identify and list the driving and restraining forces (perhaps using a suitable brainstorming or brainwriting technique) openly discussing their understanding of them.
2. The group leader is representative of the current position as a horizontal line across the middle of the page. The leader will draw all the driving forces as arrows that either pull or push the line upwards, and all the restraining forces as arrows that pull or push the line downwards (see below). Where driving and restraining are paired use arrow thickness to signify strength of impact of a force and arrow length to show how complicated it would be to adapt. It is normally best for the team to reach agreement on these details.



3. The diagram should then be used to find as many possible combinations of moving the centre line in the desired direction. Try to:
    a. Find ways to strengthen or add positive forces
    b. Find ways to weaken or remove negative forces
    c. Recognise that the negative forces are too strong and abandon the idea

Step 7: Sell Idea

Up to this stage you may have done all this work on your own or with a small team. Now you will have to sell the idea to the people who have to maintain it. This might be your boss, a bank manager or other people involved with the project.

In selling the project you will have to deal with not only the practicality of the project, but also things such internal politics, hidden fear of change, etc.

56. Factors in selling ideas

When 'selling' an idea or new concept to management, it would be prudent to bear in mind the following issues:

The Selling Context:

- Timing, includes large scale issues such as past company experiences with similar ideas, and smaller scale issues such as annual committee cycles, etc.
- Audience is there a possibility that the audience will be receptive to your suggestions and if so do they have the ability to do anything about it.
- Idea Champion will be a key person within a group that can actively support sponsorship.

The Selling Content:

- Use simple language, avoiding technical 'jargon' that the audience is unfamiliar with
- Use a clear statement of the need for the idea, providing the necessary facts that originally stimulated this need. Describe the problem you idea will solve and explain why it needs to be solved.
- Present both the pros and cons of your suggested idea, avoiding one-sided presentations that might distort the idea's worth.
- Provide evidence in recommendation of the idea, which shows why the idea will work and why it should be better than another idea. However, do not exaggerate its worth
- Stress Key points when selling the idea taking care to avoid unnecessary detail.
- Anticipate questions and develop responses and reactions to them.

Be persistent especially if you have faith in this idea, be willing to put in the effort but no matter what, do not become overly antagonistic.

57. Other Peoples Viewpoints

If anything concrete is to happen, the real 'last word' is that of the organisation and personnel whose approval and compliance are essential. Therefore it is vital to understand their viewpoints.

DeBono and others, suggest this exercise that is particularly suited to people problems where three or four parties have different views about a situation, and works well with a group of 16 or so. It proposes a means of achieving multiple perspectives on the issue under consideration.

1. Create a list of the key three or four people or roles in the problem area and get the client to describe the people and roles concerned and to answer enquiries.
2. Separating the group into small teams, allocate one role to each team then each group should attempt to 'get into the shoes' of its role, role-playing it in the full theatrical sense if they are inclined. The intention is to be able to look at the world from this party's viewpoint.
3. Either descriptively or as a role-play, each group should give a presentation of its characters viewpoint to the other groups. The viewpoint should comprise both personal and role-related issues. For instance any particular role may have some concerns to do with current projects, etc., and others to do with family and personal career, and yet others to do with attitudes, habits, prejudices, etc.
4. This can be taken on to a second stage by forming a series of negotiating teams where each has one representative from each of the original role teams. Each negotiating team has to try to reach agreement about the issue.
5. Finally each group reports back to the others on how they got on.
6. Take time out to carefully reflect on the events.
7. A fundamental negotiating technique is to try to spot areas of agreement, partial disagreement and major disagreement, then try to increase the un-controversial areas by attempting to reach agreement on the least tricky areas, where there is partial agreement, leaving the major disagreements till the end. Even in apparently impossible situations, this technique can be surprisingly productive.

58. Personal Balance Sheet

This Personal Balance Sheet technique by Janis and Mann is a form of Listing Pros and Cons. This was originally used by counsellors etc. for people to make a reasoned, public and recorded statement of why and individual was going to make a specific change (such as stop drinking or drugs) on the basis that it was then munch more difficult for a individual to renege later.

An example table

	Expected Gains		Expected Losses	
	For you	For others	For you	For others
Option 1				
Option 2				

59. Stakeholder Analysis

Stakeholder Analysis (Mason and Mitroff, 1981) looks at how groups of people might affect the outcomes of a proposal by the way they react. To identify stakeholders the following checklist may prove useful:

- ☐ Who are the sources of reaction or discontent to what is going on?
- ☐ Who have relevant positional responsibility?
- ☐ Who do others regard as 'important' actors'?
- ☐ Who participate in activities?
- ☐ Who shape or influence opinions about the issues involved?
- ☐ Who fall in demographic groups affected by the problem?
- ☐ Who have clear roles in the situation (e.g. customer, friend, adviser)?
- ☐ Who are in areas adjacent to the situation?

Using a matrix like the one below, stakeholders can be plotted and categorised both by the chance of their affecting the situation, and by the scale of impact they would have if they did. Should any quadrant in the matrix appear empty, check that you have really included everyone, or plot the scale of the stakeholders influence (high or low) against whether they would support or oppose your project.

	Unlikely	**Likely**
Impact high	Chairman of the Board Chief accountant	My manager Key customer
Impact low	Reprographics Department	My secretary

Listing any assumptions that stakeholders are making could prove helpful, carefully assess the list, especially in relation to the stakeholder for whom they have been derived. Ask yourself does this actor have any special power in the situation, and if so are there any of his or her assumptions that could have a considerable effect on your project? How could this stakeholder be influenced to change their point or course of action.

Step 8: Action

Finally, after all the creativity and preparation, comes action! This is where all the careful work and planning pays off. Now the action is securely under way, return to stage 1, Problem finding, to continue improving your idea.

60. Create an Action Plan

The final step translates the selected, developed solution into an action plan that may include, among other things:

- to do lists
- timelines and milestones
- lists of people who need to get involved
- lists of issues that need further work

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