

# ANALYSING AND SOLVING PROBLEMS

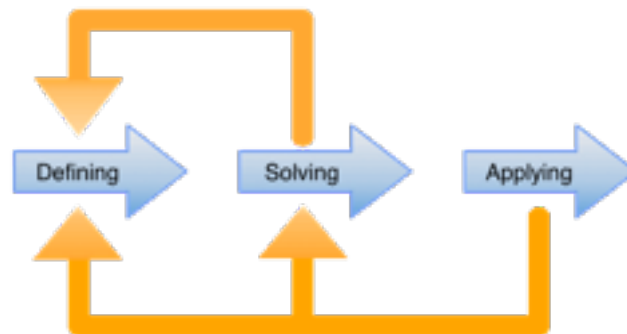
## I. General notions

This book is devoted to resolving problems. This is a process consisting successively of:

- understanding/defining a problem
- finding a solution (and often choosing from among several possible solutions)
- implementing this solution

The fact that these three steps are presented in succession does not prevent it occasionally being necessary to go back to the previous step.

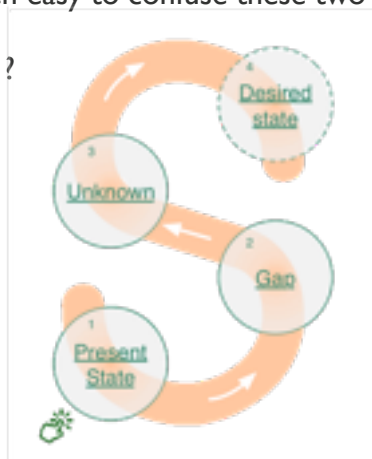
This would be the case, for example, if we see that the way in which a problem was defined does not easily enable a solution to be brought, or if the solution found becomes too difficult to put into practice.



### Links with my work?

While in a meeting, if you notice your colleagues going back on themselves and rediscussing the nature of the problem or the relevance of the solution, this is not necessarily a bad sign. On the contrary. But it is worth checking whether this represents a stumbling block or if it is delving into the issue more deeply. It is often easy to confuse these two states.

What is a problem made up of ?



The definition of the various component parts of a problem does involve a certain amount of subjectivity. They are always viewed from a certain point of view. A single situation can be a problem for some people, but not for others, or for them it may be a completely different problem. And on top of this, the solution of one party can also become a problem for the other. This is a reality which has to be taken into account.

It is therefore not enough to describe a difficult situation in order to describe a problem!  
**There is a problem each time there is a discrepancy between what actually happens and what an individual or a group would like to have happened..**

This is why, once the solution has been found, people often have to:

- Communicate and even negotiate
- Expound and sometimes defend
- Always assess

A problem may be resolved right from the point of defining it. This is what we call reframing. "The way to resolve a problem one encounters in life is to live in such a way that the problem disappears. » Ludwig Wittgenstein. *Culture and value*.

The question that must be asked in order to fully understand a problem is therefore not simply "why is there a problem", but rather "why is this a problem for me (or for us, or for them) at this time?"

The **resolution of the problem** is the process which enables us to act towards achieving our goals. This is generally a process which involves the use of a significant number and variety of skills such as **negotiation, communication and conflict management**.

The resolution of a problem also always involves **taking a decision** about the action to be performed (or, in some cases, the choice to do nothing), either collectively or individually, and the actual **implementation** of this decision.

We can also note that the definition and resolution of a problem are often made within a set **context** which has a number of **stakeholders**. Obviously, these elements must be taken into account in order to reach a truly satisfactory decision. Finally, we should also note that decisions implemented to resolve a short-term problem may sometimes have harmful consequences over the **longer term** and constitute the source of a new problem.

We will tackle these issues together over the following pages.

### Links with my work?

Very simple, this four-stage "S-shaped" model already constitutes a tool for resolving problems. Bring it to your next meeting and examine the following elements, for example:

- Has the group devoted enough time to defining the problem?
- Do the participants really agree on the definition of the problem?
- Are the participants focussing on the same aspects at the same time, or are some of them already talking about solutions while others continue to define the present status, while still others are assessing the problem and others are talking about the desired result? This is often inevitable, and sometimes even desirable. Our ability to give a clearer identification of which aspect of a problem we are talking about always has a reassuring and stimulating effect on a working group.
- Is the assessment of the discrepancy between the problematic state and the desired state, and therefore the interest in finding a solution, the same for everybody?
- And finally, if the assessment of this discrepancy varies from one person or group to another, does everybody actually have a problem?

### Further readings...

- Problem solving: explanation of an alternative system of problem solving based on [5 steps](#) (French)
- [Systemic approach](#): how the representation of a problem is influenced by the words we use to define it (French). A time line of [different approaches](#) on problem perception [PDF](#) or [WebSite](#) (English)
- Introduction to [Emotional Intelligence](#) (English)

## 2. A few basic ideas

Before going into a description of the specific methods for resolving various types of problems, it is a good idea to address the basic ideas and methods which may be of use in resolving a problem. Among the most important of these are as follows:

### 2.1 Distinguishing the type of problem

An initial general recommendation in the resolution of a problem is to check which of the following three categories it belongs to.

Is it:

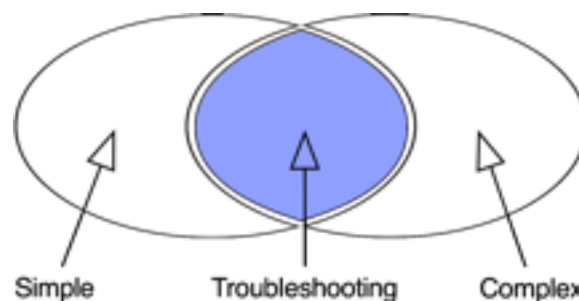
- a simple problem: a problem for which the original situation, the desired situation and the possible options are all well known)
- a complex problem: a problem for which this is not the case, either due to its technical complexity or owing to the fact that it involves a number of stakeholders with different interests or opinions (human complexity)
- a diagnostics/troubleshooting problem: a problem (either simple or complex) which arises at a time when a tool (mechanical or electronic device, procedure, etc.) which should work does not work or no longer gives the expected results.

It is generally important to recognise the type of problem with which we are confronted. The best way of approaching each of these types of problems is effectively different. This is what we will be looking at over the coming chapters:

3. Resolving simple problems

4. Diagnostics problem

5. Recognising a complex problem



### Links with my work?

Please note that troubleshooting issues can fall into the categories of either simple or complex problems. So, for example, a paper jam in a photocopier would usually be a simple problem (which can sometimes become more complex than expected if, for example, a machine sensor is affected but cannot be easily detected (the technician does not immediately see it). Likewise, the fact that a particular situation is not expected within a procedure and that you are unable to proceed with the issue can become a complex problem if you and other colleagues have widely diverging opinions as to what should be done. It returns to being a simple problem when the group leader opts in favour of a particular opinion.

### Exercise

Sort the following problems into their suitable category or categories (more than one answer is possible for some of these problems).

Solutions ?

Categorise problems in order to come up with appropriate solutions

**Question**

**Simple**

**Troubleshooting**

**Complex**

I lost my password for my PC

A member of my team appears to be very demotivated. The quality of his work has fallen.

A bank employee has come to the entrance of an institution with a briefcase attached to his wrist. Bank procedures prohibit him from detaching the briefcase (and he also doesn't have the keys), and the institution procedures require him to pass through a metal detector

## 2.2 Reframing and changing a point of view

*"You cannot resolve a problem with the same thinking of creating it.", said Albert Einstein.*

*Another quotation frequently attributed to Einstein is "Insanity is repeating the same mistakes and expecting different results"..*

Changing the framing, or the "point of view" on how we think about a situation which is posing a problem is therefore a valuable tool.

Explore opinions

This change in point of view can be done by **putting ourselves in the shoes of others**. This could be a direct stakeholder in a problem ("what would my colleague think?"), an outside reference ("what would my neighbour think who usually sees things differently to me?"), someone we admire ("what would Jean Monnet think?"), or even yourself under different circumstances ("what would I have thought ten years ago?" or "what would I think if I wasn't directly involved and was looking in from the outside?")

In this situation, we may also need to take into account the possible reaction of national, category-based or regional opinions. How would this issue be perceived in the country at national level? Or by investors? Or in the regions most directly affected by the problem?

The ability to look at a problem in this way enables us to explore the **diversity of opinions** over a given problem, and often reveals elements we may have missed at first glance.

Explore aspects

Another way of proceeding also consists of tackling the problem using a **different approach or aspect** from that with which we are more familiar (or which is more highly valued in your institution). For example, if you are an engineer and your thoughts mainly centre around technical aspects, you may be tempted to explore other aspects to the problem confronting you.

A model often used to explore forgotten aspects is the PESTLE model (**Political, Economic, Social, Technical, Legal, Environmental**). Obviously, this is not an exhaustive list. Many other aspects could also be worth exploring, such as **historical, geographical, psychological or linguistic or logistic aspects, etc.**

The ability to look at a problem in this way enables you to explore the **diversity of aspects** which constitute a problem situation. Simplified Tool: [PEST analysis](#)

## 2.3 Separating facts from opinions

To resolve a problem, we must first make a distinction between what is fact and what is opinion.

Opinions should clearly be taken into account (especially those of the most important stakeholders), but we must bear in mind that they may be mutually contradictory.



Einstein, facts and opinions

## Facts

## Opinion

This is a photograph of Albert Einstein

He seems happy

He is sticking out his tongue

He is a genius

He created the theory of relativity

He contributed more to science than anyone else in the 20th Century

He wrote "*Peace cannot be kept by force. It can only be achieved by understanding*"

- *Peace cannot be kept by force. It can only be achieved by understanding*

## 2.4 Taking into account expert opinions...and knowing how to question them

With opinions, those coming from experts in a particular field will hold greater sway. Because of the knowledge these people have, they are able to give an enlightened opinion on a given issue. But we must remember that if opposing parties call on a counter-expert in dispute situations, and so even the opinions of experts can sometimes be called into question:

- firstly taking into account their thoughts and their particular skills;
- secondly remembering that an opinion, even if it comes from an expert, is still just an opinion.

Take, for example, the opinion stated by Lord Kelvin (the physicist who discovered "absolute zero") in 1900: "There is nothing new to be discovered in physics now. All that remains is more and more precise measurement".

A few years later, many important discoveries were made by others in the field. As Mark Twain said: "They did not know it was impossible so they did it".

## 2.5 Identifying "knots", tensions and contradictions

Another habit that may help to resolve problems consists of focussing our attention on elements which hold tensions, contradictions or differences in opinion.

What exactly are the things we are trying to succeed with together and do any of them seem incompatible with the others?

Which points appear to raise the biggest disagreement?

## 2.6 Invention

It may also be of use to invent a new way of proceeding - a new tool to resolve a problem.

In some cases, the use of invention or imagination may be tiresome, or even impossible. If you have completely forgotten your (complicated) password for your e-mail account, this approach will be of very little use.

## 2.7 Taking into account limitations and needs

Generally speaking, we also need an "ecological" outlook on problems. In order to find a sustainable solution to a problem that will be effective over the long term, it is useful to take into account the limitations and needs inherent to this environment. What will be the effects on others? What resources do I have at my disposal? How much/many? Is this quantity reasonable and renewable?

### Links with my work?

When you ask the question about limitations and needs as part of your work:

- 1 Ask yourself if the solutions you come up with are compatible with the regulatory framework in which you operate.
- 2 Ask yourself about the impact that the decision you are going to take will have on your colleagues and stakeholders. Don't forget that these are people with whom you are going to have to work over many long years.
- 3 Finally, ask yourself about your priorities. Are you (or is your boss) ready to devote the human and material resources you need to contribute to resolving this problem.
- 4 More generally, always ask yourself if there isn't a simpler or cheaper solution.

## 2.8 Remember that a problem is also stimulating

We often view problems as something negative, or merely as obstacles to get rid of. Resolving a problem is a matter of **need**.

The word "problem" also covers other things. It can also have a **stimulating** aspect in the resolution of a problem.

There's a healthy market out there for puzzle games and brain teasers, and this is no accident. Books, be they thrillers or romance, mostly contain stories of heroes, with whom the reader is led to identify, who have big problems that need solving. A problem can therefore be a source of **pleasure**.

But there's more. In every school around the world, problems (to be solved on paper or "in real life", in the form of study projects) are used as a means of learning. Work on actual problems is necessary for effective learning. A problem is therefore also a way to **learn**.

Finally, as the philosopher Karl Popper wrote, **All life is problem solving**. Although we can easily apply this adage to our day-to-day life, it also means life as a biological reality which Popper was referring to. Life is an uninterrupted series of adaptations which come into play and get bigger in response to actual problems (living outside the water for an aquatic creature, or adapting to climate change, for example). Problems are therefore also a source of **change, adaptation and development**.

Keeping these ideas in mind can also contribute to changing our viewpoint over the problems we encounter. Most of the time they are both a source of risk and a source of opportunity. When we work to resolve a problem, be it alone or in a group, it is sometimes very useful to keep in mind these "positive" elements which arise from the problems we encounter.

## 2.9 Abstraction

To resolve a problem, we also need to employ abstraction. This means the creation of a simplified model of reality.

Although the idea of using abstraction may appear intimidating, we find it in the most mundane situations we encounter every day.

To solve the problem "how can I teach a child to cross the road safely", for example, we use the extremely simplified model, as follows: "in Europe, we always look left then right before crossing the road".



### Exercise

Looking at this photograph, what hypotheses can you come up with to explain the reasons which led to making this abstraction clear.

What is your understanding of traffic in this street?

Nothing is more surprising that a model of reality which is not ours.

In our professional lives, all our attempts to represent part of reality in a diagram, an explanatory text or even a short spoken description are already an exercise in abstraction. We therefore need to ask ourselves the question of the relevance of the models we use, and the elements of reality we select to resolve problems.

### Links with my work?

Questions to ask oneself:

Could part of my problem come from the model of reality I am using?

Are working procedures also abstractions? Do they include invisible, implicit aspects?

### Further readings...

- Strategic Problem Solving: the importance of giving [the problem a different frame](#) in order to find new resources (Italian)
- A series of videos about "[Critical Thinking](#)" versus "experts" influence on solving problems (English). Pulp Fiction : [Mister Wolf](#) , "I solve problems" (English)
- [Introduction to 3 models](#) that help how to set the limits of a problem: SWOt, PESTLE, Lewin (English)



## 3. Simple problems

### 3.1 Definition

A problem can be qualified as simple (otherwise known as "linear") if presented as follows: *"I'm in this situation. I am aware of all the possible courses of action, and I would like my situation to change."*



Rubik's cube

A *simple* problem is not necessarily easy to solve! It can be complicated, but not complex.

Ernő Rubik's famous cube, also known as the Magic Cube, is a good example of a simple, yet complicated, problem. Hundreds of millions of Rubik's Cubes have been sold over the years. Proof, if any more were needed, that problem-solving is a very popular pastime.

A problem is simple if the cause and effect can be understood and controlled. This is why they can still be said to be simple, even though they are complicated.

We say a problem is simple (or linear) if:

- Both the original situation and the desired ultimate situation are fully understood.
- The possible actions (or the rules to be followed) are limited in number.
- The assessment of the result is "successful" or "failed" (true or false, correct or incorrect)

We can also separate a simple problem into smaller problems, which are consequently easy to resolve.

### 3.2 Recognising which "class" a simple problem belongs to

How to connect your PC to a projector may sometimes be a problem you find difficult to solve. An IT worker, however, may find the solution fairly quickly. Similarly, a lawyer may sometimes be able to get you off the hook for a driving offence, even when you think you don't have a chance. Even the Rubik's Cube may appear impossible for you to solve, but can be completed in a very short space of time - by software that applies a repetitive procedure.

Linear problems are highly dependent on the context in which they arise. We can put them into different classes (for example: financial problems, legal problems, medical problems, etc). Knowledge plays a decisive role in their resolution. We have to recognise the class of problem and uncover the procedures to be implemented. Each subject area has its own different classes of linear problems (for example, in the field of automotive repairs, there are mechanical, electrical, electronic, hydraulic, pneumatic and more problems).

To resolve a simple problem, knowledge and understanding are extremely important.



It is important to bear in mind that each professional environment has its own individual problems. Because these are specific and because there is a wide variety of procedures to resolve them, there will inevitably be a learning curve before being able to master most situations which may arise in a satisfactory manner.

There is no such thing as a unique procedure. A recommendation can only be extremely general and divorced from any specific context.

### Links with my work?

Here are a few examples of simple problems which may arise in the world of work:

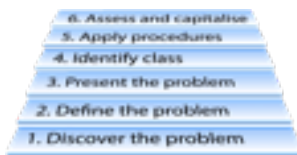
- I have to introduce a budgetary adjustment and I'm not sure about the procedure to follow
- I don't know how many radiators I need to heat a particular room
- I don't know how to export my file to PDF format

### 3.3 The procedure-based approach to solve simple problems

The procedure-based approach often gives excellent results to resolve simple problems.

This is about implementing a certain number of steps (which implies that we know what these steps are, or at least we have an idea about the minimum number).

An example of a classic problem-solving process would be as follows:



In the case of a totally new or different problem, or even of the usual procedures fail to yield the expected results, we may sometimes have to categorise the problem in a new class or create a new procedure in order to resolve it.

### Exercise

Can you identify some examples of simple problems (for which a procedure can be followed to solve them) from your own area of expertise?

## 4. Troubleshooting problems

### 4.1 Definition

A problem can be characterised as a "diagnostics problem" if presented as follows:

**"It used to work, but no longer does"**

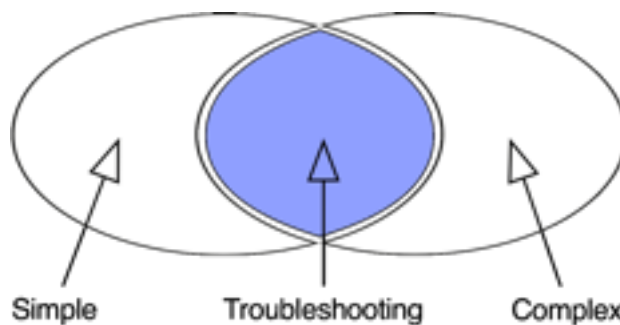
A breakdown occurs because different procedures can contradict each other. The reality of the situation can change, and what used to work no longer does. The problem you are faced with is a diagnostics problem (repairs). These problems crop up all the time.

The bad news is that no human procedure, however thorough it may be, can completely prevent a "breakdown" from happening.

The good news is that the world is a rich and varied place and so we are afforded the opportunity to be creative and inventive in order to repair things that no longer work.

Like linear problems, breakdowns are highly dependent on the context in which they arise.

Breakdown problems can be simple or complex (see [General requirements 2.1](#)).



### 4.2 Procedure-based approach for simple breakdown problems

### 4.3 Useful recommendations

#### Managing stress

A breakdown is feared, and Murphy's law tells us that it is best to anticipate these things.

"Anything that can go wrong, will go wrong » Edward A. Murphy Jr.

If a breakdown is feared, it is because this is particularly stressful, especially when it happens in front of other people. Stress reduces our ability to react and also reduces our judgement owing to a lack of objectivity.

#### Investigation

Breakdowns are often accompanied by an investigation process. To investigate is to exercise a certain questioning ability in order to clarify a situation. Although a broken photocopier can certainly be the subject of an investigation, your colleagues will probably not appreciate this kind of investigation procedure. Make sure you have authorisation to look into the causes of a breakdown.

#### Absurd decisions

Absurd decisions, known as "*normal accidents*", show the effects of [group think](#), a psycho-sociological phenomenon of pseudo-consensus arising when a group of people meets to consider and take a decision. Groups may take decisions which go against the desired interests and

solutions. How to avoid absurd decisions is the topic of the concept's creator [Christian Morel's second book](#).

#### Further readings...

- In a video, an example of a [troubleshooting problem](#) (English) .
- Two more videos (English) to go deeper in the field of "[absurde decisions](#)", and the explanation from the Nobel Prize winner D. Kahneman on how we take decisions according to two different systems ([systeme 1 / systeme 2](#)) involving rationality and intuition (English)
- [Causes and effects analysis](#) (English)
- Other tools to solve troubleshooting problems (English and French): [\(1\)](#) [\(2\)](#) [\(3\)](#)
- Risk analysis techniques [FMEA et FMECA](#) (English)

## 5. Recognise complex problems

### 5.1 Definition

The word "complex" is derived from the Latin expression (cum plexus), which means "with knots" or "laced".

A problem becomes complex when it is not linear.

A complex situation implies retroactive phenomena between various elements. Changing one of these elements will have an effect on others.

Example: Watercycle

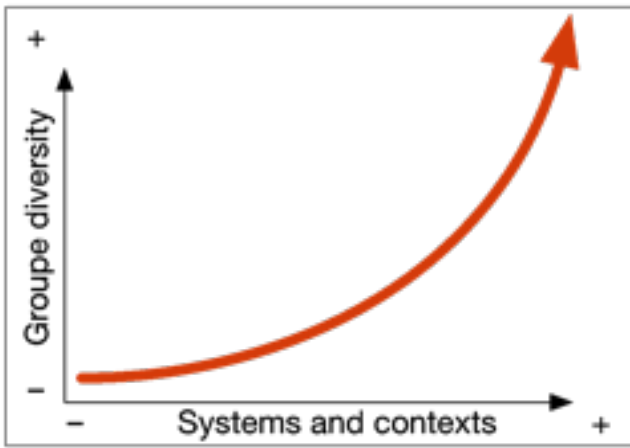


Watercycle by USGS Georgia Water Science Center - Illustration by John M. Evans, Howard Perlman, USGS - <http://ga.water.usgs.gov/edu/watercycle.html>. Under Public Domain licensing via [Wikimedia Commons](#).

Complexity may, for example, arise from one or more of the following situations:

- When it is not possible to fully comprehend the original situation
- When one does not have a clear understanding of the many interactions between the various elements of a problem
- The problem depends on a number of people who hold different opinions, approaches or interests:
  - their concerns
  - their professions
  - their cultures
  - the organisations they represent (regions, institutions)
- The problem surfaces within a context of constant change or rapidly unfolding developments

We often distinguish between two complexities within such a problem: systemic and social. It is readily apparent that it doesn't take many differing concerns to make social complexity grow exponentially.



**Ultra-complex issues**

*Some problems are so complex that you have to be highly intelligent and well informed just to be undecided about them. L.J Peter*

Some problems have such a high level of complexity that they have been given a specific name. The town planner and public policy specialist Horst Rittel qualified these as "wicked problems". The main roles of European institutions have been created through problems falling within this category (public policies).

**5.2 Comparison between simple and complex problems**



A problem cannot be defined if you have not begun to consider a solution. A wicked problem is by definition essentially unique.



There are no set rules or criteria and objectives which indicate the end of the process. We cannot demonstrate that all possible solutions have been found.



There is no method whereby all the effects which may impact the various aspects of the problem can be identified before they arise once the solution has been applied (no "test case").



A wicked problem cannot be subdivided into simpler problems which would be easier to resolve. Any intervention on part of the problem transforms it.

### 5.3 Signs of fragmentation (Jeff Conklin)

When a group is working on resolving a complex problem, we can only be struck by the manner in which dialogue changes. Such problems are often felt to be troublesome. All this pays testimony to a phenomenon of fragmentation, as seen through the appearance of a certain number of signs, as listed by J. Conklin.

- Dialogue in the form of whispers and asides
- Frequent interruptions or total silence with no participation
- Acting on points not on the agenda, or which have no connection with the previous intervention
- No clear speaking, jargon or digressions
- Constant returning to the same point
- A "hidden agenda"
- Questions are raised which have already been discussed and resolved, as if they were still open
- Defensiveness if somebody disagrees or criticises an opinion that has been expressed
- Acceptance of a group decision without there being any intention of complying with it or implementing it
- Aggressive reactions, arguing and debating over each point

It comes as no surprise that Russell L. Ackoff put forward the expression **social mess** to describe the effect a complex problem has on a group.

Positions will change over the course of the task. The fear of being oneself in a group excludes most forms of creative participation such as surprise, humour and questioning ...

#### What is the link with my job

Keep Conklin's list to hand during a meeting dealing with a difficult problem and make a note of the various signs of fragmentation you observe among the participants and in yourself. We are all liable to show signs that bear witness to the fragmentation of a work group. This is not a personal characteristic, but rather a group effect. We will see that the solution consists of changing the way the group works rather than people's personalities.

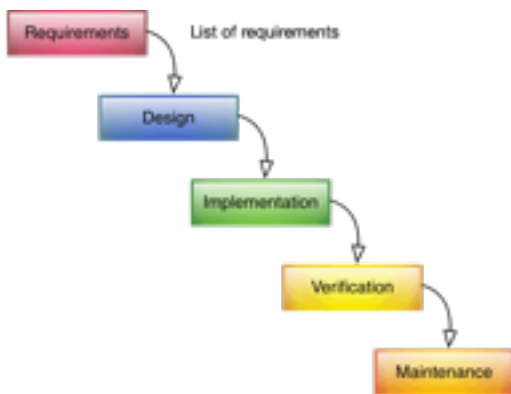
### 5.4 Complex problems: a process of resolution?

Rittel & Webber recommend a systemic approach to deal with complex problems. They make this recommendation assuming that first generation (classic) and second generation (argumentative) methods are clearly distinguished.

The argumentative approach illustrated

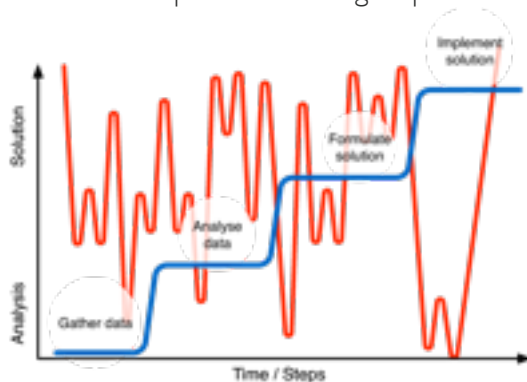
To illustrate the difference between a classic and an argumentative approach, developments in the field of IT design provide us with a good example. The classic approach here is known as the "Waterfall model". It is derived from industrial practices and methods. The concept of a waterfall is where requirements have not been fully defined and set in stone and design cannot properly

commence. The implementation itself has to wait until the complete end of the design phase, giving us the idea of a waterfall with no way back.



### The "waterfall" model

In 2001, the [Manifesto for Agile Software Development](#) appeared. This document summarises a variety of approaches which, since the mid-1990s, had put forward a method other than that of the waterfall. Defenders of **Agile Development** stress that it is not possible to achieve a perfect, definitive conclusion to any of the development phases of software before moving on to the next phase. This is why IT design projects are complex problems which cannot be fully characterised from the outset. In his book [Code Complete](#), Steve McConnell shows that software development always takes on the appearance of a wicked problem (*“wickedness” of software design - P.114 2nd edition*). These developments give a good overview of the practical application of the recommendations made by Rittel & Webber. Strictly speaking, there is no way of talking about a highly-structured procedure to resolve a complex problem. We must instead launch a process. Resolution of problems and group work



Jeff Conklin (see reference above) emphasises that when we observe a group trying to resolve complex problems, we should not wait for them to follow a linear progression of problem resolution. In the illustration opposite, a participant or a group will have problems following the blue line. They will be far more likely to adopt a path which more closely resembles the red line. "Our experience in observing individuals and groups working on design and planning problems is that, indeed, their understanding of the problem continues to evolve -- forever!"

### Wicked Problems and Social Complexity

The difficulties encountered in dealing with complex problems should not discourage us. Faced with these challenges, collaboration and collective intelligence are valuable tools. This idea is told in the Native American story of the hummingbird, as told by Pierre Rabhi.

*According to legend, one day there was a huge fire blazing in the forest. All the terrified and distressed animals were powerless before the disaster. Only the little hummingbird took action, going off to search for*



a few drops of water with its beak to throw on the fire. After a short while, the armadillo, annoyed by this tiny act, told him:

"Hummingbird! Are you mad? We need more than these few drops of water to put out the fire!"

The hummingbird replied:

"I know, but I'm doing my bit."

In the following sections, we will go on to discover the tools that will enable us to bolster our skills in terms of resolving complex problems.

### Further reading

[Wicked problems](#), Tom Ritchy (2005) - an introduction to morphological analysis

[Dilemmas in a General Theory of Planning](#), the original article by Horst W. J. Rittel and Melvin M. Webber. Or [here](#).

The **CYNEFIN** model



Image reference: Creative Commons "Cynefin framework by Dave Snowden". Released under [CC BY 3.0](#) (Layout slightly modified).

The *cynefin framework* provides a description of the various types of problems based on the subject area in which they are found. [Dave Snowden](#), puts forward the following typology, made up of four separate areas:

- Simple
- Complicated
- Complex
- Chaotic

ur s'est produite.

•

- A general overview from Edgar Morin on general complexity theory, the meaning of the order and self-organisation of a system and the complexity of a decision (French) [\(1\)](#) [\(2\)](#) [\(3\)](#)
- The importance of the thinking system to have a [larger overview on the way problem is situated](#) (English)
- [Examples of complex and very complex problems](#) (English)
- Problem solving in groups: the examples of 3 big firms around the world (English) [video](#)
- An example on how complex problems influence our daily work: the original article by Horst W. J. Rittel and Melvin M. Webber. (English) [PDF 1](#) [PDF 2](#)
- We point out two cooperating board games [Pandémie](#) and [Red November](#)



## 6. Tools: Impact of personal styles



### Preferences

Regardless of the nature of the problem, we all have our own habitual way of tackling it - our own style which gives our contribution a personal touch. In the story illustrated above, the group is faced with a simple problem, but personal styles are already appearing. While one person focusses their attention solely on a specific description of the situation ( **present status** in a way). The other looks at the constraints to the **status being sought**. A third person considers the novelty in producing fresh ways of making up for **the gap between the two** or **resolving the unknown**.

We call these *preferences*. A word which indicates that although we are all capable of bringing our attention to aspects such as a specific description of things (*truth*), the result to be expected (*standards*) or new ways of doing things (*new ways*). What sets us apart is the order in which we would like to get things done and our preference for lingering over one approach among others.

### Stakes

Better understand your own preferences, better understand the preferences of others to increase the quality of adapting ourselves. This adaptation comes through by:

- adapting our style of resolving any problems encountered
- adapting our style of resolving the expectations of our colleagues (complementarity or synergy)

### Method

Is is often the case, we can find out what our personal styles are through a questionnaire. The result you get is a mere indication that should be put into closer perspective by talking about it with friends or colleagues, for example. We should not lose sight of the fact that these results will vary over time, and especially depending on the situations encountered. This questionnaire and the information you will glean from it on your personal styles are first and foremost tools for thinking about growing your flexibility and adaptability.

### Questionnaire

We recommend that you complete the questionnaire before carrying on with this chapter.

Knowing your profiles in advance could influence your responses.

### Personal styles

## Questions

01. I like action.
02. I deal with problems methodically.
  
03. I believe teamwork is more effective than individual work.
04. I like new things a lot.
  
05. I'm more interested in the future than the past.
06. I like working with other people.
  
07. I like taking part in well-organised group meetings.
08. I attach great importance to deadlines.
  
09. I cannot stand things being put back to the next day.
10. I think that new ideas need to be proven before being put into application.
  
11. I enjoy the healthy rivalry created by relationships with other colleagues.
12. I am always on the lookout for new possibilities.
  
13. I set my own goals.
14. When I take on a task, I like to see it through to the end.
  
15. I try to understand people's emotions as much as possible.
16. When I disagree with the people around me, I won't hesitate to let them know.
  
17. I like to receive feedback on my work.
18. I find the step-by-step method to be highly effective.
  
19. I think I understand people's psychology quite well.
20. I like to look for creative solutions to problems.
  
21. I'm always extrapolating and forecasting.
22. I am sensitive to the needs of others.
  
23. Planning is the key to success.
24. I am impatient when discussions last a long time.
  
25. I keep calm under pressure.
26. I attach great importance to experience.
  
27. I listen to people.
28. People say I'm very lively.
  
29. I attach supreme importance to cooperation.
30. I use logic to consider the various possibilities.
  
31. I like to tackle a lot of work head on.
32. I always ask myself questions.
  
33. I learn by experience.
34. I know how to stay in control over my feelings.
  
35. I can forecast the reactions to a particular decision.
  
36. I don't like details.

37. An analysis must always come before action.
38. I am able to judge the atmosphere within a group.
39. I tend to take on work and leave it unfinished.
40. I am able to take decisions.
41. I seek out difficult tasks.
42. I place great store in observing data.
43. I am able to express my feelings frankly.
44. I enjoy thinking up new projects.
45. I really like to read.
46. I think I am able to keep things well-oiled.
47. I prefer to deal with one issue at a time.
48. I like to get results.
49. I am happy to learn how to understand people better.
50. I like the truth.
51. The facts speak for themselves.
52. I use my imagination as much as possible.
53. Long-term jobs make me impatient.
54. I am always active.
55. Big decisions should be taken with care.
56. I firmly believe that collaboration is required in the performance of a job.
57. I generally take decisions without thinking about them too much.
58. Emotions are the source of problems.
59. I prefer my colleagues to like me.
60. I immediately see logical links.
61. I try my new ideas out on other people.
62. I believe in the scientific method.
63. I like it when things move forward.
64. Good relationships are crucial.
65. I am impulsive.
66. I accept that people are different from one another.
67. Communication is an end in itself.
68. I enjoy intellectual rivalry.
69. I like to be organised.
70. I often jump from one task to another.
71. It is highly creative to speak and work with other people.
72. It is essential to assert oneself.
73. I like playing with ideas.

74. I don't like wasting my time.

75. I like doing what I know how to do.

76. I learn from contact with others.

77. I find abstract principles interesting and pleasant.

78. I have the patience to focus on details.

79. I like statements that are short and to the point.

80. I have confidence in myself.

What should you conclude from these results?

Naturally you have the option of reading the explanations. But it would be of greater benefit to you if you first answer the AMRI questionnaire.

### Explanations here

In their book, [Management des organisations](#) Don Hellriegel, John W. Slocum, Richard W. Woodman et Michèle Truchan-Saporta use C. G. Jung to describe different ways to **acquire** and **process** information. Two main functions which each break down in two different ways.

#### Acquisition of information

Factual knowledge and accuracy

(S) Sensation

General and abstract hypotheses

(I) Intuition

#### Processing information

Impersonal analysis and logic

(P) Thought

Personal values and instinct

(F) Feeling

Their combinations gives us the four profiles for the AMRI questionnaire.

We can visualise them as follows:



Each style or preference therefore represents the intersection of two influences that we are going to look into now.

#### Action

This style is formed by the joint incidence of intuitively understanding information through *hypothesis* and processing information taking into accounts *personal values*. This pays a great deal of attention to others and an ability to seize opportunities.

#### Method

This style differs from the Action style through the mechanisms of acquiring information, here based on sensation, which place great emphasis on facts and processes them based on impersonal

values (eg: organisation and its effectiveness is more important than opinion or the reaction of other people - reason takes centre stage).

are two opposing styles, but can compliment one another. Furthermore, it would appear that although one is our preference, the other becomes our secondary preferred approach. Where our preference of *Action* calms down, we willingly adopt a more *Methodical* approach, and vice versa. We will see that this is also true with the two other styles.

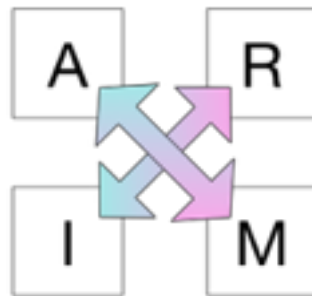
### Relation

Taking on information relies on sensation. The facts prevail over hypotheses, but a person will process these facts, analyse them based on their own personal values, where feelings play an important role. A solution which has an impact on the comfort of other people has little chance of winning favour.

### Idea

This style runs counter to the Relation style, taking on information based on intuition and by processing based on rationality and impersonal values. The interest lies in the concept, the transformation of reality, daring, etc.

**Relation and Idea** are two wholly opposing styles, but do also compliment one another. Where one dominates, the other can become a secondary preferred approach. Where our preference of *Idea* is not imposed, we willingly adopt a *Relation* approach, and vice versa.



A few keywords may deepen your understanding of a style by telling you what counts or what this style usually tends to do. Remember that this is merely a question of preference and that we are all able of all these actions.

#### If your preference is *ACTION*

- Catalyst - seeing opportunities
- Charisma - communicating, sales and advertising
- Collective teamwork - personal contact
- Creating an atmosphere
- Compliments - the success of other people

#### If your preference is *IDEA*

- Overall view - major principles
- Sense - conceptualisation
- Intuition, innovation
- Impersonal
- Change - ignoring the rules
- Little interest in details

#### If your preference is *RELATION*

- Negotiation, mediation
- Fixed, pragmatic
- Cooperation, facilitator
- Using the resources at your disposal without changing the system

- Sounding the alert in time
- Working conditions - comfort

#### If your preference **METHOD**

- Rules - procedures
- Stability
- Decision
- Facts, figures - measurable, impersonal
- Planning - commitment, impatience
- Analysis - awareness of detail
- Agenda

#### Links with my work?

It may be useful to ask yourself the following questions.

What impact could my usual problem-solving style have on the people I work with?

- Is it a source of difficulties?
- What style do you get the impression you work with most easily?
- In your opinion, what style is the easiest to work with?

Can you identify the style of any of your colleagues?

"If an organisation includes managers who practice all four styles of problem-solving, why is it difficult to reach a consensus? »

From "Management des organisations" Don Hellriegel, John W. Slocum, Richard W. Woodman et Mich. le Truchan-Saporta

#### Further readings...

- A useful reminder on how our brain can influence our behaviour in different ways: [Left brain-right brain](#) (English)
- The relevance of [persuasion in the group process](#) (English)
- How to solve complex problems using [integrative thinking using different styles](#) and preferences (English)



## 7. Tool: Functional analysis



The swing

A functional analysis enables the desired solution to be identified by accurately describing all **the functions** that this solution should be able to achieve. We can therefore **compare different solutions**. When a functional analysis is combined with **multicriteria approaches**, this enables us to manage different points of view between people appraising a situation. Diverging points of view arise from their understanding of the problem or the relative importance they give to criteria. This method is an elegant and effective way of reducing complexity.

### Links with my work?

The familiar image of a swing gives a clear and fun illustration of differences in points of view with regard to a solution. At work, we often act as people appraising a situation. My analyses or my assessment criteria can be far removed from those of my colleague, even though this may not be readily apparent. It is therefore important to make these differences visible and clear, as they are often based on differences in values or priorities. Functional analysis is ultimately a communication tool for teams.

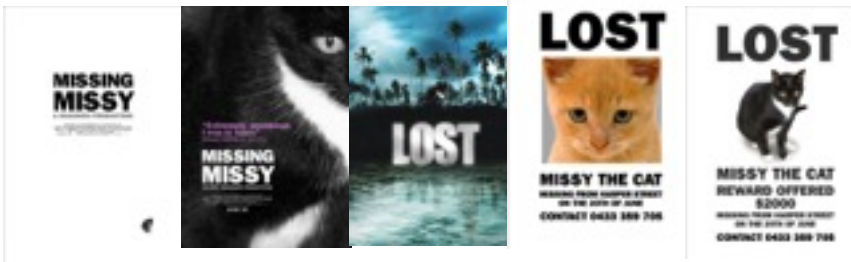
### 7.1 The possible steps in functional analysis

- 1 List the functions brought by each solution
- 2 What can we do with this solution?
- 3 This is simple brainstorming - an exchange of viewpoints intended to produce an unsorted list.
- 4 Create a functions tree
- 5 Tom Warwick recommends the following method :
  - Define the general objective
  - Use a top-down approach to identify the various functions
  - or
  - Use a bottom-up approach to identify the various functions

### Exercise

Your department has to choose a product or a service. Let's say we're talking about a photocopier.

Differences in the analysis of functions may give rise to discussion, or even intense disagreements. [David Thorne \(humorist, graphic designer and writer\)](#) provides an hilarious example that shows the difficult nature of different points of view presented by the functions of a poster intended to find Shannon's lost cat. The images below are taken from David Thorne's blog. They provoked an intense e-mail argument over the course of which Shannon believes the graphic designer to be demonstrating total incompetence: "yeah thats not what I was looking for at all. it looks like a movie and how come the photo of Missy is so small?" This annoyed comment on the first poster is the starting point for subsequent doubts and misunderstandings.



**7.2 Multicriteria assessments**

A solution poses the problem of assessing multiple criteria if it can be assessed by adopting different points of view over its advantages and disadvantages. A new building to accommodate our departments would be useful because it is inexpensive and is located near a metro station. However, the area doesn't have much in the way of facilities (shops, restaurants or hairdressers). In other words, although a solution may bring a number of functions, as is the case with the choice of building, we need to assess the solution using multiple criteria choice methods.

Example of a multicriteria matrix

Which site would you choose to set up this agency?

We need to set out a list of criteria that match the functions and the restrictions that the building would provide or respect:

- Price by square metre
- K insulation index (Belgium)
- Public transport nearby
- Quality of surroundings
- Shops nearby
- Leisure facilities
- Etc.

The multicriteria matrix

In the table below, the first column lists the various criteria to take into account. The second column - "Weight" - indicates the weighting attached to each criteria (example here and after negotiations: the presence of shops is deemed to be three times less important than accessibility by public transport). A weighting on which the group agrees is precisely an agreement which enables the complexity of a problem to be reduced following discussion. The following "Score" columns give the rating which each member of the panel gives to the various solution. The following column gives the weighted score for the solution and therefore its continued consideration.

The final decision is reached through adding the different weighted scores.

This tool enables criteria to be given a weighting, the rating of criteria by each member of the panel and the calculation of the weighted scores.

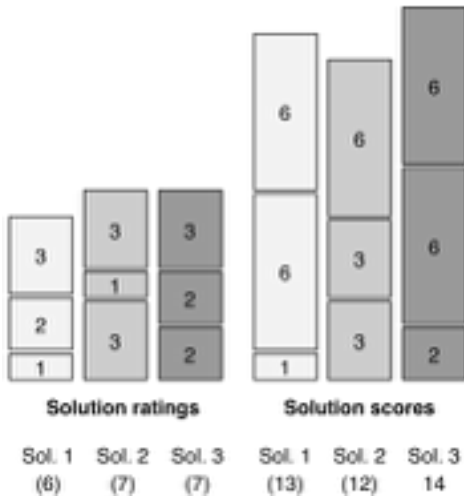
The weighting is a task for reconciling points of view. The group agrees on the compared importance of criteria.

Criteria	Weighting	Solution 1		Solution 2		Solution 3	
		Rating	Score	Rating	Score	Rating	Score
Price m <sup>2</sup>	2	3	6	3	6	3	6
Transport	3	2	6	1	3	2	6
Shops	1	1	1	3	3	2	2

Etc.

Rating out of 3      Score=Rating X Weighting

Comparison: rating / score



We clearly see that the weighting changes the final result. If this weighting is subject to open discussion, this limits the risk of dividing a group over the choice of solution chosen.

Our ability to manage different viewpoints over a problem and its solutions is a fundamental condition for collective problem-solving.

The discovery of a point of view that differs from one's own is often surprising, rather like the "Irrational Contemplations" of photographer [Philippe Ramette](#).



In the next chapter, we will deepen our understanding of the complexity brought by a group when it should actually be collectively solving a problem. A hierarchical decision may sometimes simplify a process, but in many professional situations, the approach remains collective because the problem is truly complex. It arises from various fields of expertise that a single person cannot hope to master on their own. Or also because everyone's consensus and commitment is included.

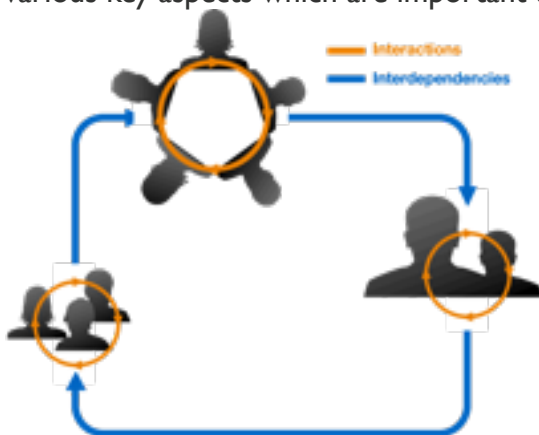
## 8. Tool: Stakeholders



A hierarchy may not provide a solution because it is preferable for the group to attempt to collectively solve the problem at hand. This group is very rarely uniform. It is made up of a number of **stakeholders**. Viewpoints, analyses, stakes, options, objectives, strategies or limitations risk being multiplied. This is perfectly normal. This list shows the elements over which a strategic analysis rests for stakeholders (the people involved in a situation). "*Strategic Analysis*" is a particular approach "from the organisational theory espoused by Michel Crozier et Erhard Friedberg".

This diversity can give rise to fears that true agreement is thrown into jeopardy. Strategic analysis helps us to better understand what arises from a situation where stakeholders are in a situation of **interdependence**. Whether they are in a work group or not, stakeholders are in a situation of interdependence. Competing strategies may arise. This is inevitable, and can also lead to progress. What is more, these various stakeholders **may or may not interact** (see illustration opposite). You are certainly interacting with most members of your department. You may not necessarily be interacting with colleagues from a different DG, but it is easy to demonstrate that you are in a situation of interdependence with them. Their strategies may have an influence on your own DG and department.

Whether you are interacting directly or are simple interdependent, it is important to understand the strategies of the various players acting within the problem at hand. Solving all problems requires the reality of everyone involved to be taken into account. M. Crozier and E. Friedberg defined strategic analysis and its rules by taking on board information about various key aspects which are important to all of us. Here is a summary.



Everyone concerned and active in an organisation has five characteristics that it is important to fully understand:

## Objectives

These are goals to be pursued - what somebody wants to achieve or perform, be it linked to the problem at hand or not

## Limitations

What has to be taken into account and what limits or changes an action and strategies - for example regulations, positions, dialogue, etc

## Strengths and weaknesses

These are the means and the resources which the player may use to achieve the objective and monitor their stakes. Their hierarchical power, their influence relating to their authority and their notoriety, their support within the organisation, their abilities to see the bigger picture, etc.

## Stakes

These are everything that the player may win or lose in a situation - the consequences for them, in a way. We say that "*the stakes make the player*". It is sometimes difficult to differentiate between stakes and objectives. It is important not to give up, as the stakes give a measure of the risk and the strength of commitment.

## Strategies

This structures actions, the advantages and the resources used to reach an objective in a given situation, taking into account the stakes. Each person always sees their strategy as rational. But this rationality can be limited by the quality of the information we receive, or by cultural elements, for example. Strategies will naturally give rise to alliances, coalitions, oppositions and negotiations.

Armed with these different entry points, we can begin to describe them to better identify which strategy to adopt. We recommend building up a grid as presented below.

	Player A	Player B	...	Player N
Objectives				
Limitations				
Main Assets				
Stakes				
Strategies				

## Links with my work?

Strategic analysis will enable you to better identify the effects of a problem and especially understand and better negotiate:

- your own role and your room for manoeuvre in situations where you are convinced you have no influence (scope for independence or the creation of areas of greater freedom). Certainly, there will be situations whereby there is nothing that could be called an "area of uncertainty" that provides room for manoeuvre. For example, regulations and positions may force such-and-such a decision, but we often tend not to see room for greater freedom.
- differences in analysis between people
- the attitude of a colleague standing counter to a proposed solution
- a new solution which takes into account all limitations

## Exercise

- 1 Find a colleague who is available and ready to play this game.
- 2
- 3 Explain the players grid to them.
- 4
- 5 Ask them to complete yours and you complete theirs.
- 6
- 7 Exchange your grids, correct them and discuss your corrections.
- 8
- 9 Meet up again to talk about your reactions.

## Further reading...

Rémi Bachelet, an educator and researcher at the Central School of Lille to license a course [Strategic Analysis](#) (around 45 minutes)

## 9 – Tools : Shared Vision and Creativity

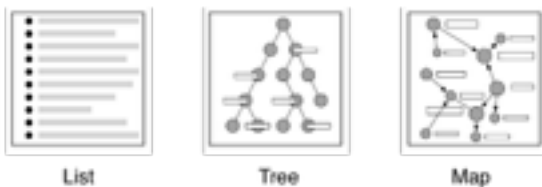
This final summary chapter offers **some practical tools** for problem solving. Several knowledge and analysis tools have already been presented in the previous chapters. This time we are only focusing on some concrete tools you can use in **groups and teams**. As soon as the process becomes a Team or Organization issue, sharing the vision of the problem and using creativity tools become essential too.

### 9.1 Shared Vision

In a small booklet David Straker firmly opts for a pragmatic approach. He notes with some amusement that recent problem-solving tools are always based on older tools, which have been borrowed. He acknowledges that the tools he offers in his book are no exception. They are based on the **three major problem representation and problem-solving methods**: lists, trees and maps...

3 basic problem-solving tools

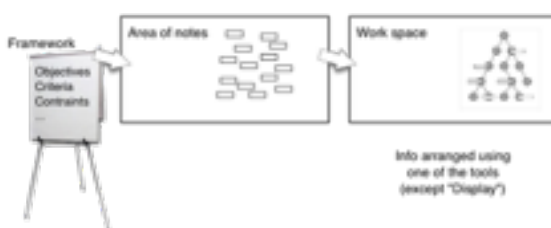
- The List: filters and classifies information
- The Tree: allows one to organize and hierarchize information
- Maps: enables the creation of links between pieces of information in more complex structures



3 workspaces

Problem representation and classification of data require different joint workspaces:

- the framework: the selection of the information responds to established objectives and criteria,
- the note area for comments on structured information and
- a work area for collecting and analyzing working hypotheses.



The IBIS method

« [Issue-Based Information System](#) » (IBIS) was invented by Werner Kunz and Horst Rittel as an argumentation-based approach to tackling complex problems that involve multiple stakeholders. The basic structure is a diagram. IBIS is meant to support the coordination and planning of political decision-making processes. IBIS guides the identification, structuring, and settling of issues raised by problem-solving groups and provides pertinent information for discussions.



Questions

Starting with an open question, group members identify problems and further questions they want to raise.





Ideas

The response to a Question is an Idea, a possible answer or solution for the Question. Ideas respond to one and only one Question.



Pros/Cons

The place for rationale, opinion, facts, data, rhetoric, etc. is included in the Pros and Cons of IBIS, generically known as "Arguments".

Conclusions

A Decision is not really a separate element in IBIS. This is simply one of the Ideas related to a Question and is indicated as the answer/solution/decision for that Question. For some Questions there may be several Ideas presented as the solution. Questions are the heart and soul of IBIS, because anything in the map – a Question, an Idea, a Pro, a Con – can be questioned.



9.2 Creativity

The SCAMPERR method

Alex Osborn, credited by many as the originator of brainstorming, originally came up with many of the questions used in the technique. However, it was Bob Eberle, an education administrator and author, who organized these questions into the SCAMPERR mnemonic.







You use the tool by asking questions about existing products, projects or services, using each of the seven prompts mentioned in the link above. These questions help you come up with creative ideas for developing new products, projects or services, and for improving current o

- S: Substitute
- C: Combine
- A: Adapt
- M: Magnify
- M: Modify
- P: Produce
- E: Eliminate
- R: Reorganise
- R: Reverse



## The SIX THINKING HATS method by de BONO

“Six Thinking Hats” is a book by Edward de Bono which describes a tool for group discussion and individual thinking involving six coloured hats. "Six Thinking Hats" and the associated idea of parallel thinking, provide a means for groups to plan thinking processes in a detailed and cohesive way and, in doing so, to think together more effectively. Participants use the filter offered by the hat to represent, discuss and solve the problem.

Coloured Hat	Think Of:	Detailed Description
 WHITE	White paper	The white hat is about data and information. It is used to record information that is currently available and to identify further information that may be needed.
 RED	Fire and warmth	The red hat is associated with feelings, intuition, and emotion. The red hat allows people to put forward feelings without justification or prejudice.
 YELLOW	Sunshine	The yellow hat is for a positive view of things. It looks for benefits in a situation. This hat encourages a positive view even in people who are always critical.
 BLACK	A stern judge	The black hat relates to caution. It is used for critical judgement. Sometimes it is easy to overuse the black hat.
 GREEN	Vegetation and rich growth	The green hat is for creative thinking and generating new ideas. This is your creative thinking cap.
 BLUE	The sky and overview	The blue hat is about process control. It is used for thinking about thinking. The blue hat asks for summaries, conclusions and decisions.

### Links with my work?

Choose the adapted Problem-Solving Tool according to the following situations:

- You have a problem communicating with your boss. Every time you talk to him you have a reaction that makes you feel less efficient at work.
- A new computer system has been introduced in your unit without asking your opinion. The system does not work now.
- For a long time in your unit, you cannot solve a problem related to the allocation of the budget. You suspect that a colleague is looking after his own interests.