Creative Thinking Techniques

Derrick Brown, Director
Jan Kusiak, General Manager
IRM Training Pty Ltd ABN 56 007 219 589
Suite 209, 620 St Kilda Rd, Melbourne, Vic. 3004, Australia
03 9533 2300
derrickbrown@irm.com.au
jan.kusiak@irm.com.au

Introduction

This extract from IRM's training material looks at how systematic, creative thinking techniques can be used to design practical solutions to business problems. Successful designs don't just happen. Whilst we can sometimes get 'flashes of brilliance', successful designs are more likely to occur as part of a systematic process.

> *Great things are not done by impulse, but by a series of small things brought together.*
> Vincent Van Gogh (1853-1890)

The first step in developing a solution is to identify and define the problem - see the IRM paper *Problem Analysis Techniques*. Using the problem definition as a starting point we can apply a number of creative thinking techniques to identify potential solutions, then further analyse and refine these to give us an optimum solution for the problem at hand. This paper discusses some of the successful creative thinking techniques used by business analysts and describes a generic model which can be used to guide the process.

Table of Contents

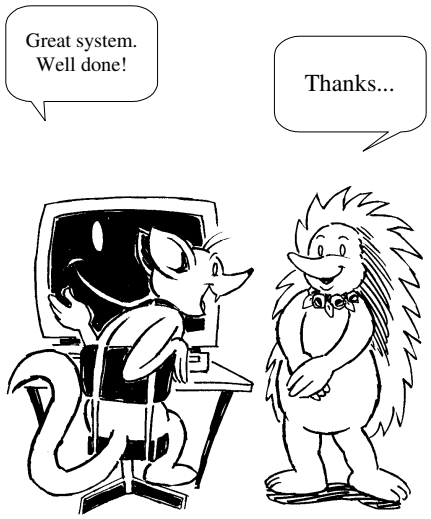
1.0 Successful design strategies

The design strategies that we choose are crucial to a project's success – a strategy that initially looks good but that proves to be difficult to implement is not a good strategy. Many projects fail because the strategy proves to be too ambitious and breeches the agreed constraints.

Consider the 80/20 rule – often we can solve 80% of the problem with only 20% of the resources, the other 80% of the resources being needed to cater for what may be considered inconsequential factors. This initial consideration may influence all subsequent thinking.

Characteristics of successful designs…

- meet the agreed objective(s)
- solve the defined problem(s)
- are technically feasible
- are developed (and operate) within constraints
- are capable of implementation
- can absorb medium term business growth
- are acceptable to the user community



2.0 Design methods

Design is an iterative process and first designs are often thrown away. An outline design is required first, then the details should emerge progressively.

Any system design method must:

- force partitioning of the problem
- progress from the most abstract to the more detailed
- concentrate on logical design first and physical design last
- produce a specification that can be understood by its readers

There's nothing wrong in copying ideas that are in general circulation from other businesses. Quite often an idea can be transferred across industry boundaries with great results.

People make the difference. The best design teams usually have mixed backgrounds – they bring different experiences and different approaches to the problem. A team of people with IT backgrounds are likely to tackle a problem in the same way, whilst say a customer service representative may have an entirely different outlook – and this is what we need.

Don't rush through problem analysis – good problem analysis will give you a clear understanding and definition of the problem. This definition is critical when communicating potential solutions to stakeholders.

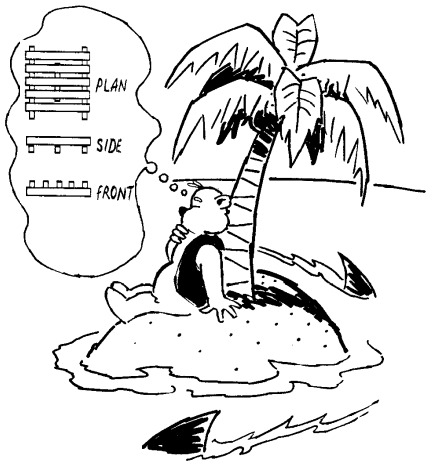
Danger !!

IT staff (and others) frequently get swamped far to quickly in the detail of technical design. Much time is then wasted when the outline changes, rendering the details irrelevant. It is an important principle to focus on the major issues first. Leave the detail until later – *get the outline design (the concepts) approved first*.

A good example of this is found with screen and report designs. Many analysts, designers and users can be quickly sucked into endless discussion on the best-looking, most appropriate design. Much of this discussion will focus on the physical aspect*s* – which are irrelevant to the major issue. This is all detail and is best left to the technical design phase. If system output is the focus of the design discussion then agreement should be sought only on the output data itself, not on the method or format of output.

2.1 Vertical thinking

This tends to be easier for many of us – it is more detailed and physical. It is where many of us feel most comfortable.

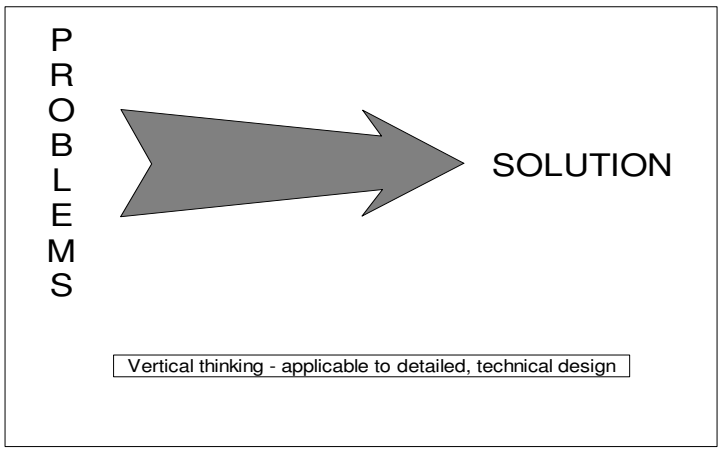


Vertical thinking…

- is logical
- results in unique or few solutions
- is convergent
- is more natural for most of us

Many of our clients will also be happiest at this level – discussing the screen or report details, for example. However, be aware that we should not get into these details until we have decided in principle what design strategy to adopt. Otherwise much time and effort will be wasted in detailed discussions - only to find out later that none of it is relevant.

JAD (Joint Application Development) groups often get focussed on these details - and can soak up much time in doing so.

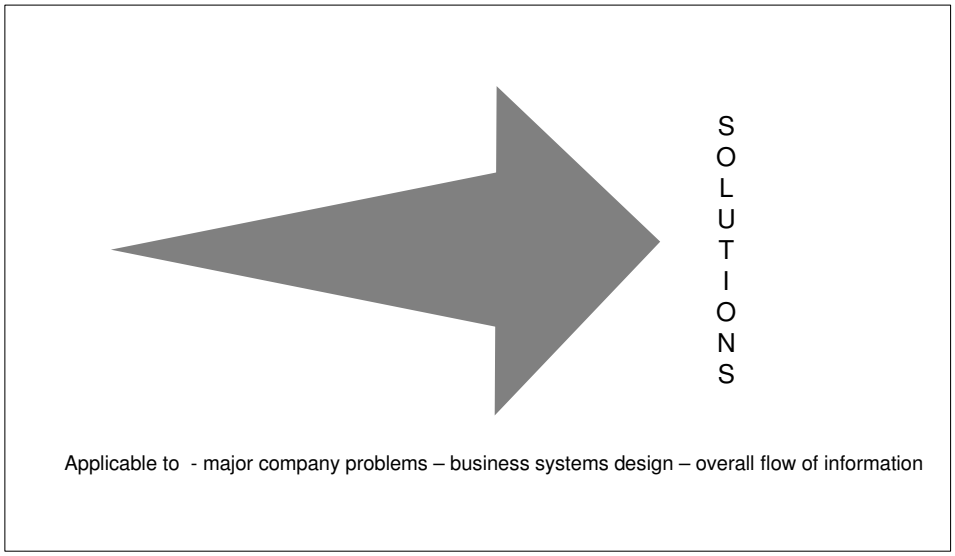


2.2 Creative thinking

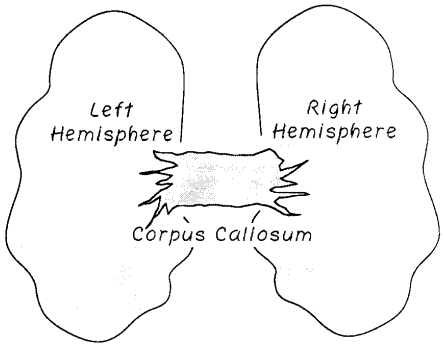
Most of us are not natural creative thinkers. Telling oneself and the team 'to be creative' does not usually yield results. Some special techniques are required to help us use our brains in a different way - to change our usual thinking process. The issue with creative thinking is that almost by definition any idea that has not already been examined is going to sound crazy. But a good solution will probably sound crazy – *at first*. Unfortunately, that's why we often won't put it forward.

Creative thinking…

- is imaginative
- generates many possible solutions
- is divergent
- is lateral



3.0 The brain



In order to find ways of being consciously creative, we must first understand how the brain works. Experimentation on the brain has proved to be very difficult and it is only in the last few years, with advanced scanning technology, that science has discovered much of what we now know.

Put simply, the brain consists of two hemispheres joined by a bridge of nervous tissue called the Corpus Callosum. In unusual cases, some people have been born with a split corpus callosum where the two halves of the brain are not connected. Split brain patients are excellent subjects for studying how functions are localised and in which part of the brain they are performed. This has shown that anatomical features in one half of the body are controlled by the opposite half of the brain - the brain is crossed.

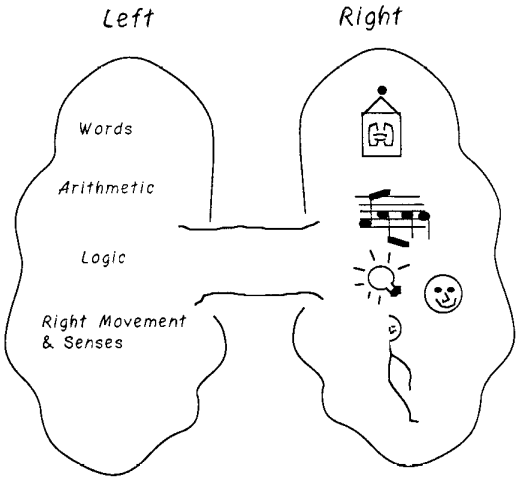
In one experiment, a split brain subject is shown the words 'Hat Band'. Each eye sees the whole visual field. The right visual field is processed by the left side of the brain, and the left visual field is processed by the right side of the brain. When the subject is asked what has been read, they reply 'band'. When asked what sort of band, the subject must guess - Rubber band? Jazz band? The subject has no idea what kind of band.

The conclusion is that the left side of the brain is the word processing side and of course, it is this side which reads the word 'Band'. The right side has received the impression of the word 'Hat', but, because of the cut corpus callosum, this is not transmitted to the left brain.

Since the subject cannot say that they have received the impression of the word 'Hat', we can deduce that the right brain is not capable of word processing. This and similar experiments allow a model of the brain to be drawn showing the localisation of functions between the two halves. This model is true for right-handed people. There is less specialisation of the two halves when the subject is left-handed.

3.1 Left and right brain functions

It is found that in right-handed people, the left brain deals with the senses and movement of the right of the body, together with speech, reading, mathematics and analytical (logical) thinking.



The right brain deals with the senses and movement of the left side of the body together with creativity, the interpretation of shape and the relationship of objects in space. This is, of course, an over-simplification. For example, when a person is brain damaged and loses say movement of one side of the body, the other side of the brain can often be trained to take over the missing brain functions.

We can see that the left brain is the text processor and the right brain is the picture processor. Further research tells us that the logical left brain analyses new ideas generated by the creative right brain – and turns these ideas into words. Unfortunately, the left brain is found to be dominant and tends to filter out many ideas because they appear to be crazy.

The reason behind this dominance of the left brain is probably rooted in our evolutionary past. Primitive man had few left brain functions and relied on right brain functions for survival. An intruder's intentions were judged as hostile or friendly by stance and facial expression. When the left brain functions evolved, the left brain suppressed the 'suspicious'

mistrusting right. Modern man needs to find a way of suppressing left brain activity to allow the right to express itself via the generation of ideas – even, and most importantly, the 'crazy' ones.

3.2 Blocks to creativity

We may fear…

- making mistakes
- looking foolish
- being criticised
- being alone
- being outcast
- disturbing tradition
- being associated with taboos

We may also suffer from…

- left brain dominance
- incompatible objectives
- hostility

For these reasons we find that subconsciously we are hindered from coming up with new ideas. If asked at a meeting for ideas to solve a particular problem, most of us are unlikely to do so. We are simply afraid of looking foolish. And our logical left brains prevent the examination of the ideas, seemingly rejecting them before we consciously recognise them! We must take special steps to try to prevent this from happening.

One way to inhibit the left brain from its dominance is to give it something to do. A right body physical movement will do nicely – like playing with a piece of blu-tack, or doodling. Perhaps you've found yourself doodling while listening – it may be something that you've found helps you to focus on ideas. Test this for yourself – read a passage from a book aloud, with an observer. Now repeat the exercise, but this time do something with your right hand, say, toss a coin repeatedly. Your reading will suffer! Your left brain has to multi-task and the word-flow is more disjointed.

4.0 Creative thinking techniques

Many techniques exists to stimulate creative thinking and whilst the following list is not exhaustive, the examples below can work well when solving business problems. No special tools are needed.

4.1 Brainstorming

The process…

- Organise the team, materials and scribe
- Appoint a chairperson
- State the problems we are trying to solve
- Restate the problem a number of times:
  - How to reduce time to ...
  - How to speed up ...
- Inhibit the left brain
- Have a warm up session e.g.
  - Other uses for:
    - A gumboot
    - A torch
    - A paper clip
- Brainstorm the restated problems and record the ideas
- When the session slows down, invite the 'wildest idea'
- At the end of the session, classify all ideas then evaluate
- do not eliminate ideas too quickly
- Request assistance from management on matters of policy, don't speculate

To be successful, brainstorming sessions need a good chairperson. It is vital that *no* discussions are allowed on any idea during the session, the idea is just recorded. The chairperson's role is to keep the ideas coming, often fast and furious, with people striking sparks off each other.

The evaluation is the hard part, but don't strike out the crazy ones too quickly – they might just be the key to a good solution. Evaluate ideas against a checklist such as the one below:

	Idea 1	Idea 2	Idea 3	Idea…n
Does it meet the objectives				
Does it solve the problem				
Does it introduce new problems				
Will it fit in with current systems				
Can it accommodate growth				

Try not to make the checklist too comprehensive at this stage. We want to eliminate the ideas that are clearly unworkable but retain all that are worth further consideration.

4.2 A bridge - process flow analogy

Solutions to bottleneck or flow problems..

A congested road bridge makes a good theme for a brainstorming session. There are many conceptual similarities between traffic and process flows. Many solutions fall into one of the following classes:

- Speed up the flow
- Reduce the flow
- Divert the flow

These generic solutions apply to many systems, whether traffic, production lines or information flows. We are mainly concerned with information flows and the bridge analogy often helps.

Thinking about road traffic problems should also remind us to consider social, political, environmental and economic factors when creating our solutions.

4.3 The six thinking hats

Design options can generate much discussion during the evaluation process. This needs to be controlled if we are to make good use of our time. It is easy to take sides, to defend our own ideas and to attack what we may see as opposing ideas. This may not be constructive.

An approach that helps to avoid confrontation and which channels our critical analysis is the 'Six Thinking Hats' approach (Dr Edward de Bono). Using this technique a group can evaluate an idea and can argue both the *pros* and *cons* whilst remaining as objective as possible.

A chairperson should formally facilitate the process. An individual may 'wear' a hat to produce a comment without any possible attached stigma - 'wearing the black hat for a moment I don't think that this will work…'. The person who is always critical without being constructive *has* to become constructive (or lose face) when asked by the chair - 'now let us wear the yellow hat and see what good things may result from this idea'.

Caution!!! The process does need to be facilitated. Like any of these methods, it may not be useful and may even be counter-productive unless managed correctly.

The hats…

1. **White hat** - neutral - (think of white paper)
   Information - What do we know? What information do we want? What do we need?
2. **Red hat** - fire, warmth
   Feelings, emotion, intuition, hunches
3. **Black hat** - caution
   Legality, judgement, morality
4. **Yellow hat -** sunshine
   Positive, optimism, benefits
5. **Green hat -** growth
   New ideas, new slants, options, opportunities
6. **Blue hat -** sky
   Overview, control of the process, agenda, next step, action plans, conclusions

4.4 Business process re-engineering: 20 questions

This process works well as a design tool (and also as a problem analysis tool – see the IRM paper: *Problem Analysis Techniques*). The last question of each group (…*should*…?) makes us consider the broader design options. The last group of questions (*How*…?) encourages us to focus on the *method*. It's important that the *What* group of questions is asked first, and the *How* group of questions is asked last.

1. **What?**

- What is being done? (what is being *achieved)*
- Why is it necessary?
- What else *could* be done?
- What else *should* be done?

2. **Where?**

- Where is it being done?
- Why there?
- Where else *could* it be done?
- Where else *should* it be done?

3. **When?**

- When is it done?
- Why then?
- When else *could* it be done?
- When else *should* it be done?

4. **Who?**

- Who does it?
- Why this person/group?
- Who else *could* do it?
- Who else *should* do it?

5. **How?**

- How is it done?
- Why this way?
- How else *could* it be done?
- How else *should* it be done?

Use the ideas generated from the brainstorming sessions, apply the BPR 20 questions technique and re-visit the most promising.

5.0 Validation

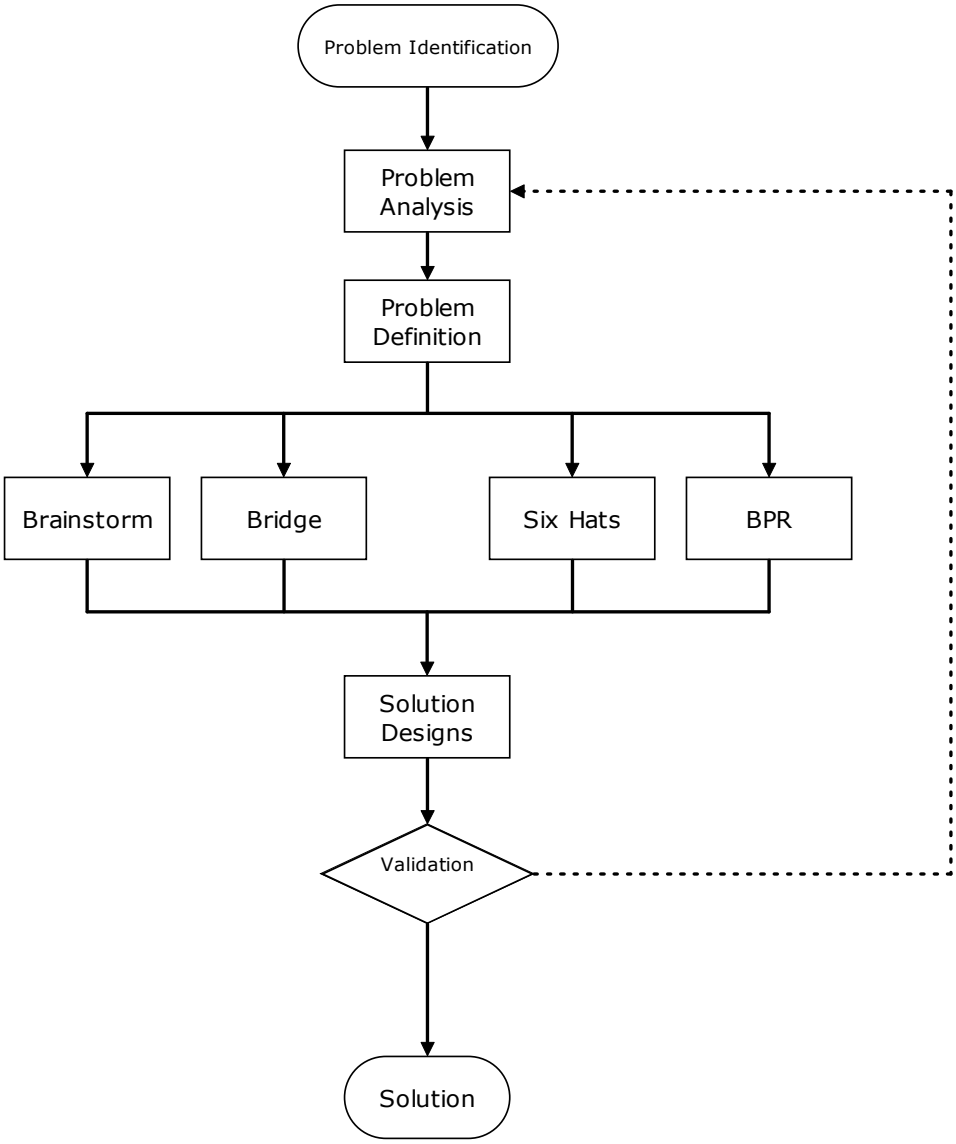
Prior to commencing detailed specification, the analyst should appraise the outline design using the following checklist:

- have the objectives been met?
- have the problems been solved?
- what new problems have been introduced? (there are always some)
- is the design vulnerable to change in the working environment?
- will the design cater for reasonable growth?

Characteristics of good ideas..

- solve, or partially solve, more than one identified problem
- can be implemented quickly. Your client will often be attracted to a *partial* solution that *relieves* the problem, while you continue to work on the complete solution
- can be implemented *independently*. In IT we often put forward complex solutions that depend upon the successful implementation of other systems. When a problem occurs with one system there is often a domino effect of delays
- mesh well with overall business strategies. These will always find favour with management.
- can be implemented step-by-step, *incremental implementation.* Implement a basic solution, then implement more sophistication. In this way you offer a faster solution delivery - albeit not a complete solution – at first. Management may well be willing to wait for the full solution, especially if the business concepts are new

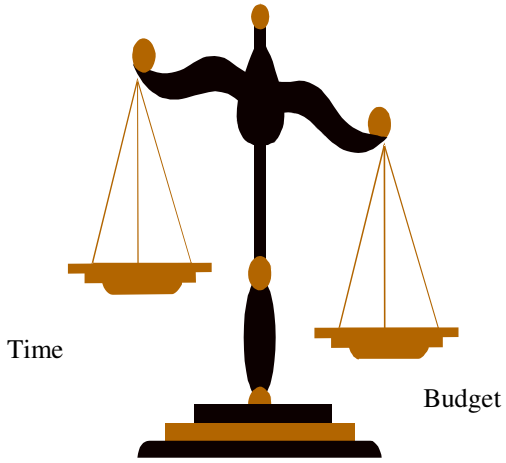
6.0 Creative thinking - generic process model



Hints and tips…

- Modelling the current system (logical & physical) can aid problem understanding
- Chose creative techniques applicable to the problem and your team. Not all problems lend themselves to all techniques. Be flexible and willing to try a different technique or a combination of some or all of them
- Be open to new information - for example, facts uncovered during a brainstorming session may require you to revisit your understanding of the problem
- Essential modelling techniques help give an uncluttered view of the proposed solution
- Don't disregard a solution just because it doesn't solve the whole problem. Your final solution may be built from several ideas, each relevant to a different part of the problem

7.0 Balance



All solutions are compromises. We may need to balance how many functions we automate against the time and money required to achieve this. We may weigh the merits of automating a process against the frequency (and therefore inconvenience) of doing it manually.

Before these decisions can be made, we must establish the basic facts as far as is reasonable (estimating where necessary). Wherever a system design option exists, weigh up the facts, consult the client or your colleagues as appropriate and recommend or make a decision.

Never be afraid to think outside the square and to seek alternative solutions, or to re-define the problem. There's always another way of doing it.

The important thing is not to stop questioning.

Albert Einstein (1879 - 1955)

By Derrick Brown and Jan Kusiak

Send feedback and comments to: training@irm.com.au