

Brainstorming

Brainstorming and Lateral Thinking

Brainstorming is a lateral thinking process. It asks that people come up with ideas and thoughts that seem at first to be a bit shocking or crazy. You can then change and improve them into ideas that are useful, and often stunningly original.

During brainstorming sessions there should therefore be no criticism of ideas: You are trying to open up possibilities and break down wrong assumptions about the limits of the problem. Judgments and analysis at this stage will stunt idea generation.

Ideas should only be evaluated at the end of the brainstorming session - you can then explore solutions further using conventional approaches.

If your ideas begin to dry up, you can 'seed' the session with, for example, a random word.

Individual Brainstorming

When you brainstorm on your own you will tend to produce a wider range of ideas than with group brainstorming - you do not have to worry about other people's egos or opinions, and can therefore be more freely creative. You may not, however, develop ideas as effectively as you do not have the experience of a group to help you.

Group Brainstorming

Group brainstorming can be very effective as it uses the experience and creativity of all members of the group. When individual members reach their limit on an idea, another member's creativity and experience can take the idea to the next stage. Therefore, group brainstorming tends to develop ideas in more depth than individual brainstorming.

Brainstorming in a group can be risky for individuals. Valuable but strange suggestions may appear stupid at first sight. Because of such, you need to chair sessions tightly so that uncreative people do not crush these ideas and leave group members feeling humiliated.

To run a group brainstorming session effectively:

- Define the problem you want solved clearly, and lay out any criteria to be met;
- Keep the session focused on the problem;
- Ensure that no one criticizes or evaluates ideas during the session. Criticism introduces an element of risk for group members when putting forward an idea. This stifles creativity and cripples the free running nature of a good brainstorming session;
- Encourage an enthusiastic, uncritical attitude among members of the group. Try to get everyone to contribute and develop ideas, including the quietest members of the group;
- Let people have fun brainstorming. Encourage them to come up with as many ideas as possible, from solidly practical ones to wildly impractical ones. Welcome creativity;
- Ensure that no train of thought is followed for too long;
- Encourage people to develop other people's ideas, or to use other ideas to create new ones ;
- Appoint one person to note down ideas that come out of the session. A good way of doing this is to use a flip chart. This should be studied and evaluated after the session.

Where possible, participants in the brainstorming process should come from as wide a range of disciplines as possible. This brings a broad range of experience to the session and helps to make it more creative.

And again, it's worth exploring the use of computer-based tools for group brainstorming. As long as you're reasonably quick with keyboard and mouse, these significantly improve the quality and effectiveness of a brainstorming session.

Brainstorming is a great way of generating radical ideas. During the brainstorming process there is no criticism of ideas, as free rein is given to people's creativity (criticism and judgment cramp creativity.) This often makes group brainstorming sessions enjoyable experiences, which are great for bringing team members together.

Individual brainstorming is best for generating many ideas, but tends to be less effective at developing them. Group brainstorming tends to develop fewer ideas, but takes each idea further. Group brainstorming needs formal rules for it to work smoothly.

Step 1: State your problem clearly

Before you start, firmly plant in your mind the idea that your problem can and will be solved. Your job is to find that solution, using personal brainstorming.

State your problem clearly and concisely in one sentence at the top of a blank sheet of paper. Then write down everything you know about your current problem or challenge. Try to isolate and write down specific factors or trends that have contributed to it. Keep in mind that a problem, clearly defined, is already half solved.

By gathering all of the information that you know about your challenge and laying it out in front of you in tangible form, you enable your most powerful problem-solving tool -- your brain -- to see connections, interrelationships and implications in the information you've collected, which would not be obvious if you just kept all of this information in your head.

Think about people who have faced problems or challenges similar to the one you are facing. What strategies or solutions did they use? Then determine if any elements of their solutions can be adapted to your current situation.

Step 2: Brainstorm solutions

As you review your problem statement and supporting information, write down any ideas that occur to you. Don't censor yourself at this point; there will be plenty of time to evaluate your ideas later. Write down every idea, no matter how far-fetched. Your goal at this stage of the personal ideation process is to generate a large quantity of ideas.

Ask yourself: How would a person who is an expert in this area solve this problem? You might want to try this exercise using famous people from history, creative thinkers such as Albert Einstein, or other leaders and innovators that you respect. Your goal for this exercise is to perform a bit of "slight of head" -- to whack your thinking into a different frame of reference to generate fresh ideas and insights.

Divide your problem into its component pieces and write each of them down -- perhaps in a mind map or outline that shows the relationships between each element. Then, try brainstorming ideas for each one. This "slice and dice" technique often works well when you're faced with complex or multi-dimensional challenges.

Envision an ideal future goal or outcome. Then work backwards to the present, writing down the steps you would need to take now to move toward that objective.

If you find yourself running out of ideas too quickly, don't give up. Keep working at it until you have written down at least 20 possible ideas or solutions. Many times, the first 5 to 10 ideas you write down are top-of-mind solutions; often the best ideas take more concentrated and prolonged brainstorming to emerge.

Brainstorming Rules & Techniques

The concept was first introduced by Alex Osborne in the 1930s. It is a tool for generating ideas. It is an activity in which all members of a group (whether it be a work team, classroom, committee, etc.) contribute to a list of problems to be solved or solutions to a problem. Brainstorming helps get a lot of ideas into discussion in a short amount of time. Brainstorming may look unstructured, but to be effective, there should be some ground rules. These can include:

1. Set a time limit on the brainstorming session.
2. Don't let participants get sidetracked. Now is not the time to critique ideas that are being suggested.
3. Be sure that everyone speaks freely.
4. Be sure everyone contributes.
5. Let the participants, not the leader, do the talking.

Elaine Beich, in *The ASTD Trainer's Sourcebook: Creativity & Innovation* suggests these similar rules:

1. Suspend judgment.
2. Encourage freewheeling
3. Quantity is wanted.
4. Piggyback ideas onto other ideas.
5. Post all ideas as you go.
6. Ask for clarification, but avoid questions such as "how" and "why."
7. Allow enough time.
8. Encourage playfulness and humor.
9. Assign a facilitator and a recorder.

Basic Brainstorming

Write a question, challenge, or topic on a flip chart or chalkboard. Ask participants for their input and recognize people through the traditional raising of hands. List every idea offered on the flip chart or chalkboard.

Brainstorming with Guidelines

Divide participants into four groups. Assemble groups at far ends of the room so they will not overhear each other during the activity. Ask each group to choose a spokesperson who will act as a leader and write down all ideas generated by the group.

Meet with each group spokesperson separately. Tell the spokespeople from two of the groups to "Brainstorm uses for a paperclip." Give these groups as little guidance as possible. Give the spokespeople from the other two groups a copy of a sheet of paper that has the following information:

Brainstorm new uses for a paper clip. Follow these guidelines during your brainstorming session:

1. Don't let group members get sidetracked in whether the ideas are good or bad.
2. Get participation from all group members.
3. Let group members do the talking.
4. Encourage group members to speak their minds freely.

Tell all of the group representatives to start their brainstorming sessions with their groups. Allow ten minutes for the sessions. Tell groups they were assigned the same topics, but that two of the groups were told to follow ground rules during their session. Compare the number of ideas generated by the groups that did not have ground rules to follow to the groups that did. Did either group seem to generate more

ideas? Did the groups without ground rules get sidetracked in discussions of whether the ideas were good enough to include on their list? Discuss how having ground rules during a brainstorming session helps to keep the session focused and effective.

Paired Brainstorming

Divide participants into pairs. Have each person offer a "rapid-fire" response. Have them keep giving answers back and forth - even if they get off track - until neither can think of anything further.

Plan-Ahead Brainstorming

Send out a statement of the problem or challenge to participants a few days before the brainstorming session. Ask them to bring ideas with them.

Facilitating Brainstorming

If you are facilitating a brainstorming session, be prepared to offer ideas that will help stimulate participants if they get stuck or start looking at the challenge from only one perspective. When ideas start to slow, push them to generate "x" more ideas. Or, tell them you want them to generate as many ideas as possible in "x" minutes.

Writing it Down

Before verbal brainstorming begins, have each participant write ideas down on paper or index cards. Then collect all of the ideas and redistribute them. It doesn't matter if participants get their own ideas. Taking turns, have each person read the idea they were given. This allows the ideas to be presented anonymously and may allow some ideas to come up that participants might otherwise be uncomfortable presenting. When all the ideas have been read, begin team brainstorming.

Add an Idea

Give each participant a stack of index cards. Have each person write their idea and then pass the card to the left. When the participant gets a new card, he or she should read it, write another idea, and then pass the card to the left. This continues until each card has passed to each person. If a person cannot think of an idea, he or she should write a question and other people can start answering it. Rounds are slower in this form of brainstorming because people need more time to read ideas and answer questions. The facilitator then collects all the cards and sorts them into categories.

Some experts suggest having participants look through the stack of cards and share the most creative, most practical, the one that everyone could do, the zaniest one, etc.

Keep in mind that brainstorming is only the first third of a problem-solving process. It generates the ideas. It is now up to the participants and team leader to organize the ideas and determine what to do with each one.

Ten Basic Guidelines for Successful Brainstorming

1. No idea too stupid

There is an ideal solution to your problem and brainstorming is the key to finding it. However, discussing, criticizing or generally dismissing ideas as they come up reduces your chance of finding the secret treasure and render your brainstorming session useless.

It is often emphasized that in group brainstorming, criticism should be put 'on hold'. Instead of immediately stating what might be wrong with an idea, the participants focus on extending or adding to it, reserving criticism for a later 'critical stage' of the process. By suspending judgment, you create a supportive atmosphere where participants feel free to generate unusual ideas. However, persistent, respectful criticism of ideas by a minority dissenter can reduce *groupthink*, leading to more and better ideas.

2. Watch the clock

A little time pressure is good for brainstorming, so agree a maximum time for brainstorming, say 10 to 20 minutes, and stick to it. Start and finish on time, and encourage a brisk pace to maximize the time invested in this activity. Maybe assign a time-keeper to own this task.

3. Record your progress

All your good ideas are wasted hot air if they are not recorded methodically and more importantly, legibly. Consider using brainstorming software, post-it notes, flip charts or other such methods for getting your ideas down. Whatever you choose, make sure you bring all the necessary tools and materials with you!

4. Quantity not quality

The aim of brainstorming is to churn out as many ideas as you have time for BEFORE you do any reality check on their merits. Through quantity you will find quality, even though it might take some time and effort to get there. Ideas breed ideas.

Use divergent thinking techniques to generate many variations, related ideas, and alternate or even opposite concepts. The greater the number of ideas generated, the greater the chance of producing a radical and effective solution.

5. Use both sides of your brain – unusual ideas are welcome

Most work activities use your left brain, so make your right brain do some work for a change and get more from brainstorming. Use colored or scented pens, random props or anything that says "creative and fun" and not "stuffy and staid."

To get a good and long list of ideas, unusual ideas are welcomed. They may open new ways of thinking and provide better solutions than regular ideas. They can be generated by looking from another perspective or setting aside assumptions. If an idea is too "wild" to be feasible, it can be tamed down to a more appropriate idea more easily than think up an idea.

6. Encourage the right mindset and have fun

Consider using an ice-breaker or creativity exercise to get group members into the right frame of mind and away from creativity blocking thoughts of unanswered emails, to-do lists and other priorities. And once brainstorming has started, remember performance anxiety will dry up creative juices quicker than a quick thing, so make sure the atmosphere is kept light and fluffy and above all, fun.

7. Let no good idea go unheard

Not everyone enjoys brainstorming and group problem solving. Shyness, fear of looking stupid or silly may keep people quiet. Brush up on your facilitation skills and avoid the risk of great ideas being un-spoken or unheard.

If a participant has an idea and insufficient time or opportunity to present the idea, then write it down and present it later. Sometimes brainstorming sessions get hectic, and we do not want to lose any ideas.

8. Combine and improve ideas

Good ideas can be combined to form a very good idea, as suggested by the slogan "1+1=3". Also, existing ideas should be improved. This approach leads to better and more complete ideas than just generation of new ideas, and increases the generation of ideas, by a process of association.

9. After the brainstorm, review ideas

After the brainstorming session, review all of the ideas (and consolidated ideas) for feasibility. Can this be done? Do we have sufficient time? Sufficient resources? Technical capabilities? Are there any conditions and contingencies that may interfere? How do we address any potential issues?

This is the time to think critically about the myriad of ideas that were generated. Do not discount or delete an idea because it is difficult or "seems impossible," because there may be ways to bring that idea to fruition. Some great ideas may not seem possible at first, but great ideas have a way of happening when we commit to them.

10. Establish priorities and a plan

Now that you have a list of the best ideas, which will be pursued first? How will the ideas be implemented? Is there a logical sequence to acting upon the ideas? Who and what is necessary to make it happen? What is the strategic plan and the tactical directions?

Great ideas are only valuable when they are pursued and followed through. Without a plan and sense of direction, even great ideas can get lost.

Problem Solving Techniques

Trial and Error – the least structured method, this involves trying any possible solution without a systematic or methodical approach.

Difference Reduction (aka Hill Climbing) - attempting at every step to move closer to the goal situation. The problem with this approach is that many challenges require that you seem to move away from the goal state in order to clearly see the solution.

Working Backwards – start at the goal state (or end state) and work toward the initial state (or starting state) by searching for the most direct path or sequence of steps that will connect the two states.

Analogy – look for similar problems that have been successfully solved before and apply the same methods to solve the current problem.

Pattern Recognition / Pattern Matching – useful when problem solving by analogy fails due to difficulty in identifying similar problems; examine your problem for deeper patterns rather than superficial similarities, then look for other problems with similar patterns.

Means-Ends Analysis (aka Subgoal Decomposition) – breaking a larger and more complex problem down into smaller, manageable sub-problems, each of which may be also be broken down into smaller, more manageable components; the solution for each sub-problem becomes a sub-goal, and the solution to the original, larger problem is based on the process of getting from the initial state to the goal state by systematically solving all of the sub-problems.

Modeling / Model Building – create an abstract model of the problem to help better understand the problem, all of its facets, and possibly expose previously unseen possibilities.

Proof of Impossibility – try to prove that the problem cannot be solved; the point(s) at which the proof breaks down should be the starting points for possible solutions.

Constraint Examination – review and examine all of the constraints and assumptions for those that may not be accurate or may not apply to the problem.

Research – what have others already done for this problem or similar or related problems? Perhaps a solution already exists? (For example, competitive analyses help business survey the landscape of what is already being done and how.)

Generalization (deduction) – can you find a problem that is more general than yours? How was this problem solved? What can you learn from it?

Specialization (induction) – can you find a problem that is more specific than yours? How was this problem solved? What can you learn from it?

Incubation – take time away from the problem and do other, unrelated tasks or activities; allow the problem to rest without focus, attention, or effort then return to it, often with a different perspective and new ideas.

Concept Fan

To start a Concept Fan, draw a circle in the middle of a large piece of paper. Write the problem you are trying to solve into it. To the right of it radiate lines representing possible solutions to the problem. This is shown in Figure 1:

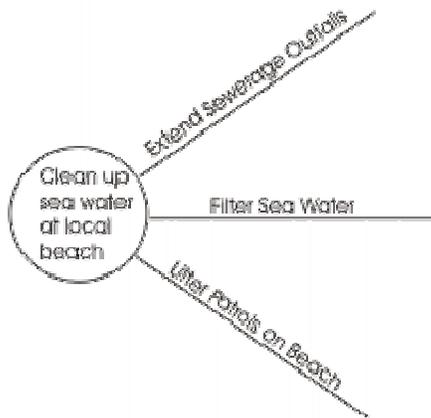


Figure 1: First Stage of a Concept Fan

It may be that the ideas you have are impractical or do not really solve the problem. If this is the case, take a 'step back' for a broader view of the problem.

Do this by drawing a circle to the left of the first circle, and write the broader definition into this new circle. Link it with an arrow to show that it comes from the first circle:

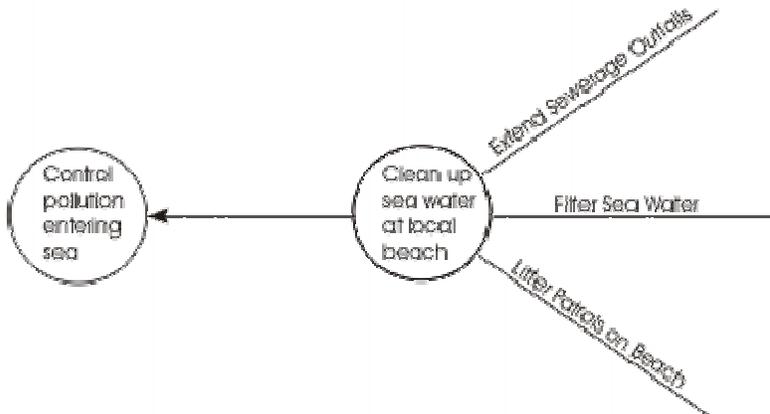


Figure 2: Broadening the Problem Definition on a Concept Fan

Use this as a starting point to radiate out other ideas:

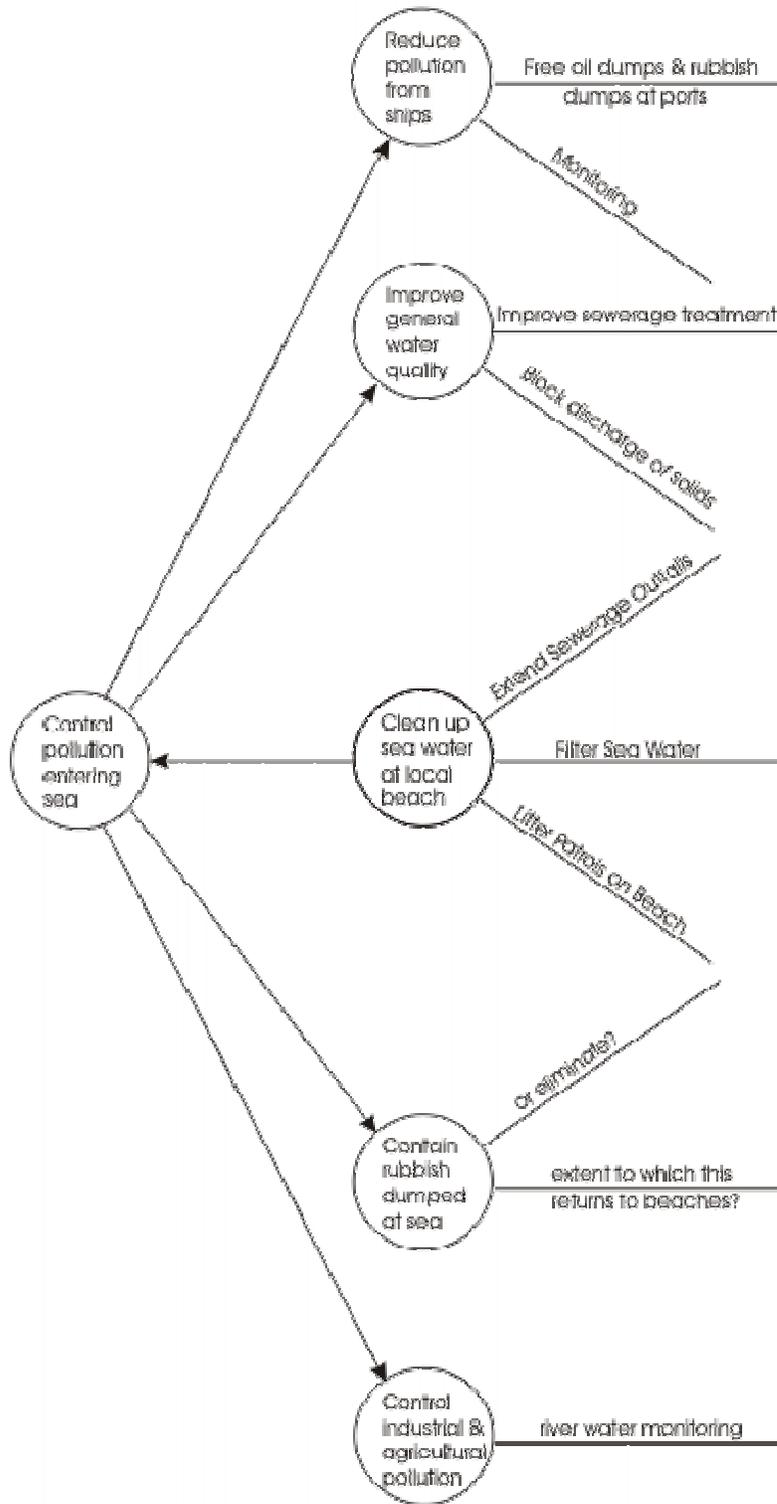


Figure 1.6.3: Radiating Ideas from the Broader Problem Definition

If this does not give you enough new ideas, you can take yet another step back (and another, and another...):

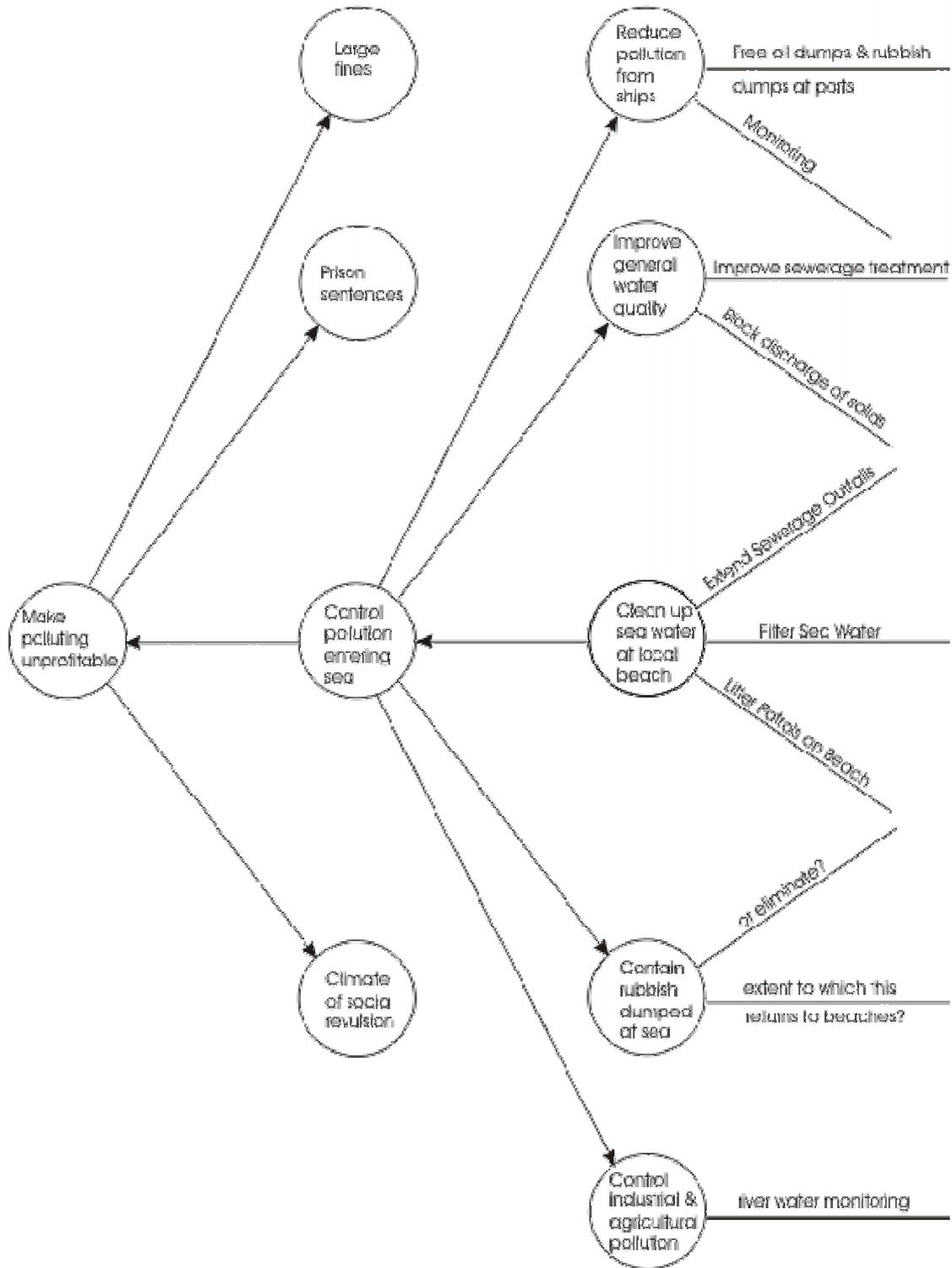


Figure 4: A Developed Concept Fan

Key points about the Concept Fan

The Concept Fan is a useful technique for widening the search for solutions when you have rejected all obvious approaches. It gives you a clear framework within which you can take 'one step back' to get a broader view of a problem.

To start a concept fan, write the problem in the middle of a piece of paper. Write possible solutions to this problem on lines radiating from this circle.

If no idea is good enough, redefine the problem more broadly. Write this broader definition in a circle to the left of the first one. Draw an arrow from the initial problem definition to the new one to show the linkage between the problems. Then radiate possible solutions from this broader definition.

Keep on expanding and redefining the problem until you have a useful solution.

Provocation

Provocation is an important lateral thinking technique. Just like Random Input, it works by moving your thinking out of the established patterns that you use to solve problems.

As explained earlier, we think by recognizing patterns and reacting to them. These reactions come from our past experiences and logical extensions to those experiences. Often we do not think outside these patterns. While we may know the answer as part of a different type of problem, the structure of our brains makes it difficult for us to link this in.

Provocation is one of the tools we use to make links between these patterns.

How to Use Provocation

We begin by making deliberately stupid statements (Provocations), in which something we take for granted about the situation is not true. Statements need to be stupid to shock our minds out of existing ways of thinking. Once we have made a provocative statement, we then suspend judgment and use that statement to generate ideas. Provocations give us original starting points for creative thinking.

As an example, we could make a statement that 'Houses should not have roofs'. Normally this would not be a good idea! However this leads one to think of houses with opening roofs, or houses with glass roofs. These would allow you to lie in bed and look up at the stars.

Once you have made the Provocation, you can use it in a number of different ways, by examining:

- The consequences of the statement
- What the benefits would be
- What special circumstances would make it a sensible solution
- The principles needed to support it and make it work
- How it would work moment-to-moment
- What would happen if a sequence of events was changed
- Etc.

Edward de Bono has developed and popularized use of Provocation by using the word 'Po'. 'Po' stands for 'Provocative operation'. As well as laying out how to use Provocation effectively, he suggests that when we make a Provocative statement in public that we label it as such with 'Po' (e.g. 'Po: the earth is flat'). This does rely on all members of your audience knowing about Provocation!

As with other lateral thinking techniques, Provocation does not always produce good or relevant ideas. Often, though, it does. Ideas generated using Provocation are likely to be fresh and original.

Example:

The owner of a video-hire shop is looking at new ideas for business to compete with the Internet. She starts with the provocation 'Customers should not pay to borrow videos'.

She then examines the provocation:

- *Consequences:* The shop would get no rental revenue and therefore would need alternative sources of cash. It would be cheaper to borrow the video from the shop than to download the film or order it from a catalogue.
- *Benefits:* Many more people would come to borrow videos. More people would pass through the shop. The shop would spoil the market for other video shops in the area.
- *Circumstances:* The shop would need other revenue. Perhaps the owner could sell advertising in the shop, or sell popcorn, sweets, bottles of wine or pizzas to people borrowing films. This would

make her shop a one-stop 'Night at home' shop. Perhaps it would only lend videos to people who had absorbed a 30-second commercial, or completed a market research questionnaire.

After using the Provocation, the owner of the video shop decides to run an experiment for several months. She will allow customers to borrow the top ten videos free (but naturally will fine them for late returns). She puts the videos at the back of the shop. In front of them she places displays of bottles of wine, soft drinks, popcorn and sweets so that customers have to walk past them to get to the videos. Next to the film return counter she sells merchandise from the top ten films being hired.

If the approach is a success she will open a pizza stand inside the shop.

Key points about Provocation

Provocation is an important lateral thinking technique that helps to generate original starting points for creative thinking.

To use provocation, make a deliberately stupid comment relating to the problem you are thinking about. Then suspend judgment, and use the statement as the starting point for generating ideas.

Often this approach will help you to generate completely new concepts.

DO IT - A Simple Process for Creativity

DO IT is an acronym that stands for:

- D - Define problem
- O - Open mind and apply creative techniques
- I - Identify best solution
- T – Transform

How to use DO IT:

1. Define Problem

This section concentrates on analyzing the problem to ensure that the correct question is being asked. The following steps will help you to do this:

- Check that you are tackling the problem, not the symptoms of the problem. To do this, ask yourself why the problem exists repeatedly until you get to the root of it.
- Lay out the bounds of the problem. Work out the objectives that you must achieve and the constraints that you are operating under.
- Where a problem appears to be very large, break it down into smaller parts. Keep on going until each part is achievable in its own right, or needs a precisely defined area of research to be carried out.
- Summarize the problem in as concise a form as possible. Robert W. Olsen suggests that the best way to do this is to write down a number of two word problem statements and choose the best one.

2. Open Mind and Apply Creative Techniques

Once you know the problem that you want to solve, you are ready to start generating possible solutions. It is very tempting just to accept the first good idea that you come across. If you do this, you will miss many even better solutions.

At this stage of DO IT we are not interested in evaluating ideas. Instead, we are trying to generate as many different ideas as possible. Even bad ideas may be the seeds of good ones.

While you are generating solutions, remember that other people will have different perspectives on the problem, and it will almost certainly be worth asking for the opinions of your colleagues as part of this process.

3. Identify the Best Solution

Only at this stage do you select the best of the ideas you have generated. It may be that the best idea is obvious. Alternatively, it may be worth examining and developing a number of ideas in detail before you select one.

When you are selecting a solution, keep in mind your own or your organization's goals. Often decision making becomes easy once you know these.

4. Transform

Having identified the problem and created a solution to it, the final stage is to implement this solution. This involves not only development of a reliable product from your idea, but all the marketing and business side as well. This may take a great deal of time and energy.

Many very creative people fail at this stage. They will have fun creating new products and services that may be years ahead of what is available on the market. They will then fail to develop them, and watch someone else make a fortune out of the idea several years later.

The first stage in transforming an idea is to develop an Action Plan for the transformation. This may lead to creation of a Business or Marketing Plan. Once you have done this, the work of implementation begins!

Key points about DO IT:

DO IT is a structured process for creativity. Using DO IT ensures that you carry out the essential groundwork that helps you to get the most out of creativity tools.

These steps are:

1. *Problem Definition:* During this stage you apply a number of techniques to ensure that you are asking the right question.
2. *Open Mind:* Here you apply creativity techniques to generate as many answers as possible to the question you are asking. At this stage you are not evaluating the answers.
3. *Identify the best solution:* Only at this stage do you select the best solutions from the ones you came up with in step 2. Where you are having difficulty in selecting ideas, use formal techniques to help.
4. *Transform:* The final stage is to make an Action Plan for the implementation of the solution, and to carry it out. Without implementation, your creativity is sterile.

Lotus Blossom

We were all born as spontaneous, creative thinkers. Yet a great deal of our education may be regarded as the inculcation of mind sets. We were taught how to handle problems and new phenomena with fixed mental attitudes (based on what past thinkers thought) that predetermine our response to problems or situations. Typically, we think on the basis of similar problems encountered in the past. When confronted with problems, we fixate on something in our past that has worked before. Then we analytically select the most promising approach based on past experiences, excluding all other approaches, and work within a clearly defined direction toward the solution of the problem.

Our rutted paths of thinking

Once we think we know what works or can be done, it becomes hard for us to consider alternative ideas. We tend to develop narrow ideas and stick with them until proven wrong. Following is an interesting experiment, which was originally conducted by the British psychologist Peter Watson, that demonstrates the way we typically process information. Watson would present subjects with the following three numbers in sequence.

2... 4... 6...

He would then ask subjects to explain the number rule for the sequence and to give other examples of the rule. The subjects could ask as many questions as they wished without penalty.

He found that almost invariably most people will initially say, "4, 6, 8" or some similar sequence. And Watson would say, yes, that is an example of a number rule. Then they will say, "20, 22, 24" or "50, 52, 54" and so on— all numbers increasing by two. After a few tries, and getting affirmative answers each time, they are confident that the rule is numbers increasing by two without exploring alternative possibilities.

Actually, the rule Watson was looking for is much simpler -- it's simply numbers increasing. They could be 1, 2, 3 or 10, 20, 40 or 400, 678, 10,944. And testing such an alternative would be easy. All the subjects had to say was 1, 2, 3 to Watson to test it and it would be affirmed. Or, for example, a subject could throw out any series of numbers, for example, 5,4,3 to see if they got a positive or negative answer. And that information would tell them a lot about whether their guess about the rule is true.

The profound discovery Watson made was that most people process the same information over and over until proven wrong, without searching for alternatives, even when there is no penalty for asking questions that give them a negative answer. In his hundreds of experiments, he, incredibly, never had an instance in which someone spontaneously offered an alternative hypothesis to find out if it were true. In short, his subjects didn't even try to find out if there is a simpler or even, another, rule.

Creative geniuses think differently

Creative geniuses don't think this way

The creative genius will always look for a multiplicity of ways to approach a subject. It is this willingness to entertain different perspectives and alternative approaches that broadens their thinking and opens them up to new information and the new possibilities that the rest of us don't see. Einstein was once asked what the difference was between him and the average person. He said that if you asked the average person to find a needle in a haystack, the person would stop when he or she found a needle. He, on the other hand, would tear through the entire haystack looking for all possible needles.

When Charles Darwin first set to solve the problem of evolution, he did not analytically settle on the most promising approach to natural selection and then process the information in a way that would exclude all other approaches. Instead, he initially organized his thinking around significant themes, principally eight, of the problem, which gave his thinking some order but with the themes connected loosely enough so that he could easily alter them singly or in groups. His themes helped him capture his thoughts about

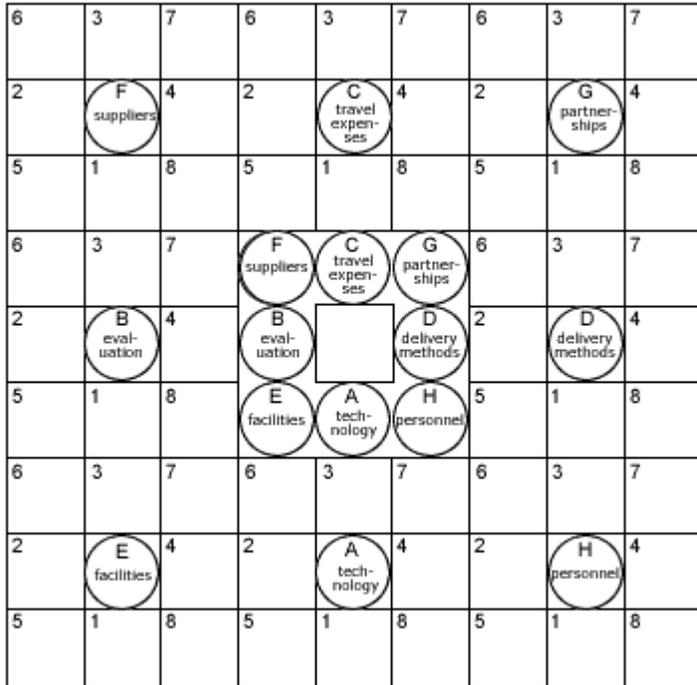
evolutionary change by allowing him to reach out in many alternative directions at once and pulling seemingly unrelated information into a coalescent body of thought.

Darwin used his themes to work through many points that led to his theory of evolution by helping him to comprehend what is known and to guide in the search for what is not yet known. He used them as a way of classifying the relation of different species to each other, as a way to represent the accident of life, the irregularity of nature, the explosiveness of growth, and of the necessity to keep the number of species constant. Over time, he rejected some of his themes— the idea of direct adaptation, for instance. Some were emphasized -- the idea of continuity. Some were confirmed for the first time -- the idea that change is continuous. Some were recognized -- the frequency of variation. By adjusting and altering the number of themes and connections, Darwin was able to keep his thought fluid and to bring about adaptive shifts in his thinking. He played the critic, surveying his own positions; the inventor, devising new solutions and ideas; and the learner, accumulating new facts not prominent before.

The Lotus Blossom brainstorming technique

The point is that by organizing his thinking around loosely-connected themes, Darwin expanded his thinking by inventing alternative possibilities and explanations that, otherwise, may have been ignored. A creative-thinking technique that will help you expand your thinking in a similar fashion is Lotus Blossom, which was originally developed by Yasuo Matsumura of Clover Management Research in Chiba City, Japan. The technique helps you to diagrammatically mimic Darwin's thinking strategy by organizing your thinking around significant themes. You start with a central subject and expand into themes and sub-themes, each with separate entry points. In Lotus Blossom, the petals around the core of the blossom are figuratively "peeled back" one at a time, revealing a key component or theme. This approach is pursued in ever-widening circles until the subject or opportunity is comprehensively explored. The cluster of themes and surrounding ideas and applications, which are developed in one way or another, provide several different alternative possibilities. The guidelines for Lotus Blossom are:

1. Write the central problem in the center of the diagram.
2. Write the significant themes, components or dimensions of your subject in the surrounding circles labeled A to H surrounding the central theme. List The optimal number of themes for a manageable diagram is between six and eight. If you have more than eight, make additional diagrams. Ask questions like: What are my specific objectives? What are the constants in my problem? If my subject were a book, what would the chapter headings be? What are the dimensions of my problem?
3. Use the ideas written in the circles as the central themes for the surrounding lotus blossom petals or boxes. Thus, the idea or application you wrote in Circle A would become the central theme for the lower middle box A. It now becomes the basis for generating eight new ideas or applications.
4. Continue the process until the lotus blossom diagram is completed.



When you write your ideas in the diagram, you'll discover that ideas continually evolve into other ideas and applications, as ideas seem to flow outward with a conceptual momentum all their own.

An important aspect of this technique is that it shifts you from reacting to a "static" snapshot of the problem and will encourage you to examine the significant themes of the problem and the relationships and connections between them. Sometimes when you complete a diagram with ideas and applications for each theme, a property or feature not previously seen will emerge. Generally, higher level properties are regarded as emergent -- a car, for example, is an emergent property of the interconnected parts. If a car were disassembled and all the parts were thrown into a heap, the property disappears. If you placed the parts in piles according to function, you begin to see a pattern and make connections between the piles that may inspire you to imagine the emergent property--the car, which you can then build. Similarly, when you diagram your problem thematically with ideas and applications, it enhances your opportunity to see patterns and make connections. The connections you make between the themes and ideas and applications will sometimes create a emergent new property or feature not previously considered.

Vertical Thinking

Vertical solutions are based on existing ideas or knowledge -- solutions that others have already had some success with.

To paraphrase Thomas Edison, the world outside of your industry, market or profession is full of existing ideas that people have never fully capitalized upon, which may be adapted to your specific need or challenge.

When you're doing "vertical" research, Web search engines can help you to find articles, white papers, case histories and other documents that demonstrate how other people have tackled challenges similar to yours. Likewise, you can use online discussion forums to ask others for advice on how they solved a similar problem.

Thinking vertically is something like drilling deeper in an existing oil well, or mining an existing seam in a gold mine that may already be just about tapped out. Digging deeper into known, familiar territory carries little risk, but is unlikely to result in a breakthrough idea.

Most of us tend to rely on safety and security of tried-and-true solutions -- the so-called conventional wisdom so typified by the expression, "That's the way it's always been done...". It takes courage to step out in a fresh, new direction.

Horizontal Thinking

Next, try thinking about your challenge horizontally -- in other words, come up with a variety of ideas by thinking in totally new directions. This is where creative brainstorming techniques can be very useful. They whack you out of your familiar, rutted paths of thinking behind, and can help you to jump-start your thinking in new, creative directions.

To use our oil drilling metaphor, vertical thinking is like digging exploratory wells in different locations, in hopes of finding new deposits of fresh, untapped ideas. Horizontal thinking tends to be more risky, but is more likely to lead to a breakthrough idea that could yield significant value to you or your company.

Combining vertical and horizontal thinking

In real world problem-solving situations, a combination of both approaches usually produces the best results. This technique ensures that you tap the best existing ideas and information, while also generating novel, untested ideas, increasing the likelihood that you'll uncover the ideal solution to your problem or challenge. In fact, creativity experts suggest that you gather as much information as possible about your existing challenge or opportunity (vertical thinking) before you begin brainstorming novel solutions (horizontal thinking).