4 Tools for Developing Innovative Solutions

4.4 Analogical Reasoning

Keywords
Creativity technique, creativity, creativity tool, analogy, analogies, drawing analogies, problem solving

After reading the component the reader will have the capability to explain what analogical reasoning is, describe the implementation procedure and give one or more examples. It will take 30 minutes to go through this module including a short task, but it takes 40 – 50 minutes to conduct it with a group of people.

Introduction
How can you increase the level of creativity and innovation in your organisation? One of the easiest and quickest ways is to develop people’s skills in generating multiple solutions to problems. Creativity techniques can help anyone generate alternatives. One of these techniques is “analogical reasoning” or “drawing analogies” which can provide insight into defining and solving a problem.

4.4.1 What is Analogical Reasoning

Experiences we have had and knowledge we have acquired help us to orientate and to adapt our actions. We go back to information we have stored in our brain in a given situation to make a decision or to act in the most efficient way.

I remember that when I was a child I was very afraid of injections. One day, my mother took me to the hairdresser. As the hairdresser was dressed in a white coat, which was traditional at that time and the same as the doctor had worn when he gave me the injection, I turned around in the doorway and ran away as fast as I could…

We try to find parallels to situations/problems which are structured similarly. In conclusion, an analogy is a comparison of two things that are essentially dissimilar but are shown through the analogy to have some similarity. Analogies are comparisons of the similar features of two things- they are also mental telescopes through which you can spy ideas. When using analogies to solve a problem we look at two unrelated things- one of which is from the problem and the other is from an unrelated field.

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1 www.innosupport.net
2 Higgins, James M (1994) Creating Creativity
We find the relation between them and tease from the comparison a new idea. Analogy often goes to the heart of the problem\(^3\). For instance, consider the following examples:

**Helicopters**: The hummingbird can also hover and fly backwards.

**Hypodermic needles**: The scorpion uses the pointed tip of its tail to inject poison.

Photos: Source: [http://openphoto.net](http://openphoto.net), Helicopter photo taken by David Martin, hummingbird photo taken by Marek Novotný, injection photo by Dušan Zidar and scorpion photo by Fibobjects

**Anaesthesia**: Many snakes use venom to paralyze and desensitize their prey before eating it.

Most of us are threatened by the strange and unfamiliar and have a need to understand it. When confronted with something unfamiliar, we tend to break it down and analyze the different parts to see if this will allow us to understand it or make it familiar. Our minds compare the unfamiliar object with things that are familiar and this process can convert the strange into the familiar\(^4\).

Analogue Reasoning is a creative method and has nothing to do with thinking “we have always done this successfully in this way, so we will continue doing it this way”, which often blocks new and innovative solutions.

Why don’t you take five minutes to find one or more analogies to see if it works for you!

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4.4.2 Why use it
This method can help us to find ideas for solving a problem. We all have stored a lot of information in our brains, personal experiences and information we have kept from other sources like TV programmes, movies, books etc. When we get into a certain situation where we have to find a way to solve a problem, it helps us to mobilize that information which had been used in a comparable situation.

This is generally very useful, especially if colleagues from very different background of knowledge and experience come together to discuss a problem. Have you ever been a member of such a diverse team?\(^5\)

Analogies move people to fresh perspectives that provide new connections for new ideas. Using more tools brings problem solvers to more perspectives. This variety and richness increases the possibility of success in applying creativity to problems.\(^6\) It is used to better identify and understand problems. Drawing analogy might provide insight into how to solve a business problem.\(^7\)

4.4.3 Where to use
This technique can be implemented by a group of people and an individual. It is a problem solving technique and all areas of an enterprise can use it in order to generate ideas and solve a problem. It can also serve as a starting point for a productive brainstorm session.\(^8\)

It could be very useful for creative and design units, marketing units, sales, production unit, etc.

4.4.4 How to implement
Here one possible way of implementing analogical reasoning is presented and it takes about 40 minutes, but there are also other more detailed models that could take you longer periods of time (months). The procedure is recommended to take place in a quiet place (room), where people can relax and think. You can use a flipchart in order to take notes of your thoughts or even draw pictures.

**Step1. State your challenge**. Identify what it is you want ideas for. “How to make X”, “How to prevent Y”, How to speed up Z.\(^9\)

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\(^5\) [www.innosupport.net](http://www.innosupport.net)
\(^7\) Higgins, James M (1994) Creating Creativity
\(^9\) Higgins, James M (1994) Creating Creativity
Step 2. Choose a parallel or distant field. The greater the distance the parallel world is from your challenge, the greater your chance of producing new ideas. A business analogy to a business challenge is too close - analogies from television or cookery more likely to stimulate creative thought. Biology is another fertile field for analogies.

Possible objects of producing analogies:
- System
  - Structure
    - Elements (form, colour, material, physical state)
    - Relation between such elements
  - Function
- Environment of the system

Where to search for analogies?
Suitable analogies can be found in different fields of work or disciplines which seem to be “distant” from each other. Therefore, for the composition of a work group, experts from different fields are useful (technicians, doctors, biologists etc.).

Useful fields to look for analogies may be:
Nature: we all know about surprising solutions by using examples from nature (the durability of a spider net, the orientation of bats), which have been transferred and used for technical solutions. There is a whole scientific discipline dealing with this topic - BIONICS.

There are lots of problems we are trying to solve which animals and plants have already solved. Other cultures, other technical disciplines, art, medicine, science, history are useful fields to search for analogies.

In looking for analogies from “distant” fields of work, solution concepts can be developed that are completely different from the original context of our problem. So they can lead to innovative solutions.

Prerequisites:
- Clear definition of the problem
- Available knowledge in different levels/expertise of different fields of knowledge (natural science, technical expertise, medicine...) – group work with experts from “distant” fields can be very useful
- Capability to “see” similar structures/functions in a different field of knowledge

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10 [http://www.mycoted.com/Analogies](http://www.mycoted.com/Analogies)
12 Higgins, James M (1994) Creating Creativity
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- Abilities to transfer the similarities found to the problem situation which has to be solved
- Knowledge about available sources of knowledge - databases, experts… - and abilities to use them

Step3. **Generate a list of items** (people, situations, objects, actions, places, etc.) that it is “like” it in some way or list the images that you associate with your chosen field, and then choose one or more particularly rich and interesting ones. This will allow you to describe the analogy in as much detail as possible.

Step4. Look for similarities and connections between the two components for your analogy. Don’t think of looking for connections as something arduous, or feel as though you were forcing yourself to swallow something unpleasant for your own good. Think easy. Let your thoughts come and go as they wish. **Determine any insights or potential solutions that the analogy yields**.

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13 www.innosupport.net
14 http://www.mycoted.com/Analogies
16 Ibid
17 Higgins, James M (1994) Creating Creativity
Some tips for drawing successful analogies are:

- After identifying your problem choose a parallel or distant field. When drawing an analogy select a much unrelated world or field to draw the analogy to. The greater the distance the parallel world is from your challenge, the greater your chance of producing new ideas.
- Venturing into strange areas which seem totally unrelated to your challenge will increase your chances of seeing the challenge in a new context. The stranger the analogy, the greater your chance of generating a unique idea.
- Relax and use your fantasy.

Now it's your turn to apply this technique to your daily work and solve one possible business problem using an analogy. Let's try it!

For example, your business problem is the following: You own a jewelry store and customers doubt about how jewelry would look with their wardrobes (colour of their clothes, etc.). So implement the technique of drawing analogies in order to advertise or present your products in order to remove your customers’ doubts.
Two possible fields to draw analogies from are given below, but you could try to find one on your own before looking at it. In order to get some help look at the annex (indicative list of fields).

**Possible answers:**
Toy industry could be one field to use for drawing an analogy! The owner could use dolls wearing clothes combined with jewelry in the shop-window.

Delivery of food could be another field. The owner could send the jewelry or an imitation of the jewelry to the customer’s home (jewelry delivery) in order to try it on with his clothes and return it in a few hours.

Did you find it easy? What was the problem, the analogy and the new idea produced?

### 4.4.5 Case Studies/ Examples

There are lots of examples of finding solutions from nature. Analogies found in other technical fields are quite common, too. In training for analogical reasoning, the question of how to transfer the lessons learned from **historical examples** often arises and we are often asked to illustrate how these examples apply.

*The animation is available in the online guide only ([www.innosupport.net](http://www.innosupport.net)).*

1. **Example:** Therefore, we have chosen one example from historical sources (see K. H. BUSCH).

   The “Rat catcher of Hameln” is a story well known in Germany. People of the German town Hameln suffered millions of rats and mice. In 1284, as the story goes, a man wearing a strange looking vest appeared in the town and told the citizens that he would be able to free the town from the plague.

   The citizens promised him a good reward. He took out of his pocket a small pipe and started to play. All the rats and mice came out of the houses and followed him. He went right away into the nearby river; the animals followed him and drowned…

   - Attracting/driving away animals (rats, mice, moles, and midgets) by using acoustic means is very common nowadays.

   *For those who do not know the German story, we are going to tell it to the end.*

   The citizens were very happy but “forgot” to reward the man who had freed them from the plague. He went away very angrily but appeared again, early in the morning of the 26th June.
He started to play his pipe again but this time, many children appeared to follow him. They went out of the town to a hill where they disappeared forever …  

2. Example: A second example drawing analogy from medicine sector.
A new nightclub having its grand opening and the owners wanted to send out clever and amusing invitations. They worked with the following analogy: “An invitation is like an aspirin.” In other words, they made the familiar strange. How can an invitation be like an aspirin? This analogy forced them to search for connections and similarities between two items. The search resulted in one of the year’s most unusual invitations.

The idea: Make the invitation pill-like. The club sent out a blue pill nestled in a black velvet ring box. Instructions on the box read “Drop into warm water, stir and let dissolve.” When immersed, the capsule dissolved and a piece of cellophane with the time, date and place floated to the top. The invitations cost $1.10 each and the opening was a smash.

3. Example: A third example drawing analogy from nature.

At Atlas Copco Tec, a mining equipment company based in Golden, Colorado, a product development team used analogies to develop a machine that would both dig ore and load it onto a conveyor belt. One of the members was an entomologist. He suggested the praying mantis as an example. As it eats, it clutches food between its forelegs and thrusts it into its mouth. The result of that analogy was the ROC 302, a large tractor with shovels on each side (like forelegs) that load the ore onto a conveyor belt running through the middle of the machine.

4.4.6 Summary
An analogy is a comparison of two things that are essentially dissimilar but are shown through the analogy to have some similarity. Analogical reasoning is a problem solving technique that can be implemented by a group of people and an individual, as well. Drawing analogies between two unrelated fields can generate multiple solutions and ideas.

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18 www.innosupport.net
19 Higgins, James M, 1994, Creating Creativity
20 Higgins, James M, 1994, Creating Creativity
Variable case studies and tips are provided for successful implementation of analogies. It's worth trying!

After reading this component the reader should be aware of what Analogical reasoning is and its usefulness and importance for generating ideas and solving problems (creative thinking). It is a fruitful tool for generating ideas and solutions. The reader should be able to follow the implementation procedure for one of his own problems in his working (or another) environment. Variable case studies have guided the reader to accomplish the task and better understand the implementation of analogies.
Bibliography


<http://www.mycoted.com/Analogies>, viewed 29 May 2008, last update 16 April 2006: This website includes all creativity techniques in alphabetical order, giving basic information for each one of them.

<http://openphoto.net>, viewed 29 May 2008: It is a website with pictures and images. Images used in this chapter are derived by this website.
For further information you could visit the following links:

http://www.gocreate.com: The website contains a database (with search function) of articles and books on creativity. Business consultation services concerning development of new ideas through writing, idea generation, creative thinking, innovation, problem solving in organisations, industry and education.

http://www.creativityatwork.com: This website focuses on leadership development, creativity, collaboration and cultivating environments that foster innovation.

http://www.virtualsalt.com/crebook2.htm: This website describes many classic creative thinking techniques.

http://www.eirma.org/members/learninggroups/lg03-creat/Learngroup_creat_follow-up/Ramon-Vullings-creativity_tool_catalogue.pdf: This is a catalogue of creativity techniques including personal analogy description.

http://www.brainstorming.co.uk/tutorials/analogytutorial.html: This website contains information about how to use the analogy technique.

http://creativityblog.structured-analogy-consultants.com/category/analogy/: This is a blog including information about books, articles and other issues related to analogies and other creativity techniques.

Glossary

Creativity techniques: “Creativity techniques are the terms given to a wide range of techniques or methods which can be used with individuals or in team situations to facilitate a systematic approach to turning explicit individual experiences, knowledge and creative ideas (stored in peoples’ brains) into a format which can be transferred to others and used to create new knowledge and to find innovative solutions” (source: http://en.wikipedia.org/wiki/Creativity_technique).

Entomologist: An entomologist is a scientist who studies insects. Some entomologists study the classification, life cycle, distribution, physiology, behavior, ecology, or population dynamics of insects. Other entomologists study urban pests, forest pests, agricultural pests, or medical and veterinary pests and their control (source: http://www.aboutbioscience.org/entomologist.html).
### Annex

#### Indicative list of distant fields

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