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Module 19: Creativity and Innovation

Part 3:

Techniques for Promoting Innovation

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Training for Employment

Module 19: Creativity and Innovation

Part 3: Techniques for Promoting Innovation

Importance

There are different types of innovation tools which can make a tremendous enhancement in the performance and the satisfaction of individuals, teams, and your entire organization.

Learning Objectives

Upon the completion of this module, you will be able to:

- Define innovation and creativity tools
- Define scamper

Innovation and Creativity tools

Although creativity is a cognitive approach often based on imagination, different tools (for example, idea generating sessions), can be used to enhance and assist it. However, tools should not only focus on idea generation – measuring, monitoring and continuous implementation of innovation and creativity should have their tools as well.

Tools for Creativity and Innovation

Creativity and innovation can be enhanced in many ways. As you have already learned, to cultivate both creativity and innovation at the workplace, certain leadership behaviors should be practiced:

- Focus on continuous learning
- Have an open attitude towards risk taking
- Use and share knowledge and information
- Conduct fair and informative evaluations
- Reward creative performance

SCAMPER

This is where creative brainstorming techniques like SCAMPER can help. This tool helps you generate ideas for new products and services by encouraging you to think about how you could improve existing ones.

About the Tool

SCAMPER is a mnemonic that stands for:

Substitute.

Combine.

Adapt.

Modify.

Put to another use.

Eliminate.

Reverse.

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

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, a facilitator and author, who organized these questions into the SCAMPER mnemonic.

Note:

Remember that the word "products" doesn't only refer to physical goods. Products can also include processes, services, and even people. You can therefore adapt this technique to a wide range of situations.

How to Use the Tool

SCAMPER is really easy to use.

First, take an existing product or service. This could be one that you want to improve, one that you're currently having problems with, or one that you think could be a good starting point for future development.

Then, ask questions about the product you identified, using the mnemonic to guide you. Brainstorm as many questions and answers as you can. (We've included some example questions, below.)

Finally, look at the answers that you came up with. Do any stand out as viable solutions? Could you use any of them to create a new product, or develop an existing one? If any of your ideas seem viable, then you can explore them further.

Example Questions

Let's look at some of the questions you could ask for each letter of the mnemonic:

Substitute

What materials or resources can you substitute or swap to improve the product?

What other product or process could you use?

What rules could you substitute?

Can you use this product somewhere else, or as a substitute for something else?

What will happen if you change your feelings or attitude toward this product?

Combine

What would happen if you combined this product with another, to create something new?

What if you combined purposes or objectives?

What could you combine to maximize the uses of this product?

How could you combine talent and resources to create a new approach to this product?

Adapt

How could you adapt or readjust this product to serve another purpose or use?

What else is the product like?

Who or what could you emulate to adapt this product?

What else is like your product?

What other context could you put your product into?

What other products or ideas could you use for inspiration?

Modify

How could you change the shape, look, or feel of your product?

What could you add to modify this product?

What could you emphasize or highlight to create more value?

What element of this product could you strengthen to create something new?

Put to Another Use

Can you use this product somewhere else, perhaps in another industry?

Who else could use this product?

How would this product behave differently in another setting?

Could you recycle the waste from this product to make something new?

Eliminate

How could you streamline or simplify this product?

What features, parts, or rules could you eliminate?

What could you understate or tone down?

How could you make it smaller, faster, lighter, or more fun?

What would happen if you took away part of this product? What would you have in its place?

Reverse

What would happen if you reversed this process or sequenced things differently?

What if you try to do the exact opposite of what you're trying to do now?

What components could you substitute to change the order of this product?

What roles could you reverse or swap?

How could you reorganize this product?

Key Points

SCAMPER helps you develop new products and services. Many of the questions it uses were created by Alex Osborn, but Bob Eberle developed the mnemonic.

SCAMPER stands for:

Substitute.

Combine.

Adapt.

Modify.

Put to another use.

Eliminate.

Reverse.

To use SCAMPER, simply ask questions regarding each element. Remember, not every idea you generate will be viable; however, you can take good ideas and explore them further.

Mind Mapping

Mind Mapping is a useful technique that helps you learn more effectively, improves the way that you record information, and supports and enhances creative problem solving.

By using Mind Maps, you can quickly identify and understand the structure of a subject. You can see the way that pieces of information fit together, as well as recording the raw facts contained in normal notes.

More than this, Mind Maps help you remember information, as they hold it in a format that your mind finds easy to recall and quick to review.

About Mind Maps

Mind Maps were popularized by author and consultant, Tony Buzan. They use a two-dimensional structure, instead of the list format conventionally used to take notes.

Mind Maps are more compact than conventional notes, often taking up one side of paper. This helps you to make associations easily, and generate new ideas

. If you find out more information after you have drawn a Mind Map, then you can easily integrate it with little disruption.

More than this, Mind Mapping helps you break large projects or topics down into manageable chunks, so that you can plan effectively without getting overwhelmed and without forgetting something important.

A good Mind Map shows the "shape" of the subject, the relative importance of individual points, and the way in which facts relate to one another. This means that they're very quick to review, as you can often refresh information in your mind just by glancing at one. In this way, they can be effective mnemonics – remembering the shape and structure of a Mind Map can give you the cues you need to remember the information within it.

When created using colors and images or drawings, a Mind Map can even resemble a work of art!

Uses

Mind Maps are useful for:

- Brainstorming
- Summarizing information, and note taking.
- Consolidating information individually, and as a group.
- From different research sources.
- Thinking through complex problems.
- Presenting information in a format that shows the overall structure of your subject.
- Studying and memorizing information.

Drawing Basic Mind Maps

To draw a Mind Map, follow these steps:

1. Write the title of the subject you're exploring in the center of the page, and draw a circle around it. This is shown by the circle marked in figure 1, below.

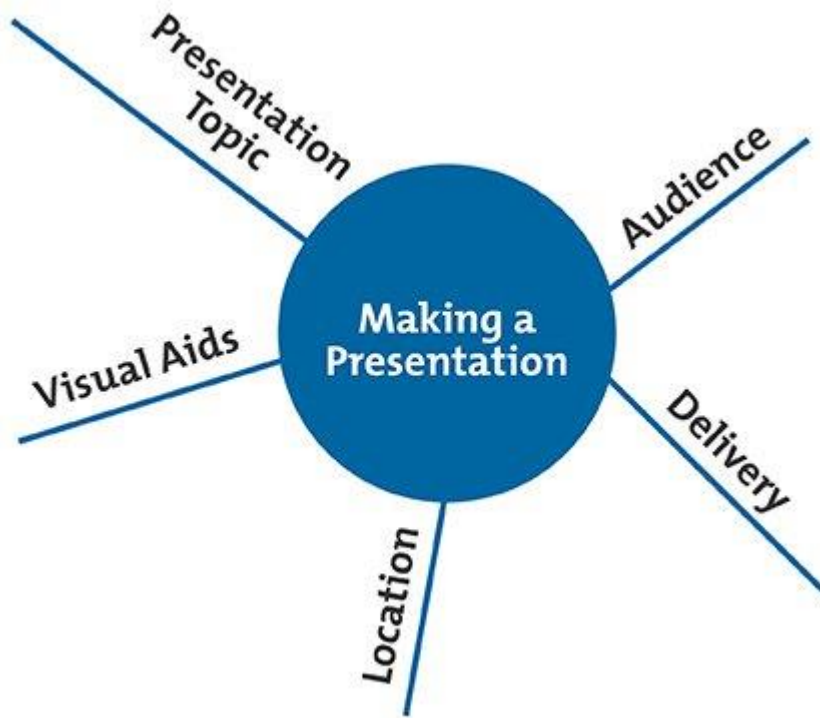
(Our simple example shows someone brainstorming actions needed to deliver a successful presentation.)

Figure 1



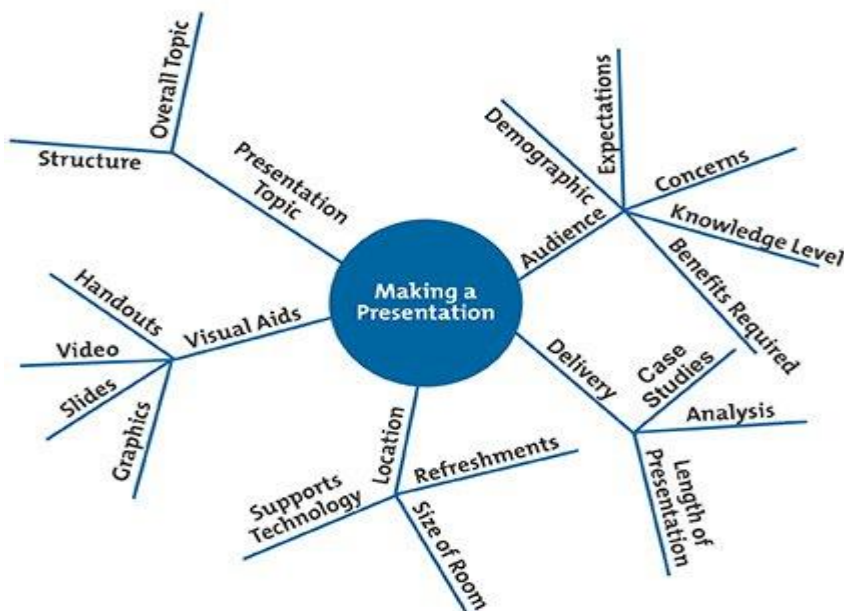
2. As you come across major subdivisions or subheadings of the topic (or important facts that relate to the subject) draw lines out from this circle. Label these lines with these subdivisions or subheadings. (See figure 2, below.)

Figure 2



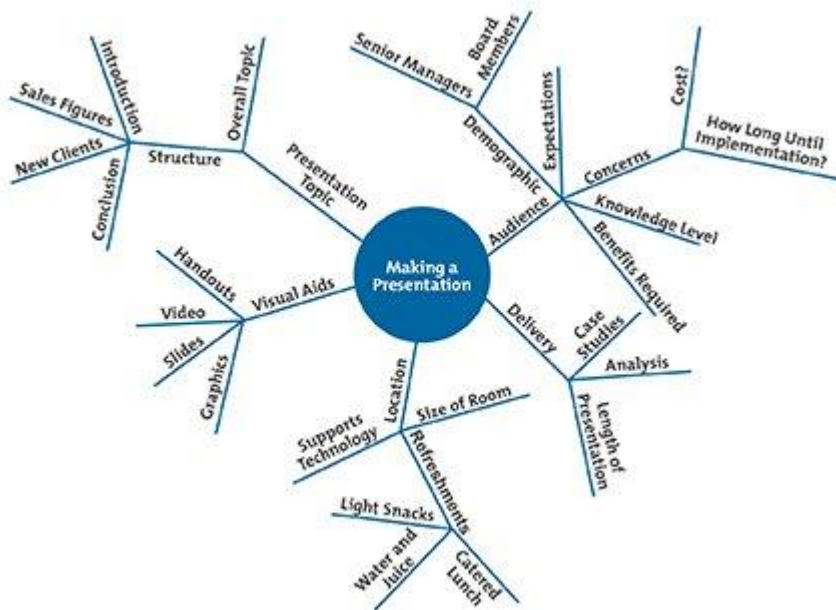
3. As you "burrow" into the subject and uncover another level of information (further subheadings, or individual facts) belonging to the subheadings, draw these as lines linked to the subheading lines. These are shown in figure 3.

Figure 3



4. Then, for individual facts or ideas, draw lines out from the appropriate heading line and label them. These are shown in Figure 4.

Figure 4



5. As you come across new information, link it in to the Mind Map appropriately.

A complete Mind Map may have main topic lines radiating in all directions from the center. Sub-topics and facts will branch off these, like branches and twigs from the trunk of a tree. You don't need to worry about the structure you produce, as this will evolve of its own accord.

Using Mind Maps Effectively

Once you understand how to take notes in Mind Map format, you can develop your own conventions for taking them further. The following suggestions can help you draw impactful Mind Maps:

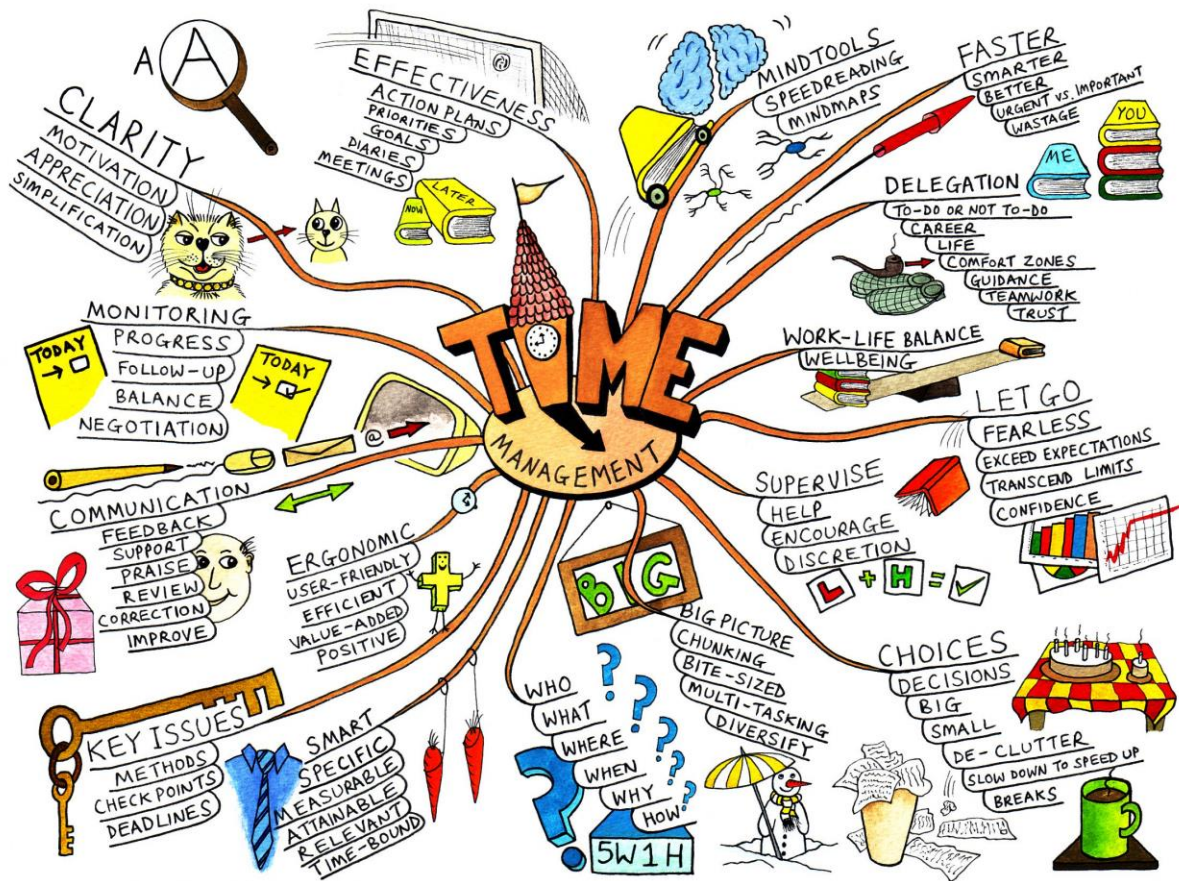
- **Use Single Words or Simple Phrases** – Many words in normal writing are padding, as they ensure that facts are conveyed in the correct context, and in a format that is pleasant to read.

In Mind Maps, single strong words and short, meaningful phrases can convey the same meaning more potently. Excess words just clutter the Mind Map.

- **Print Words** – Joined up or indistinct writing is more difficult to read.
- **Use Color to Separate Different Ideas** – This will help you to separate ideas where necessary. It also helps you to visualize the Mind Map for recall. Color can help to show the organization of the subject.
- **Use Symbols and Images** – Pictures can help you to remember information more effectively than words, so, where a symbol or picture means something to you.

- **Using Cross-Linkages** – Information in one part of a Mind Map may relate to another part. Here you can draw lines to show the cross-linkages. This helps you to see how one part of the subject affects another.

Visual Example



Key Points

Mind Mapping is an extremely effective method of taking notes. Not only do Mind Maps show facts, they also show the overall structure of a subject and the relative importance of individual parts of it. They help you to associate ideas, think creatively, and make connections that you might not otherwise make.

Mind Maps are useful for summarizing information, for consolidating large chunks of information, for making connections, and for creative problem solving.

To use Mind Maps effectively, make sure you print your words, use different colors to add visual impact, and incorporate symbols and images to further spur creative thinking.

TRIZ

TRIZ is a Creativity and problem solving methodology based on logic, data and research, not intuition. It draws on the past knowledge and ingenuity of many thousands to accelerate the project team's ability to solve problems creatively. As such, TRIZ brings repeatability, predictability, and reliability to the problem-solving process with its structured approach.

About TRIZ

"TRIZ" is the (Russian) acronym for the "Theory of Inventive Problem Solving." G.S. Altshuller and his colleagues in the former USSR developed the method between 1946 and 1985. TRIZ is an international science of creativity that relies on the study of the patterns of problems and solutions, not on the spontaneous and intuitive creativity of individuals or groups. More than three million patents have been analyzed to discover the patterns that predict breakthrough solutions to problems, and these have been codified within TRIZ.

TRIZ is spreading into corporate use across several parallel paths – it is increasingly common in Six Sigma processes, in project management and risk management systems, and in organizational innovation initiatives.

Generalized Solutions

TRIZ research began with the hypothesis that there are universal principles of creativity that are the basis for creative innovations, and that advance technology. The idea was that if these principles could be identified and codified, they could be taught to people to make the process of creativity more predictable. The short version of this is:

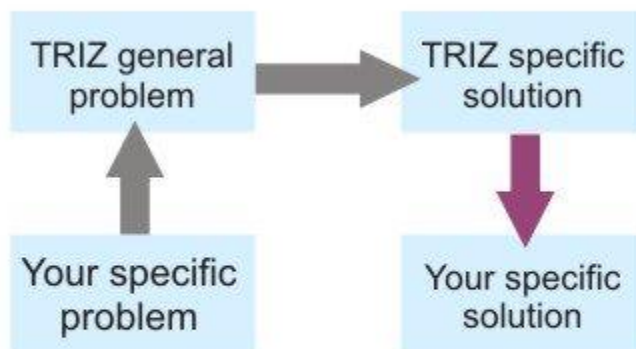
Somebody someplace has already solved this problem (or one very similar to it.) Today, creativity involves finding that solution and adapting it to this particular problem.

The three primary findings of the last 65 years of research are as follows:

1. Problems and solutions are repeated across industries and sciences. By classifying the "contradictions" in each problem, you can predict good creative solutions to that problem.
2. Patterns of technical evolution tend to be repeated across industries and sciences.
3. Creative innovations often use scientific effects outside the field where they were developed.

Much of the practice of TRIZ consists of learning these repeating patterns of problems-solutions, patterns of technical evolution and methods of using scientific effects, and then applying the general TRIZ patterns to the specific situation that confronts the developer. Figure 1, below, describes this process graphically.

Figure 1: The TRIZ Problem-Solving Method



The arrows represent transformation from one formulation of the problem or solution to another. The gray arrows represent analysis of the problems and analytic use of the TRIZ databases. The purple arrow represents thinking by analogy to develop the specific solution.

Here, you take the specific problem you face, and generalize it to one of the TRIZ general problems. From the TRIZ general problems, you identify the TRIZ solutions to those general problems, and then see how these can be applied to the specific problem you face.

Eliminating Contradictions

Another of the fundamental concepts behind TRIZ is that at the root of many problems is a fundamental contradiction that causes it (we'll give examples below.) In many cases, a reliable way of solving a problem is to eliminate these contradictions. TRIZ recognizes two categories of contradictions:

1. **Technical contradictions** are classical engineering "trade-offs." The desired state can't be reached because something else in the system prevents it. In other words, when something gets better, something else automatically gets worse. Classical examples include:
 - The product gets stronger (good), but the weight increases (bad).
 - Service is customized to each customer (good), but the service delivery system gets complicated (bad).
 - Training is comprehensive (good), but keeps employees away from their assignments (bad).
2. **Physical contradictions**, also called "inherent" contradictions, are situations in which an object or system suffers contradictory, opposite requirements. Everyday examples abound:
 - Software should be complex (to have many features), but should be simple (to be easy to learn).
 - Coffee should be hot for enjoyable drinking, but cold to prevent burning the customer.
 - Training should take a long time (to be thorough), but not take any time.

Some of the TRIZ Tools

The "General TRIZ Solutions" referred to in Figure 1 have been developed over the course of the 65 years of TRIZ research, and have been organized in many different ways. Some of these are analytic methods such as:

- The Ideal Final Result and Ideality.
- Functional Modeling, Analysis and Trimming.
- Locating the Zones of Conflict. (This is more familiar to Six Sigma problem solvers as "Root Cause Analysis.")

Some are more prescriptive such as:

- The 40 Inventive Principles of Problem Solving.
- The Separation Principles.
- Laws of Technical Evolution and Technology Forecasting.
- 76 Standard Solutions.

In the course of solving any one technical problem, one tool or many can be used.

One of these tools, "The 40 Principles of Problem Solving" is the most accessible "tool" of TRIZ.

The 40 Principles of Problem Solving

These 40 Principles are the ones that were found to repeat across many fields, as solutions to many general contradictions, which are at the heart of many problems. A list of all 40 Principles of Problem Solving can be found at <http://www.triz-journal.com/archives/1997/07/b/index.html>.

Here are just a few of the Principles and examples of how they could have been used to create products that were once new and innovative:

Using TRIZ

The best way to learn and explore TRIZ is to identify a problem that you haven't solved satisfactorily and try it. Use the List of the 40 Principles of Problem Solving tool that can be found at www.triz-journal.com to help you through the process.

Summary

In this part, you learned how to:

- Define innovation and creativity tools
- Define scamper