4 Tools for Developing Innovative Solutions

4.2 Brainstorming

Keywords
Idea generating, Creative Technique, Group Session, Brainstorming, Brainwriting

Learning Objective
After reading the component you will have the capability to explain what brainstorming is, describe the implementation procedure and give one or more examples. You will also learn about other forms of brainstorming and how combining it with other creative procedures can enhance the technique. It will take approx 30 minutes to read this module and it takes approx. 40 – 50 minutes to conduct it with a group of people.

Introduction
All companies and organisations need to be creative and innovative if they wish to remain competitive and to continue to meet the demands of their customers and the changing marketplace. Innovative companies have the ability to break into new markets and improve their productivity and in particular their profitability. Successful innovation can lead to new products, new processes and new ways of working. They require a steady flow of good ideas, knowledge and resources.

Often the best place to find or generate ideas is by involving your employees. Take time out to think and encourage others to do the same. Record and evaluate your ideas and act on the best ones. Simple techniques such as brainstorming can get the ideas flowing, help you to organise them and save you time.

4.2.1 What is Brainstorming?

Brainstorming is a group creativity technique designed to generate a large number of ideas for the solution to a problem. The method was first popularised in the late 1930s by Alex Faickney Osborn, in a book called Applied Imagination. Osborn proposed that groups could double their creative output by using the method of brainstorming.

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The term Brainstorming has become a commonly used word in the English language as a generic term for creative thinking. The basis of Brainstorming is generating ideas in a group situation based on the principle of suspending judgment - a principle which scientific research has proved to be highly productive in individual effort as well as group effort.²

According to Osborn:

_Brainstorming is a method by which a group tries to find a solution for a specific problem by amassing a list of ideas spontaneously contributed by its members³._

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.⁴

### 4.2.2 Why use brainstorming?

Brainstorming is a very useful and easy to use tool that you can use to develop highly creative solutions in your organisation. It can be very helpful when you need to find a new approach to a problem, improve productivity and customer service, and consequently improve your profitability.

Involving your employees in the process can help with the implementation of changes in the organisation as they helped to create the solution. It can also improve communication within the organisation as in many instances employees can see why a problem is occurring but do not communicate this information to management for a variety of reasons.

If you follow the rules then brainstorming will work for you. Because of its flexibility brainstorming has spread throughout the world from when it was first developed in the late 1930’s. It has been used by almost all of the world’s largest companies, government organisations and high tech companies and it is even used by small family run businesses.

Why don’t you try to discover new solutions to problems and to create new opportunities to advance your business forward?? Let’s take the first steps to make you an inventor of a highly competitive product, service or process!!

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² [http://www.mycoted.com/Brainstorming](http://www.mycoted.com/Brainstorming)
4.2.3 Where can brainstorming be used?
You can either brainstorm on your own or as a group of people depending on your personal preferences and circumstances.

**Individual Brainstorming**
Brainstorming on your own can lead to creative and imaginative ideas and you do not have to worry about other people's egos or opinions. However, without the experience and expertise of a group you may not be able to expand on ideas generated and you will not experience one of the true benefits of brainstorming i.e. when new ideas are sparked by something that one of the group might say.

If you work by yourself or if the problem is too small to justify gathering a group you may have no choice but to brainstorm by yourself. The website [www.brainstorming.co.uk](http://www.brainstorming.co.uk) gives some useful tips on how to brainstorm on your own.

**Group Brainstorming**
Brainstorming in a group can be very effective if the session is well managed. An idea generated by one member can be expanded upon by another or the experience of one member can give a new angle to an idea generated. A well chaired session should bring out the creative abilities and experiences of all members of the group. The facilitator should be careful to ensure that quieter people within the group are given the opportunity to express their ideas and that uncreative or dominant individuals do not crush ideas and leave group members feeling embarrassed.

Brainstorming can be used in many situations the most popular being:

- Planning e.g. development of strategy for a new business venture
- New product / market concepts
- Problem solving e.g. how to deal with decreasing sales
- Managerial process issues e.g. reward system for new ideas
- Process improvement e.g. how to improve production line productivity
- Research and development
- Improving communication within an organisation
4.2.4 How to Brainstorm?

The most basic form of brainstorm is to gather a group of people into a room. The size of the group can vary between 4 to 20 people. A chairperson or facilitator co-ordinates the session and a scribe can also be used to write down the ideas generated. The facilitator introduces all the participants and the reason for the brainstorming session; he/she outlines the rules and encourages everyone to participate. Brainstorming sessions can last for 15 minutes or up to half a day depending on the content and the situation. Brainstorming can also become a regular feature in team and management meetings.

There are four basic rules in brainstorming\(^5\). “These are intended to reduce the social inhibitions that occur in groups and therefore stimulate the generation of new ideas. The expected result is a dynamic synergy that will dramatically increase the creativity of the group”\(^6\).

- **No criticism**: During the idea generation session ideas should be allowed to flow freely and should not be criticised, instead of looking at what is wrong with them participants should look at expanding or adding to them. Criticism should be held until the evaluation stage where the ideas can be analysed in more dept.

- **Focus on quantity**: The idea is to get as many suggestions as you can during the session, where quantity should lead to quality. It may take a little time to evaluate all ideas but it should be worth it in the end. “The assumption is that the greater the number of ideas generated, the greater the chance of producing a radical and effective solution”\(^7\).

- **Unusual ideas are welcome**: No idea is too stupid or crazy! “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”\(^8\).

- **Combine and improve ideas**: “Good ideas can be combined to form a single very good idea, as suggested by the slogan “1+1=3”. This approach is assumed to lead to

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8 Ibid.
better and more complete ideas than merely generating new ideas alone. It is believed to stimulate the building of ideas by a process of association\textsuperscript{9}.

It is also important to watch the clock, record your progress and keep it fun and creative.

Have you ever taken part in a brainstorming session? Were the four basic rules respected?

Osborn\textsuperscript{10} suggests that when a group of people meet to have a brainstorming session that the facilitator should make everyone aware of the four basic rules. He says that each facilitator should interpret the rules and explain them to suit the group. An example of one way that a facilitator could interpret the first rule is:

“If you try to get hot and cold water out of the same faucet at the same time, you will get only tepid water. And if you try to criticise and create at the same time, you can’t turn on either the cold enough criticism or the hot enough ideas. So let’s stick solely to ideas and let’s cut out all criticism during this session (Osborn, 1948)”

\textbf{Mind Maps} are a very powerful tool to use in a brainstorming session. A mind map is a diagram used to represent words, ideas, tasks or other items linked to and arranged radically around a central key word or idea\textsuperscript{11}. Mind maps can be either hand-written on a flip chart/whiteboard or using mind map software and give a much clearer overview of the ideas generated. Mind maps can be used during the session or at the evaluation stage to group and consolidate ideas.

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{9} Ibid.
\item \textsuperscript{10} Osborn, A.F. (1963) Applied imagination: Principles and procedures of creative problem solving.
\item \textsuperscript{11} \url{http://en.wikipedia.org/wiki/Mind_map}
\end{itemize}
\end{footnotesize}
The following mind map describes how to run an effective brainstorming session.

**Figure 1: Mindmap - Overview of Brainstorming Session**

And now let’s have a look at the following Flash presentation which explains the stages of brainstorming in more detail, how to prepare the session, how to select participants, the rules of brainstorming and how to call for and evaluate ideas.

*The interactive animation is available in the online guide only ([www.innosupport.net](http://www.innosupport.net)).*
4.2.5 Example of a Brainstorming Session

**Situation:** The number of customers to a shop has reduced in recent months; the owner is looking for new ways to attract new customers and to increase the frequency of existing customers.

**Problem:** How can we get more customers?

**The Brainstorming Session**

1. Plan the session – fix the place and time
2. The shop employees are invited to participate. However, the supervisor and owner are not involved in the session.
3. The session is held away from the shop in a relaxing environment.
4. The facilitator is a good communicator and uses a word association game to break the ice and warm-up the group.
5. The facilitator raises the question: How can we get more customers? She/he writes down the problem on a flipchart.
6. She/he set out the rules of the session; 20 minutes, anyone can produce an idea, everyone has to respect the ideas of his/her colleague and NOT CRITICISE!
7. The facilitator calls for ideas.
8. The scribe, using a mind map, writes down the ideas generated.

Figure 2: Mind Map – Summary of ideas generated during brainstorming session.

9. A scoring criteria is agreed and each idea is then scored:

   Negative 1  ➤  5 Positive
4. Tools for developing innovative solutions

4.2 Brainstorming

Figure 3: Results of evaluation of ideas generated during brainstorming session

<table>
<thead>
<tr>
<th>Ideas generated</th>
<th>Cost</th>
<th>Ease of implementation</th>
<th>Speed of Implementation</th>
<th>Biggest Potential Impact</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden products</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Sports products</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>New payment facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly payments</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Credit card facility</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Advance payments</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>1 payment after 2 months</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Promotional supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce prices</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Buy one get one half price</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Advertise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newspapers</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>Radio/TV</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Posters</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Mailshot</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>New delivery method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home deliveries</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Online shop</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>15</td>
</tr>
</tbody>
</table>

Explanation as to how they were scored:

Each idea was scored on a range from 1 negative to 5 positive. For example, with the introduction of new products; it would be much easier to introduce a new range of sports products rather than garden products as an existing supplier has a range of sports products which are not currently sold in the shop. The cost and ease of introducing these new products would be relatively small as the shop has sufficient space and storage. However, it was felt that neither of these new products would have a particularly high impact on attracting new customers as other shops in the area carried similar products.

From the session the following recommendations are made to the shop owner:

- Look at introducing new product lines into the shop
- Allow customers to pay by credit card
- Hold a sale and introduce buy 1 get 1 half price into selected product ranges
- Advertise in local papers and evaluate the impact after a number of weeks
- Erect posters in areas with high volume of people
• Develop a customer database by collect customer contact details for future mailshots

• Investigate feasibility of home deliveries and website / online shop.
4.2.6 Variations of Brainstorming

There are a number of variations of brainstorming with most of these techniques widely written about in creative technique books and websites, the most popular including:

- Nominal group technique
- Group passing technique / brainwriting
- Team idea mapping
- Electronic Brainstorming
- Directed Brainstorming

The website [www.wikipedia.com](http://www.wikipedia.com) gives a good description of each of these techniques in more details.

The **nominal group technique** is a type of brainstorming that encourages all participants to have an equal say in the process. Instead of each person giving their idea verbally, participants are asked to write down their ideas anonymously. They are then given to the facilitator who shares them with the group and the group votes each one. The vote can be as simple as a show of hands in favour of a given idea. This process is called distillation.

After distillation, subgroups can be formed to take responsibility for different aspects of the ideas generated. The top ranked ideas may be sent back to the group or to subgroups for further brainstorming. For example, one group may work on the colour required in a product. Another group may work on the size, and so forth. Each subgroup will then produce a list of ranked ideas. Sometimes ideas that were previously dropped may be brought forward again once the group has re-evaluated the ideas.

With the **group passing technique** each person in a circular group writes down one idea, and then passes the piece of paper to the next person, who adds some thoughts. This is repeated until everybody gets his or her original piece of paper back. This method can produce an extensive list of ideas each of which will be elaborated upon by all members of the group. This technique is often referred to as **brainwriting**. Method 635 a form of brainwriting, is explained in more detail in module 4.3.
An ideas book is another popular form of group passing technique. A description of the problem is written on the inside cover of a hardback book. A distribution list is drawn up and the book is passed to each person on the list one-by-one. Each person records their ideas and adds to ideas of previous entrants. A “read out” meeting is held once each person on the list has contributed. This method takes longer than a group meeting; however it combines the advantages of individual and group brainstorming and gives each person time to think about the problem.

**Idea mapping** is a method of brainstorming similar to that used in the example above. The main difference however is that each of the participants is given the topic and asked to do an individual brainstorm on the problem prior to the session. It is important that the topic is well defined to ensure that each member has a clear idea of what is expected of them. A meeting is held to consolidate all the ideas using a mind map. This mapping process helps to create a common understanding of the issues and the suggested solutions. New ideas can arise as sharing takes place and these can also be added to the mind map. Once all of the ideas are captured they should then be prioritised and actioned.

**Electronic brainstorming** is a computerised version of the manual brainwriting technique and is a combination of the nominal group technique and the team idea mapping described above with one main difference – the individuals do not meet face-to-face. It is usually done via email where web-based forums or special software can also be used. The facilitator sends the question out to group members and they contribute independently by sending their ideas directly back to the facilitator. The facilitator then compiles a list or mind map of the ideas and sends it back to each individual for further feedback. Electronic brainstorming overcomes many of the problems of standard brainstorming, such as production blocking and evaluation apprehension. In addition it is much easier to log and archive the ideas generated and the results can be used during later creative idea generating sessions. Electronic brainstorming also enables much larger groups to brainstorm on a topic, as you do not need to worry about the logistics and co-ordination of a large group of people.

One of the drawbacks of electronic brainstorming is that you might not get the flow of ideas that come from face-to-face brainstorming. An idea generated by one can often spark a new idea in another – much like when someone tells a joke, it can remind you of another joke you have heard before, which you would otherwise never have thought of. You also loose the social aspect and team building effects of group brainstorming.
**Directed brainstorming** is a variation on brainwriting and it can be done manually or electronically. The main difference is when the criteria for evaluating the idea is known prior to the session and the idea generation process is more focused. Each participant is asked to contribute one idea either on a sheet of paper or on an electronic form; all the papers/forms are then randomly swapped among the participants. Each participant is then asked to produce a better idea based on the evaluation criteria than the one that is on the paper/form in front of him or her. Forms are swapped again and participants are asked to improve upon these ideas again with one of the evaluation criteria in mind.

Let’s look at the example in 4.2.5 above again. During the brainstorming session one participant suggested selling sports products in the shop. If they were using directed brainstorming, another participant would expand upon this idea with the criteria “biggest potential impact” in mind and might suggest a particular range of sports products that are not available in other stores. Someone else could take the idea further with the “cost” criteria in mind and suggest cost effective ways of promoting this new product range.

![Figure 4: Expansion of ideas generated using Directed Brainstorming method](image)

<table>
<thead>
<tr>
<th>Participant 1 Idea:</th>
<th>Introduce new sports products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
<td>Participant 2</td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
<tr>
<td>Ease</td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td><em>Particular range of equipment which is not already available in other stores</em></td>
</tr>
</tbody>
</table>

Directed Brainstorming directs and focuses the brainstorming session and can be more productive and efficient than the classic brainstorming method. However, it may produce less creative or crazy ideas as participants are focusing on the evaluation criteria instead of thinking “outside the box”.

Many more forms and variations of brainstorming developed since Osborn first introduced the concept in the late 1930’s, one such variation Method 635 is examined in more detail.
in Module 4.3. Many other creative techniques such as Attribute Listing, examined in Module 4.5, can use brainstorming as part of the creative process.

Why not introduce a brainstorming session into staff meetings? Start with a simple problem/statement to warm the group to the concept and elaborate as they become more comfortable with the method. Use different variations and perhaps introduce a reward system for new/innovate ideas generated which helps to solve a particular problem or which increases turnover!

4.2.7 Summary of Key Points

**Brainstorming** is a group creativity technique designed to generate a large number of ideas for the solution to a problem. It asks that people come up with ideas and solutions that seem at first to be a bit shocking or crazy. You can then change, improve and build upon the ideas and produce useful and imaginatively original solutions. There are a number of variations of brainstorming and it can be combined with other creative techniques.

In this module you will have learned what brainstorming is, how to use it on your own and how to implement it with a group. You will have learned what the four main rules of brainstorming are and how combining it with other creative techniques such as mind maps can enhance the technique.

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<http://en.wikipedia.org/wiki/Mind_map>

Production blocking 2008, Wikimedia Foundations Inc, 26 May 2008, 
<http://en.wikipedia.org/wiki/Production_blocking>

**Further Reading**

There are an extensive range of books available on brainstorming. Go to www.amazon.com or http://books.google.com/bkshp?hl=en&tab=wp and conduct a search on brainstorming. These sites give a comprehensive list of books on the topic and in some instances you can preview pages from the book. Some of those listed include:

- **Eightstorm: Eight Step Brainstorming for Innovative Managers** by Kishore Dharmarajan (Paperback - Jun 22, 2007)
  
  Written in the form of a fable, Eightstorm introduces an advanced brainstorming process which claims to be able to turn anyone into a highly innovative corporate thinker.

- **Instant Creativity: Simple Techniques to Ignite Innovation & Problem Solving** (Paperback) by Brian Clegg (Author), Paul Birch (Author)
  
  Is a collection of tried and tested techniques to encourage individuals and groups to make the most of their creativity. It offers over 70 quick and simple exercises to help find fresh ideas and solutions to problems.

- **Creative Business Solutions: Breakthrough Thinking: Brainstorming for Inspiration and Ideas** (Creative Business Solutions) (Paperback) by Nick Souter (Author)
  
  Filled with lessons, tests, puzzles, and visual riddles that kick-start the flow of ideas, this guide identifies four major destructive work patterns and offers insightful ways to overcome them.

Tony Buzan the inventor of Mindmaps has written a large range of books on the topic of mind mapping, the following books contains examples of thinking tools and practical Mind Map examples, including running a meeting, preparing for an interview and starting up a new venture

- **The Ultimate Book of Mind Maps** by Tony Buzan 2006
  
- **How to Mind Map:** The thinking tool that will change your like by Tony Buzan 2002
Websites
Similarly there are an array of websites explaining brainstorming and its many variations, including:

www.mycoted.com/brainstorming
www.mindtools.com/brainstm.html
http://en.wikipedia.org/wiki/Brainstorming
www.brainstorming.co.uk
Nominal Group Technique explained in more detail
http://www.mycoted.com/Nominal_Group_Technique
http://www.asq.org/learn-about-quality/idea-creation-tools/overview/nominal-group.html

Conducting a general search of the word brainstorming or brainwriting will give you a wide variety of webpages offering explanations, advice and software on how to use brainstorming. Some of the websites offering electronic brainstorming include:

www.mindjet.com
www.conceptdraw.com
www.groupsystems.com
http://bubbl.us

GLOSSARY
Group Creativity Techniques are methods to facilitate creativity in a group of people.

Lateral thinking process produce ideas by thinking ‘outside the box’, or along an alternate tangent of thought

A mind map is a diagram used to represent words, ideas, tasks or other items linked to and arranged radially around a central key word or idea. It is used to generate, visualise, structure and classify ideas and as an aid in study, organisation, problem solving, decision making, and writing. (http://en.wikipedia.org/wiki/Mind_map)

Brainwriting is a variation of brainstorming where ideas are written down by individuals, and buzz groups.

Production blocking is a common problem in brainstorming groups. It is a tendency for one individual to dominant or inhibit other people during a group discussion. This can “block” the creative process as the other participants do not have time to think of or share other ideas as they are too busy listening to one person. Production blocking becomes
more of a problem as the size of the group increases. However, production blocking can be overcome with some varieties of brainstorming i.e. electronic brainstorming. (http://en.wikipedia.org/wiki/Production_blocking)

Evaluation Apprehension can also be a common problem with brainstorming where apprehension of negative feedback and criticism may inhibit members from expressing original ideas.