

Problem Solving--Brainstorming

The brainstorm method to solve problems has three steps.

- I Diverging from the problem (Brainstorming activity)
Beginning with a problem statement, this first stage is about a generating many ideas using different techniques. Wild and unexpected ideas are welcomed.
- II Evaluating and grouping ideas (Decision Matrix)
The second step is about evaluating, reviewing and grouping ideas. Now an overview is created of the solution space (e.g. all possible solutions) and whether more ideas are needed.
- III Converging: choosing a solution (Group Dynamics)
The third step is about choosing ideas and selecting ideas for the next phase in the design process.

I Brainstorming Activity

Brainstorming (Alex Osborne) is a creativity technique designed to generate a large number of ideas for the solution to a problem

Ground Rules

1. Criticism is postponed.

The participants in a brainstorming session should try not to think of utility, importance, feasibility and the like, and certainly not make any critical remarks thereon. This rule should not only lead to many, but also to unexpected associations. Also, it is important to avoid participants feeling attacked.

2. Quantity is emphasized.

Try to think of as many associations as possible. The objective of this rule is to attain a high rate of association. The underlying idea is not only that 'quantity breeds quality' but also that through a rapid succession of associations the participants have little chance of being critical.

3. 'Free wheeling' is welcomed.

The purpose is to have participants express any idea they think of; 'the wilder the idea, the better', it is said. In a brainstorming session an atmosphere must be created which gives the participants a feeling of safety and security.

4. Combination and improvement of ideas are sought

One should endeavor to achieve better ideas by adding to, and building upon, the ideas of others.

Brainstorming is done with a group consisting of 4-8 people. A facilitator leads the brainstorm session, and asks the group provocative questions. The group's responses (the ideas) are written down. The stages that the group goes through in a brainstorm session are methods on their own, and different alternative methods are possible within a brainstorm session (for example: who, what, why, when, how, forward and backward planning, and wishful thinking).

The ground rules for brainstorming were developed precisely because people in a room operating in the normal way will not generate better and different ideas. The social dynamics will worsen the group's performance.

Pugh Decision Matrix (Rev 0, PS 2/21/13)

		Criteria Label	A	B	C	D	E	F	
		TOTAL	Wt Factor	2					
Candidates		Raw	Weighted	Raw	Weighted	Raw	Weighted	Raw	Weighted
1		0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0
4		0	0	0	0	0	0	0	0
5		0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0
7		0	0	0	0	0	0	0	0
Comments									
1 Brainstorm to develop a list of criteria; Refine the list to the most important.									
2 Assign a Relative Weight to each criteria (Typically 1-5)									
3 Evaluate each choice against the criteria. (Choose a baseline and compare the others to the baseline; typically a 5 or 7 point scale is used)									
4 Multiply each options rating by the weight. Add the points for each candidate.									
The candidate with the highest total may not be the one to choose, but the relative scores can generate meaningful discussion and help to clarify the decision.									

Extracting Information by Asking Good Quick Questions

It happens every day: The mind blanks as the talk ends and the speaker closes with: “Any questions?” The room quiets and it seems that nothing can be recalled from the just concluded talk. It is particularly awkward when no one at all responds. What happened?

Or you are looking at a compilation of data with a group. The leader asks “What conclusions can you draw from this?” At that moment, the data looks like a jumble on the page.

There is a skill to being ready for these questions. For some, it’s second nature. If it isn’t though, a little preparation can make the questions come to mind much easier.

1. Three Steps for Quick Questions--Finding, Keeping, Asking

Find the topics that raise questions

For some people, the topics appear to be completely covered by the speaker or the data sheet and there is nothing to be added. The trick is to pay attention more critically to identify areas of further interest.

Two good places to start:

What is in front of you that was not expected or makes no sense.

Consider the consequences of what someone is saying (or the data is showing). This technique allows questions to surface and adds another dimension to understanding the subject.

Keep the hooks for questions

Most talks proceed so fast that topics come and go before the listeners can fully consider them. Some points do raise questions, but, in a flash, the speaker is on to the next topic. For those points that do raise questions, though, make a mental or written note (one or two words will do), so that it can be used to bring it back to mind when the discussion period begins. Similarly, physically marking the data sheet for relationships that stand out helps to make them stand out

Formulate questions without evaluation

Prejudging the quality of the question is the major deterrent to actually putting it forward. No need to wait and let the pressures mount.

The fact is that most questions are fine. This fact can help to defuse the inhibition of the naturally occurring doubt. It isn’t the final question, but begins the process getting a new perspective.

Follow-up the initial answer

In many cases, the opening question is often hit or miss. However, by considering the first answer, together with your own view of the desired outcome, follow-up questions can be guided to be more specific new understanding.

Getting YOUR Ideas into the Discussion

It seems that many discussions, either at meetings or in the classroom, are dominated by a few people. Their thoughts and ideas are not any better, but the others have a difficult time getting in. The quiet ones are very aware of the fact that they have relevant points, often better than those on the table, but the conversation goes round and round without them. As time passes, the threshold for entry appears to become higher. Contributions become more difficult to make. Often, people find themselves holding on to an idea until the moment is appropriate. Then the topic shifts, the point is obsolete and the waiting process begins again. The longer the discussion goes, the more unpleasant and frustrating it becomes. Also, it seems to become more difficult to enter the conversation.

It would be nice if there were always a facilitator to engage everyone or that the participants would make space for each other, but usually it is not going to happen. People have to make their own space and then use it. However, there are three tricks that people can use to lower the entry barrier for themselves:

Get in early.
Get in cheap.
Do some advance preparation.

Get in early.

Make a comment early in the discussion. That gets the ball rolling. The laws of physics are very clear about this: It is far easier to keep a ball in rolling than it is to get it started. It is easier to comment a second or third time than the first. The early part of the discussion is often perfunctory, so it is a good time to make the first entry. Take advantage of this.

Get in cheap.

The quiet ones seem to have a higher quality standard for their contributions than the others. That standard becomes restrictive. It is more important to get in and be a participant than to lay back and hope to contribute the winning approach or a unique point in a single contribution. That home run scenario is the stuff of daydreams and rarely happens at a meeting. A better strategy is to first get in at any level and then allow the quality of the ideas to surface.

Do some advance preparation.

Be ready since even a little preparation can make a big difference. A few questions or points ready from the assigned reading or other background. (The techniques in the “Extracting Information” page may be helpful). Write them down and take them into the meeting. These points can be a grounding reference to make a contribution to get the ball rolling. This approach is particularly helpful for those who arrive at these discussions and find their minds go blank and they literally “have nothing to say”.

The fact is that ideas don’t count and cannot be used unless they are on the table and evaluated. These approaches can help all participants to do that.

Working Smart—Strategies for Difficult Exams

Take a deep breath before beginning in order to calm your mind. Racing forward in the first few minutes can lead to careless errors that are difficult to identify and correct.

Repeat this if you get harried or nervous during the exam

Preview the test before you answer anything. This gets you thinking about the material. Make sure to note the point value of each question. Quickly estimate how much time you should allow for each section according to the point value. This preview should only take a minute or two.

Read the directions: Never assume that you know what the directions say.

Underline with a pencil what you are asked to do. This will force you to focus on the answer.

Keep track of the time and progress during the test.

Answer the easy questions first. This will give you the confidence and momentum to get through the rest of the test. You are sure these answers are correct.

Go back to the difficult questions. While looking over the test and doing the easy questions, your subconscious mind will have been working on the answers to the harder ones. For problems with multiple parts (i.e. a, b,c,d), and use the earlier sections for hints to solve the later parts.

Answer all questions

Avoid careless errors—Think before you start writing. Review the test carefully, especially the easy questions.

Use all of the time allotted for the test.

Show all your work (especially when partial credit is awarded) and write as legibly as possible.

Use Prior Knowledge

Leverage any relevant general information you may have.

Consequential Listening

You can only understand what people are telling you when you also think about the consequences of what they are saying.

This goes one step beyond responding to a direct question. Just the increased awareness of the listener increases the likelihood of getting a better result or a smarter decision.

Asking Better Questions

When it's time to get information by asking questions, thinking about "Consequential Listening" from the questioner's perspective can help you to formulate questions so that the answers have a better chance of providing high quality information.

In many cases, the opening question is often hit or miss. However, by considering the first answer, together with your own view of the desired outcome, **follow-up questions** can be guided to be more specific.

One other point: Listening for Consequences differs from the technique known as active listening. Active listening focuses attention on the content speaker, with interactions to ensure understanding. Here, the listening exercise is to go beyond understanding and make the effort to synthesize or extrapolate the information into a more useful form.