



Brainstorming & its variations



Brainstorming?

- Brainstorming is a technique intended to rapidly generate a large number of ideas for the solution to a problem
- The method was first popularized in the late 1930s by Alex Osborn in a book called "Applied Imagination"

Structure of a Classical Brainstorming Session

- Ice-breaking (get to know each other)
- Phase I: Idea Purge Phase
 - The problem is stated clearly
 - Every group member quickly writes his or her ideas on a sheet of paper (2 min in total)
 - 4~12 members (diversity of thinking)
- Phase II: Idea Trigger Phase
 - Leader calls each member for their ideas
 - Team members read their ideas
 - Leader writes them down on a board
 - If some ideas trigger other ideas, members should write them down
 - Repeat until no more new ideas are generated
 - Sort and organize the ideas

Creative
thinking

-
- Phase III: Idea Evaluation & Solution Recommendation Phase
 - In its final stage of a brainstorming session, the group (or a different group) evaluate the ideas and select one or a few as the solutions to the problem proposed to the group

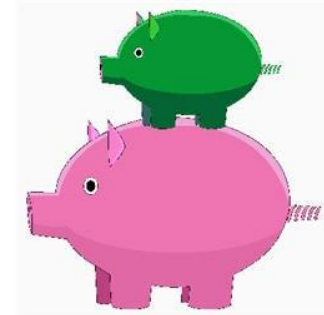
Judgmental
thinking

Two fundamental principles

- Delayed judgment:
 - Judgmental thinking vs. creative thinking
 - Judgmental thinking inhibits creative thinking
 - Delaying judgment is for generating as many ideas as possible
 - Delaying judgment eliminates fear (a mental barrier to creativity)
- Focus on quantity:
 - The “1/300” law (Makoto, 2007)
 - “When you generate 1000 ideas, only 3 of them are useful.”
 - Linus Pauling:
 - “One must endeavor to come up with *many* ideas — then discard the useless ones”

Basic rules for brainstorming

- Basic rules
 - No criticism: think first-judge later
 - Focus on quantity (even fragmented ideas or keywords are ok)
 - “Quantity bears quality”
 - Keep Short & Snappy
 - Don’t settle for the first idea (avoid any fixation)
 - Support each other (never criticize)
 - Accept unusual ideas
 - Combine, Improve, Expand (Hitchhiking/piggybacking)
 - Relax
 - Have fun
 - Laugh
 - The Wilder, The Better
 - Try to be creative (consciously try to **eliminate mental barriers**)
 - Reduce the social inhibitions that occur in groups, and therefore, stimulate the generation of new ideas
 - Try to create a dynamic synergy that will increase the creativity of the group

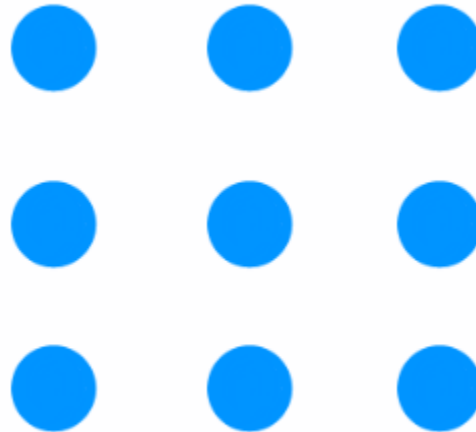


Types of Mental Barriers

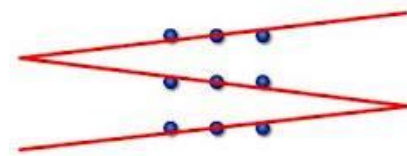
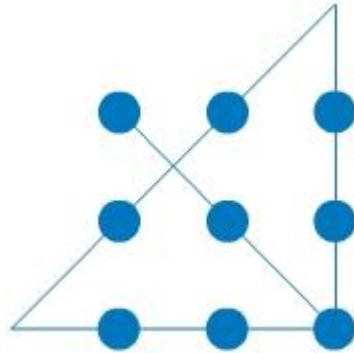
- False assumptions and nonexistent limitations
- Typical solutions
- Making things more difficult than they are: being overwhelmed
- Incomplete or partial information
- Information and sensory saturation:
 - “when our brain is repeatedly exposed to the same information for a long time, it tends to ignore it, consider it unimportant or useless”
- Associative thinking:
 - “engineers tend to develop engineering solutions to every problem”
- Misunderstanding
- Inability to communicate properly
- Emotions-, culture-, and environment-related barriers
- Fear
- Orderly vs. chaotic: Analysis/synthesis dilemma
- Falling in love with an idea
- Improper methods of solution
- Overabundance of resources

Nine circles problem

- Without lifting your pen, draw no more than 4 straight lines to cross all the nine circles



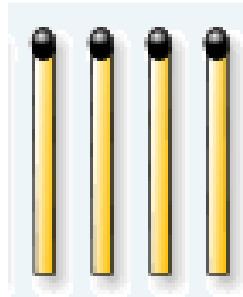
Some solutions



- Can you come up with other solutions?

4 matchsticks problem

- Using 4 identical matchsticks, can you create an image of two equilateral triangles?



Killer phrases that easily kill a brainstorming session

Beware of the following phrases: They stifle creativity and halt innovation!

- ~ It won't work!
- ~ We haven't the time.
- ~ We haven't the manpower.
- ~ We tried that before.
- ~ We've gotten along without it so far.
- ~ Do it the same way.
- ~ We have to be cautious.
- ~ Easy does it!
- ~ Damn good idea, but...
- ~ Let me sleep on it.
- ~ Why rock the boat?
- ~ That's risky thinking.
- ~ I've had five years of experience.
- ~ How could you be so stupid as to think....
- ~ Go ahead but I don't want to get mixed up with it.
- ~ We've never done it that way before.
- ~ Let's discuss it at some other time.
- ~ You didn't understand our problem.
- ~ We're too small for that.
- ~ Here we go again!
- ~ Let's think it over for awhile, and watch developments.
- ~ It's not our responsibility.
- ~ We never used that approach before.
- ~ Let's put it in writing.
- ~ Yes, but...
- ~ We have too many projects now.
- ~ Beware of your imagination

WHICH KILLER PHRASES DO YOU USE?

IDEA KILLER

B I N G O

But...	We've already tried that before.	It'll never fly.	Let me play devil's advocate here...	Let's not go off on a tangent.
You're setting yourself up for failure.	Sure it will...	In THIS economy?	Do you think we're made of money?	That's not a high priority right now.
Have you really thought about the implications?	That won't work because...		The only problem with that is...	Run an ROI, and get back to us.
Is this in line with our strategy?	The front line will never go for it.	You're kidding... right?	Yes, but...	Does anyone really care about that?
What you are really saying...	If it ain't broke...	Sure, in theory... but you don't think it'll really work	But how much is this idea worth?	Do we really have the resources for this?

Pause Before You Pounce.
Say "Yes" To An Idea First... See Where It Goes, Then Evaluate.

Idea-Sandbox.com

Blamestorming



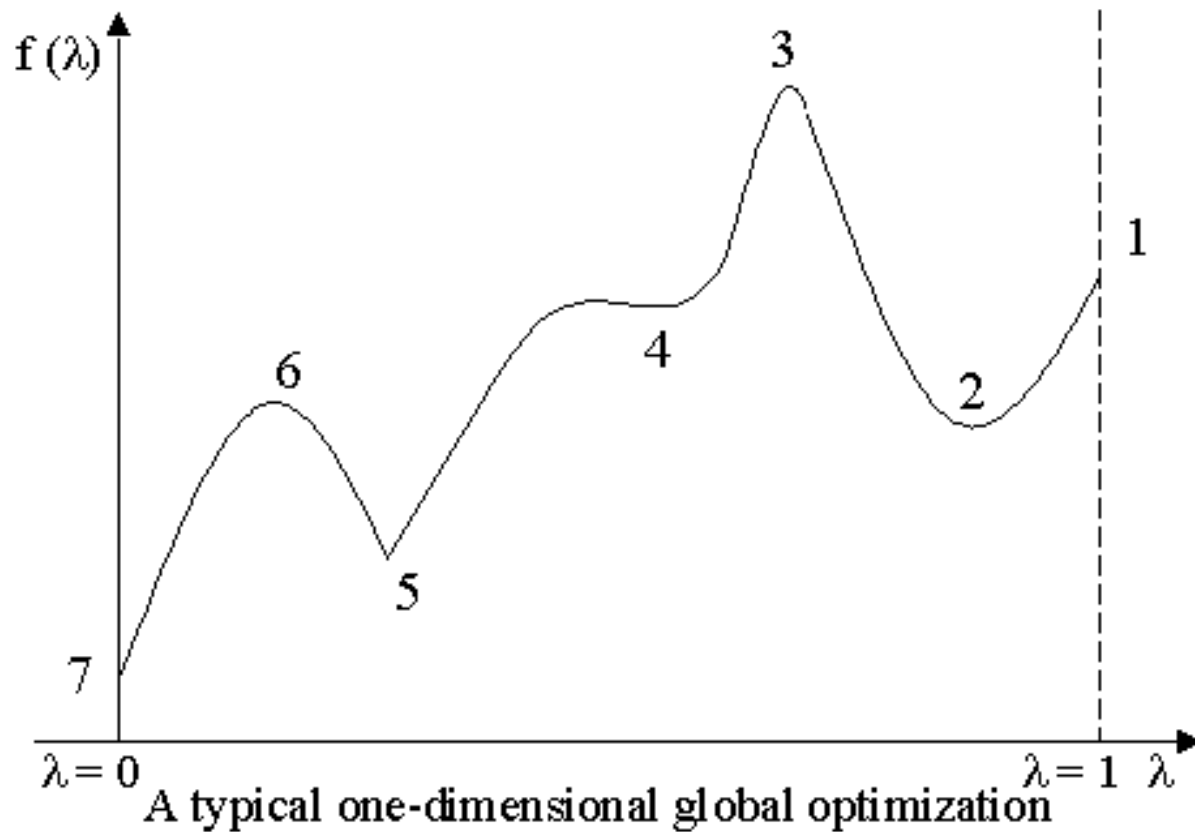
About the leader

- The leader only records and writes down all the ideas
- The leader is **not** supposed to lead the brainstorming
- The leader is not a boss but a secretary

Class Activity #1

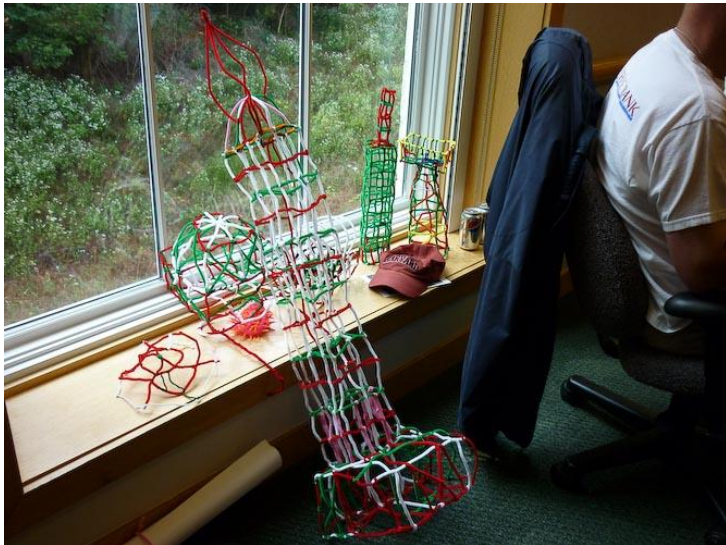
- Brainstorming exercise

An “optimization” analogy to brainstorming



Visualization and prototyping can be helpful

- In many cases, drawing the ideas or developing and making models may be even more helpful than writing the ideas.
- Some expert brainstormers actually take their “play kit” of Lego parts, play dough, duct tape, Styrofoam, and other similar parts to the session in order to quickly make a model of their ideas

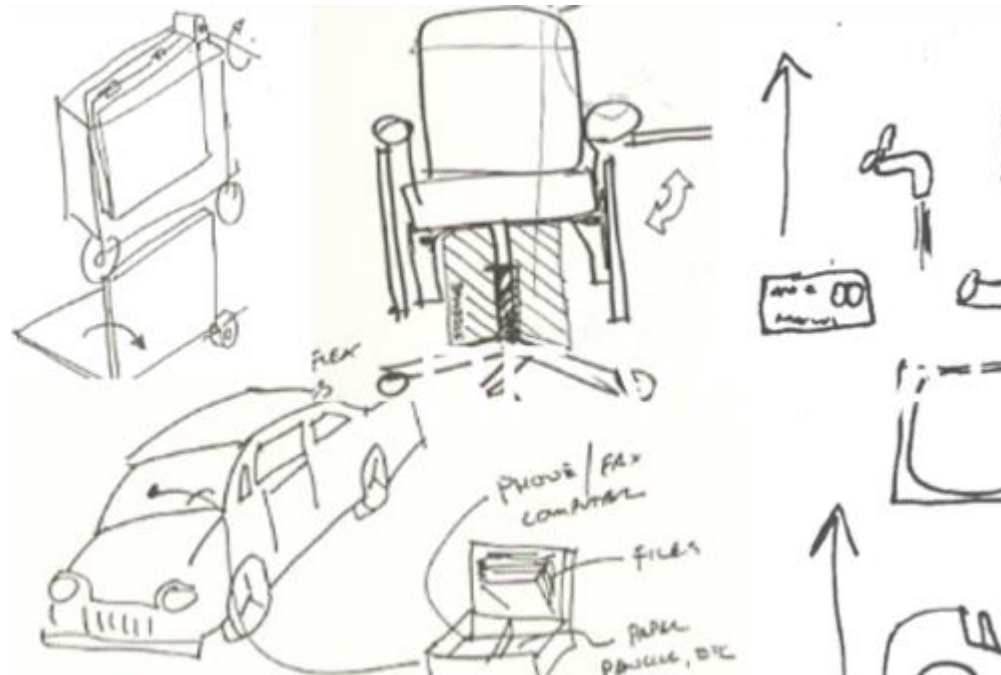


Play-doh



Visual brainstorming (brain drawing)

- A variant of brainstorming
- Participants express all of their ideas visually rather than using words.
- Stimulate the right brain?



Strengths of brainstorming

- Strengths:
 - Quickly generate many ideas!
 - Satisfy the social-emotional needs of the participants (if everything goes well)
 - ...

Weaknesses

- May be limited to simple problems
 - For a complex problem, the problem should be divided into multiple sub-problems
 - Some problems may require deep thinking
- Generated ideas could be low-quality/superficial
- Group brainstorming may not result in high return on investment (human resource) when abused. Some problems can be effectively solved by a single individual
- Some members may try to dominate brainstorming
- Some members may be shy/introvert and do not contribute
- Intimidation
- Volatile issues lead to arguments
- Delaying judgment can be very difficult:
 - Try to get Phases I & II within 30 minutes!
- It is very hard to give credit to individuals when credit is due...
 - What can you do to remedy this problem?
- Only generate one idea at a time

Variations of brainstorming

Individual Brainstorming

- Brainstorming can be done by a single individual
- Some recent empirical studies demonstrated that individual brainstorming sessions independently conducted by multiple brainstormers can produce better results than a group brainstorming session

Brainwriting (Method 635)

- A variation of brainstorming that aims to overcome weaknesses of brainstorming

BRAINWRITING



Silence is golden...

Brainwriting (Method 635)

6-3-5 Method

1. 6-3-5 means: 6 in group/3 ideas per round/5 minutes per round.
2. Divide everyone into groups of about 6. Too many in a group is unmanageable, too few restricts the generation of ideas.
3. Each participant starts with a prewritten brainwriting form. The problem to be addressed is written at the top of the form (see example).
4. In the first round, participants have 5 minutes to write 3 ideas in the top boxes (1 per box) of the brainwriting form. Often the problem is known ahead of time and the participants come in with the 3 ideas already developed. If this is the case, this initial time can be shorter.
5. At the end of each round, the form is passed to the person on the right. As each person gets a form from the person on the left, they read all the ideas on the sheet and then add three new ones. The new ideas can be completely new, or can be variations of ideas already on the sheet, or can be additional developments to ideas already on the sheet. Ideas from other participants should foster new ideas. There is no talking or discussion during these rounds.
6. The process is completed when each participant gets his own form back, now filled up with many ideas.
7. The last step is to sort the ideas using a clustering method

Brainwriting form

Problem statement: How to...			
	Idea 1	Idea 2	Idea 3
1			
2			
3			
4			
5			
6			

Brainwriting (Pool Method)

Pool Method

1. Each participant gets a form. Problem is written on form.
2. 5 – 8 in group.
3. Each person writes three ideas at top and puts sheet in center of table.
4. Participants take new sheet out of center pile and add to it.
5. No rounds. Put sheets back and get new sheets at own pace.
6. Process completed at end of pre-determined time (e.g. 30 min).
7. Sort ideas.

e-Brainwriting

↳ Electronic method

1. Ideas above are adapted by emailing sheets around or posting onto a website.
2. Moderator must somehow make sure that participants keep participating.

Brainwriting guidelines

Brainwriting Guidelines

DEFER JUDGMENT ↳ no bad ideas

QUANTITY ↳ more is better

FREEWHEEL ↳ wild ideas

PIGGYBACK IDEAS ↳ play off ideas of others

WRITE NEATLY & CLEARLY ↳ **ideas fully understood**

What you can do:

- ↳ Write new ideas
- ↳ Combine other ideas
- ↳ Adapt ideas to new areas
- ↳ Modify ideas into alternative approaches
- ↳ Add to ideas

Sorting and organizing ideas (brainstorming & brainwriting)

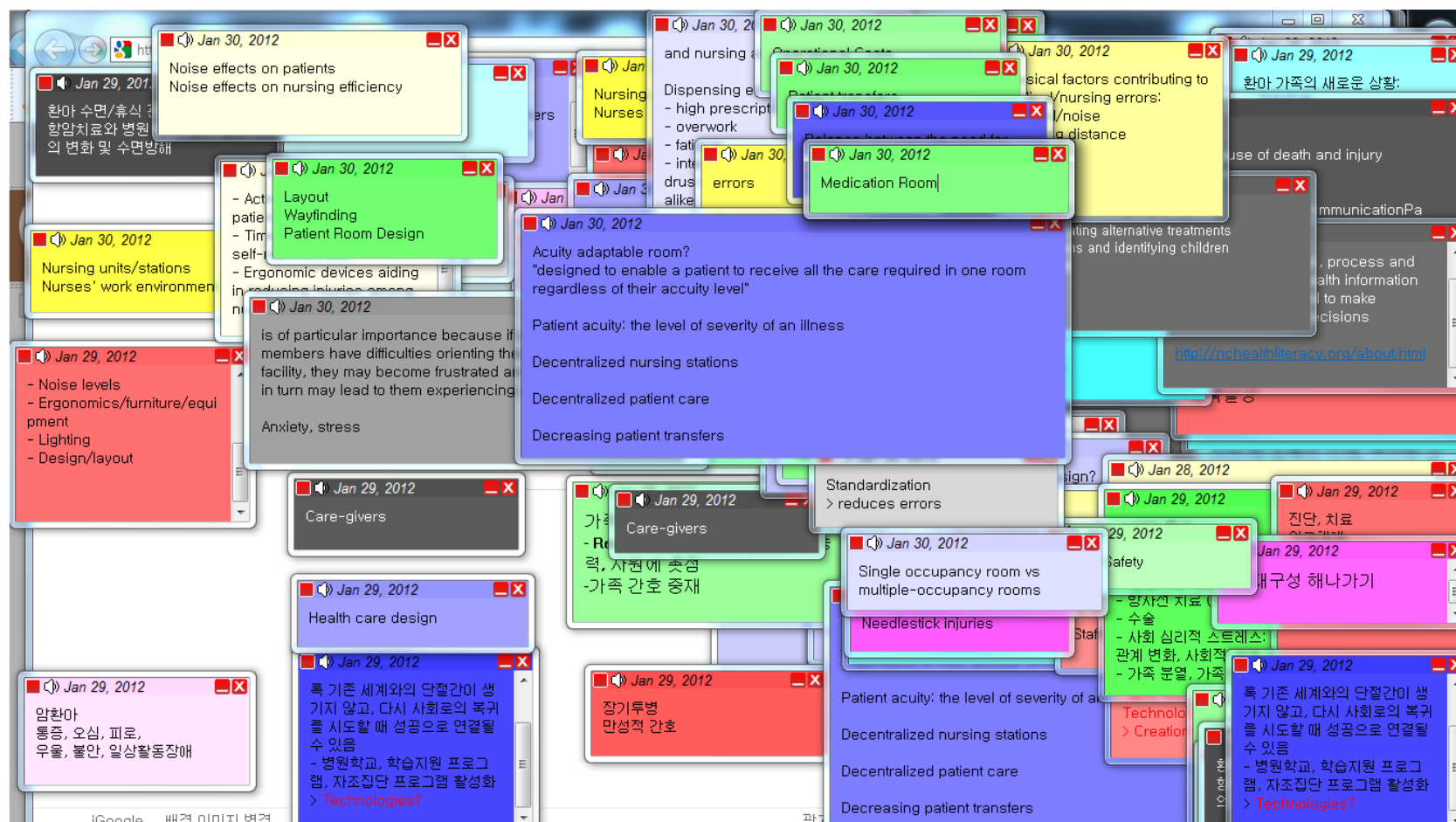
↳ Cluster Technique

1. Immediately after the brainwriting session, all ideas are copied onto Post-Its.
2. Participants, as a group or individually, begin arranging ideas into “clusters.” This is simply a sorting process; there should be no discussion of which ideas are better or worse. Some require absolute silence at this point.
3. The group agrees on (or an individual assigns) a label to put on each cluster.
4. If an idea can fit into two or more clusters, duplicates may be made.
5. Clusters can stand individually if the goal is just to get a bunch of ideas. If some consensus must be reached, discussion can begin about which clusters to merge or eliminate.

Sorting & organizing ideas



- Sticky Notes



Reverse Brainstorming

Reverse brainstorming is a way to bring a new perspective to idea generation that can be especially helpful when a team is cynical about a project or lacking energy. If you have members of your team who are hostile or worn out, this approach can take advantage of the hostility or fatigue. The process is simple. Let's say that your senior managers want to increase customer loyalty for the new e-commerce site that has just been launched. In traditional brainstorming, you would ask the question "What could we do to improve customer loyalty for our new site?" In reverse brainstorming, you can ask the negative question "What could we do that would reduce customer loyalty for our site?" or perhaps more strongly "What could we do to drive customers away from our site?" This negative question might yield answers like:

1. Require users to read every line of the software license.
2. Make it hard to log in.
3. Ask for lots of personal information.
4. Use deceptive defaults to make more money for us (for example, default to a 2-year subscription and put the default where it is likely to go unnoticed).
5. Hide the fact that products might be out of stock.
6. Use deceptive out-in/opt-out labels.
7. Hide things behind general links; e.g., putting opt-out features behind a "More info..." link.
8. Use double negative labels to trick users.
9. Not be clear what links go to ads and what links go to actual content.
10. Add things to the shopping cart in a sneaky way.



CYNICISM

He learned it from watching YOU.

motifake.com

Reverse Brainstorming

When to Use:

This method can be used simply to provide a different perspective on a particular problem. It is also useful when you have a team with low morale, serious cynicism, or open hostility. Reverse brainstorming can sometimes bring smiles to a group that has struggled with new ideas to old and difficult problems. You can use this method as a complement to other ideation methods.



Reverse Brainstorming

Procedure:

1. Develop a question for brainstorming and then convert it to a negative question.
2. Let the brainstorming team know about the specific question and ask them to do a little homework and generate a few items before the group session.
3. Write the questions on the board or display it on the online brainstorming tool.
4. Describe the guidelines for the brainstorming session.
 - a. No criticism of negative ideas.
 - b. New and wild negative ideas are welcome.
 - c. No war stories; just describe the negative item so that everyone understands what you mean (war stories waste time and prevent others from expressing their ideas – this is called “production blocking” in the brainstorming literature)
 - d. Only one person can speak at a time.
5. Conduct a short warm-up exercise using a negative question that is not related to your main question.
6. Ask if there are any questions.
7. Begin the reverse brainstorming.
8. After you generate the negative ideas, schedule a “conversion” meeting where you convert the negative ideas into positive ideas as shown below. Each negative idea might yield more than one positive idea.

Reverse Brainstorming

Reverse Brainstorming Ideas	Converted Ideas
Require users to read every line of the software license.	Simplify the license and use plain English
Make it hard to log in.	Eliminate log-ins; if the person is an intermittent user, provide an easy way to get at passwords and even user names; make the username email.
Ask for lots of personal information.	Minimize the amount of personal information required at all stages of purchasing; Explain why certain information is needed ("Why we need a phone number?")
Use deceptive defaults to make more money for us (for example, default to a 2-year subscription and put the default where it is likely to go unnoticed).	Use good defaults that do not appear to take advantage of users; be clear about what the defaults are; develop a list of best practices for choosing defaults
Hide the fact that products might be out of stock.	Provide a warning about out-of-stock; provide an in-stock warning; provide a link to the closest alternative

Reverse Brainstorming Exercise

- Freezer
- Instruction:
 - Watch and study the video clips carefully.
 - From your observations, identify a few problems that users may experience during the use of the refrigerator.
 - Develop multiple ideas for redesigning the refrigerator so as to eliminate the identified problems (your ultimate goal is to improve users' experiences during the product use). Use **brainstorming (30 mins) and reverse brainstorming (30 mins)**.
 - Select one idea and recommend it as your redesign solution.

Directed Brainstorming

In directed brainstorming, each participant is given one sheet of paper or electronic form and told the brainstorming question. They are asked to produce one response and stop, then all of the papers or forms are randomly swapped among the participants. The participants are asked to look at the idea they received and to **create a new idea that improves on that idea** based on the initial criteria. The forms are then swapped again and respondents are asked to improve upon the ideas. The process is repeated for three or more rounds.

BodyStorming

- What is bodystorming?
 - Bodystorming is a unique method that spans empathy work, ideation, and prototyping.
 - Bodystorming is technique of physically experiencing a situation to derive new ideas. It requires setting up an experience - complete with necessary artifacts and people - and physically "testing" it.
 - Bodystorming can also include physically changing your space during ideation. What you're focused on here is the way you interact with your environment and the choices you make while in it.

BodyStorming

Why bodystorm?

We bodystorm to generate unexpected ideas that might not be realized by talking or sketching. We bodystorm to help create empathy in the context of possible solutions for prototyping. If you're stuck in your ideation phase, you can bodystorm in the context of a half-baked concept to get you thinking about alternative ideas. Designing a coffee bar? Set up a few foam cubes and "order" a coffee! Bodystorming is also extremely useful in the context of prototyping concepts. Have a couple concepts you're testing? Bodystorm with both of them to help you evaluate them. Developing any sort of physical environment demands at least a few bodystorms...

BodyStorming

How to bodystorm?

1. Get up
2. Do it

It's pretty simple, really. Get physical! If you are trying to ideate in the context of hospital patients, try walking through the experience to come up with new ideas. If you are designing products for the elderly, rub some Vaseline on your glasses to view the world through older eyes. Bodystorm by moving around and becoming aware of the physical spaces and experiences related to your solutions. Pay close attention to decision-making directly related to your environment and related emotional reactions. Dig into the "WHY"!

Body storming tools

Ford's 3rd age suit



Obesity empathy suit

- <http://www.empathysuit.com/>



empathysuit.com

About the Suit

Obesity Awareness

In the News

How to Order

Contact Us



Female Suit
Mass = 7.5 Kg
Bulk = 15 Kg

Male Suit
Mass = 10 Kg
Bulk = 20 Kg

About the Suit

In many cases, it is difficult for healthcare professionals who have never been overweight, to truly relate to the experience of what it is like to be an obese person. Though they are well aware of the health risks relating to this condition they are largely unaware of the day to day discomfort and inconvenience that their patients might experience. In an effort to raise awareness whilst providing an innovative teaching tool we have developed the **Two-Part Obesity Empathy Suit**.

The suit replicates the appearance of an additional 15 Kg for women and 20 Kg for men of body fat. The wearer not only looks larger but weighs more and has to learn what it is like to carry out normal activities as an obese person. The suits are handmade to order from high quality, durable materials and are available in both male and female versions.

Used as part of a comprehensive obesity awareness program the Obesity Empathy Suit is an invaluable tool to promote greater understanding of the day to day difficulties experienced by the clinically obese person. These suits are currently being used Worldwide by opinion leaders working in the field of Obesity.

You might know
what **Obese** means...



... but do you know
how it **feels?**

Body storming tools

Experiential design with VR



C-Sketch

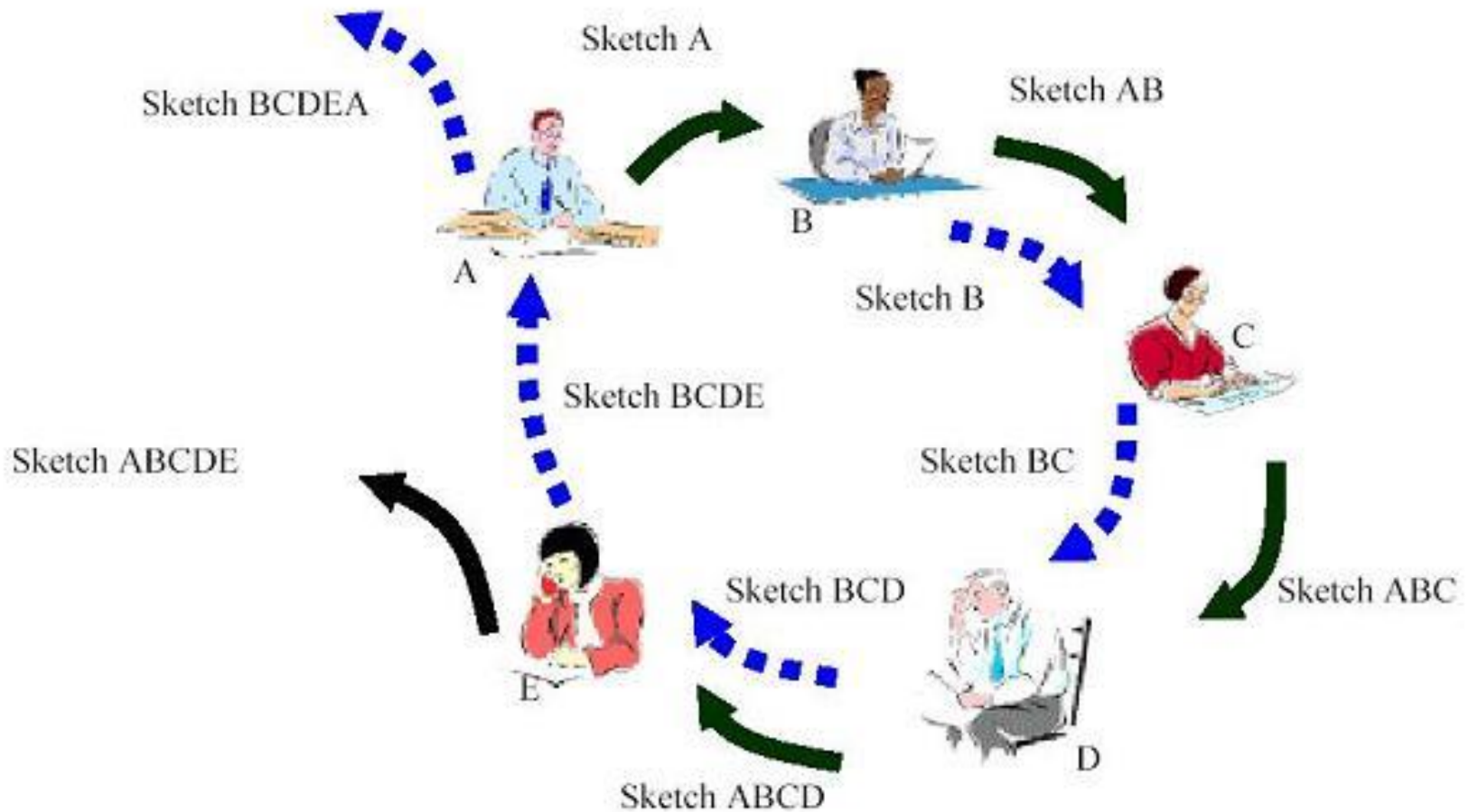
Origin

- Professor Jami Shah



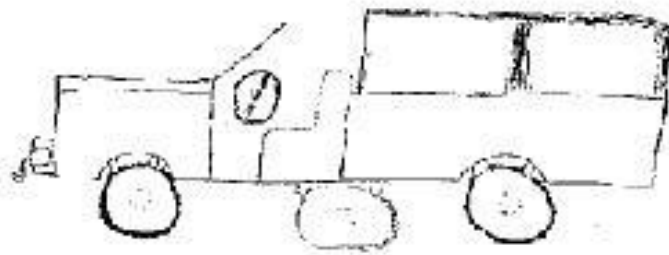
- Design Automation Lab at Arizona State University

Collaborative Sketching Process

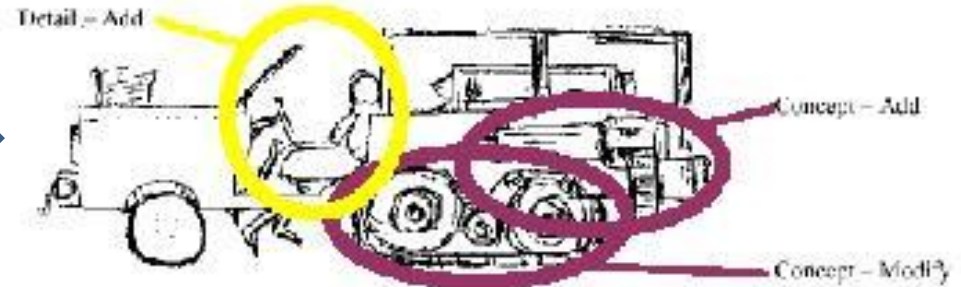


Use only written words and hand-drawing sketches to generate ideas!
One participant's idea serves as a stimulus/provocation for the next person.

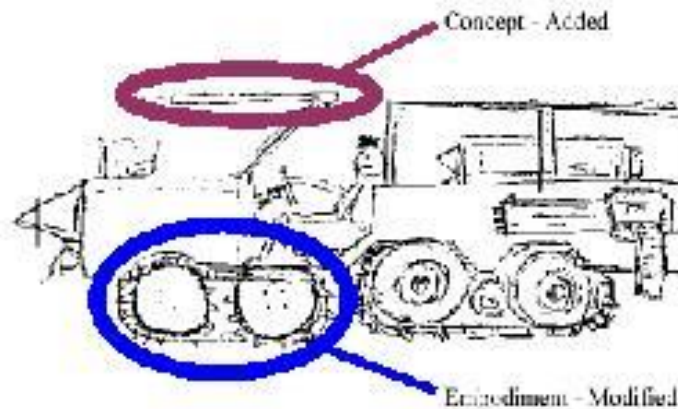
C-sketch Example



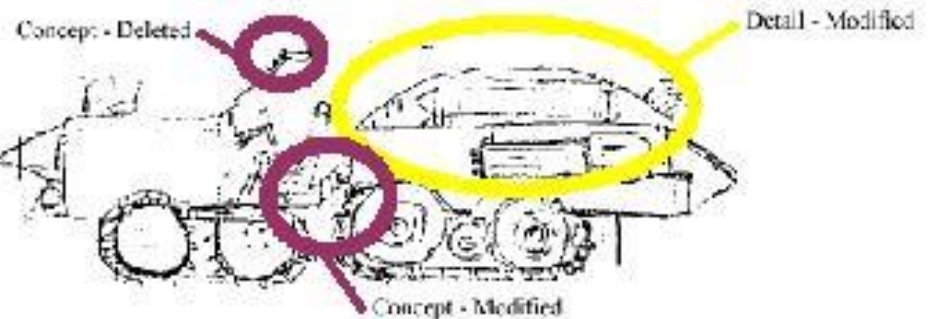
(a)
Initial Design by Designer A



(b)
Design of AR



(c)
Design ABC



(d)
Design ABCD

Brainstorming vs. C-sketch

- Brainstorming may not always result in many good design solutions because:
 - Unnecessary unfocused communications among team members
 - Strong personal egos and attitudes
- C-sketch may be a useful strategy because:
 - It promotes team collaboration,
 - It reduces time for verbal communication,
 - It accumulates ideas from multiple individuals, and
 - Drawing is an effective means for communicating ideas
- Potential problems:
 - Unfocused design objectives
 - Possible misunderstanding of sketches



Bodystorming

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Bodystorming exercise (1 hour total)

- Rubik's cube problem
- Standard brainstorming (30 minutes)
- Bodystorming (30 minutes)