
https://commons.wikimedia.org/wiki/Thunderstorm#/media/File:Lightning3.jpg
BRAINSTORMING
IMPROVING THE CREATIVITY, QUANTITY,
AND QUALITY OF DESIGN IDEAS

THE PURPOSE OF BRAINSTORMING

- Brainstorming allows designers to generate multiple design ideas that can lead to the most ideal design solution.
- Brainstorm is best done in teams or multiple designers to co-generate design ideas, often one idea builds upon another.
- Timing of brainstorming during the design process is critical – to reduce the chances of design fixation (Smith) it is best to Not explore existing solutions (benchmarking), conduct Internet searches, or even think about existing solutions. Rather, generate new an novel ideas from within the design team members' minds.

BRAINSTORMING

- **Criticism** is Ruled Out- when brainstorming begins, the group should avoid judging design ideas.
- **Freewheeling** is welcomed- sometimes the ideas are crazy and wild. All ideas should be written down because one idea can spark another.
- **Quantity**- encourage multiple design ideas- the more the ideas the better. If students get stuck, remove some design aspect or add something.
- **Combination and Elaboration –** Encourage design teams to combine ideas or elaborate on existing ideas. These techniques often generate additional ideas.

(Linden, 1992, p. 11-12, from Ames & Linden, 1979)

IDEO BRAINSTORM RULES

1. **Defer Judgement**. There are no bad ideas in a brainstorm. There will be plenty of time to narrow the ideas later.

2. **Encourage Wild Ideas**. Even if an idea doesn't seem realistic, it may spark a great idea for someone else.

3. **Build on the Ideas of Others**. When you hear an idea from a teammate, think "and..." rather than "but..." in order to be as generative and open as possible.

4. **Stay Focused on Topic**. To get more out of your session, keep your brainstorm "How Might We" question in sight.

5. **One Conversation at a Time**. All ideas should be heard, so only one person should talk at a time. Wait your turn to share and make sure the whole group is listening.

6. **Be Visual**. Draw your ideas, as opposed to just writing them down. Stick figures and simple sketches can say more than many words.

7. **Go for Quantity.** Set an outrageous goal—then surpass it. The best way to find one good idea is to come up with lots of ideas.

OSBORN (1953) BRAINSTORMING RULES

Brainstorming Rule	Explanation
1. Go for Quantity	Come up with as many ideas as possible
2. Avoid Criticism	Verbal and nonverbal criticisms should be suspended until the evaluation process begins (after brainstorming)
3. Welcome Unusual ideas	The crazier the better; you never know where the train of thought might take you.
4. Combine and Improve	The idea that 1+1+= 3 means that combinations of the ideas can lead to new and better ones.

TEAM NORMS

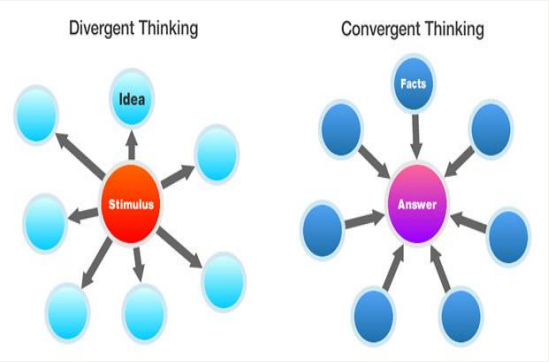
Establishing **Team Norms** – rules for how the teams will function.

- I listen when others are talking
- I encourage everyone to participate
- I help others without doing the work for them
- I ask for help when I need it
- I am critical of ideas, not people
- I remember that we are all in this together
- I value and respect each design team member

Mandel, 2002, p. 5-6

DIVERGENT/ CONVERGENT THINKING

- Divergent thinking often has the designer identify design criteria and then generate "wild" and unique ideas to meet the criteria.
- Our "wild" ideas in this course will be to consider all the various groups of people to study and the various ranges of users.
- Just like creating wild product ideas, exploring unique combinations of user groups can help lead to new innovations.
- Converging is when the design team seeks to select ideas that meet design criteria and narrow down the options for the best solutions.
- The natural flow of divergent/convergent thinking throughout the process is important



DECOMPOSITION

- Identifies individual functions of a final solution (product)
- With a list of functions, design teams begin brainstorming alternative approaches to each function.
- This approach attempts to remove existing solutions out of the equation by considering the function not the product.
- Consider a stapler, what is the overall function of a stapler? What are alternatives? (Staple less design). Decomposition in this case is not concerned with current staples, just joining loose papers together.
- The more complicated the operation, the more identified functions.

INPUTS TECHNIQUE

- This technique uses the environment (inside or outside) to inspire design ideas. Examples: watching people, TV, looking around a room, books, magazines.
- Grabbing inspiration from input cues, filling the mind with input outside the brainstorming sessions.
- Connecting input to brainstormed ideas is key and should be recorded in your engineer's notebooks.
- It might be a challenge to observe someone fishing – consider renting or checking out a fishing video from the library. Any student that does not have experience with fishing – this would be a great place to start with inputs technique.

https://commons.wikimedia.org/wiki/File:People_watching_on_beach.jpg

THE PROPS TECHNIQUE

- The technique uses everyday objects to generate design ideas.
- The object should be unrelated to the design problem.
- The term mock-ups are often used to help designers simulate the design solution without creating a real prototype. IDEO – mocked up a surgical tool with film canister, a dry erase marker, and a few other household items. It gave the team an object to interact with to promote additional iterations of design ideas.

https://upload.wikimedia.org/wikipedia/commons/9/9b/Various_film_container.JPG

https://upload.wikimedia.org/wikipedia/commons/d/de/Dry-erase_markers.jpg

"DECK OF CARDS" TECHNIQUE

- A few playing cards are used to organize existing elements or features of a designed solutions.
- Example: Toy designs usually use common elements such as noise, vibration, lights, etc. Each element can be assigned to a card – 8 of hearts, queen of diamonds, etc. The collection of cards are shuffled and several selected to combine elements.
- For Dbait – we can consider common features of a lure such as a) lip; b) bright colors; c) rattle; d) spinner; e) skirt; f) sent; g) glitter; others?

https://commons.wikimedia.org/wiki/File:Hand_of_traditional_British_playing_cards.jpg

RELAXATION TECHNIQUE

- Many examples in history of invention indicate the "eureka" moment occurs when the designer is in a relaxed state.
- The relaxation technique can involve breaks during brainstorming sessions, opportunities for a quick walk, talk with design teams about other tasks or non academic topics – later to return to the brainstorming session.
- Consider thinking about a design problem before sleeping and keeping your notebook beside the bed ready to record novel ideas.

https://commons.wikimedia.org/wiki/File:Green_Soft-Covered_Composition_Notebook_(14822730560).jpg

TRY IT OUT

YOUR TURN TO BRAINSTORM