Standard Brainstorming

Brainstorming, also known as the Delphi technique, is used to generate innovative ideas. Osborn (1957) introduced brainstorming to create synergy within the members of a group: ideas suggested by one participant would spark ideas in other participants. Subsequent studies (Collaros and Anderson, 1969, Diehl and Stroebe, 1987) challenged the effectiveness of group brainstorming, finding that aggregates of individuals could produce the same number of ideas as groups. They found that production blocking, free-riding and evaluation apprehension were sufficient to outweigh the benefits of synergy in brainstorming groups. Since then, many researchers have explored different strategies for addressing these limitations. For our purposes, the quantity of ideas is not the only important measure. We are also interested in the relationship among the members of the group. As de Vreede et al. (2000) point out, one should also consider elaboration of ideas, as group members react to each other's ideas.

Brainstorming sessions have two phases: the first for generating ideas and the second for reflecting upon them. A small group (three to seven people) agree on a specific topic and a limited period of time. The goal is to generate as many ideas as possible, maximizing quantity over quality: Twenty different ideas are better than three indepth ideas. Phase 1 usually lasts from half-an-hour to an hour, depending upon the topic and the group. Sessions longer than an hour are not recommended. Even if ideas are still flowing, the group should stop when time is up. It is better that everyone leaves feeling energized and excited by the ideas rather than tired and bored.

In phase 1, everyone suggests ideas, no matter how impractical or silly they seem at the time. The most important rule is: do not evaluate the ideas. Other group members are allowed to ask clarification questions, but must avoid discussing the merits of the idea. Statements such as "that's stupid" or "someone already did that" are forbidden. What makes brainstorming sessions interesting and fun is the way in which ideas spark other ideas, which is why this rule is so important. To help make people more comfortable and to encourage people to offer unfinished ideas, insist that everyone put in at least one "stupid" idea (without identifying which one it is!).

The group must chose a moderator and a scribe. The moderator encourages *everyone* to contribute ideas and ensures that the session finishes on time. The moderator's role is very important: he or she is responsible for keeping the tone positive and ensuring that participants do not interrupt or criticize each other. If an idea is unclear, the author has a couple of sentences to clarify it. If that is insufficient, the scribe should write it and everyone should move on. The time limit is very important: brainstorming is very intense and, if done well, will leave everyone energized and excited, not tired and bored. The moderator should also ensure that everyone participates. Some people naturally dominate discussions: the moderator should help make sure that others have a chance to contribute. Non-native speakers, or people from a different cultural or technical background may more time to talk. If someone is quiet, the moderator should explicitly ask for an idea and wait for a response.

The scribe is responsible for recording the ideas. Note that *every* idea, no matter how small or controversial, must be recorded. Usually, ideas are displayed so that everyone can see them, on a whiteboard or flipchart or typed and projected onto a screen. Another common variation involves writing ideas on post-its or notecards and placing them on a wall. While this allows for parallel generation of ideas, it also allows participants to ignore what others say. At the end, the scribe is responsible for preparing and distributing the final list of ideas.

When the time is up, or if the group appears to be getting tired, the moderator should stop the session. Everyone should take a short, five-minute break before moving to phase two.

In phase 2, everyone begins to reflect upon and evaluate the ideas. The scribe re-reads the complete list of ideas. . If it is important to thoroughly investigate all possibilities, then each idea can be discussed in turn. If it is important to select a small set of ideas that will become the basis for further work, the group can vote on the ideas. In that case, participants may ask clarifying questions, but avoid critical remarks.

One useful technique for identifying which ideas resonate within the group is to ask each participant to vote for their three favorite ideas. Each person goes up to the whiteboard or the flipchart sheets and puts a check mark next to the three "best" ideas. Note that ideas have different scopes and may overlap: this is not important at this stage. After everyone has voted, it is easy to see which ideas have clusters of votes. Ideas with the highest scores can be discussed, and the most promising ones pursued in later design activities, such as video brainstorming. Note that this is not a true evaluation, since the ideas produced vary greatly in scope. A small idea that nobody voted for may still be an important contribution to a later design. The purpose of the vote is to expose everyone to all the ideas, so that everyone has a chance to reflect on and be inspired by them.

Variations: Researchers have suggested several alternative brainstorming strategies to address some problems in group dynamics. For example, although the goal of face-to-face brainstorming is to ensure that everyone has a voice, some people may still dominate the conversation. In situations in which there are differences in power relationships, language skills or technical backgrounds, some participants may feel inhibited from speaking.

One solution for face-to-face groups is to ask participants to write their ideas on individual cards or post-it notes. After a pre-specified period of time in which everyone writes, the moderator reads each idea out loud to the whole group. Authors are encouraged to elaborate (but not justify) their ideas, which are then posted on a whitefboard or flipchart. While the moderator is reviewing each of the ideas, group members may continue to generate new ideas, inspired by the others they hear. As in the standard brainstorming session, participants should take a break and then vote on their favorite ideas.

Exercise: Standard Brainstorming

Group:

1. Choose the brainstorming topic, the more specific the better.
2. Spend up to 15 minutes generating the maximum number of ideas possible.
   List *all* ideas, including "stupid" ones. If you get stuck, use the 'contrasts' technique.
3. Scribe reads all the ideas out loud
4. Every member of the group has three votes to mark their favorite ideas to pursue.
5. Look at the final votes and identify ideas with multiple votes.

Total ideas:

Vote	List of ideas	page 1
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Vote List of ideas

Brainstorming, including a variety of variants, is for group building and participatory design. Designers may, of course, brainstorm ideas by themselves. But brainstorming in a group is more enjoyable and, if it is a recurring part of the design process, plays an important role in helping group members share and develop ideas together. Brainstorming, using paper prototypes, is also an excellent way to place all members of a design team on an equal footing, allowing people with scientific, artistic, and technical skills to work with users.

Mackay (2000), characterizes four levels of capturing brainstormed ideas:

1. "Say it"

A traditional brainstorming exercise, in which participants describe in words (verbally or on cards) as many ideas as they can, each of which is written on the whiteboard for later analysis. This approach generates the largest quantity of ideas, but they are often poorly formulated or too vague to be of much use to anyone else.

2. "Show it"

Participants draw on the whiteboard to illustrate their ideas. This results in somewhat fewer ideas, which, although usually better formulated, are still often abstract or "static". They rarely provide much insight into the details of the interaction.

3. "Act it"

Participants use simple prototyping materials and "act out" each interaction idea. This results in fewer ideas, but each is better thought out and is more likely to capture the dynamic nature of the interaction. Acting it out also facilitates communication within the design team. This is sometimes called 'bodystorming'.

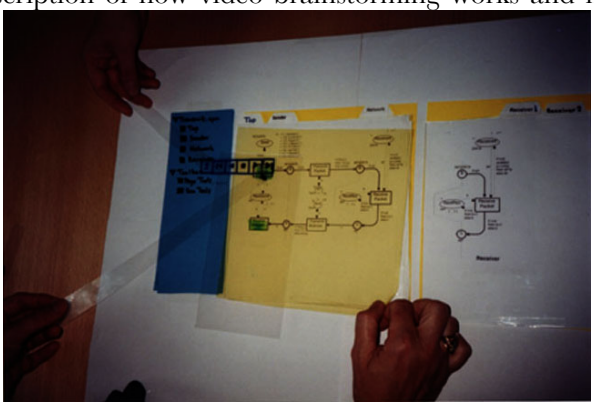
4. "Video it"

Participants use the same prototyping materials as above but act out each idea in front of the video camera. Once participants are familiar with the technique, they generate ideas almost as quickly as in the "Act it" style. Although this brainstorming technique produces the fewest number of ideas, they are usually the most detailed and programmers can use the resulting video clips to create software prototypes. Participation is also high: it is difficult to sit quietly when everyone else is preparing for a new "take".

Video Brainstorming

Video brainstorming extends standard brainstorming, so that participants not only write or draw their ideas, they act them out in front of a video camera. The goal is to simulate a wide variety of ideas very quickly and capture them in a way that is easier to understand (and remember) than hand-written text notes. In general, raw notes from brainstorming sessions tend not to be very useful after a few weeks because the participants no longer remember the context in which the ideas were created. Although video brainstorming generates fewer ideas in the same amount of time, each idea is easier to understand and recall. Video brainstorming is particularly appropriate when the goal is to create ideas for how users will interact with the new system and is especially appropriate at later stages of project design.

Video brainstorming requires thinking more deeply about each idea. One can stay abstract when describing an interaction in words or even with a sketch, but acting out the interaction in front of the camera forces the author of the idea (and the other participants) to seriously consider how a user would interact with the idea. It also encourages designers and users to think about new ideas in the context in which they will be used. Video clips from a video brainstorming session, even though rough, are much easier for a programmer to interpret than ideas from a standard brainstorming session. See Mackay et al. (2000) for a more complete description of how video brainstorming works and how it can influence the design process.



Participants work together, using a combination of paper and transparencies, to illustrate how a user would interact with a particular software tool.

Video brainstorming sessions require more preparation and resources than regular brainstorming. As in other forms of brainstorming, it is important to set a time limit. We usually limit sessions to two hours. Experienced groups can tape 10-20 ideas in this time, but beginning groups may only be able to shoot one idea per person.

If you have a large group, separate into smaller groups of 3-5 people. Use circular tables and gather a set of supplies for each group. The supplies will vary according to the topic of the brainstorming session. Participants will need materials to illustrate their ideas. The simplest is to use "paper" prototyping supplies: colored paper, post-it notes, pens, transparencies, scissors and tape, plus any other office supplies that seem relevant. Of course, one can brainstorm ideas using the full set of prototyping techniques discussed in section 3, from mockups to wizard of oz simulations.

Each group should have its own video camera and tripod. Many tripods allow you to attach the camera so that it shoots down, toward the table, which is particularly useful if you plan to shoot users interacting with simulated computer screens.

Before shooting, prepare a sheet with three columns: take number, author, and idea description. Each idea will be captured as a separate "take". If you decide to explore several variations of the same idea, each variation is considered a new take. Whoever is the currently in the role of scribe is responsible for noting the corresponding information on the master sheet. The first scribe should prepare a title card (hand-written on colored paper or on a whiteboard) with the name of the brainstorming session, the date and any other relevant information. Don't forget to label the video tape in advance, with the date, brainstorming topic, and the list of group members. Begin by setting up the camera on the tripod and shoot at least 5 seconds of the brainstorming title card before taping the first idea.

Each person must have the opportunity to illustrate at least one favorite idea. The author of the idea takes on the role of director. After explaining the idea to the group (no arguments, it's the director's idea), he or she can ask other group members to help illustrate the idea for the camera. One person should handle the camera and another should act as the scribe. The scribe prepares the title card for the take, by writing the director's name, a 3-5 word summary of the idea, and the take number. It's best to have a supply of different colored paper for making title cards, so that it's easy to distinguish the different takes on the video tape. The camera person shoots 5 seconds of the title card, then pauses the camera. The director then gives everyone a chance to practice the interaction once or twice and then videotapes it. Do not try to edit in the camera, by rewinding the tape and reshooting the idea if you make a mistake. Simply shoot the title card again (modified to say "Take 3 b") and reshoot the scene. Remember, you want to capture as many ideas as possible.

For the next idea, everyone shifts roles, with a new director, camera person and scribe. Ideas often become explorations of a "theme and variations". One person tapes a particular idea, and others create different interpretations or extensions of the idea in subsequent "takes". Some people work systematically through a set of ideas, others seek maximally diverse ideas, to show the limits of the design space.

We generally run a standard brainstorming session, either oral or with cards, prior to a video brainstorming session, to maximize the number of ideas to be explored. Then, participants take their favorite ideas from the previous session and develop them further as video brainstorms. Everyone is asked to "direct" at least one idea and incorporate the hands or voices of other members of the group. Unlike oral brainstorming, everyone usually participates.

Roles:

Director:	Choose an idea and assign jobs to the other group members.
Scribe:	Write the titlecards, fill in the idea summaries, and collect materials
Camera:	Videotape the idea (*not* the discussion about the idea!)
Makers:	Create paper prototypes or mockups of new technology
Actors:	Perform the actions with the mockup to illustrate the idea.

Preparation: Bring the list of key ideas, web search results and whatever you need to choose your first ideas. Also, bring: video brainstorming title cards (on different colored paper), plus post-it notes, transparencies, tape, scissors, marking pens, colored paper and anything else that will help you mock up the interface. Choose a quiet area with a table with prototyping materials, as well as a flipchart or whiteboard.

Procedure: Choose the director, who chooses the first idea and assigns the remaining roles. (Everyone will perform each role, over a series of ideas.) Create the materials necessary to illustrate the idea, rehearse once, video the titlecard and then video the interaction. You can use a voice over, but it is usually best to illustrate the idea through the action.

Exercise: Video Brainstorming

Group: ____

For each idea, choose one director who is responsable for the idea.
If someone has a suggested variation, that preson becomes the director for the second take.
Each idea should take 3-5 minutes.
Don't forget to shoot the title card before each idea!

Idea 1 Take _____ Color _____ Concept name _____

Director _____

Description _____

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Idea 2 Take _____ Color _____ Concept name _____

Director _____

Description _____

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Idea 3 Take _____ Color _____ Concept name _____

Director _____

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Idea 4 Take _____ Color _____ Concept name _____

Director _____

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Idea 5 Take _____ Color _____ Concept name _____

Director _____

Description _____

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Idea 6 Take _____ Color _____ Concept name _____

Director _____

Description _____

Idea 7 Take _____ Color _____ Concept name _____

Director _____

Description _____

Idea 8 Take _____ Color _____ Concept name _____

Director _____

Description _____

Idea 9 Take _____ Color _____ Concept name _____

Director _____

Description _____

Idea 10 Take _____ Color _____ Concept name _____

Director _____

Description _____