

## The Challenges of Teaching & Learning Creativity

*Approaches to teaching creativity are commonly referred to as "fostering creativity" or some other term that implies an activity that can't be specified. The process of creativity is a non-linear event that can only easily be identified after it has occurred. Creativity can rarely be sequenced into an elegant algorithm or methodology. The challenge that we face as teachers is finding ways to teach a process that is only visible once it has occurred. We share this with you so you can understand that while methodologies help, the creative process is a more fluid experience.*

One of the challenges of observing creativity in action is perhaps that it often comes from a mundane activity but has an extraordinary result so that it is only identified as creativity posthumously. It is conceivable to measure a person's inclination to be creative by their ability to have "eureka moments". Others have identified a person's propensity towards creativity as a measure of their ideational fluency—the ability to generate a large number of ideas in a specified timeframe. At times, creative results come from the relentless search for a solution. As Edison said "I have not failed. I've just found 10,000 ways that won't work." Regardless of how creativity emerges, whether through a natural cognitive advantage, or through earnest persistence, it can be taught through combination of strategies and approaches that can maximize your inventive potential.

As described above, this remains a challenging endeavor, but not an impossible one. D-Lab has been able to nurture the creative technological potential of Masai herders in Sub-Saharan Africa, Andean weavers in Ecuador, and Indian rickshaw pullers. Our design staff has overcome cultural and communication barriers through the use of what is becoming a common language of appropriate technology design around the world. You are now learning this language.

Our class hails from a variety of backgrounds. Each one of you brings your own range of capabilities to your projects. This can provide a rich and diverse environment for idea exchanges and brainstorming sessions. We all still have barriers to overcome, but we're prepared to leap above them and make you into a medical device design force to be reckoned with. Try to follow these strategies:

**Learning to Fail:** At times, previous experiences can unintentionally discourage creativity as a way to manage risks. The creative process is an inherently risky, and failure is often a method of shaping a better solution. Failure is not something that you

should be afraid of—when you couple it with iterative design. Safe ideas, are generally boring. Don't let them overshadow your exciting ones!

**Learn to get your hands dirty:** Overly preparing the idea on the blackboard will delay the much needed prototype that will nurture your mechanical dexterity. Drawing helps. Many of us love filling whiteboards. Make sure you add a healthy dose of transforming your sketches into quick sketch prototypes.

**Divide and conquer:** Physical design challenges can be broken down into subcomponents that make attacking a problem easier to grasp.

**Break the rules without violating the laws of physics:** The creative energy, if properly unleashed is enormous. Sometimes, our excitement can lead to attempts at breaking basic physics and engineering rules. Good design can provide a method that shows us that your imagination and the basic laws of the universe are not incompatible. (Most of the time)

**Follow historical wisdom:** A way to kick start inspiration is to learn from vintage technologies and find ways to apply them into the modern landscape of design.

**Peer through the lens of analogy:** Whether it's biomimicry, language rules, or context shifting, great solutions often arise from finding answers to analogous technologies: using the way a razor clam burrows in the sand to shape the design of an anchoring device, the movement of a merry-go-round to pump water from a well, or the veins in a leaf to inspire the design of microfluidic chips.

**Enhanced persistence:** Identify a baseline approach and try to come up with ways to improve and leverage it. One baseline approach is pure trial and error - hiring typing chimpanzees and waiting for the definitive creativity manual to emerge. What can be done to increase the chances of hitting a home run? Put the simian typists in front of computers instead of typewriters and run their inputs through a spell checker that finds non words and throws them out. If the solution is not imminent amplify the leverage.

**Learn to foster eureka moments:** Take a break; alternate between intense work towards a solution and other activities. The space in between can provide moments of inspiration when least expected. "Hollowed out, clay makes a pot. Where the pot's not, is where it is useful." Train your brain to be ready to take advantages of the spaces.

**Learn from your notes:** Organized, graphical, and creative note-taking can not only document your efforts so far, but give your mind a head start in developing an idea into a breakthrough.

**Learn from our differences:** Multidisciplinary teams are more effective at coming up with solutions that homogenous ones. By learning about our group's backgrounds, our diverse skill sets, and our cognitive preferences we can optimize our solution space. By learning to trade hats and not just specialize based on our preferred skill sets, we can jostle our imagination, and practice our divergent thinking skills to come up with new ideas.

We believe that these are valuable lessons to learn. D-Lab strives to make sure you can recognize that your intellect can be harnessed towards breakthrough solutions; that multidisciplinary teams will lead them to newfound skills; and that your impact on the world can include transforming far away communities that are less fortunate, but with a creative potential to rise out of poverty.

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EC.710 D-Lab: Medical Technologies for the Developing World  
Spring 2010

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