

# MindShift

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## Why Learning Should Be Messy

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*The following is an excerpt of [One Size Does Not Fit All: A Student's Assessment of School](#), by 17-year-old Nikhil Goyal, a senior at Syosset High School in Woodbury, New York.*

Can creativity be taught? Absolutely. The real question is: "How do we teach it?" In school, instead of crossing subjects and classes, we teach them in a very rigid manner. Very rarely do you witness math and science teachers or English and history teachers collaborating with each other. Sticking in your silo, shell, and expertise is comfortable. Well, it's time to crack that shell. It's time to abolish silos and subjects. Joichi Ito, director of the M.I.T. Media Lab, told me that rather than interdisciplinary education, which merges two or more disciplines, we need anti-disciplinary education, a term coined by Sandy Pentland, head of the lab's Human Dynamics group.

"Today's problems — from global poverty to climate change to the obesity epidemic — are more interconnected and intertwined than ever before and they can't possibly be solved in the academic or research 'silos' of the twentieth century," writes Frank Moss, the former head of the M.I.T. Media Lab.

Schools cannot just simply add a "creativity hour" and call it a day.

Principal at High Tech High, an innovative, project-based learning school in San Diego, California, Larry Rosenstock, points out, "If you were to hike the Appalachian trail, which would take you months and months, and you reflect upon it, you do not divide the experience into the historic, scientific, mathematic, and English aspects of it. You would look at it holistically."

After indicating the problem at hand, scoop out the tools, research, networks, and people required to get it solved. Get out of your comfort zone.

“You can have students do laboratories and hands-on activities and learn nothing, because they are following the cookbook and going through the motions without having their brains on.”

In practice, this means the elimination of English, mathematics, history, and science class. Instead, we need to arrange the curriculum around big ideas, questions, and conundrums. What does learning look like in this model? Letting kids learn by doing — the essence of the philosophy of educator John Dewey. He wrote: “The school must represent present life — life as real and vital to the child as that which he carries on in the home, in the neighborhood, or on the playground.” Let kids travel to places, work with mentors, and inquire about the world around them.

Diana Laufenberg, former teacher at the Science Leadership Academy, described to me, “The role of inquiry is the starting point of learning. School-based education has always been about telling and getting of information, rather than exploring or investigating.” Let kids create for themselves. We can start by employing project-based learning, where students probe real world problems collaboratively. Back in 1918, William Heard Kilpatrick wrote a famous article laying out what he called the “project method”: a curriculum based on “wholehearted purposeful activity proceeding in a social environment...the essential factor [being] the presence of a dominating purpose.” In project-based classrooms, learning literally comes alive.

## **CASE STUDY: BRIGHTWORKS**

Let’s examine three institutions: The Brightworks School, a K-12 private school; Stanford d.school, an institute of design; and the M.I.T. Media Lab, a graduate program.

The Brightworks School in San Francisco, California, which opened its doors in September 2011, epitomizes a new style of learning. Founder Gever Tulley told me, “If the pedagogical unit of traditional public education is a day divided into a series of 45 minute periods, then the pedagogical unit of Brightworks is the arc, which is divided into three phrases.” Each arc, he says, has a central theme.

The first phase of the arc is called exploration. “Within this phase,” Tulley says, “we create a landscape of experiences populated by passionate people who have devoted some portion of their lives to an aspect of the topic.” The children begin a journey looking through a kaleidoscope of perspectives and eventually mold a clear statement of what they intend to accomplish in the next phase. The second phase is expression. Tulley notes, “During this phrase, the mixed age teams work together, sharing skills, to take the ideas to completion — within the deadline.” The final phase is called exposition, where the public gets to view what the kids have done.

The first topic of the previous school year was cities. For three weeks, the students looked at the history of cities, how cities work, and the future of cities. 18 field trips were built into their schedule. Almost every day, Tulley explains, “we went into the city to see something or work with someone who has dedicated their life to some aspect of the city. Be they in waste water management, city

planners, or architects.”

“The point is to see the topic in as many ways as you possibly can,” says Tulley. “Part of that is to expand the notion of cities in the students’ minds.”

Note: project-based learning is not necessarily expensive. He reveals, “If you look at the net aggregate cost of putting a child through a nearby public school in terms of public expenditure, at Brightworks, we do not spend anymore on kids in our private school in terms of net aggregate cost.”

### **CASE STUDY: STANFORD D.SCHOOL**

At the Stanford d.school, projects drive the curriculum. Bringing majors from engineering, business, medicine, science, and design to come together to solve real or abstract problems is the underpinning of the institution’s philosophy. The goal is to have students become what are called “T-shaped” students, who have depth in a particular field of study but also breadth across multiple disciplines. Its founder and director is David Kelley, whose mission is to transmit “empathy” into his students to encourage them to see the human side of the challenges posed in class and regain their creative confidence, often lost in the early years of schooling.

Based on the axioms of what Kelley has called “design thinking,” instead of being spoon-fed problems to solve, students must first define problems themselves through observation, research, and dialogue. After, students visualize and brainstorm potential solutions with one another in the stage of “ideation.” Next, by means of prototypes, students make sketches and three-dimensional models of potential ideas to iterate continuously. Lastly, students make the final touches on a finished prototype.

The school concentrates on four areas: the developing world, sustainability, health and wellness, and K-12 education. From extracting water for irrigation in Burma to supplying solar lanterns for the poor in rural India and Africa to building infant warmers in Nepal, these students are certainly making their mark on the world.

### **CASE STUDY: M.I.T. MEDIA LAB**

Similarly, the M.I.T. Media Lab has an anti-disciplinary approach to learning. Their research program is “focused on inventing a better future through creative applications of innovative digital technologies.” Instead of lectures, grading, and tests, roughly 25 groups of graduate student researchers and a few undergraduate researchers work with faculty members and scientists on a research topic. Due to its non-linear and collaborative process, fascinating innovations are born from Aida, a dashboard-mounted robot for cars and trucks to a trillion-frame-per-second video to Huggable, a robot teddy bear companion for pediatric hospital patients.

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projects look messy, and it's loud, teachers have gotten in trouble for that."

How can we evaluate projects? We can't grade them the same way as tests. Gever Tulley offered me a very relevant hypothetical situation.

"Suppose you and I decided to build a boat. Our hypothesis might be: we can build a boat under \$30 using recycled materials and sail it across the Hudson River. Our teacher or mentor can help us shape that to ensure that the challenge meets our cognitive and intellectual development. If the teacher thought the task was too easy for us, he or she might add a twist — the boat needs to have two masts or sail power. Half a day, a few times a week, you and I would work on this project and we have a deadline."

"Suppose then we build the boat, drop it in the Hudson River, and it sinks. No one has to tell us that our boat is not working. We don't need the 'F.' It's unnecessary and inappropriate. That first version of the boat could have been a hypothesis. We learned from the experience and the next version will be more well thought out. So after going back to drawing board and making tweaks, we test the final version. We find that the boat sails well downwind, but cannot sail upwind."

"What grade should a teacher give? Is that a 'C' because it only went in one direction? Or is that an 'A' because we tried a bold idea but we neglected 3,000 years of sailing history and would have been able to sail it in both directions if we had done our research? You can't decide. The feedback from the boat is its own incentive to improve our thinking for the next project."

The point is that evaluation is no longer about giving a single number, but rather a documented process from start to finish. At the Brightworks School, students will leave with an iPad, filled with all the projects they completed in their term. Plus, portfolios and publishing your work online is one of the biggest motivators for kids. When she was teaching at the Science Leadership Academy, Diana Laufenberg said that if you Googled her students' names, you would find an entire web history linked to them. Couple that with the fact that in project-based learning, kids are working on something they have a passion for, thus they have a stake in the outcome and will keep trying even when something isn't working. That's true in life as well.

**PROJECT-BASED LEARNING IS MESSY**

Why hasn't project-based learning picked up yet? There are a few reasons. First, the model of education says principal Chris Lehmann where kids sit in rows, read textbooks, and hear lectures has lasted so long, because it never goes that wrong. "It's boring as hell, but most principals don't yell at their teachers if they walk by their classroom and all they see is a quiet classroom with kids reading the textbook. No one gets in trouble."

"If you go into a classroom," says Lehmann, "where there isn't that structure, kids aren't exactly on pace, projects look messy, and it's loud, teachers have gotten in trouble for that."

Second, the way students attempt to learn via projects does not work. Tulley says, "It amounts to kit-based experiences in 45 minute periods. 'We're going to do a biology kit.' We already know that those recipe like exercises do not stimulate creativity."

I also spoke with Harvard Professor Eric Mazur on this issue as well. He says, "You can have students do laboratories and hands-on activities and learn nothing, because they are following the cookbook and going through the motions without having their brains on. The word 'hands-on' is overused and abused."

The role of the teacher in project-based learning as Laufenberg likes to say is an "architect of opportunity. Through a scaffolding strategy, they help us make sense of what we have learned. Still, teachers must understand that learning is uncomfortable, messy, and complicated." Get over compliance and control!

In a summary published on Edutopia, Brigid Barron and Linda Darling-Hammond reviewed numerous studies and found that:

1. Students learn more deeply when they can apply classroom-gathered knowledge to real-world problems, and when they take part in projects that require sustained engagement and collaboration.
2. Active-learning practices have a more significant impact on student performance than any other variable, including student background and prior achievement.
3. Students are most successful when they are taught how to learn as well as what to learn.

As the old adage goes, "Tell me and I forget, show me and I remember, involve me and I understand." Harvard Professor Howard Gardner said to me that schools should incorporate the



Brightworks School

best of two models of learning: a hands-on children's museum, which encourages open-ended exploration, and an apprenticeship, which provides a more structured environment for practicing meaningful skills in an authentic, real-life context.

The bottom line is that you don't have to learn the boring stuff before you start applying it. Start rolling around in the dirt from the get go.

*Nikhil Goyal lives with his family in Woodbury, New York. His work has appeared in the New York Times, Wall Street Journal, MSNBC Melissa Harris-Perry, Fox and Friends, Fox Business: Varney & Co., NBC Nightly News, and Huffington Post.*

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