

Bringing Design Thinking to Schools

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The Educational Imperative

- But we'll also do more to retrofit America for a global economy. That means updating the way we get our electricity by starting to build a new smart grid that will save us money, protect our power sources from blackout or attack, and deliver clean, alternative forms of energy to every corner of our nation. It means expanding broadband lines across America, so that a small business in a rural town can connect and compete with their counterparts anywhere in the world. And it means investing in the science, research, and technology that will lead to new medical breakthroughs, new discoveries, and entire new industries.

Barack Obama
January 8, 2009

Design education a response

- Design-based learning offers an opportunity for preparing students to have the 21st century skills needed to respond to the needs, challenges and problems that will have to be solved in an uncertain future.

Designing defined

- It is a creative counterpart to the scientific method, and it presumes that there is more than one right solution to any problem and many paths to each alternative...For designers, doing is a way of knowing. They are as likely to analyze a problem through models, diagrams, walks through an environment, or sketches as they are through statistics or writing. Designers are fluent in several vehicles of thought (images, words, numbers) and methods of communication, storing and recombining experiences for future use. Their process is iterative, always alerting them to new problems and opportunities.
- Davis, et.al., (1997) Design as a Catalyst for Learning. Alexandria, VA: ASCD. p.2

We believe design:

- Is an important and highly useful mode of inquiry that puts "doing" at the center of problem-solving
- Has applications across the K-12 spectrum
- Engages students in ways that are inclusive of their diversity
- Makes students see the relevance of their school work
- Is a "third space" activity that can respond to complex problems (with interdisciplinarity) and with the result of innovation

From Design practice to classrooms

- **Understand** (Research current solutions, talk to experts, seek out sites to observe)
- **Observe** (Observe users, collect sketches, photos, videos, and artifacts to analyze and synthesize user needs)
- **Point of view** (Synthesize needs of users. Develop insight)
- **Ideate** (Generate many ideas using brainstorming and other techniques)
- **Prototype** (Create low-resolution representations of ideas)
- **Testing** (Observe, interview users with prototypes. Iterate.)

Why is design in schools an equity issue?

- Through design, children learn that they have tools and power to change the world.
- To date, mostly in private and high-end schools far more than in public.
- These very important learning experiences are difficult to implement in beleaguered public schools that are being pushed towards "back to basics" programs.

Why research Design for K-12?

- The goal is to understand how design processes help students learn, to discover what content is best suited for design projects, and to develop tools to bring what is now a custom curriculum development process to EPAA and a wide range of schools.

What we've done



- Involved Stanford students @ d.school and research
- 3 projects 6th and 7th graders at EPPAA ES
 - Plate tectonics, literacy, geography
- Two "boot camps" for K-12 teachers

Pilot Research Project

- Commensurate with 5 curriculum units
- Teacher Interviews with each teacher
- In-depth Observational Study of classroom
- Interview study of students in the 7th grade Geography Project



Themes emerging from the work

- Students understand and take to design processes
- Students engaged individually, personally and collaboratively
- Bringing design into classroom was challenging and problematic

Understanding Design

- Students embraced the design process:
 - adopted the discourse of design in varied ways
 - able to reflect on the nature of the process as they created a projects and solutions

Affect & Design

Design thinking played a role in developing students' creative confidence.

- Students were engaged in personally meaningful work, had opportunities to express their voices, and saw the power of risk-taking as they engaged design challenges.
- They enjoyed hands-on work.
- They oriented to the needs of others.
- They saw the value of their collaborations.

Design Thinking & Content Learning

Our team struggled to integrate design thinking with content standards in geography.

Teacher saw the value of design process, but questioned its place in her classroom culture. It seemed difficult to manage along with content even though she was positive about the outcomes for students.

Students found both design thinking concepts and geography content as new and they attended more to design.

New Study of Math-based design unit in May '09



- Pre and post growth in content learning
- Problem-solving and meta-cognitive skills
- Engagement

Moving Forward

Our goal remains to work with teachers and on curriculum that is responsive to their needs

- And to...
- Research how best to bring the design process into connection with key content areas and needs in urban schools.

