An Experience of "Yes"

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The inkling was there all along. Back in 2005, in A Whole New Mind, author Daniel Pink included design — "utility enhanced by significance" — as an essential aptitude for the 21st-century learner.

As Pink's work began to achieve general currency among educators, related threads from the realm of business also converged. The successes of companies like Facebook, Amazon, and Twitter have intensified the aura around "innovation." Truly novel ideas with social utility attract dazzling talent as well as vast quantities of attention and capital. In the purely aesthetic realm, Apple under Steve Jobs built a peerless reputation for beautiful functionality — while open-source and "maker" devotees work within an equally compelling aesthetic of functionality as a kind of beauty in itself. With innovative products and services aggressively pursued and richly rewarded, there is growing focus on environments and approaches — think Google's storied workplace culture — that seem to foster authentically new ideas and new solutions in any field.

Some attentive independent school educators began looking around. If forward-thinking independent schools are to produce new minds, they maintained, "design" — the proposition that an aesthetic process matters — must be part of the learning experience they offer.

Enter, then, "design thinking." A concept as challenging to define as it is to implement, design thinking focuses on a process long familiar to students and teachers in schools of art and architecture: the posing of a problem, perhaps elegantly framed but more likely ill-structured or open-ended — and with some constraints. Working within the constraints, problem solvers work through possible solutions and create workable models for critique, testing, retesting, and redesigning until a breakthrough is achieved. Design thinking is above all an iterative process, with constant improvement — experimenting with and then scrapping Plan A and moving onto Plan B — as a central tenet. In its educational incarnation, says Cathy Van Lancker, visual arts chair and developer of a pioneering course in design thinking at Moses Brown School (Rhode Island), the method also involves near-continual assessment to "measure process — daily feedback, ongoing practice, observations, summaries, reviews, rubrics." Kim Saxe, director of the Innovation Lab, or I-Lab, at Nueva School (California), sees this iterative prototyping as helping students develop "a totally different attitude about failure. When kids see that failure is giving them important information, they don't give up — they incorporate the information."

STEM to STEAM

Design thinking was given a name and life 20 years ago through the work of Rolfe Fast and David M. Kelley at the Hasso Plattner Institute of Design (more commonly referred to as the "d.school") at Stanford University. Kelley later founded IDEO, which has grown into a leading design firm and, increasingly, a fountainhead of educational ideas. Other leaders associated with design thinking include Roger Martin, dean of the Rotman School of Business at the University of Toronto, and Tim Brown, now CEO of IDEO and whose book Change by Design offers business leaders a template for applying design thinking to organizational development.

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It is important to emphasize what design thinking is not: it is not exclusively a tool for arts education, nor is it strictly technical. In its most complete expression, says Moses Brown's Van Lancker, whose course draws on such resources as Rhode Island School of Design (RISD) students and corporate partner Hasbro, design thinking adds the element of creativity that spurs both elegance and innovative thinking in more technical fields. She cites RISD president (and a developer of virtual world *Second Life*) John Maeda's call for the insertion of the letter A — for Arts, broadly construed — in among the STEM (science, technology, engineering, mathematics) disciplines: turning STEM into STEAM. "This could happen in every class, every level, and every day," says Van Lancker.

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At Nueva, Saxe has watched good classroom projects become extraordinary learning experiences using design thinking. In one example, the classic "egg-drop challenge" — usually involving a limited time for design, a single set of materials, and a dramatic, climactic one-time "test day" — becomes a more thoughtful exercise in design, materials science, and basic physics when students are encouraged and given the resources (say, three packs of cards instead of just one from which to build three versions of the protective container) to design, build several prototypes, test, redesign, and test again. Using the iterative design-thinking process, students can focus on the actual problem in its full context rather than on wondering if their single egg will break or survive. "With more chance to design, we've seen a greater variety of solutions, and students are thinking more deeply about the physics — from one inspired by a sycamore leaf to one based on a combination of a fan and a parachute. What's more, we see kids really sticking with and improving their work until it's time to move on to the next project."

Furthermore, design thinking in its origins and in its applications is what Mary Cantwell, Center for Design Thinking coordinator at Mount Vernon Presbyterian School (Georgia), calls "a process with heart" — a technique built around human needs and aspirations that demands deep empathy and understanding, even across geographical, cultural, and socioeconomic boundaries. Although not a "liberal arts" approach, design thinking incorporates and often requires research, skills, and above all the articulation of both problems and solutions that draw upon the most fundamental skills we associate with the humanities and their focus on human behaviors, accomplishments, and yearnings. As Nueva's Saxe puts it, "Design thinking unlocks capabilities. It's a personal transformation process."

Design Thinking Resources for Schools and Teachers

Be Playful Design (design consultancy) (blog):*http://blog.beplayfuldesign.com*

Tim Brown, ***Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*** (Harper Business, 2009)

Continuum (design consultancy): http://continuuminnovation.com

Design Thinking for Educators — a collaboration between Riverdale Country School and IDEO: *www.designthinkingforeducators.com*

The Design Thinking Toolkit for Educators (Version One) (Riverdale + IDEO, 2011; downloadable at www.designthinkingforeducators.com)

IDEO (design consultancy): *www.ideo.com*; see also *www.ideo.org*

Innovation Lab at Nueva School: *www.nuevaschool.org/programs/i-lab*; see also summer institute site at *http://nuevadesigninstitute.org*

Thomas Lockwood, ***Design Thinking: Integrating Innovation, Customer Experience, and Brand Value*** (Allworth Press, 2009)

Roger Martin, ***The Design of Business: Why Design Thinking Is the Next Competitive Advantage***

(Harvard Business School Press, 2009)

NAIS Commission on Accreditation, ***A Guide to Becoming a School of the Future***(NAIS, 2010) *www.nais.org/files/PDFs/NAISCOASchools.pdf*

NuVu (design-studio-based term-away program): *www.nuvustudio.org*; see also blog at http://nuvustudio.org/blog/ and related content from Beaver Country Day School at *www.bcdschool.org/academics/nuvu-studio-program*

OWP/P Architects, VS Furniture, and Bruce Mau Design, ***The Third Teacher: 79 Ways You Can Use Design to Transform Teaching*** (Abrams, 2010)

Daniel Pink, ***A Whole New Mind: Moving from the Information Age to the Conceptual Age*** (Riverhead Books, 2005)

Reimagine:Ed: *http://reimagine-ed.org*; see also blog at*http://nextchapter.reimagine-ed.org/our-blog*

Rotman: The Magazine of the Rotman School of Management (University of Toronto; thematic issues regularly cover creativity, innovation, and design thinking)

Stanford d.school REDLab (Research in Education and Design):www.stanford.edu/group/redlab/cgi-bin

With a host of TED talks and conference presentations to draw upon, many educators are beginning to focus on design thinking as they cast about for ways to embed "21st-century learning" into school curricula. While this catchphrase may be drifting toward cliché status, most widely accepted formulations, including the "Essential Capacities for 21st Century" identified by the National Association of Independent Schools Commission on Accreditation,[1] align neatly with the design-thinking model. In an industry ever in search of manageable ways to systematize the messy business of educating children, design thinking holds promise as a platform for teaching creativity and problem solving, generally in a collaborative format, based on critical and often ethical analysis and featuring opportunities for communication across cultures in the form of presentation and advocacy in multiple media and genres. To some practitioners, design thinking has the potential to fundamentally transform the nature of the classroom experience, to incorporate all the aims of contemporary education within one powerful and proven framework.

But design thinking is more than pedagogy and curriculum. Following on the work of Tim Brown and others, design thinking is also regarded as an exceptionally promising management technique, a structured approach to problem solving and decision making at every level from the classroom to the boardroom. Applied thoughtfully, design thinking combines inclusivity with creative yet disciplined and intentional action in ways that can resonate with school values while supporting truly innovative models of strategic leadership and school improvement. At Riverdale Country School (New York), for example, a team of teachers, with facilitation from IDEO, used design thinking to explore new approaches to building faculty collaboration. Says Riverdale teacher Michael Schurr, "To me one of the biggest steps was when we went out and observed other business practices. Design thinking encourages you to remove yourself from your current setting and look at other models. It's been eye-opening." Having prototyped several models, Riverdale faculty now share an online collaboration space that grew out of the process.

Design Pioneers

A great many people may be talking about design thinking at present, but relatively few schools are actively applying the approach. Largely, but not exclusively, inspired by work at Stanford's d.school, many schools that have embraced design thinking have done so in the context of their academic programs.

The Nueva School has played a leading role in disseminating design thinking through its highly regarded I-Lab program and its director, Kim Saxe. A K–8 school (with plans to expand through high school), Nueva has made design thinking an element of many of its programs, and all Nueva faculty are trained in the approach at the school's own summer institute. "Bringing in design thinking is an extension of 40 years of team-teaching using a project-based, interdisciplinary, collaborative curriculum," says Saxe. With its focus on in-depth inquiry and critical thinking, design thinking is also, she adds, "a perfect approach to developing

new curriculum." Above all, "design thinking is positive — we want to give kids an experience of 'Yes!' It's not about asking for permission."

The Elements of Design Thinking[1]

Problem definition, with constraints
• Define as precisely as possible the problem to be solved; acknowledge that the "answer" or solution may be unknown.
• Research the problem and its context; be open to all information and multiple perspectives.
• Focus on human needs and aspirations embedded in the problem; approach the problem with empathy.
• Enumerate and articulate known and knowable constraints — economic, physical, social, limitations to available data and skill sets; view constraints as a contextual boundaries but not as limits.
• Enumerate and articulate known and knowable resources.

Design-process thinking
• Without judgment, brainstorm possible approaches and solutions; engage multiple voices and perspectives, including stakeholders and end users — think like an anthropologist.
• Roughly categorize suggested approaches and solutions, seeking common themes and approaches; resist being bound by apparent constraints.
• Through in-group and expert feedback, refine suggested approaches and solutions.
• Select best possible approaches and solutions; refine into action statements.

Visualization and graphical reasoning
• Based on required research, develop ways to describe the solution in the context of the problem, relating it also to constraints and resource needs.
• Use visual descriptions to articulate process steps and clarify relationships among elements, resources, constraints, and aims.
• Use in-group and expert feedback to revise and refine all aspects of solution and process.

Modeling; approximation and scaling
• Continue research, and solution and process revision.
• Design and build prototypes and scale models of the solution; these may be process narratives of pilot programs.
• Use in-group and expert feedback to revise or refine prototypes in real time; use multiple loops of prototyping and feedback to optimize solution.
• Attend carefully to details.
• If feasible, prototype or pilot multiple solutions, using in-group and expert feedback to revise, refine, and select optimal solutions.

Decision making; dealing with uncertainty
• Implement and monitor all aspects of solution(s) in the field, refining and revising where necessary.
• Compare projected and actual effects of solution, revising and refining.
• Apply and respond to expert and user feedback to optimize.
• Understand and respond to limitations of solution as applied in context.

Note
1. Adapted from "More Innovation in Schools," by Harry West, CEO, Continuum LLC.

At Mount Vernon Presbyterian, Cantwell finds that students and teachers alike are drawn to the interpersonal rewards of design thinking. "It has fostered collaboration in ways we haven't anticipated," she observes. Mount Vernon Presbyterian has reformulated the design-thinking process as DEEP: Discovery, Empathy, Experiment, Product — a version that resonates with students and is also congruent with the school's strategic vision. Head Brett Jacobsen sees design thinking "as a natural platform for standards and skills to be incorporated in the classroom. Most importantly, it provides for a rigorous and relevant environment in which students produce something of value that can impact their local or global community

or will have tremendous transfer later on in life."

The Lovett School (Georgia) is approaching design thinking from a slightly different perspective. Laura Deisley, Lovett's director of 21st-century learning, describes her office as "The Skunk Works," an investigational arm seeking best practices and promising partnerships to support program development in all areas. Deisley sees design thinking as fitting into every major trend in contemporary education, from Tony Wagner's "Seven Survival Skills" to brain-based learning. Lovett, says Deisley, is "looking for places to reframe everywhere." She adds that design thinking is likely to be part of the coming strategic-planning process.

Design thinking's overall promise as a management tool has perhaps been less thoroughly explored by schools, although work at Riverdale Country School (New York) in partnership with IDEO has generated the "Design Thinking for Educators" program and its comprehensive *Design Thinking Toolkit for Educators*.

Michael Schurr at Riverdale appreciates the way the design-thinking "process forces you to slow down, get together with others, and to be specific about what it is you're trying to solve. The idea of prototyping doesn't typically exist in a school setting — the first solution is generally the one you go with, but with design thinking you remove yourself from that."

Along with collaboration, Riverdale has applied design thinking to questions like reducing waste and even classroom décor. "It's of a piece with our institutional goal of bringing in more voices and tapping student wisdom," says Schurr. "For example, we learned through interviewing our second grade students that they really don't care what's on the bulletin boards. They're too high, the students can't read them and generally don't have a say in what goes up. We took this information and created lower bulletin-board space, and now kids put information on notecards or drawings or whatever they think will help them in a unit of study and add it to this wall. We see kids accessing this information and really using it to deepen their understanding." As it happens, plentiful and accessible display and "writing on the wall" areas — like the extensive whiteboard and Idea Paint surfaces found in many studios, laboratories, and think-tank collaboration spaces — are a staple of design-thinking environments.

Studio-based design thinking is the core methodology at NuVu, a studio-learning immersion program for high school students in Cambridge, Massachusetts. Developed by Saeed Arida, Saba Ghole, and David Wang during graduate studies at the Massachusetts Institute of Technology, NuVu is intended to be a radical experience: "We want to change the way education is done," says Arida.

At NuVu, which offers term-length and full-year programs, students are first introduced to the basic techniques and technologies of the design studio, and then experience a series of two-week "studios" exploring specific topics related to the term's theme. In the spring of 2011, for example, NuVu students explored all aspects of "Design for Development," from education to energy systems to nutrition. Each studio is coached by professional experts from the regional (and increasingly global) higher-ed, technical, and creative communities, and each studio ends with a formal critique in which students present their work to still other experts for feedback.

According to Arida and Ghole, one of NuVu's chief aims is to develop a "critique culture" in which continuous feedback informs all aspects of learning. "The key to a successful studio-based education is the quality of the feedback," says Arida. He adds that NuVu "coaches need to learn how to understand students' projects and perspectives very quickly and synthesize a productive response on the fly. Ultimately, the quality of the coach is based on the quality of his or her feedback."

Beaver Country Day School (Massachusetts), NuVu's founding affiliate, currently sends about 20 students per trimester to NuVu. (Other NuVu-ers come from a scattering of independent and public schools or are being home schooled.) All kinds of students have embraced the NuVu approach. As one Beaver student put it, "NuVu helps the analytical kids think more creatively and the creative kids think more analytically." In December 2011, a group of Beaver students attended the TED-related INK conference in Jaipur, India, and then field-tested with children in Delhi an educational app they had developed in partnership with the Sesame Workshop in India during the Design for Development studio at NuVu.

Beaver head Peter Hutton sees the NuVu experience as a partnership that has already had a powerful impact on students and faculty, and Beaver is working to incorporate design-thinking methods into its already heavily collaborative and project-oriented curriculum. "NuVu is multidisciplinary in the best sense," says Hutton. "It rewards divergent thinking and, given the emphasis on iteration and prototyping, the willingness to 'make excellent mistakes,' in the words of Daniel Pink." This winter, Beaver is beginning work

with IDEO to train all faculty in design thinking and, in the future, to help the school design a new schedule and to create metrics to measure the effectiveness of design thinking, multidisciplinary learning, and programs like NuVu.

The Future of Design Thinking

The challenge ahead for independent school educators is to find the most effective ways to deploy design thinking. Done well, says Lovett's Deisley, design thinking could be "a framework for everything we want." But, she asks, "How do we advance the model to really change what we do? Is it more TEDx events, short workshops, a consultancy?"

While the upside of design thinking is clear to those who have experienced the approach, Nueva's Saxe notes that "a lot of the benefits are in the currently impossible-to-measure or the hard-to-measure category. How do you measure proactivity and curiosity?"

Other questions involve how design thinking dovetails with traditionally content-intensive course work at the high school level and how teachers can be brought to the high standard of expertise cited by NuVu's Arida and others as necessary for effective project development, management, coaching, and the creation of a true "critique culture." Is an immersive environment, like NuVu, somehow transferrable to a more traditional school setting? And how does the design-thinking approach, which is intensely interpersonal, work in a blended or online setting? Is design thinking, in other words, a potentially universal solution, or just another superb tool with limited application?

Laura Deisley sums up the challenges: "Design thinking could be highly disruptive and highly revolutionary. I don't know whether it's sustainable in independent schools. Are our stakeholders willing to go there? People have to understand what the work is and be able to facilitate it — it's a highly emotional experience. What's the lever? Is it a better strategic-planning process, or is it about dropping a studio into your school? To activate the core of a school, you have to disrupt something."

Peter Gow is the director of college counseling and special programs at Beaver Country Day School (Massachusetts).

Note

1. Analytical and creative thinking and problem solving; complex communication (oral and written); leadership and teamwork; digital and quantitative literacy; global perspective; adaptability initiative, and risk taking; integrity and ethical decision making.