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Engaging Kids in Design-based Learning

by Gian Paolo Bassi Tech Crunch Aug 17, 2016

While most kids their age are glued to various digital devices, often wasting hours playing mindless games or watching cat videos, 164 fourth and fifth graders, along with eight elementary school teachers, have been using those same devices to explore new paths to learning. In 15 classrooms across Texas and Virginia, students are using manufacturing design and digital fabrication processes to create physical models, learning the underlying mathematical concepts and using them in meaningful contexts.



The FabLab Classroom pilot is a National Science Foundation project focusing on the “E” in STEM education (Science, Technology, Engineering and Math). The project started at the University of North Texas and is based on a scaled-down version of Neil Gershenfeld’s Fab Lab, which originated at Massachusetts Institute of Technology (MIT). Students design their projects in 3D on a computer, then make the item using simple materials.

A wide range of digital tools and facilities available to students and their teachers are transforming the K-12 education system. Fab Labs and makerspaces provide creative areas where kids can design, invent and learn. Video games (e.g. Minecraft) and virtual reality (VR) are being employed as design-based learning tools. 3D printers are more readily available — in schools, in collaborative spaces and at home. All these tools and the widespread commitment to STEM education are introducing kids to 3D design at a very young age.

There is no shortage of national interest and enthusiasm for STEM. President Obama believes that more STEM-focused curricula can help rectify America’s education woes and the decline of the American manufacturing industry. Deputy Secretary for the U.S. Department of Education Jim Shelton says, “STEM education is important for every student, no matter what they want to do in life.” STEM advocates believe this new generation of young people is being inspired by increased access to new kinds of tools, machines and methods. Is it simply the democratization of manufacturing? Or is the maker mindset and further enablement of hands-on, design-based education driving a seismic shift in mentality — from consumer to producer?

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Engaging Kids in Design-based Learning

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Driven by a “sense of agency”

With the shift to offering these tools earlier in a child’s academic journey, we’re not just providing great access to design-based learning, we’re also instilling in students a “sense of agency,” helping them develop their ability to confidently design and create. According to The Harvard Graduate School of Education Agency by Design project:

“A key goal of maker-centered education is to help young people and adults feel empowered to build and shape their worlds. Acquiring this sense of maker empowerment is strongly supported by learning to notice and engage with the designed dimension of one’s physical and conceptual environment — in other words, by having a sensitivity to design. This sensitivity develops when young people and adults have opportunities to: look closely and reflect on the design of objects and systems, explore the complexity of design, and understand themselves as designers of their worlds.”

I see and hear these themes echoed every day in conversations with 3D CAD customers, especially with recent college graduates, but also from our education team that works in the K-12 segment. Whether it’s labeled STEM or the more encompassing STEAM (add A for Art), students get truly engaged with learning. It’s encouraging to see students inspired by initiatives that bring educational lessons to life, like the new and rapidly expanding Google Expeditions pioneer program, which helps teachers engage students with VR and Google Cardboard. This immersive, 3D experience enables virtual journeys, from the bottom of the sea to the surface of Mars.

Through FIRST Robotics competitions, more than 78,000 students in the U.S. are active participants in what the Agency by Design espouses as “sensitivity to design.” These students make real-world calculations to build robots that are capable of scooping up and shooting balls, jumping over obstacles or making other seemingly impossible moves, all in a maker spirit that weaves together the numerous disciplines of STEM learning.

According to The 74, a nonprofit, non-partisan news site covering education in America, the Bricolage Academy of New Orleans has something missing in its classroom: chairs. In his recent piece, *The Maker Movement Is About More Than Science and Math — But Is All This Tinkering Really Effective?*, Mark Keierleber writes, “Instead of sitting with paper and pencils at desks, students stand at work tables and tinker with LEGOs, robots, wooden blocks, and circuit boards.”

Kids at the Bricolage Academy, along with those 164 students in Texas and Virginia, are just the tip of the iceberg. That iceberg is upending and bringing millions more students to the surface as they start to experience the power of STEM, the maker movement and new methods of teaching like blended and personalized learning.

These students and teachers may not use the same language as President Obama, the Department of Education or the Agency by Design project, but the message is the same: “I want to learn how to create something amazing.”

It isn’t just technology, or a STEM focus, or even a maker mindset; instead, the focus should be on how schools can help children realize they are not just consumers — they are designers, creators, makers and producers. Today’s fifth graders will be lifelong STEM learners.

We flipped professional development and our teachers loved it!

by Aaron Sams and Juins Aglio

eSchool News

September 12th, 2016



A district built a learning network for teachers and saw PD participation increase 600 percent

Learning cultures have no doubt shifted for students in most K-12 public schools. With new one-to-one initiatives, blended learning, online courses, project-based learning, one could argue that students are now more prepared than ever before for the 21st century. But what about teachers?

How are teachers learning to operate as professionals in the 21st century? Most teachers rely on traditional professional development methods like guidebooks on curriculum implementation or face-to-face, lecture-style settings, the gist of which is “Tell me something and maybe I will do it.” Other

teachers, though, strive for more dynamic personalized learning opportunities (like the ones our students receive). So, how is it that we are preparing our students for the 21st century with a sense of urgency, but when it comes to quality learning for teachers, many school districts do not practice what they preach?

There are many theories of why we use words like collaboration, creativity, and communication with students, but we judge and evaluate our teachers with words like individual assessments, standards, and individual accountability. Maybe it is the fault of a “system” that places high expectations for teachers to teach 21st-century skills, but only be evaluated on 20th-century learning outcomes.

The reality is that when teachers move away from the front of the classroom and hand some of the control of the learning process over to students, students become more active learners. The process of learning moves to the forefront, and the act of obtaining points or scores takes on a lesser role. The more teachers interact with students individually, the more informal, formative assessment can take place. Also, struggles that can lead to students simply giving up on their homework can be diagnosed and corrected by the teacher, allowing the student to progress in his work and ensuring understanding of the material.

In a flipped class, the first benefit comes in the recovery of class time. We recognize this to be true for our students, so how can we apply this same principle to professional development?

During the 2015–2016 school year, the Montour School District in Pennsylvania flipped professional development to create a robust and innovative digital network called the Montour Learning Network (MLN) for EdTech and Innovation. The MLN’s vision is modeled after Pittsburgh’s Remake Learning initiative, a professional network of educators and innovators working together to shape the future of teaching and learning in the Greater Pittsburgh Region. MLN will serve as a resource to shape the future of teaching and learning based upon Montour’s newly written Core Values. All staff members can access the network individually to read articles about learning innovation, browse upcoming ed tech events and opportunities, and connect with other network members within the Montour School District. (Check out this [video](#) to learn more about how MLN works.)

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We flipped professional development and our teachers loved it!

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Since the creation of the MLN, digital professional development participation has increased 600 percent. Through weekly updates within the entire district, the MLN engages teachers through a wide variety of support networks, including Google for Educators, EdTech Resources, Social Media, Digital Citizenship, Tech Support, Innovation Zone, and more.

Montour School District recognizes that the number one resource we have is each other. Montour is filled with talented staff members doing extraordinary things for children every day. District leaders honor and respect the staff's time by providing asynchronous professional development. Through the MLN, Montour has established a Digital Badge reward system that enables teachers to share and learn from each other. The goal of awarding these Digital Badges is to create a community of professionals to promote a growth mindset and support a learning culture while working together. To date, Montour teachers have earned numerous internal badges in a wide range of competencies including Digital Citizenship, EdPuzzle, ClassFlow, GAFE, Flipped Learning, and many more.

With MLN, the district has created the same sort of learning environment for its teachers that it delivers to its students. Flipping our professional development gives our valued educators the freedom to learn on their own time and review material as often as they need. Having so much information at their fingertips also makes their interactions with school and district leaders more productive. Now that their PD has moved into the 21st century, all of our teachers are better prepared to pass along those 21st-century skills to their students.

Professional Development for Teachers

2016 ICE Conference



Indiana Connected Educators

2016 ICE CONFERENCE

Conference Information:

JOIN US - OCTOBER 12-14, 2016

Save the date and plan to join us at Noblesville High School on October 12-14, 2016. Come back and follow us on Twitter to stay connected to the latest and greatest information, including keynote speakers, spotlight sessions, preconference workshops, and our call for concurrent session speakers!

The Indiana Connected Educators conference is an annual conference that addresses the latest tools and information on educational technology in the 21st century. The theme for the 2016 conference is ICE on Fire. Make plans to join us as ICE returns to Noblesville High School for their annual conference on October 13-14 with Pre-Conference workshops available on October 12. [Register now](#) for early bird pricing (discounted pricing ends July 31).

- Dates: October 13 & 14, with pre-conference workshops available on the 12th
- Location: Noblesville High School - 18111 Cumberland, Noblesville, IN
- Full lunch provided October 13 & 14; meals on your own on pre-conference October 12 workshop day

Fees

- *October 13 & 14: \$100 until August 1 (late registration: \$125)*
- *\$75 per day until August 1 - late registration \$85 per day*
- *Pre-conference workshops: \$25 per half-day workshop (\$50 for the full day)*
- *Special Student Rate: \$25 per day*

[REGISTER NOW TO GET THE BEST RATES!](#)

2016 Indiana Council of Teachers of Mathematics Conference "Staying Ahead of the Curve: Teaching Math Pro-Actively"

What: Indiana Council of Teachers of Mathematics Annual Conference

When: Sunday afternoon, November 6th and Monday, November 7th, 2016

Where (new location): Marriott East, 7202 East 21st Street, Indianapolis, IN 46219

Registration: \$110.00 (Includes annual ICTM Membership)

[2016 Fall Conference Registration link \(click on to go to online registration\)](#)

Online registration is open until Thursday, November 3, 2016. **IF hotel is needed: ICTM room rate is \$119. Must book by Oct. 12th. You need to mention that you are with the ICTM conference.

We will share valuable information about effective instruction and information about embedding the Process Standards for Mathematics. Sessions will have presenters from across the state, the Indiana Department of Education and also national educational leaders. Most of the presenters are current math educators who have a wealth of information and field-tested ideas to share. The conference begins at 1 pm on Sunday, November 6. Doors will open at noon for check-in. Register today!

Major topics at the 2016 Fall Conference:

- Understanding and teaching the NEW College and Career Readiness Standards
- Incorporating the Mathematical Practice Standards in your everyday classroom
- Bringing STEM effectively in the K-12 classroom
- Rigor in the classroom
- Differentiation
- Preparing for the NEW Indiana assessments
- Mathematics coaching

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- Reach your students more effectively by using web media for the digital age.
- Augment your own dynamic presence in the classroom with teaching tools that mirror the skills needed for success in higher education and the 21st Century workplace.
- Create and share lesson plans that teach your subjects utilizing your favorite resources.
- Earn PGP points by completing PRISM led online Moodle course – either Beginning Moodle or Intermediate Moodle courses are available to you at no cost several times throughout the year.

Through our strong support from the [Lilly Endowment](#) and others, we are constantly growing and improving. Check our site regularly to see what new resources you can use in your classroom.

www.rose-prism.org



PRISM is a free website that provides collections of online resources for Indiana educators in the fields of science, technology, engineering, and mathematics (STEM). The primary collection of digital teaching materials is indexed according to the Indiana Academic Standards for 6th, 7th, and 8th grade and secondary education courses.