

Early Years Conference October 2014 Building Young Makers - Resources

The Maker Movement/Culture --A Primer

The **maker culture** is a contemporary culture or subculture representing a technology-based extension of DIY culture. Typical interests enjoyed by the maker culture include engineering-oriented pursuits such as electronics, robotics, 3-D printing, and the use of CNC tools, as well as more traditional activities as such metalworking, woodworking, and traditional arts and crafts. The subculture stresses new and unique applications of technologies, and encourages invention and prototyping. There is a strong focus on using and learning practical skills and applying them creatively.



http://en.wikipedia.org/wiki/Maker_culture.

Background on the Maker Movement (and why you should care about making with young children)

Fred Rogers Center Blog

<http://www.fredrogerscenter.org/blog/back-to-school-with-the-maker-movement/>

Excerpt:

Play, Fred Rogers said, “is often talked about as if it were a relief from serious learning. But for children play is serious learning. Play is really the work of childhood.”

Through her play, my daughter learned to experiment, explore new materials with her hands, and developed new fine motor skills. But she also had to learn to work next to her friends, express herself, and negotiate conflict.

“As the children work together or side by side,” [wrote NAEYC’s Angie Dorrell](#), “they learn to understand someone else’s viewpoint. The children also have the opportunity to express themselves and become confident in sharing their ideas with others.”

Research shows that play builds social-emotional competence in many domains: language skills, social skills, empathy, imagination, self-control, persistence, and higher-order thinking. And many advocates argue that our focus on early learning and academic achievement has been at the expense of valuable play-based programs, particularly in kindergarten. The maker movement may be a way of bringing play back into the picture.

When kids play and make things,” [responded Steve Davee with the Maker Education Initiative](#), “when they are put in charge of what they build and make, wonderful things happen: personalities, relationships and abilities are forged. I never get tired of seeing it.

The Teachers' Innovation Project

<http://www.fredrogerscenter.org/blog/the-teachers-innovation-project/>

Excerpt:

In Melissa Butler's kindergarten classroom at [Pittsburgh Allegheny](#), an elementary school on the city's north side, 5-year-olds are learning about simple circuits and electricity.

The children examine the circuit parts, take them apart carefully, and notice each component. They sketch the technology from different angles. They discuss what they see with their teachers and their friends.

This classroom is part of a unique partnership called the Children's Innovation Project, which will be expanding this school year to become the Teachers' Innovation Project—a partnership between the Fred Rogers Center, [Carnegie Mellon University](#), [Carlow University](#), [Clarion University](#), [Pittsburgh Public Schools](#), and the [Sprout Fund](#).

"As opposed to children just using technology to explore, we want them to be producers of technology," [Butler said](#), "and create their own circuits and take apart toys and re-appropriate their components for new expression."

The project was started by Butler and Jeremy Boyle, an assistant professor of art at Clarion University. In 2010, when Boyle was a resident artist with Carnegie Mellon's [CREATE Lab](#), he developed simple circuit blocks for use in K–3 classrooms as an effort to explore meaningful technology education with young children.

We're interested in persistence, and struggle over time. We're interested in ideas around collaboration and conceptual thinking.

Butler and Boyle wanted to understand how technology could be a vehicle for innovative pedagogy. They wondered what kind of learning the exploration of technology, as raw material, could facilitate in a classroom.

Youth maker movement: creating, risk and reward--What makes the maker movement important to youth development?

http://msue.anr.msu.edu/news/youth_maker_movement_creating_risk_and_reward

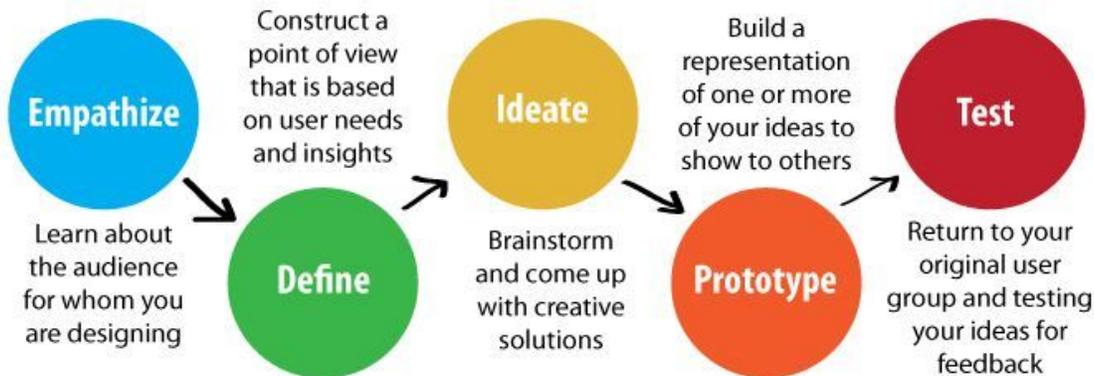
Excerpt:

According to [Michigan State University Extension](#), youth are getting involved and for good reason: there are clear benefits to youth development:

- [Experiential learning](#)—By creating stuff, whether physical objects, computer programs or ideas, youth "learn by doing" and often create something multiple times, learning from each iteration.
- Healthy risk-taking—When making, something mistakes are bound to happen with things going wrong. These "making laboratories" allow youth to create errors safely and feel accomplished when the third try at a project hits it out of the park.
- Science, technology, engineering and mathematic (STEM) topics—Youth might make a robot, a video or a quilt. The open space, peer input and adult guidance available in the maker environments help lead to more in-depth conversations about the science and technology involved. Exploring these topics early allows for interest to build towards careers in STEM fields.

- [Design-based thinking](#)—Aspects like working on hands-on projects, sharing open space with peers and tweaking a product until it is just right are conducive to thinking skills that dominate creative fields and are becoming important overall in fast paced, ever changing job markets.
- Entrepreneurship—Maker spaces give youth that critical place to create from which can lead to products, micro-businesses and tons of associated life lessons from becoming a youth entrepreneur.

Design Thinking and the Critical Role Failure Plays in Innovation



From the dschool at Stanford: <http://dschool.stanford.edu/dgift/>

Design thinking is a methodology that imbues the full spectrum of innovation activities with a human-centered design ethos. Innovation is powered by a thorough understanding, through direct observation, of what people want and need in their lives and what they like or dislike about the way particular products are made, packaged, marketed, sold, and supported.

Maker Movement Reinvents Education

<http://www.newsweek.com/2014/09/19/maker-movement-reinvents-education-268739.html>

Excerpt:

In his most recent book, *Creating Innovators: The Making of Young People Who Will Change the World*, Wagner profiles some of America’s great innovators and observes a pattern in their youths: A childhood of creative play led to their development of deep-seated interests and curiosities, and these passions fueled their intrinsic motivation to set and achieve career and life goals. Another trend Wagner found was that the adults in these innovators’ young lives nurtured their imaginations and taught them to persevere and learn from failure. ***“What we’re learning about innovation,” says Wagner, “is the importance of failing early and failing often...failing forward, failing fast and cheap. The whole idea of trial and error is something that is antithetical to our formal systems of education.... In fact, we penalize failure.... So there’s a complete contradiction between the world of schooling and the world of innovation.”***

How the Maker Movement is Transforming Education

<http://www.weareteachers.com/hot-topics/special-reports/how-the-maker-movement-is-transforming-education>

Excerpt:

“Hard Fun” and the Process of Design

The tools and ethos of the Maker revolution offer insight and hope for schools. The breadth of options and the “can-do” attitude espoused by the movement is exactly what students need, especially girls who tend to opt out of science and math in middle and high school.

However, hands-on Making is not just a good idea for young women. **All students need challenge and “hard fun” that inspires them to dig deeper and construct big ideas. Making science hands-on and interesting is not pandering to young sensibilities; it honors the learning drive and spirit that is all too often crushed by endless worksheets and vocabulary drills. Making is a way of bringing engineering to young learners.** Such concrete experiences provide a meaningful context for understanding the abstract science and math concepts traditionally taught by schools while expanding the world of knowledge now accessible to students for the first time.

Activities, Project Ideas, Products, and More!

Idaho Commission for Libraries – Fun with Math & Science webpage

<http://libraries.idaho.gov/doc/fun-math-science-family-workshops>

Make Magazine

<http://makezine.com/kids/>

DIY Maker Club

Created by a Lower School Technology Coordinator for PreK-2nd Grade students.

<http://mpowerstech.edublogs.org/diy-maker-clubs/>

<http://margaret-powers.com/tag/maker-movement/>

We Are Teachers

Includes Project Ideas for Maker Classrooms

<http://www.weareteachers.com/hot-topics/special-reports/how-the-maker-movement-is-transforming-education>

<http://www.weareteachers.com/hot-topics/special-reports/how-the-maker-movement-is-transforming-education/8-elements-of-a-good-maker-project/>

Sylvia’s Super Awesome Maker Show--Videos and more all created by a 13-year old maker!

<http://sylviashow.com/http://sylviashow.com/episodes/s2/e7/mini/squishycircuits>

(A great episode on Squishy Circuits)

LEGO Education <http://education.lego.com/en-us/>

Search by age, grade, and more for great products and projects.



Makedo – Tools for Creative Play

<http://mymakedo.com/>



STEM's newest darling: Robotics

<http://www.bostonglobe.com/magazine/2014/10/02/stem-newest-darling-robotics/FrQEOiiLNbWXL5GI6UE8WP/story.html>



Young Programmers Working with Bee-Bots -- <http://www.bee-bot.us/>

Bee Bots – A video introduction -- <https://www.youtube.com/watch?v=52ZuenJIFyE>

Get some great ideas from these wonderful organizations:

Fayetteville Free Library—Little Makers

- <http://fflib.org/make/little-makers>
- <http://scprato.com/tag/little-makers/>
- <http://scprato.com/2013/11/08/electricity-and-circuits/>

New York Hall of Science – Little Makers

- <http://nysci.org/little-makers/>
- <http://nysci.org/event/little-makers-ball-run-fun-2/>

Make Anything – Resources for projects <http://www.projectmakeanything.org/resources.html>