



Making and Makerspaces in Education: Resources for Innovative Learning

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Maker Ed | Oakland, CA

MakerEd.org | @MakerEdOrg | @JessicaKParkers @heyasteph | #makered



Mission: provide educators and institutions with the training, resources, and community of support they need to create engaging, inclusive, & motivating learning experiences through maker education.

Making is the act of
creating.

Background on the Maker Movement



Invent.

To learn more please visit



HACKER
DOJO



The Tech
Museum



Noisebridge



Dave Jenson Photography
CC BY 2011



2016
191 TOTAL FAIRES
3 FLAGSHIP
33 FEATURED
155 MINI

38 COUNTRIES

11 YEAR GROWTH

Over 14M+ global attendees in 2016

- Flagship Faires
- Featured Faires
- Mini Maker Faires



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Maker Ed

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Teacher Resources

The Rundown

REPORT AIR DATE: June 29, 2011

Can DIY Movement Fix a Crisis in U.S. Science Education?



Extreme Marshmallow Cannons!

How the government and private sector can turn American kids on to science through "Making."

By Thomas Kalil | Posted Wednesday, June 13, 2012, at 7:50 AM ET

27

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Read more from [Slate's special issue on science education](#) and give us your best ideas for raising the next generation of scientists and engineers.



Earlier this year at the [White House](#), President Obama met Joey, who developed the "extreme" cannon capable of projecting a marshmallow 100 feet. Joey handed the president one of his designs, which stated simply, "Don't Be Afraid to Try Something."

Joey is a self-described "Maker," part of a community of young people and adults who are designing and building things on their own. He participated in

Forbes

New Posts

First Public Library to Create Maker Space

[Comment now](#)

TECH | 11/15/2011 @ 2:21AM | 5,835 views

Re-imagining a public library in the age of the maker and hacker, the Fayetteville Free Library (FFL) in New York State is the first public library to create a **maker space** in the United States.



The Economist

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Technology Quarterly: Q4 2011 ▾
Monitor

More than just digital quilting

Technology and society: The "maker" movement could change the way we live and work. It is taught and boost innovation. It may even herald a new industrial revolution

Dec 3rd 2011 | from the print edition



Like 1.2k

MakerBot INDUSTRIES



STEM Career Pipeline: Department of Education, CTE



—

Federal agency
partnerships: **Corporation
for National and Community
Service (CNCS) -- Maker
Ed's Maker VISTA program**



Research: National Science Foundation (NSF) improving innovation and STEM workforce development



—

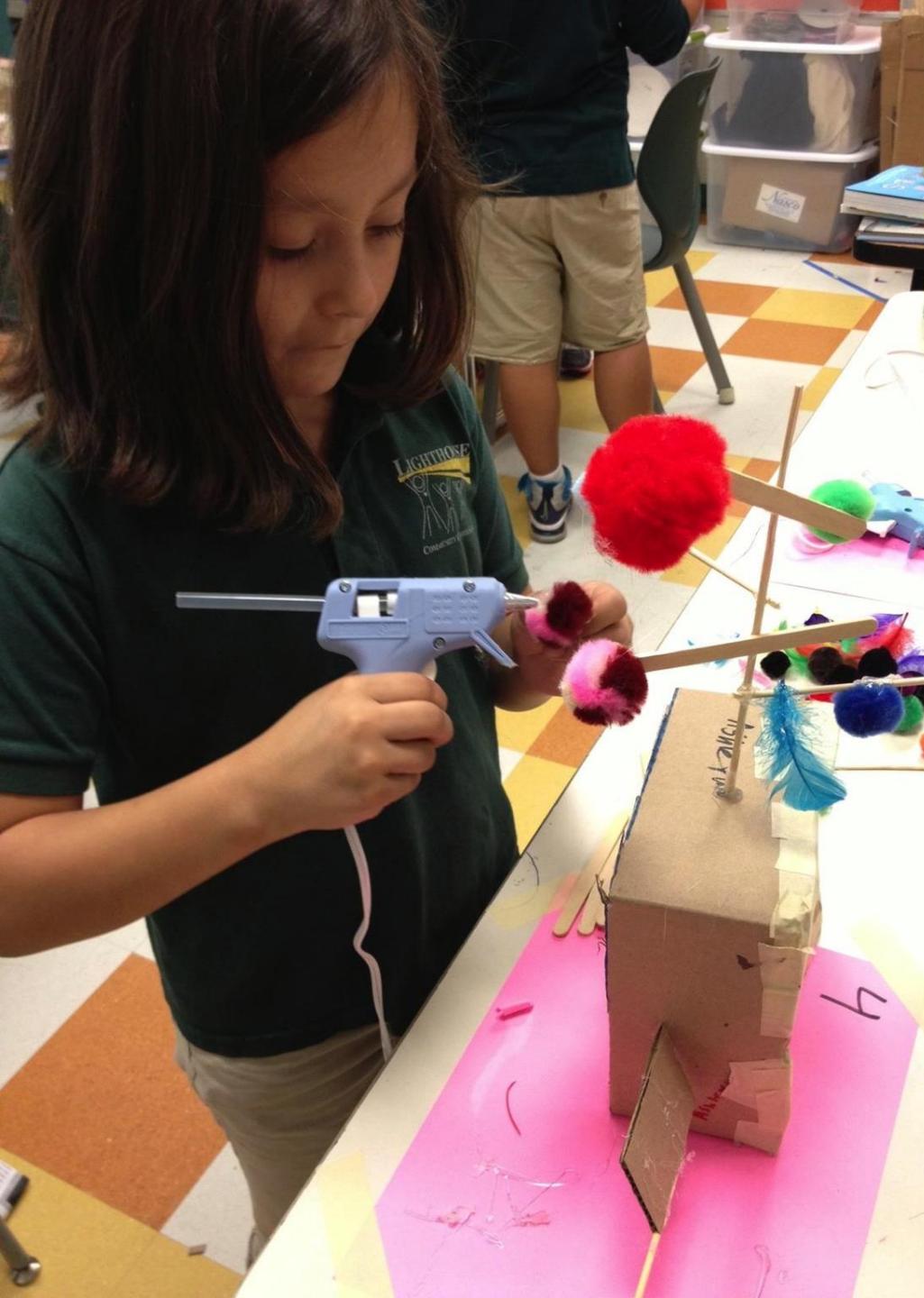
Research: Institute of Museum and Library Services (IMLS) to support competitive workforce and an engaged citizenry



Higher Education: MakeSchools.org and Fab Foundation (Fab Lab Network)



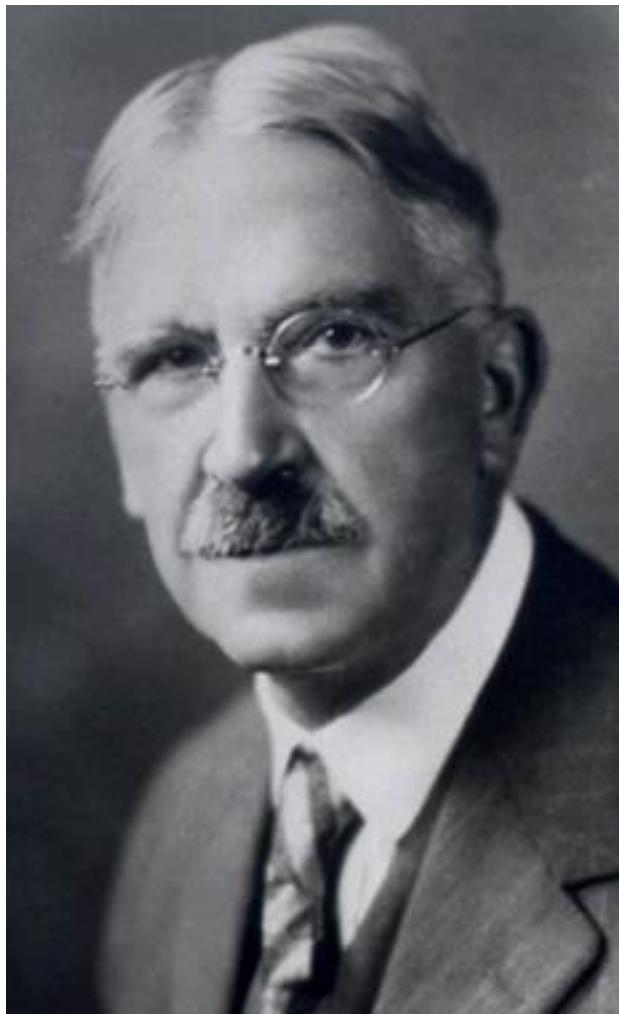
Every Place a Makerspace



“Give the pupils **something to do**, not something to learn; and the doing is of such nature as to demand thinking; **learning naturally results.**”

-John Dewey

Long & Rich History...



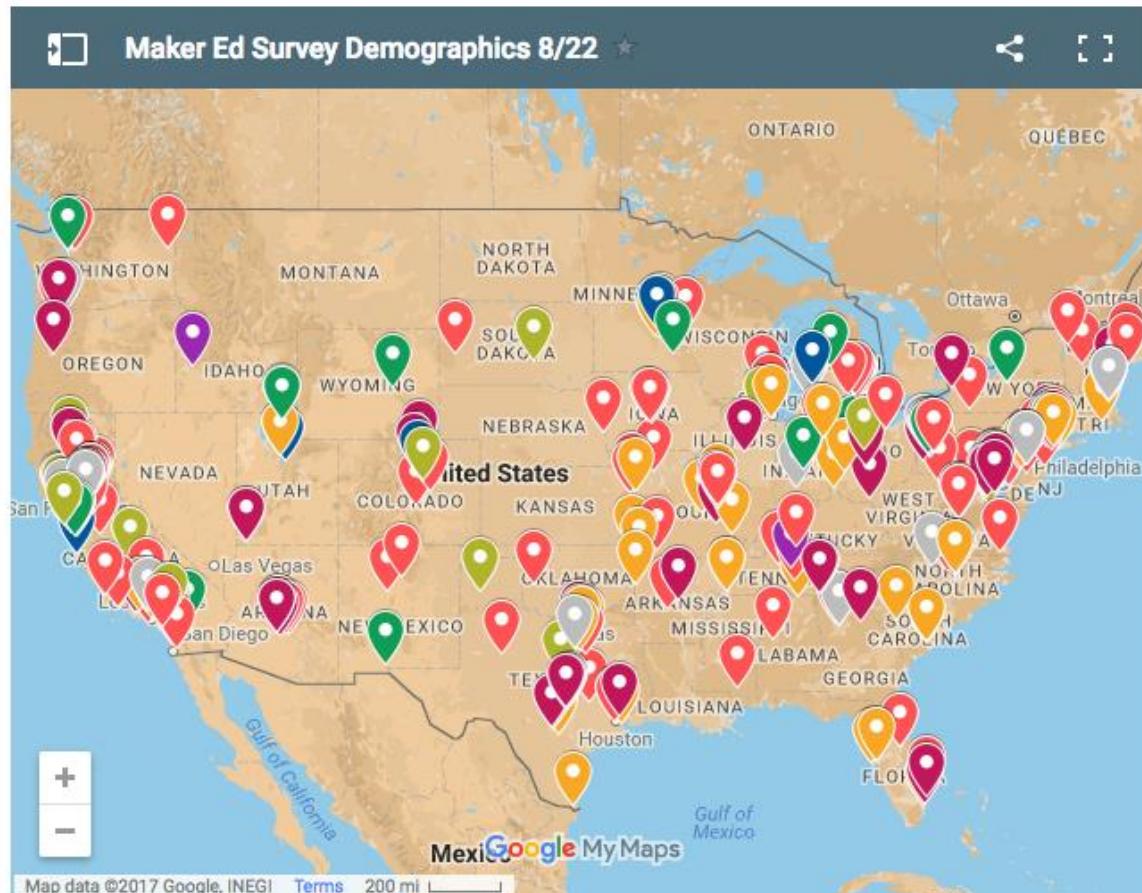
Arts and Crafts Movement:
focus on craftsmanship

Progressive Educators:
Montessori, Piaget, Vygotsky,
Freire, Dewey

Vocational Education: metal,
auto, wood, 4H, etc. (shop & ag
classes)

Spaces for Making: Hall of
Science, Exploratorium, Magic
House, Legoland

Research on Maker Educators



Click on the button in the top left of the map to open a sidebar and sort the data. Data points can be clicked to reveal more information about the respondent, including information about how they've incorporated making into their practice.

<http://makered.org/community/research/#map>

Key Findings:

- there may be a trend towards incorporating making in K-12 settings
- respondents tended to be experienced, veteran educators & leaders
- varied reasons & interests in making

Four Sketches of Making in K12

“Educational leaders, particularly school administrators, need to be ‘the crazy ones, the misfits, the rebels, the troublemakers, the round pegs in the square holes...’ that create energizing experiences for all that walk into their schools.”

Meadow Elementary (CA): building shared ownership in K-5

Schaefer Charter (CA): infusing making in summer programming; eliminating summer school in K-5

Northfield Community Middle School (NJ): redefined school spaces through making and design

Albemarle County Public Schools (VA): tied making to lifelong learning and included in strategic plan



Meadow
Elementary:
Unused
Portable &
Ziplock
Challenge







Piner Olivet Maker Camp



“My most remarkable take-away from our Maker Camp experience was watching the five teachers who worked in the camp begin the first day scared, nervous about not having a lesson plan to work from, and by the end of the camp, all of the teachers stepped back, allowed students to fail and learn from their failures, watched students persevere, guided students rather than showed them answers...Consequently, our Schaefer makerspace was created without a question as to why.”



0:13 / 8:51



Northfield
Community
Middle School:
Hallways as
Makerspaces





Corley - 801
Stock Market Game

- 1) Patrick Neuman
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)

Jühr - 973
Design an app

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)
- 10)
- 11)
- 12)
- 13)
- 14)
- 15)
- 16)
- 17)
- 18)
- 19)
- 20)

O'Connor
Build It!

- 11)
- 12)
- 13)





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Seven Pathways of Educational Environments

The Albemarle County Public Schools District is a geographically large and socio-economically diverse district of almost 14,000 students and 1200 teachers in 26 schools surrounding Charlottesville, Virginia. It spans 726 square miles, from the Appalachian Trail to Virginia's Piedmont plain, including an urban ring, suburban communities, and low density rural areas. Schools buses travel 14,000 miles daily. The percentage of elementary school students who receive free or reduced lunch ranges from 5% in one school to 79% in another. The distribution of students who are English as Second Language Learners (ESOL) ranges from less than 5% to more than 50% across schools. Each school has vastly different needs and available community resources. Teachers throughout the district also vary across background as well as in experience, skill levels and teacher education training. No broadband, cable or 4G commercial service is possible in 70% of this mountainous community.

The Challenge

These diverse geographic and demographic circumstances challenge district leaders to address opportunity

Albemarle
County Public
Schools:
Making
Supports
Lifelong
Learning

Seven Pathways: (1) choice and comfort; (2) instructional tolerance; (3) university design for learning/individualized learning; (4) maker-infused curriculum; (5) project/problem/passion-based learning; (6) interactive technology; and (7) connectivity.



Walton Middle
School,
Albemarle
County Public
Schools:
Rolling
Treehouses

Photo: Public Workshop







My Favorite Thing Has Been.....
All of it Has been
extraordinary.

MY NAME IS

Henr.K

AND I AM A BUILDING HERO!

Purpose, People, Parts & Pieces



APPENDIX A

MAKERSPACE PLANNING SHEET

	How do I imagine it being used? What do I hope to achieve?	What do I already have?	What do I still need? (Why do I need it?)	How do I get it? (From where or whom? When? At what cost?)
SPACE Think of the physical space as well as the atmosphere or environment you are trying to create.				
MATERIALS & TOOLS Consider whether or not each item will need to be maintained or replenished.				
PEOPLE Mentors, staff, volunteers, community partners, youth, etc.				

Excerpted from Youth Makerspace Playbook

Maker Ed

Key Insights for Education



Every child a
maker

Top maker tools:
glue, cardboard,
tape, hand tools

Invest in
community

Photo: Children's Museum of Houston

Maker Ed

Key Opportunities in Education



Ask the students/youth
what they are currently
making/doing

Appreciate and document
learning process (not just
product/outcome)

Connect making with
established
principles/practices (PBL,
inquiry, depth of learning)

Opportunities for **design**,
prototyping, and **iteration**

Photo: Analy High School

Maker Ed

Key Challenges for Education



Photo: DIY Girls

Lack of time:
schedule,
curriculum, PD

Equity & access:
digital divide

Assessment
(formative &
summative)

Q&A



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Thank You



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