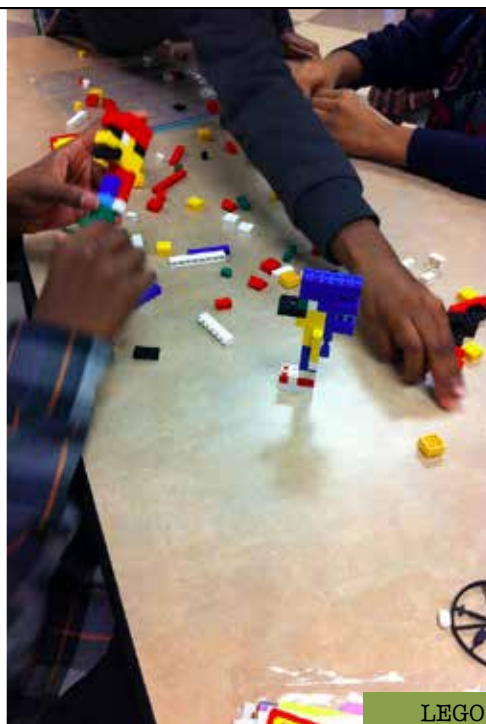


BUILDING MAKERSPACE CULTURE

Kristin Fontichiaro
University of Michigan
School of Information
@activelearning

Kamehameha Elementary, March 4 & 5,
2015, 2:30 - 3:30pm

Download today's slides:
<http://bit.ly/fontblog>



Hacking Fashion: T-Shirts



Slides & List of Maker Activities
<http://bit.ly/fontblog>

WHAT'S IN YOUR PATRONS' DREAM MAKERSPACE?

- STITCHING**
 - Knitting
 - Crochet
 - Sewing
 - Needlepoint
 - Bibbun embroidery
 - Crewel
 - Cross stitch
 - Crewel
 - Stitchery
 - Quilting
 - Tailoring
 - Patternmaking
 - T-shirt redesigning / Project
 - Runway challenges
 - E-Textiles
 - Sewing machine
 - Embroidery machine
 - Serge
 - Hand puppets
 - Spinning
- PAPER**
 - Origami
 - Quilling
 - Paper airplanes and gliders
 - Giftwrapping
 - Hand-drawn comics
 - Cardboard box creations
 - Scrapbooking
 - Collage
 - Bookbinding
 - Silhouette Cameo
 - Cricut machine
 - Shadow puppets
- AUDIO/MUSIC PRODUCTION**
 - FinalCutPro
 - Little Bit / KORG electronic music kit
 - Musical Tools (see website/musicbooks)
 - Garage Band
 - Audacity
- CIRCUITS**
 - Snap Circuits
 - Equihy Circuits
 - Little Bits
- APPS, SOFTWARE, AND WEB-BASED TOOLS**
 - Animation (e.g., Golanima.com, Xanimat.com)
 - Cartoon-making (e.g., Pictos.com, Makalaim.com)
 - Photo editing (e.g., Pictomaker.com, Fotr.com)
 - Stop-Motion animation (e.g., MyGears app)
- VIDEO PRODUCTION**
 - Production Room
 - Green Screen
 - MovieMaker
 - Movie
 - FinalCut Pro
- GRAPHIC DESIGN**
 - Canva.com
 - GIMP
 - Adobe Photoshop
 - Adobe Illustrator
 - Adobe InDesign
- PROGRAMMING/ CODING**
 - HTML
 - Python
 - Java
 - http://scratch.mit.edu
 - Arduino microcontrollers
 - Raspberry Pi mini-computers
 - LEGO Mindstorm
 - Makey Makey
- SCIENCE**
 - Make your own musical instruments
 - Paper airplane trajectories
 - Make your own speaker
 - Junk box challenges
- COOKING**
 - Kitchen Knives 101
 - Make fresh salsa
 - Make smoothies
 - Cookie decorating
 - Cake decorating
 - Freezer jam
- WRITING**
 - Choose Your Own Adventure
 - 24-word memoir
 - NaNoWriMo
 - PiBuildMo
 - Express Book Machine
 - DIY Publishing: Lulu, CreateSpace, Smashwords, Scribbr.com
- 3D MODELING AND PRINTING**
 - 3Doodler pen
 - 3D printer (e.g., MakerBot, Replicator 2, Cube)
 - MakerWare software
 - Tinkercad.com
 - Shapeways.com
 - Maya or Blender software
- MISC.**
 - Rubber band bracelets
 - Shrinky Dinks
 - Duct tape wallets
 - Marshalltown launchers
 - Junk box challenges
 - Art boxes
 - Candle making
 - LEGO places
 - Decorative painting
 - Furniture refurbishing
- GARDENING**
 - Seed exchange
 - Bonsai pruning
 - Flower arranging

INVENT TO LEARN
Making, Tinkering, and Engineering in the Classroom
By John L. Martin, Mary M. Martin, Ph.D.

<http://bit.ly/fontblog>

KRISTIN FONTICARDO IS THE MICHIGAN MAKERS UNIVERSITY OF MICHIGAN SCHOOL OF INFORMATION
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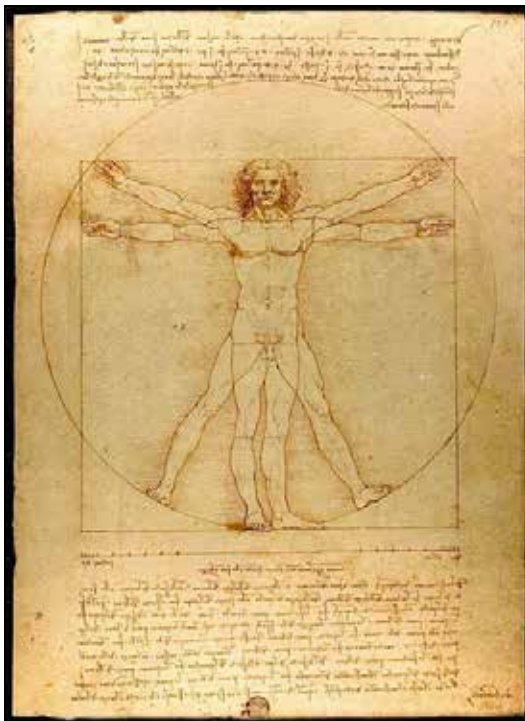
How can we support
the Leonardos in our community?



Makerspaces are one answer.



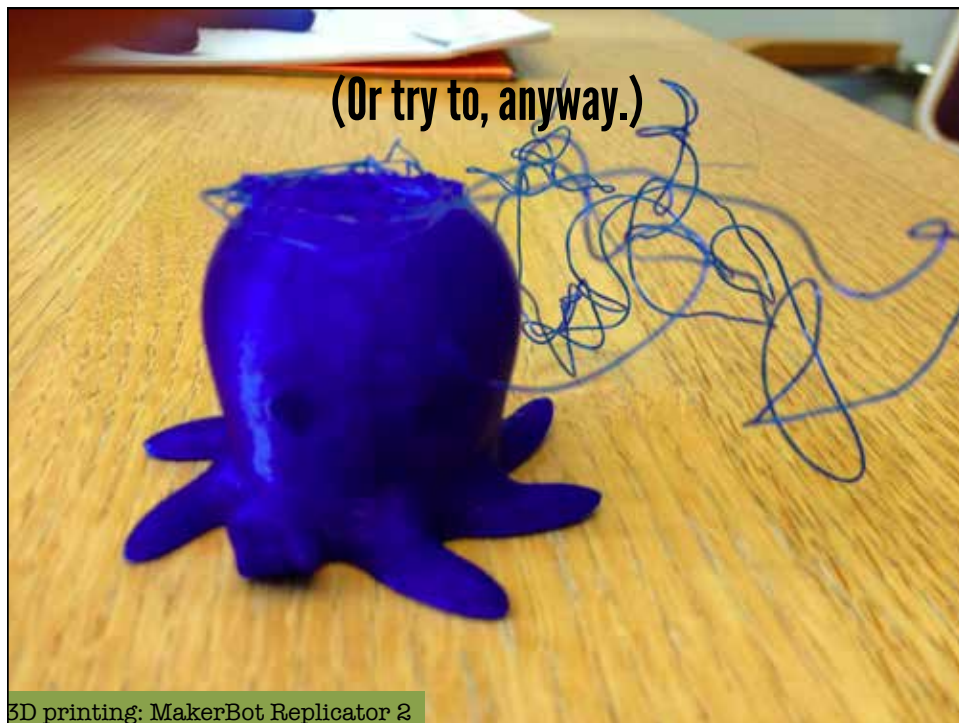
Student's own
slingshot / catapult



**Makers
Make
Stuff.**



Makers
Transform
Stuff.



This is a makerspace.



This is, too.





And so is this.



And this.



Parker Thomas,
<http://makezine.com/2013/08/11/key-qualities-for-a-school-makerspace/>

Tools
+
Support
+
Community

People
+
Process
+
Place

Dale Grover, Maker Works, Ann Arbor, Michigan

Parker Thomas,
<http://makezine.com/2013/08/11/key-qualities-for-a-school-makerspace/>

EXPLORATION + FORMAL AND INFORMAL LEARNING + PEER LEARNING + EXPOSITION

Tools
 +
 Support
 +
 Community

People
 +
 Process
 +
 Place

Dale Grover, Maker Works, Ann Arbor, Michigan

All this for 15 cents—
300 New Ideas
 300 New Pictures!



Do you know—

- That you can run in your bath-tub? (the newest idea for standing at home) *See page 496*
- How roller-skates save time in the office? (the newest idea for standing in office hours) *See page 494*
- How to make a hen lay self-preserved eggs? (the newest idea for keeping fresh) *See page 157*
- How smoke is hounded? (the newest idea for saving fuel) *See page 142*
- How to make an automobile tire out of a rope? (the newest idea in saving money) *See page 147*
- How factory work is made easier by music? (the newest idea for the phonograph) *See page 148*
- How a "flyer" was converted into a small locomotive? (the newest idea for getting the motor's power) *See page 146*
- How war-guns work? (the newest way of getting the motor's power) *See page 149*
- How to make real gold out of goldfish? (the newest idea for real money) *See page 147*

Do you like to make things?
 The April number shows how to make a life-camera, a combination diving-bell, writing-desk and night-light, an automatic gas generator, a self-moving demolition car and 19 other interesting and useful articles for the home and work shop.

Learn about these and all the 300 newest ideas in the April Popular Science Monthly.

APRIL Popular Science Monthly
 15¢ On all Newsstands—get your copy today

Making isn't new ...

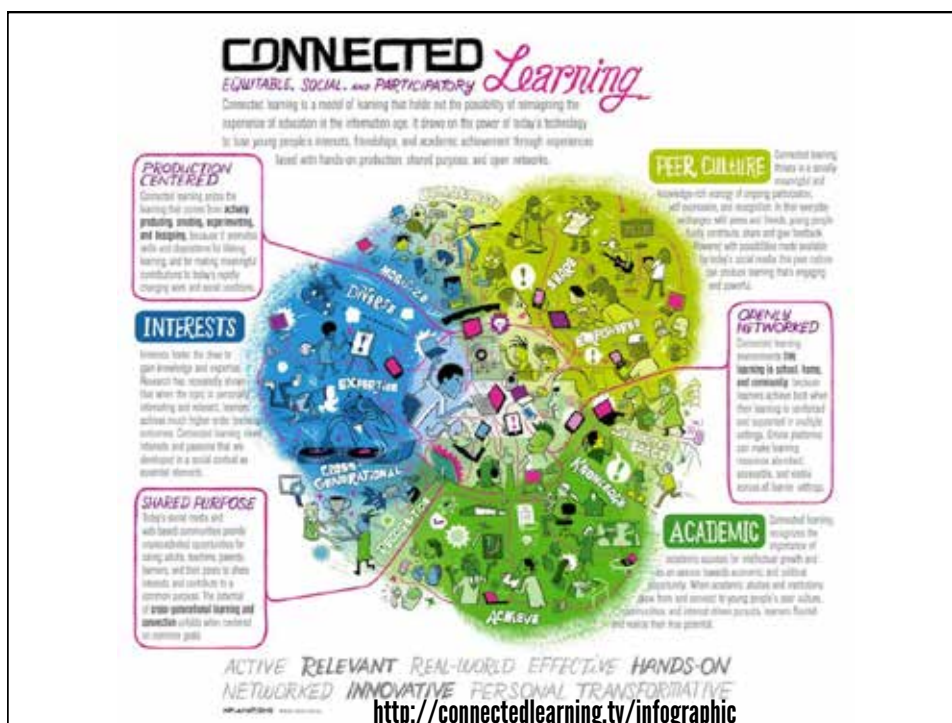
http://upload.wikimedia.org/wikipedia/commons/0/04/Popular_Science_Monthly_1916_Ad.jpg





Our makerspaces
hit the mark when
makers are working
from their “**center
of gravity**”

(Dewey 1900)



RULES OF THUMB FOR MAKER SUCCESS



3D printing: MakerBot Replicator 2

#1: Know Your Purpose: Your “Spine.”

Entertain? Educate?

Enhance academics?

Fill a void in academics?

Give highly-scheduled kids a chance to putter?

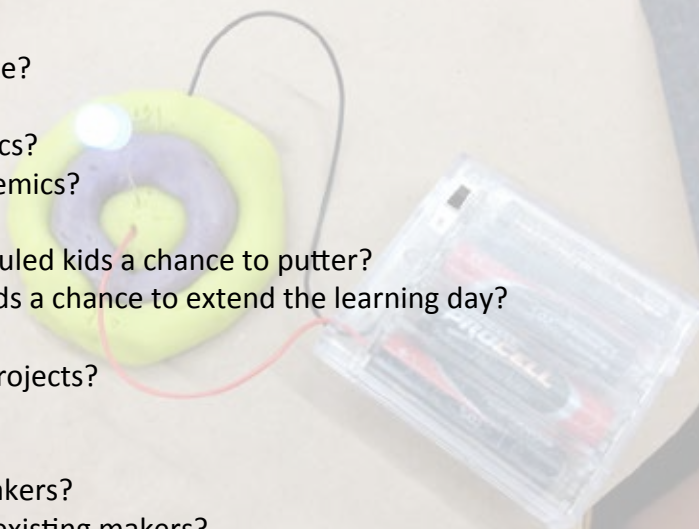
Give ambitious kids a chance to extend the learning day?

One-off faddish projects?

A community?

Welcome new makers?

New services for existing makers?

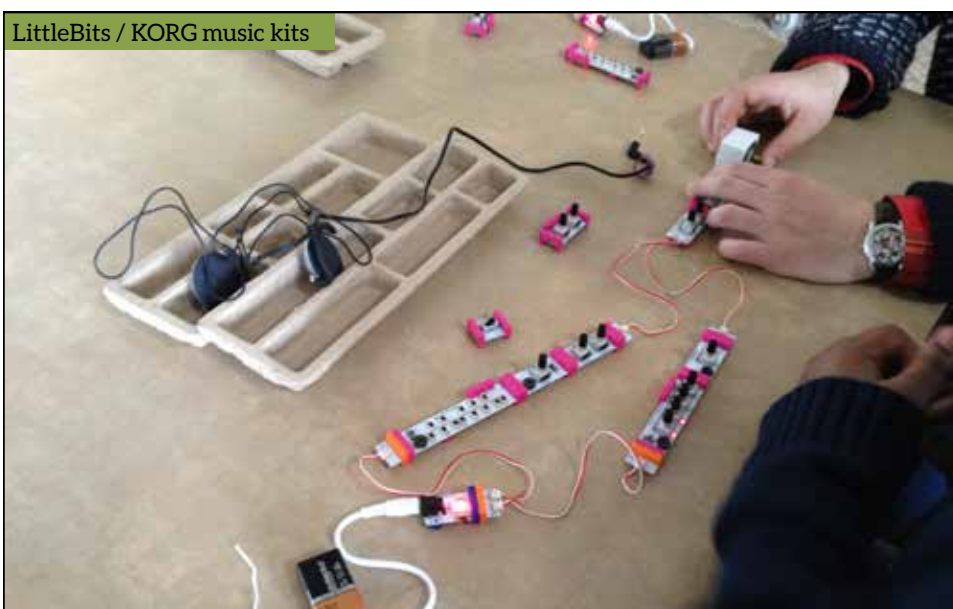


Squishy Circuits



Example: Michigan Makers

- Create community around making
- Balance DIY exploration with guidance from mentors
- Create sustainability and replicability
- "Have something for every member of the family"
- Welcome female makers



#2: No two makerspaces are the same.

3D printing: MakerBot Replicator 2



International Boys School Coalition: Raid your hotel room and create something with it

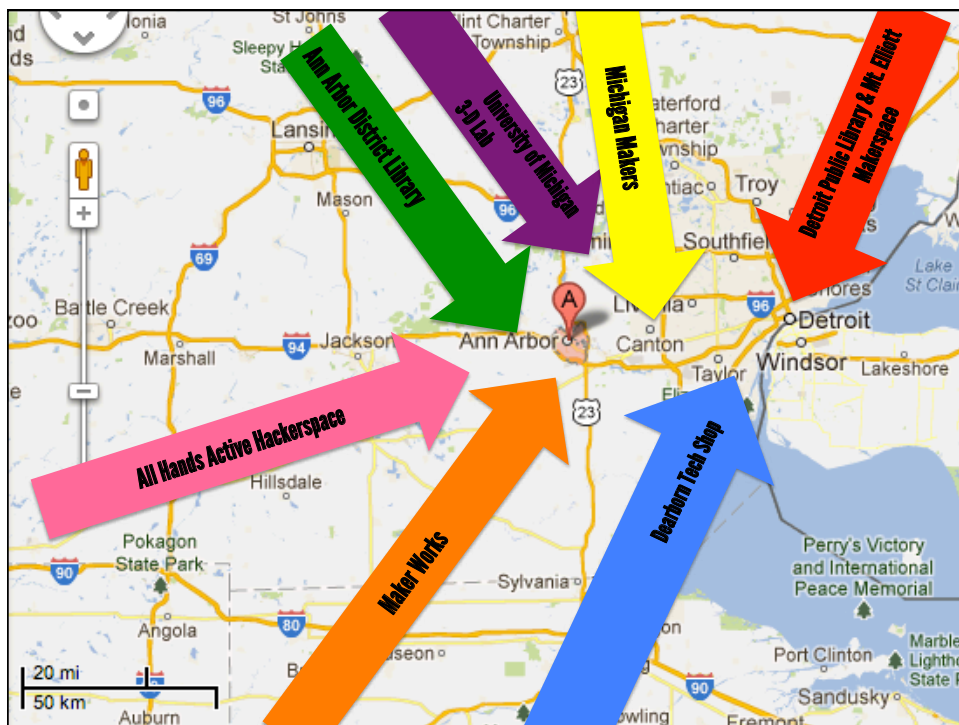
#3: Embrace Open Source Thinking.



'Arduino Uno R3' by SparkFun Electronics on Flickr. CC-BY.
<http://flickr.com/photos/sparkfun/840685680/>

Arduino Microcontroller

#4: Partner (Don't Compete) with Others.

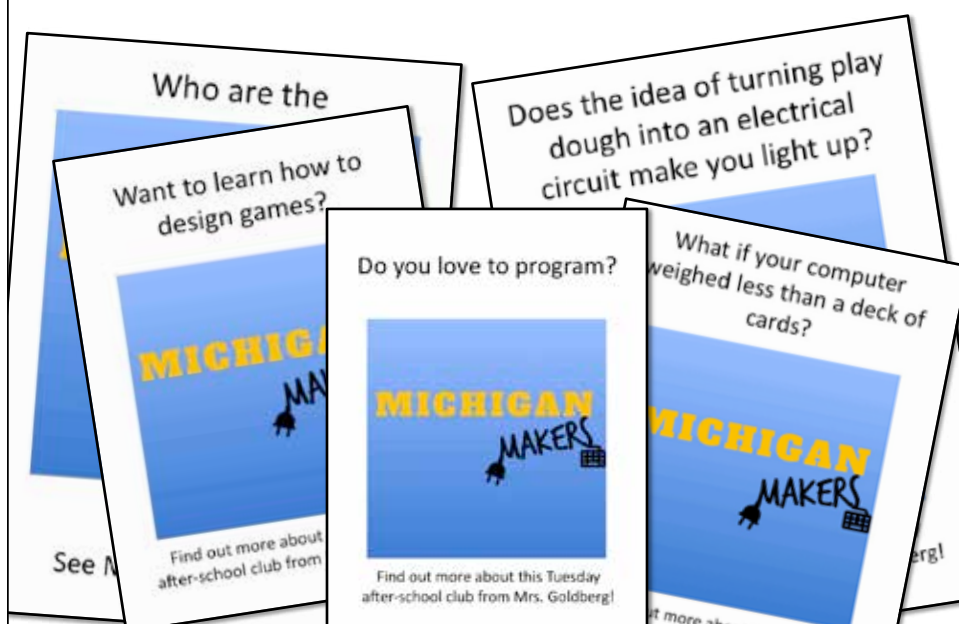


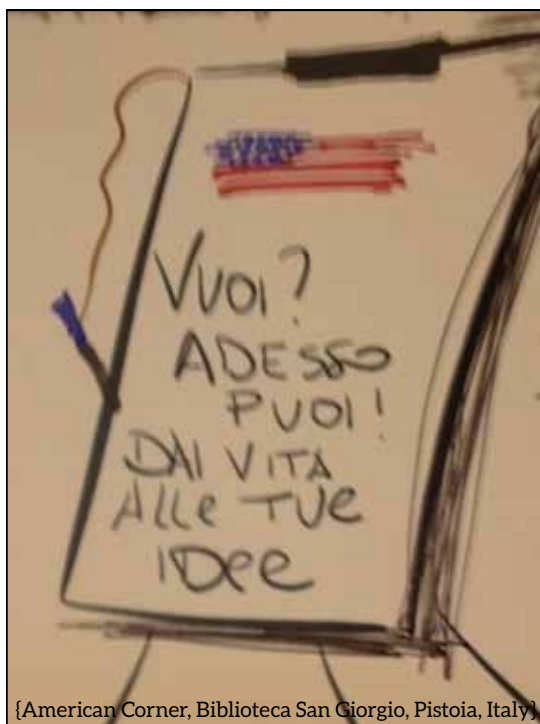
Corollary: Partner Skills, Too: Look For Mashups.



Junk Box Creations

#5: Cast A Wide Net. Welcome All Kinds Of Making.





{American Corner, Biblioteca San Giorgio, Pistoia, Italy}

**Want to?
Now you can!
Give life to your ideas**

We intentionally plan activities that appeal to both genders.

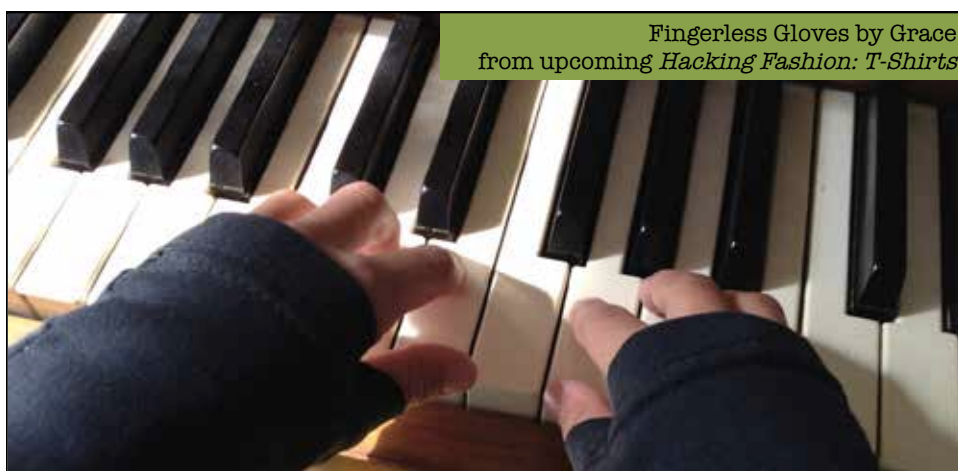


Sewing machine orientation project: bean bags

{Surprise! Boys like sewing machines more than girls do.}



Corollary: Sometimes, making allows for self-soothing and re-centering.



Fingerless Gloves by Grace
from upcoming *Hacking Fashion: T-Shirts*

“You need to be making *something*.”



LED + battery + marker + tape = flashlight

#6: Match Mentors With Learners.



Programming

East Middle School

1042 S. Mill Street • Plymouth, Michigan 48170
Phone: 734 / 416-4950 • Fax: 734 / 416-4949
A Michigan Department of Education Accredited School

PLYMOUTH-CANTON Community • Schools

Scott Busak
Principal
Christopher Moraw
Assistant Principal

4/24/13

To whom it may concern,

I am writing about Michigan Makers, an after-school program at East Middle School. In Michigan Makers, you learn differently than you would in a regular classroom. You learn about how to make an endless list of things. Makers learn how to work with programs like Scratch. They also learn about things that other makers around the world have created, like Arduinos, and the Raspberry Pi. Makers learn about other concepts like board game design, conductive clay, 3D printing, making comics, and sewing too. With all these things, you are free to use your creativity in coming up with your own creations. But it's much more than that. Along the way, you learn about teamwork and problem-solving. You meet other people who have completely different brains and ideas and thoughts, and who have the same interest in making that you do.

The graduate students came every week to our school. They spent tons of their time to make it work, and they taught us so much. They were very patient, and endured all of our questions. They made the learning fun, and actually learned with us too. The students encouraged us to step out of what we were used to doing. We could show our projects and creations to them, and they would give us helpful feedback. They would give us their honest viewpoints: what was great, and what we could fix. They didn't teach us by handing us textbooks and assignments. They taught us by guiding us, then letting us figure things out on our own and solve problems in our own way.

The main thing I got out of Michigan Makers is a love of making. I met fascinating people. I got an understanding of how to use different programs and new skills. I also got many more ideas for cool projects I could work on in the future.

A school/library/community center/company should hire the graduate students because they are very dedicated. They have a lot of patience and know how to work well with people. They are enthusiastic about every idea. They have tons of amazing ideas, and they can make anything possible.

Sincerely,

Himaja

Himaja

In Michigan Makers ... you are free to use your creativity in coming up with your own creations.

But it's much more than that. Along the way, you learn about teamwork and problem solving.

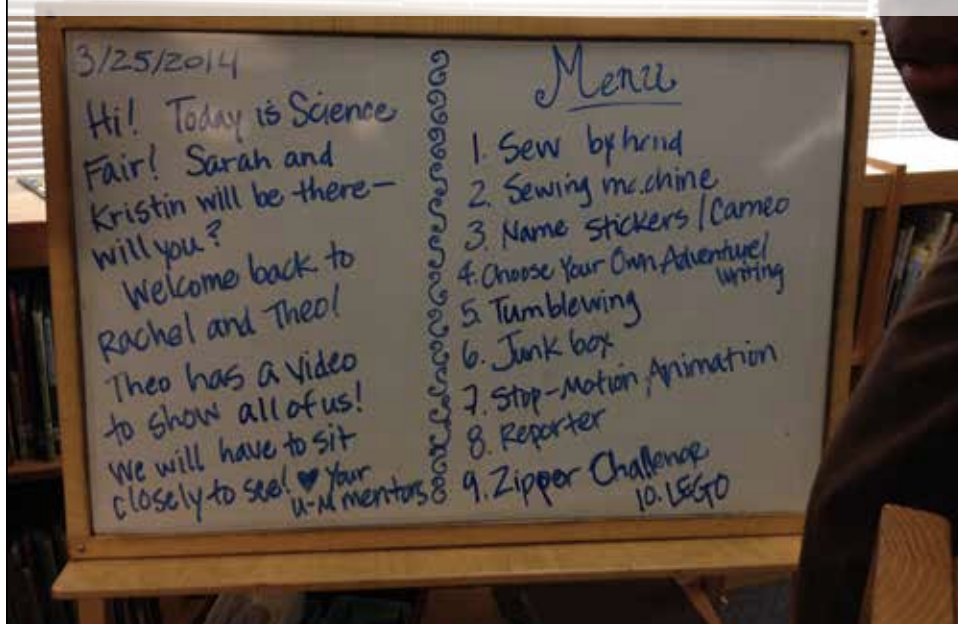
You meet other people who have completely different brains and ideas and thoughts, and who have the same interest in making that you do ...

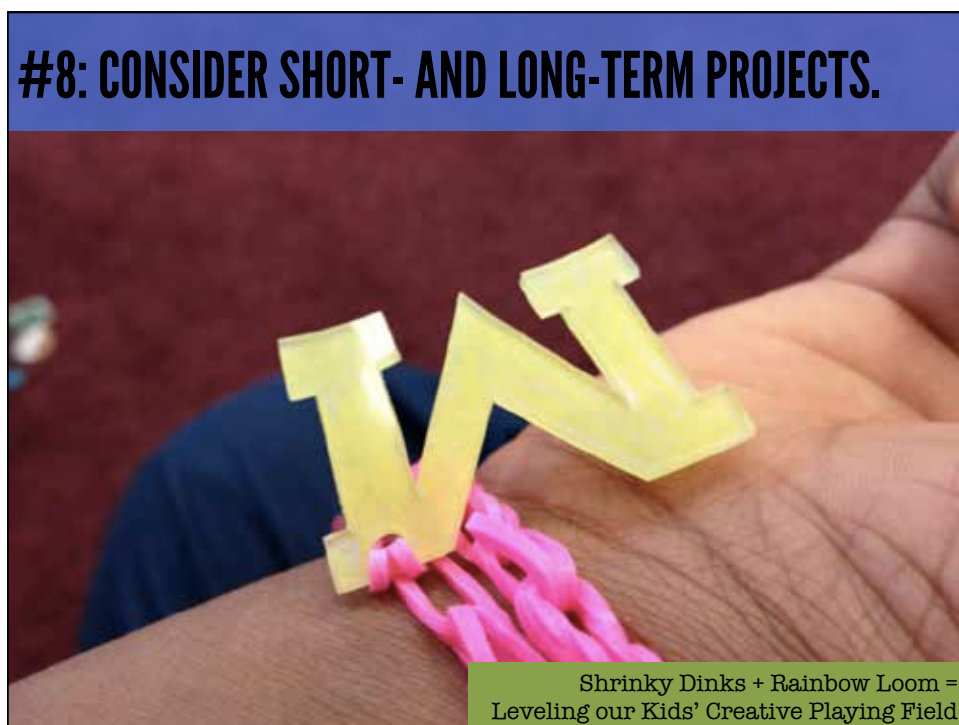
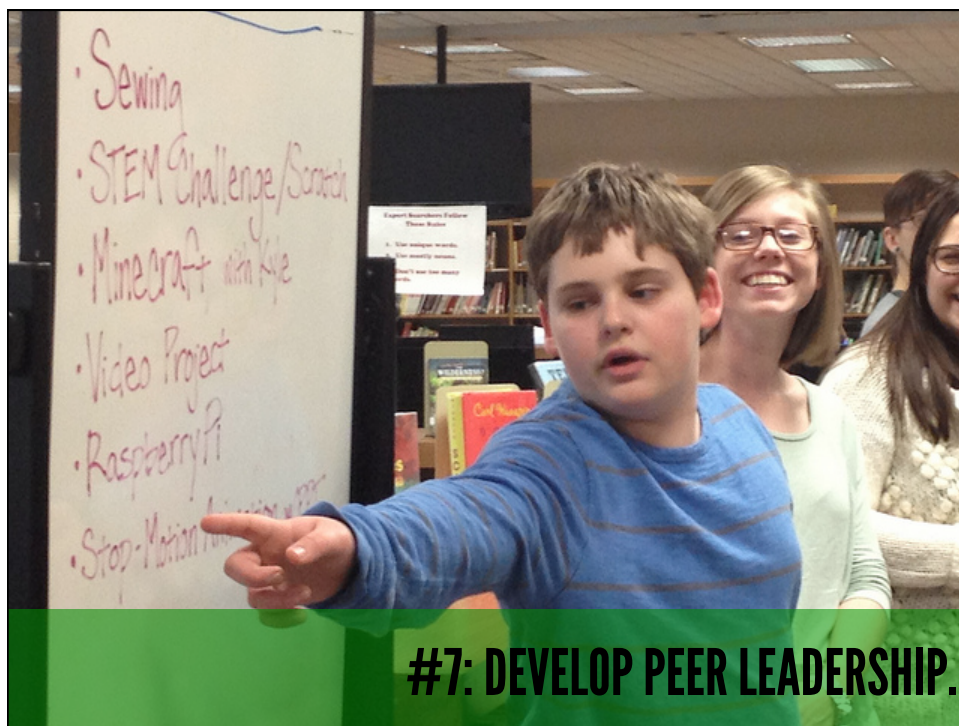
The [graduate] students encouraged us to step out of what we were used to doing. They taught us by guiding us, then letting us figure things out on our own and solve problems in our own way.

Corollary: Redefine “Teacher” And “Learner.”



#7: Think Windows And Mirrors.





#9: Celebrate Progress: Daily.



MyCreate Stop-Motion Animation

#9 again: Celebrate Progress: Long-Term.



Student's personal robot kit





Who is it all for? What do they want/need?

#10: 7 S's of Planning

- Students/patrons
- Stamina
- Support
- Sherpas
- Space
- Storage
- Stuff

(Range & Schmidt 2014)

Arduino Microcontrollers




How much can you take on and sustain?

#10: 7 S's of Planning

- Students/patrons
- Stamina
- Support
- Sherpas
- Space
- Storage
- Stuff

(Range & Schmidt 2014)

A mentor upgrades his computer's RAM



Who will support you w/ budget, PR, admin.?

#10: 7 S's of Planning

Students/
patrons
Stamina
Support
Sherpas
Space
Storage
Stuff

(Range & Schmidt 2014)

Snap Circuits



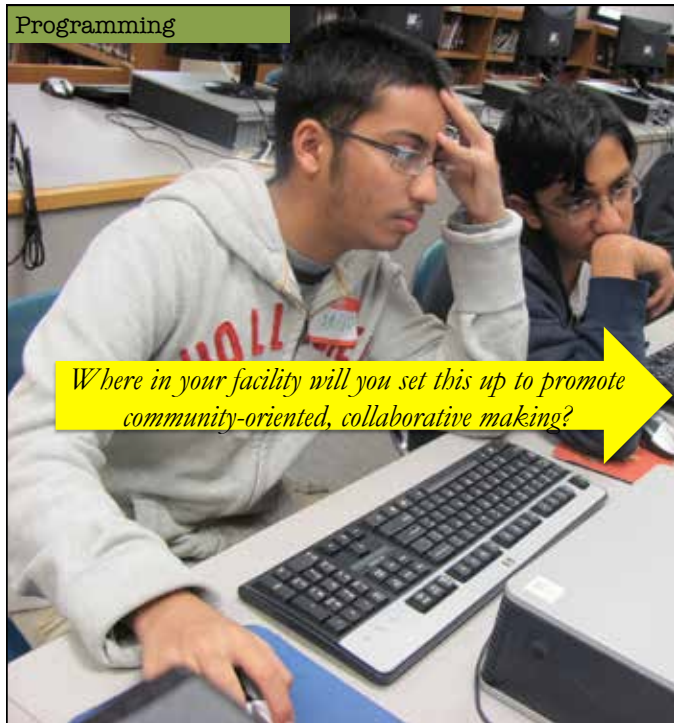
Who already does this kind of work and can mentor you?

#10: 7 S's of Planning

Students/
patrons
Stamina
Support
Sherpas
Space
Storage
Stuff

(Range & Schmidt 2014)

Programming




Where in your facility will you set this up to promote community-oriented, collaborative making?

#10: 7 S's of Planning

Students/
patrons
Stamina
Support
Sherpas
Space
Storage
Stuff

(Range & Schmidt 2014)




Where are you going to put it all away?

#10: 7 S's of Planning

Students/
patrons
Stamina
Support
Sherpas
Space
Storage
Stuff

(Range & Schmidt 2014)

LEGO + Zipper Challenge



#10: 7 S's of Planning

- Students/ patrons
- Stamina
- Support
- Sherpas
- Space
- Storage
- Stuff

(Range & Schmidt 2014)

Design a board game

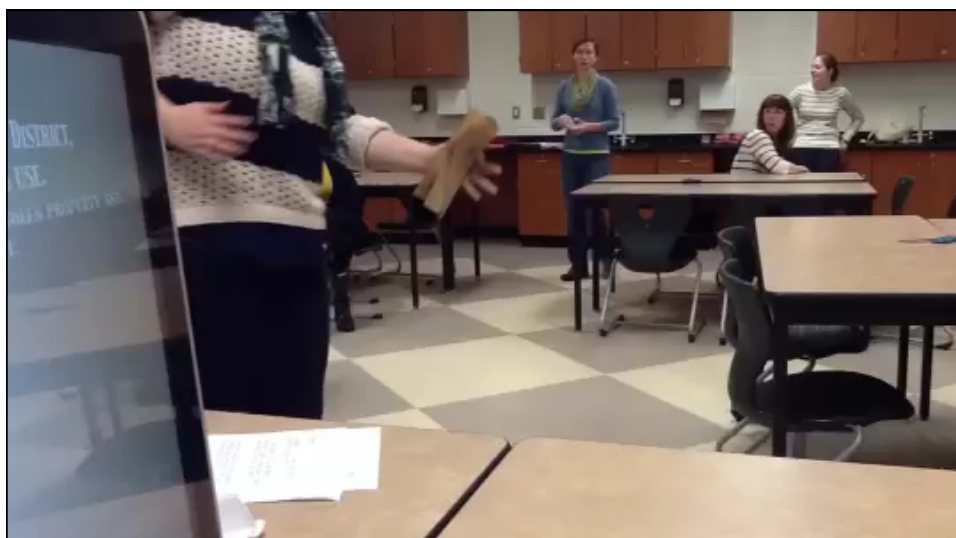


#10: 7 S's of Planning

- Students/ patrons
- Stamina
- Support
- Sherpas
- Space
- Storage
- Stuff

(Range & Schmidt 2014)

*What are you going to buy,
with or without a 3D printer?*



Project Runway refashioning challenge: LED bulbs + thrift store shirts

Join us! We're still learning, too.

<http://makerbridge.si.umich.edu> - @makerbridge

created by Sharona Ginsberg

Named a "Top 10 Series Nonfiction" by *Booklist*, 4/1/2014

"Here's a series many librarians need as much as their readers ... the volumes in this cutting-edge series communicate a level of energy that elevates the challenging material into need-to-know-right-now stuff."

QUESTIONS?

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<http://bit.ly/fontblog>

