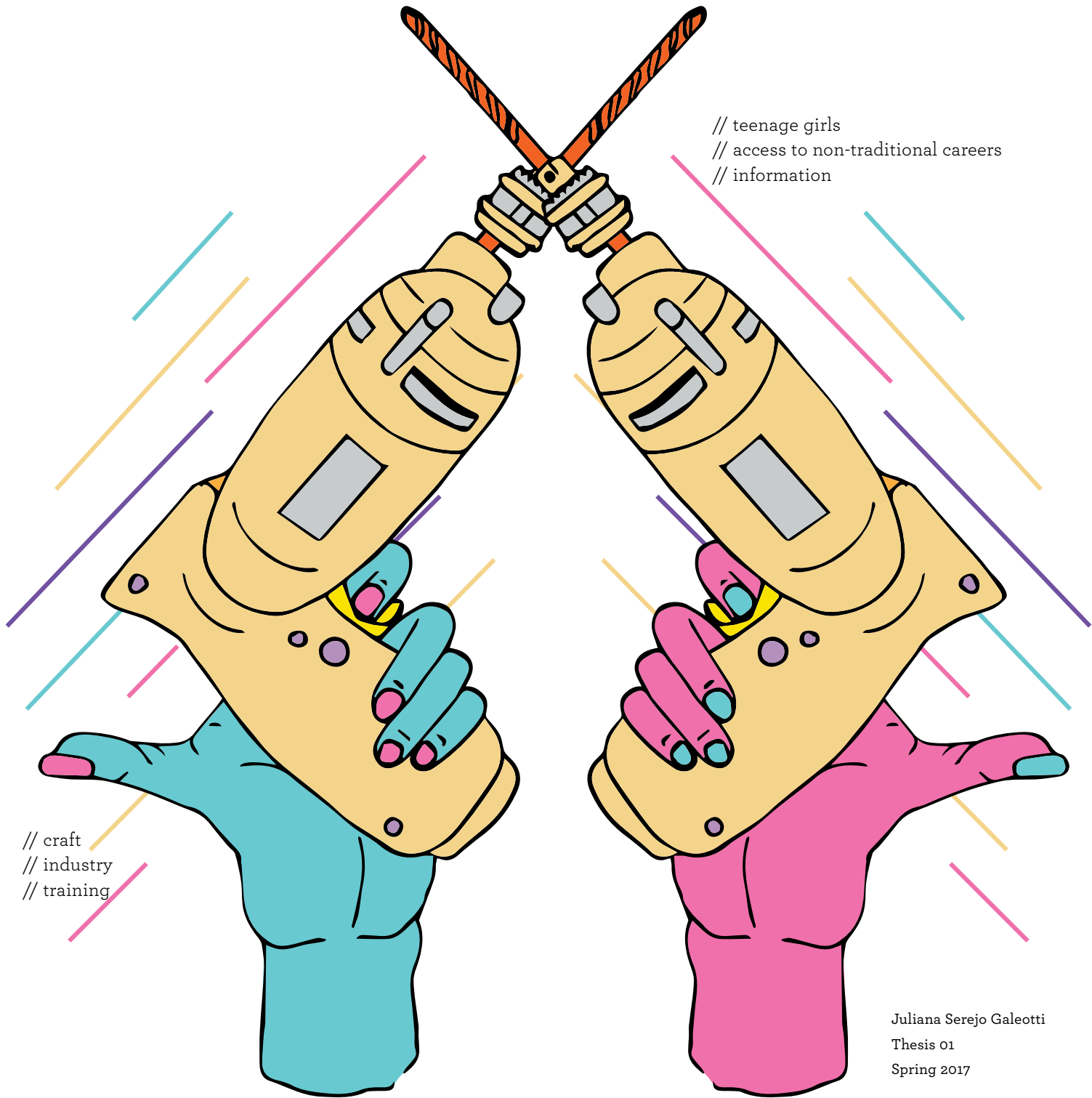# Girls In The Workshop

Mentoring a new generation of women for gender breaking careers in Industry and Craft.

// teenage girls
// access to non-traditional careers
// information

// craft
// industry
// training

Juliana Serejo Galeotti

Thesis 01

Spring 2017

Thesis 01: Research Deck

Interviews with:
- Carla Hall
- Suz Somersall
- Emily Pilloton

12/01/2017
20/01/2017
31/01/2017

Insight #1:
How to keep them interested?

The Big "Q"
An issue that kept popping up during my interviews with female makers was:
How to get the girls interested and keep them interested/connected with Making?
This seems to be a struggle many instructors and teachers are going through right now.

Suz Somersall
Co-founder of KiraKira, an innovative platform that introduces girls to engineering by offering free online classes and access to 3D printing.

Somersall's target audience are girls from 13 to 18 years of age. More specifically girls that are middle school. Why? This has mostly to do with the drop off rate of 8th graders from school. Current drop of rate of 8th graders is up to 25%.

Carla Hall
Artist and instructor at The Crucible, a non-profit art education organization that works in collaboration with the oakland community.

The Crucible used to save spots for female makers to join a selctive group to build a sculpture that stays in the front of their building. However they are getting lesser and lesser girls who want to engage in the sculpture project. They don't know why that is.

Emily Pilloton
Founder of design firm Project H and Girls Garage. Founded in 2016, Girls Garage is a design and building program for girls.

Family is the key component: "Basically it depends on the how the family teaches their kids about making and about hands-on activities,
 to encourage them to carry it forward".

Interviews with:
- Carla Hall
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- Emily Pilloton

12/01/2017
20/01/2017
31/01/2017

Insight #2:
You can't become what you can't see

How could we encourage teenage girls to participate more?
This was a question I asked my three interviewees and all of them answered the same thing:
Gear your visuals it towards girls.

Suz Somersall

Why aren't teenage girl engaging as much? What is the problem?
- Lack of diversity
- Lack of content
- Lack of female models to look up to

"Lack of participation in STEM is partially a matter of perception. Women ask, 'Is this something that feels like me? Do I see people like myself?'"
— Yasmin Kafai, Professor of Learning Sciences, University of Pennsylvania Graduate School of Education

Carla Hall

How could we encourage the girls to participate more? "Gear it towards girls, the school introduction and videos on individual youth, everything! Show them reflection of what they can be (relatable points)."

Emily Pilloton

"You can't become what you can't see"
The girls need female mentors that look like them (physcially) They need female mentors that are serious bad asses so they can admire."

While toolboxes are typical toys for boys, girls are not usually encouraged to work with tools and workbenches. Seeing female peers actively participating in making activities helps to set such gender stereotypes that can negatively affect girls' identity and performance.
A lack of identication may be a barrier to women's interest and engagement in some of the more tech-oriented aspects of making, at least initially.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

Thesis 01: Research Deck

Interviews with:
- Suz Somersall
- Emily Pilloton

20/01/2017
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Insight #3:
Giving back to others

Encouragment = Giving Back to the Community
As we continued to talk about ways to help engage the girls, Suz Somersall and Emily Pilloton, pointed out something very interesting.

Intersecting other areas of their lives with the possibilities of making apparently stimulates girls to continue to make.

Suz Somersall

-What would encourage them?
"Help them build a project for school."

Emily Pilloton

Emily noticed that her students got more enthusiastic about making after they finished a building project for the local community.

"More important for kids to do something back to the community, for others. No need to take it home, it's another way of gratification."

"A great learning model for maker activities is connecting what young people are doing that is interesting and looking at opportunity spaces to engage them. The cultural resonances are important. Because kids are di erent, we need to reach them in di erent ways. We have to give kids cover in able to legitimatize who they are right now and provide them with entry into different worlds."
— Mimi Ito, Professor in Residence at the Humanities Research Institute at the University of California, Irvine

Female makers in the survey are particularly motivated by social-service aspects of making. Among those surveyed, female makers in the US and Mexico are more likely than males to be motivated to make because they want "to help or to give."

Female makers are more likely to rely on personal connections as resources throughout the making process and that collaboration is a key part of making. Interacting and connecting with others is important to women makers.
— *Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing*

Thesis 01: Research Deck

Interviews with:
- Carla Hall
- Emily Pilloton

12/01/2017
31/01/2017

Insight #4:
Women like to work in groups

It's about connection
When it comes to making, female makers rely on connections as a resource. For them collaboration is an essential part of the process.

Carla Hall

The benefits are transformative: the girls learn how to work together and build things.

Emily Pilloton

"Work is relational" Women like to work in groups, they can have emotional connections and feel challenged in a healthy way.

Intel's Key Recommendations to Engage Girls and Women in Making
1. Build more girls- and women-inclusive maker environments in public places like libraries and schools.
2. Design maker spaces that enable open-ended investigation of projects meaningful to girls and women.
3. Develop initiatives that give girls more access to makers their own age and female mentors.

The range of maker spaces available to women only is limited. The spaces that do exist for female makers can be limited in number and may offer a narrow range of tools, kits, and types of activities. This lack of female only maker spaces can make it hard for women to gain access to a community of female makers. As a result, while men are ableto get together to make, women who want to work with others have to be more resourceful, working in mixed groups and opposite gender groups.
— Mimi Ito, Professor in Residence at the Humanities Research Institute at the University of California, Irvine MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

Insight #5:
Providing meaningful First Experiences to Making

The first experience to making has to be significant
When talking to Emily Pilloton about one of the possible design deliverables being a Starter Kit for girls, she agreed but warned me that it shouldn't be anything like a Goldieblox. She emphasized that if the first experience a girl has with building and being hands-on is by playing around with a Goldieblox that it is very bleak and won't help them connect to making.

Emily Pilloton

Girls first experience to building should be a Starter Kit that is the complete opposite of a doll-house. That is very important!

"Goldieblox is insulting!" — Emily Pilloton

Goldieblox is a construction toy + story book set for ages 4 and up that features the world's first girl engineer character. The main objective of the toy changes according to which kit is bought, but basically it focuses on "building" and putting together parts to solve a problem through creative exploration.

It's description according to Amazon.com is as follows, "Designed for tinkering and creative exploration, GoldieBlox toys build spatial skills and confidence in problem-solving.

The toy has won many awards, including: Educational Toy of the Year, People's Choice Toy of the Year, Oppenheim Toy Portfolio Best Toy, etc.

Insight #6:
Women makers = Women mentors

Can you name any women who are professional makers? What about women mentors?
Another relevant issue that kept constantly showing up during my research, was that of lack of
mentorship. According to Intel's Report MakeHers, it's actually the third top challenge female makers
face when it comes to making.

Lack of mentorship is a problem for female makers
inside the U.S. as well as both males and females
in other countries like China.

Mentorship is essential to female makers:
"Role models and mentors play a key role in girls'
personal and professional development, as well as
in their leisure activities."
— Intel Report, MakeHers

Emily Pilloton

"Women makers need more pathways to become mentors!"

Challenges and Barriers Female Makers of Different Countries Have faced

Country	U.S. Female Makers	China Female Makers	Mexico Female Makers
Top Challenges	n= 106 1. Lack of money 2. Lack of mentorship 3. Lack of information 4. Lack of access to tools and materials	n= 152 1. Lack of information 2. Lack of mentorship 3. Lack of access to tools and materials	n= 137 1. Lack of money 2. Lack of access to tools and materials 3. Lack of information 4. Lack of local, like-minded people

Data from: *Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing*

Insight #7:
Top 3 Design Solutions

Survey Results

When it came time to analyze some of the data in the survey I conducted, the one that caught most of my attention was the Top 3 choices the surveyed selected as the most successful design solutions to help encourage teenage girls to engage more in Making.

The maker movement is gaining excitement and momentum. Action is needed to take advantage of this momentum to increase participation and diversity in making, at large.

Learning approaches
Two learning approaches have a particularly strong potential to strengthen women's and girls' engagement in making: a multi-disciplinary approach and "learning through play."

Multidisciplinary approach
There are multiple pathways to making, whether via engineering, computing, science, arts, design, or another discipline. Combining different entryways can be a way to engage more people in making.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

I confess I was a bit surprised these were the chosen top three, I thought Toys & Action Figures would make it in the category and the Website wouldn't.
Top 3 Design Solutions: Starter Kits, Website and Mentorship Program.

Rank the following design solutions by how successful they would be in encouraging teenage girls to engage in Making? (Rank from 1-7)
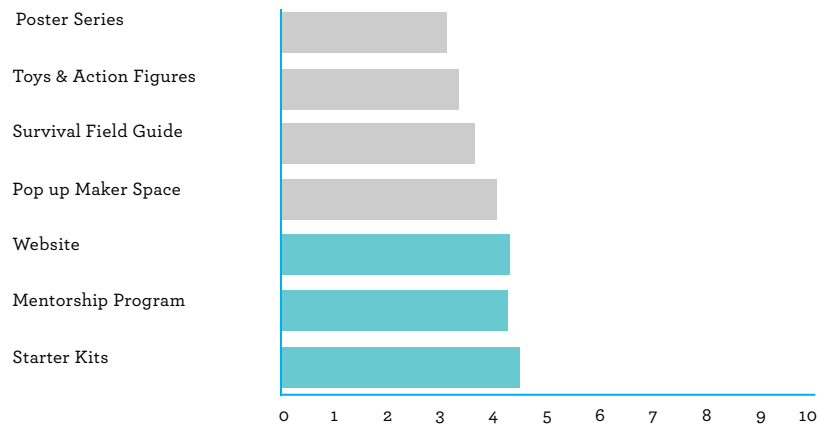
Total answers: 27

Skipped: 1

Score
1. Starter Kits   4.38
2. Website   4.18
3. Mentorship Program   4.13

Insight #8:
Bottom 3 Design Solution

Survey Results

While still analyzing Question 9 in my survey which involved ranking the most successful design solutions, the ones that were chosen as least important also caught my attention.

Especially the fact that the surveyed chose the Toys & Action Figures as one of the bottom three, that was unexpected. **Bottom 3: Poster Series, Toys & Action Figures and Survival Field Guide.**

Rank the following design solutions by how successful they would be in encouraging teenage girls to engage in Making? (Rank from 1-7)
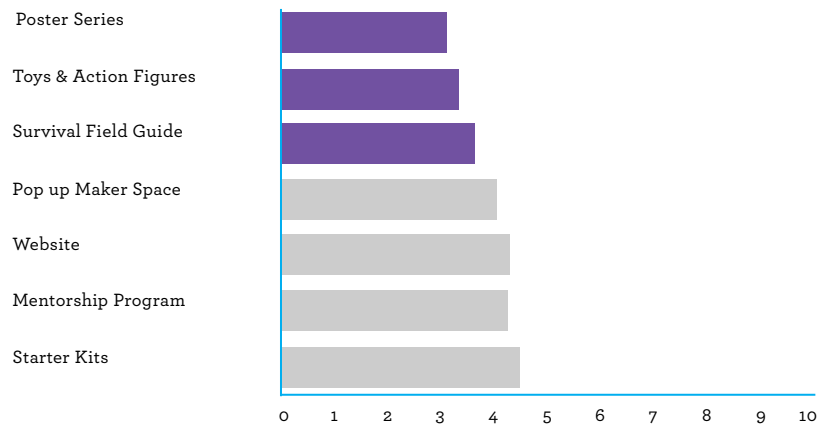
Total answers: 27

Score

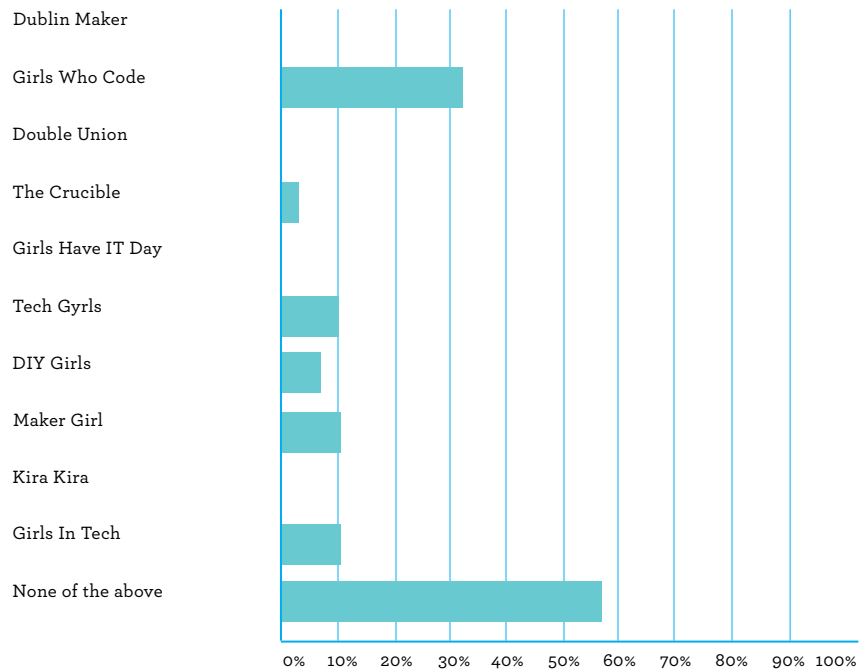|	
1. Poster Series	3.14
2. Toys & Action Figures	3.42
3. Survival Field Guide	3.75

Insight #9:
Everyone seems to know Girls Who Code

Girls Who Code leads the way
From all the organizations and non-profits presented in the survey, Girls who code is the most known organization that focuses on supporting women to learn a skill.

Have you ever heard of these organizations?
(Choose all that apply)

Dublin Maker	
Girls Who Code	
Double Union	
The Crucible	
Girls Have IT Day	
Tech Gyrls	
DIY Girls	
Maker Girl	
Kira Kira	
Girls In Tech	
None of the above	

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Total answers: 28

Score

1. Girls Who Code	32.14%
2. Tech Gyrls	10.71%
3. Maker Girl	10.71%
4. Girls In Tech	10.71%
None of the above	57.14%

Insight #10:
Gender exclusion still seen as the main problem

**Participant's personal opinion on the issue**

Gender exclusion continues to be seen as the main issue as to why teenage girls are not engaging in making as much as their younger peers.

Female makers also experience gender norms, bias and stereotypes that negatively affect their involvement in making and their access to maker spaces. As described earlier in this section, negative gender norms such as exclusion for being a woman and living in a culture where making is considered inappropriate for girls and women are experienced by a considerable number (17 %) of women surveyed, making it harder for them to freely engage in making as they might do otherwise. Some women surveyed (7 percent) also are concerned about their safety when taking part in making activities.

Gender norms and stereotypes can likewise discourage women's participation in computer science and engineering. Evidence shows that the perception of computer science as a male field is a factor in discouraging girls from participating in computing classes. Such stereotypes also reinforce expectation of success in computing in favor of men, which can motivate them to engage further in that domain, while also discouraging girls from entering computing.
— Intel Report, MakeHers:
Engaging Girls and Women in
Technology through Making,

Despite the efforts of many of these organizations Teenage girls are still not engaging in making as much as their younger peers. Why do you think this is happening? (Choose all that apply)
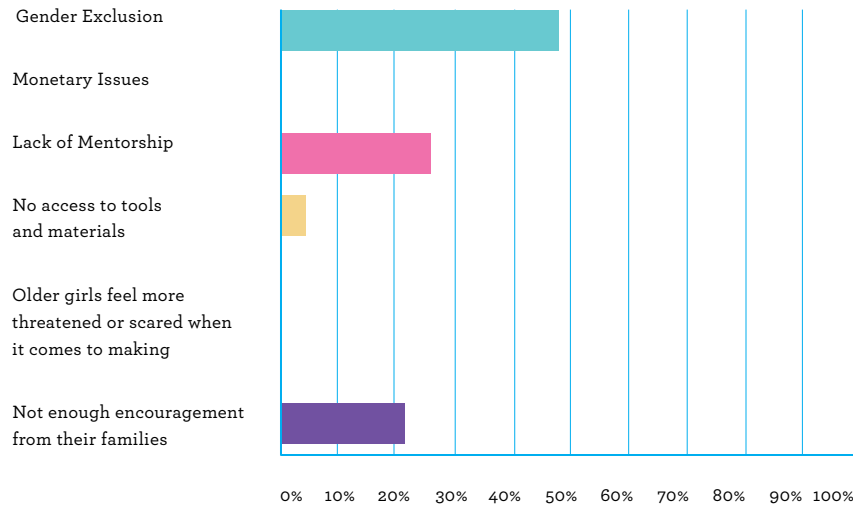
Total answers: 23

Skipped: 5

Score
1. Gender Exclusion   47.83%
2. Lack of Mentorship   26.09%
3. Not enough encouragement
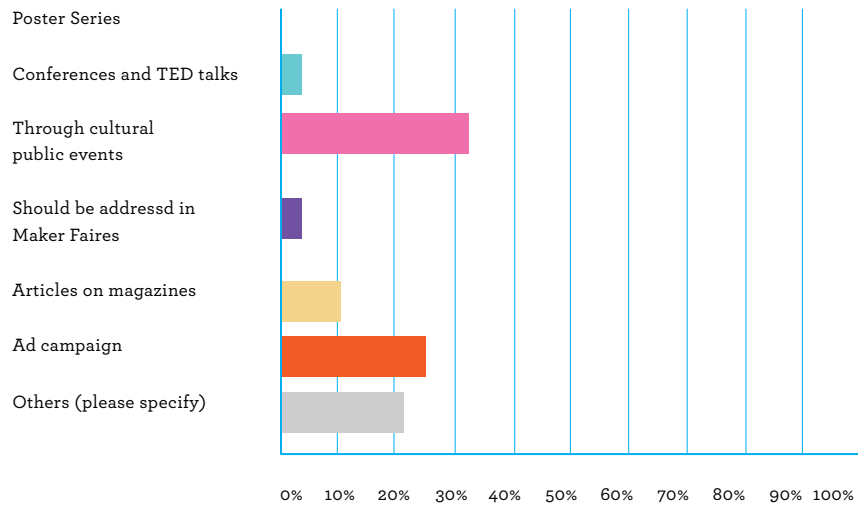   from their families   21.74%

Insight #11:
Free cultural events to raise more awareness

Provide the audience with a free event to talk about the problem
The participants in the survey chose Cultural Public Events as their main option to help raise more visibility to the issue in hand.

How could this issue be more visible to the public?

Poster Series

Conferences and TED talks

Through cultural
public events

Should be addressd in
Maker Faires

Articles on magazines

Ad campaign

Others (please specify)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

A-há!
The most interesting
and unexpected, but
highly logical response
a participant provided.

Total answers: 27

Skipped: 1

Score
1. Through cultural public events   33.33%
2. Ad campaign   25.93%
3. Others   22.22%

Responses to Others:
1. Exposure to making for girls in public schools seems like it would be very helpful and practical.
2. Websites that are popular with girls, success stories of real women (but not those that only scream).
3. Just let people do what they want.
4. I disagree that it is an issue at all.
5. YouTube vídeos!
6. More social media presences.
7. Ad campaigns from tech companies with inclusive imagery.
8. Targeted Maker faire-style events in schools and libraries.
9. Makers shows and video series like Mythbusters and Tested.

Insight #12:
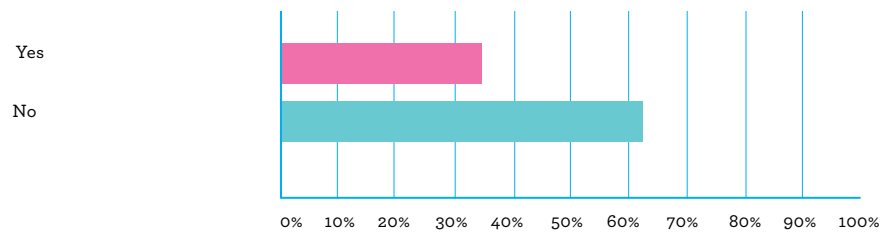Visual representation of Female Makers is scarce

Where the bad* Female Makers at?**
At the start of this thesis project and during the on-going research I noticed a difficulty in finding visual images of female makers in the fields that required more physical involvement (like in welding, black-smithing, mechanics, etc). When it came to images of females doing craft there was a wide selection. I also couldn't remember seeing any images of female makers when growing up. This caught my attention and I decided to investigate it further.

Have you ever seen any visual representation of women Makers? (Which include, but not limit to female blacksmiths, welders, glass blowers, carpenters, construction workers, coders, etc)

Yes

No

| 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |

Total answers: 28

Score
1. Yes   35.71%
2. No   64.29%

Participants comments:
1. I am one! But I don't think I really saw them much before I became a blacksmith/welder.
2. Rosie the riveter.
3. Everywhere.
4. Mythbusters.
5. There is a YouTube channel.
6. Wynwood walls.
7. Social media.

Engineer, entrepreneur and MAKE advisory board member, Limor Fried was the first female engineer to appear on WIRED's magazine cover on April 2011.

Emily Pilloton

When Maker Magazine contacted Emily Pilloton for a possible cover story they told her she would be the second female maker to be on the cover of their publication. **Maker magazine so far had only 1 female cover model since 1995.**

Insight #13:
Stronger connection to Making = amount of time spent Making

Time is essential when it comes to Making
During my interview with Carla Hall at The Crucible I asked for her opinion on why apparently younger studntes seem to have a stronger connection to Making than the older students. She pointed out that it all has to do with time.

Carla Hall

"Even though the denominator has grown with more women participating in college since the 1980s- the number of women participating in computer science has gone down. And while the denominator of computer science positions has grown, across our university system, the number of women participating in those programs has gone down. In early elementary school, girls at the same rate as boys say they are interested in careers like engineering, architects, and astronauts, But by time they get to high school those numbers have dropped dramatically. Partly because we lose girls in middle school in this country."
—Chelsea Clinton, Clinton Global Initiative Annual Meeting, Sept 24, 2014.

Early engaging projects can help children gain skills and experience at an early age. Evidence indicates that girls can be disadvantaged by a delay in their interest in and attachment to computers. Early attraction to computing

Younger kids do get more connected than older high schoolers. Why? It has to do with time, connections and the relationships they make. When they start young they create stronger ties with Making and the Making environment. In The Crucible these connection are more longlasting due to this factor.

"(...)they indicated that they would have sent their kids to the Clubhouse sooner if they had understood the true benefits."
— Suha, Director, ICT for Development Program and Former Computer Clubhouse Coordinator, Jordan

can lead to longer term advantages, yet studies on patterns of computer engagement show that more boys experience an early passionate attachment to computers than girls. Parental support and engagement is critical to ensuring girls' early exposure to computing.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making,

Insight #14:
Information content is mostly directed to a male audience

Gendered Content
Most of the information and course material are geared towards engineering, mechanics and electronics, and the audience they're mostly addressing are males. When females try to engage they lack content that inspires them.

Suz Somersall

3D printing courses right now are directed to male audiences in building with wrenches an other medieval materials, the girls who participated get bored.

"Our geek cred is constantly challenged or belittled. You might be there coding, and you want to stop for a while and draw in your notebook and think, but if you're not staring at a black and green screen or, like, melding your brain with and Arduino every second, some dude is going to come up to you and act like you need his expert lessons in how to hack."
— Liz Henry, Co-Founder, Double Union

Liz Henry
Author, technologist, and activist as well as co-founder of the first women's hackerspace in San Francisco, Double Union. Liz Henry also advocates for disability technology and hacking existing technology the disabled.

Gender norms also affect the maker spaces available to women. Typical spaces for makers tend to be male dominated. In a survey of 250 hackerspace members around the world, 90 percent of respondents were male. As a result, girls and may be intimidated at times to participate freely in such spaces. In extreme cases, harassment and an unfriendly atmosphere in maker spaces may discourage women from participating. Women may face pressure from male peers to prove that they belong. Such difficulties discourage women from participation.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

Insight #15:
The Radical Divide = Girlie Making vs Physical Making

Gender Making Activities
An interesting discussion that came along during the initial explorations on the Maker Movement and Making activities was the difference between Craft and Making.

There seems to be an unnoficial divide to what is considered Craft and what is considered Making. For some there is no difference, both mean the same thing. While for others, someone who learns a Craft has a highter status and quality work than someone who is a Maker.

Research shows that women are engaging in the making community, but frequently in very gendered ways. There is a vibrant indie craft movement running parallel, and often overlapping, with the Maker movement. In fact, many of these indie crafters, mostly women, participate in Maker Faires across the country. However, the craft component is rarely—if ever—discussed in the discourse. Technical making is perceived as requiring more skill and holds higher status compared to low-tech activities, like crafting, even when crafters use technical components in their own work.

Crafters may be part of the Maker movement but they are not necessarily viewed as 'Makers', as made evident in this quote. While many crafters use laser cutters and 3D printing, expanding the traditional definition of craft, "crafting" as a practice retains a "...more feminine, decorative, frivolous connotation than "making," which is assumed to be masculine and useful. The technologies viewed as masculine are 'hard', and real while those associated with the traditional definition of 'women's work' are understood to be 'soft' and of smaller scale (Britton, 2015).

Emily Pilloton

"Jewelry making is a bleak way to engage girls."

* Britton, Lauren
TASCHA - Technology And Social Change Group, University of Washignton - Power, Access, Status: The Discourse of Race, Gender, and Class in the Maker Movement. (2015).
Web. As retrieved from < http://tascha.uw.edu/2015/03/power-access-status-the-discourse-of-race-gender-and-class-in-the-maker-movement/> on September 21, 2016.

Insight #16:
We need to show them that these activities are empowering

Top Benefits for girls engagement in Making
1. Skills and Growth Mindset
2. Better Opportunities and Livelihoods
3. Empowerment Innovation Economic
4. Progress Gender Equality

By engaging in making, girls and women can gain valuable skills and a familiarity with problem-solving related to computer science and engineering. Such skills and experience can attract them to a longer-term engagement in those fields and advance them economically through technology related education, new job opportunities, and improved livelihoods.

Maker culture can also be an empowering experience for women on a more personal level, increasing their power.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

"Blacksmithing is sexy and cool!" — Carla Hall

"Maker culture can also be an empowering experience for women on a more personal level, increasing their power."

Insight #17:
Making improves the girl's self-esteem

Transformative Benefits
One of the most important benefits the girls get with making is of personal, social and emotional development.

Carla Hall

Most of these kids come already with expectations of themselves or others around them that they are going to fail, then they come here and they succeed. There clearly is a disparity of options.

Their participation in making and STEM-related activities has the potential to increase their confidence and self- efficacy, their access to information and technology, and their use of media and technology.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

"We need to help girls explore new kinds of personal development experiences (...)"
— Linda Lobato, CEO & Co-Founder of Machina

Interview with:
- Carla Hall

12/01/2017

Insight #18:
How to engage the minorities?

Attracting the Minorities
Making can be an effective way to attract and engage underrepresented groups, especially in the fields of computer science and engineering.

Carla Hall

"Also a big question is how do we pull in and help encourage more people of color?"

Well-crafted initiatives have the potential to transform this landscape. There are several efforts globally to engage, attract and retain women and underrepresented minorities in computer science and engineering fields. Groups like the National Center for Women in Technology, Girls Who Code, and WeTech have many collaborations and programs focused on workshops, after-school programs, student mentoring, peer support, professional training, faculty mentoring, and other opportunities focused on elementary, middle school, high school, undergraduate, and graduate students.
— Intel Report, MakeHers: Engaging Girls and Women in Technology through Making, Creating, and Inventing

Racial and ethnic equity in computer science and engineering fields continues to be a challenge. There is low participation of underrepresented minorities in the computing workforce and computer science and engineering graduate programs. African Americans, Hispanics, and Native Americans, combined, earned fewer than 8 % of computer science and engineering degrees. Research shows that many strategies can be used for increasing participation of both women and underrepresented minorities.

The playful and creative nature of making provides an avenue for people to engage in scientific and engineering problems that have personal meaning for them. Learners engage in activities that lead to understanding and mastery of concepts and tools needed to realize their projects, all within the social context of a supportive, creative community (Intel Report MakeHers, 2014).

Deliverables Strategy Chart

	Topic Area	Outcome	Audience
	Teenage girl Makers	Encourage female teens to become Fearless Makers	Teenage girls between the age of 13-19 with different income levels and cultural backgrounds
Insights **Why are we** **doing this?**	Lack of teenage girls engagement is due to the fact they don't see any female role models that look like them.	Girls could find more encourage-ment if they build things they could give back to their community, for others to use.	Women like to work in groups, they connect better with themselves and others when they're engaging in group projects.
Strategies **How are we going** **to solve for them?**	Use design to show credible visual representation of real female Makers. Example: case studies and testimonials.	Use design to establish a partner-ship to Making and Social local Community Programs.	Use design to create accessible places and opportunities the girls can engage in group activities. (Working methodolgy)
Deliverables **What are we going to** **design and produce?**	**Fearless Heroines** Credible professional female Makers that are out there currently in the field that the girls can look up to and get inspired.	**Girls Give Back** A social partnership program where the girls can build things to help solve and aide local community problems and events.	**Fearless Heroines** **Pop- Up Maker Space** A mobile Pop-Up Workshop truck that provided quick activities and Maker projects for girls.

	_Webiste
	_Onsite Gallery Event
	_Twitter account
	_Blog
	_Video Channel or Netflix Series
	_Ted talks and Lectures
	_Toys and Action figures
	_Packaging
	_Retail Sales (Delivery)
	_Catalogue with all toys
	_Marketing Materials
	_Point of Purchase Design (POV)
	For the Toys
		_Report on Making and the Maker Movement
		_Information Report on Female Makers
		_Infographics Design
		_Website
		_Digital Publication
		_Local Community Newspaper or Zine
		_Poster Series
		_Online Gallery
		_Free public events
		     -Advertising
		_Social Media Presence
		_Interviews
		_Ted Talks and Lectures
			_Truck
			_Workshop How To
			_Schedule
			_Calendar
			_Website
			_Take away trinkets (gifts)
			     -tote bag
			     -pin
			     -notebook
			_Photo Contest
			_Mentorship Program
			_Online Gallery
			_APP
			_Making and Building Products
			     -Packaging
			     -Fashion Working Clothes
			     -Advertising
			_Social Media Presence