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## 4-H and the Maker Movement

### Abstract

The Maker Movement is thriving, and 4-H programs have the opportunity to get involved and keep 4-H relevant. "Making" is gaining traction as a strategy to engage young people in building their science abilities. Collectively joining the Maker Movement would accelerate 4-H's national STEM goals and initiatives while enhancing the abilities of youth as they make innovative breakthroughs.

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## Introduction to the Maker Movement

People around the world are connecting with one another and calling themselves "Makers." A Maker is someone who makes stuff: robots, crafts, furniture, art, or electronic gadgets. The term, "Maker," described by Chris Anderson, the editor-in-chief of *WIRED* magazine, signifies "a new category of builders who are using open-source methods and the latest technology to bring manufacturing out of its traditional factory context, and into the realm of the personal desktop computer" (Gustin, 2012).

The subculture pushes innovation to the limit, encouraging new and unique applications of technologies. There is a strong focus on invention, prototyping, and applying practical skills creatively. A quick glimpse into the social networks of these Makers would reveal that they are driven simply by their curiosity for creating and learning new things—they also generously share their handiwork and techniques with others online, and even face-to-face (Thomas, 2012). In addition, with the continued social development of the Internet, more and more Makers with a shared passion for DIY (Do-it-Yourself) electronics, 3-D printing, quilting, repurposing, or woodworking are connecting with each other from all over the world. The Maker Movement is a thriving community of eager youth and adults with an itch for figuring out how to make or do things on their own (Denmead, 2013).

Riding the wave of the Maker Movement should be critically important to 4-H programs because many of these Maker projects incorporate a variety of STEM topics. Moreover, these caring adults and youth could greatly benefit from the structure and essential elements of a 4-H club as they meet together to learn STEM abilities through hands-on Maker projects (Sallee & Peek, 2014). The Utah 4-H program has recognized what its state and county programs can offer the Maker Movement and has joined in the making with an approach other 4-H programs can apply and adapt.

## Why the Maker Movement Should Matter to 4-H

The Maker Movement embraces the idea of igniting the spark in young people to create, collaborate, and develop 4-H science abilities. Instead of telling youth they need to do better in math and science, Maker projects pull youth into STEM disciplines through hands-on projects that improve these skills in an informal setting.

Maker projects are cut from the same cloth as any other 4-H project. The process of making allows youth to follow their own interests and passions and master a variety of technical skills. Apart from creating something that is uniquely their own, youth reflect on the experience and apply the knowledge that they gather in all aspects of their lives (Thomas, 2012). At its core, Making is about empowering youth to recognize they can create new things and bring their ideas to life.

Apple co-founder Steve Wozniak recounts, "Without computer clubs there would probably be no Apple computers." In fact, Silicon Valley's Homebrew Computer Club is where many of the innovations of the personal computer industry were developed (Kalil, 2012). Right now, Makers are leading the way in the development of industrial robots, 3-D printers, and smart devices that combine hardware, software, and sensors, with the Internet. Imagine how innovation in these areas could be accelerated with the guidance of adults teaching STEM abilities in an informal 4-H club setting?

## One State's Experience with the Maker Movement

In 2011, Utah 4-H was invited to participate in the pilot of Cognizant's Making the Future program:

Cognizant's Making the Future education initiative was created to unleash the passion of young people in STEM disciplines by creating fun, hands-on learning opportunities. Through financial, in-kind and volunteer support for schools and nonprofits; advocacy; college scholarships; and our flagship Making the Future After-School and Summer Program, Cognizant seeks to develop 21st century skills like creativity, innovation, and collaboration that will create a brighter future for our children, preparing them to be tomorrow's leaders in our global economy (Cognizant, 2013).

Faculty and partners familiar with the Maker Movement found this opportunity to be the right fit for the Utah 4-H program. It was especially important to join with Makers to engage youth through a wide array of potential experiences because the Maker Movement draws youth who may not see themselves as part of a STEM program.

In 2012, the Utah 4-H pilot project experimented with two delivery modes in two different communities. The first was a 5-day summer camp located in the urban part of the state, on-site with museum partner, Thanksgiving Point. The second location was located in rural, Wayne County, with a population of approximately 2,737. This program ran two, weekly afterschool programs that spanned approximately 3-4 months each.

In addition to encouraging youth to get involved in Make Projects, the common factor for each site included the use of a *mobile* Maker Space. Based on the need and success with other equipment for checkout, Utah 4-H decided to invest funds in tools and equipment that could be accessible and portable instead of a more traditional Makerspace that contains tools in a fixed geographic location. The items included a variety of hand tools, sewing machines, soldering irons, a drill press, and a vinyl cutter.

Each of the sites shared informal feedback of what things worked well for the program, lessons learned, and what things need to be improved. In 2013, the program expanded to five Maker experiences across the state, including weeklong day camps and a large residential camp experience that included a variety of Maker projects.

Findings from the experiences include the following.

- 85% used tools or materials they had never worked with before.
- 95% of youth agreed, or strongly agreed, they felt successful in a Maker Project.
- 87% of participants expressed through participating in this experience they were more interested to try and make other new projects.

## How to Get Involved

4-H programs already participate in Making through sewing, cooking, robotics, crafting, and coding clubs, etc. But to get involved in the Maker Movement a few things need to be adjusted. First, 4-H has to spin projects in a cool way that is more relevant to youth and potential volunteer leaders.

Next, 4-H professionals need to understand that technology empowers the Maker Movement. Makers share their projects, and 4-H'ers need to join in with the storytelling and video/picture documentation on social networks (Owyang, 2013). 4-H has the content. Clubs are already doing Maker projects. It's just a rebranding effort. The challenge now is in harnessing the power and brand equity of the 4-H clover and marrying it with the Maker Movement.

Here are three simple steps for joining the Maker Movement:

1. Learn about what's going on in the Maker world by visiting [makered.org](http://makered.org), and start completing Maker projects (at [makezine.com](http://makezine.com)) as a 4-H club.
2. Share projects online via Facebook, Google+, Instagram, Twitter, Pinterest, and/or Vine. Don't just share the completed project; share the process of Making, problem solving, and innovating. Tell the story behind the project.
3. Apply for community grants from Best Buy, Target, Cognizant, Home Depot, Walmart, or Costco to fund your Maker projects.

Summer is an excellent time to get started. Utah 4-H also participated in [Maker Camps on Google+](#) as a "super affiliate" during the summers of 2013 and 2014. Youth Makers met and completed a project each day for 6 weeks with Makers from all over the world over Google+ Hangouts on Air. On Fridays, they would participate in virtual field trips to places like Pixar, Cartoon Network, and NASA (Tweney, 2013).

## Conclusion

On July 2, 1862, President Abraham Lincoln signed the Morrill Act, providing each state with public lands to create universities specializing in home economics, mechanical arts, and other professions that were practical at the time. The Smith–Lever Act of 1914 established a system of Cooperative Extension Services, connected to the land-grant universities, in order to inform people about current developments in agriculture, home

economics, leadership, 4-H, economic development, and many other related subjects.

The Maker Movement is about people who want to figure out how to make or do stuff on their own. People who have a passion for creating, building, and sharing in a gamut of topics including food, gardening, sewing, mechanics, and many more. A growing trend is for Makers to gather to show off their ideas at a "Maker Faire." Extension and the land-grant system have been providing information to individuals and encouraging them to share their efforts at county and state fairs for over 100 years (Borden, Perkins, & Hawkey, 2014). Extension has an opportunity to engage with the Maker Movement to disseminate research-based information and practical skills to better support Maker efforts. As the youth component of the land-grant system, 4-H has the ability to engage a new generation of youth in the Maker Movement that will make the best better.

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