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Building and Managing Makerspaces in Extension

Abstract

As traditional face-to-face Extension office interactions are supplanted by online education options, the makerspace offers a venue for authentic engagement between Extension and the community. In makerspaces, learners make and learn from one another in a cooperative learning environment. Through involvement in the maker movement, Extension has an opportunity to apply the skills and knowledge of land-grant educators and Extension volunteers in a new and meaningful way. Creating and supporting makerspaces will increase Extension's visibility and allow for the delivery of content to a new audience. Such efforts will assist Extension in staying relevant in the 21st century.

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Introduction

One of Extension's strengths is the leadership it provides in organizing large community efforts. Some examples include community gardens, incubator kitchens, 4-H clubs, agricultural cooperatives (for both processing and marketing), and food purchasing cooperatives. A cutting-edge opportunity for additional community building lies in makerspaces, places where people can design and create together using tools and resources for production and learning. Extension has the distinct ability, reputation, and network to catalyze the expansion of makerspaces (Peters, 2002). In turn, the maker movement can provide Extension the opportunity to engage a new audience with technical knowledge and skills.

What Is a Makerspace?

Makerspaces come in all shapes and sizes and serve as gathering places for tools, projects, mentors, and expertise. The concept behind makerspaces emanates from the technology-driven "maker culture" associated with *Make*: magazine and the maker faire events it promotes. The idea of a collaborative studio space for

creative endeavors has caught hold in education, where the informal combination of lab, shop, and conference room form a convincing basis for learning through hands-on exploration. Makerspaces are zones of self-directed learning, providing physical laboratories for inquiry-based learning and validating the drive for discovery (Educause Learning Initiative, 2013).

Extension Makerspace Profiles

Utah 4-H has been involved in organizing various types of makerspaces and has discovered positive and negative elements of each.

Dedicated Makerspaces

The Cache Makers 4-H club has the largest Extension-managed makerspace in the state. Located in a rented warehouse-style facility, this space includes a computer lab able to accommodate 20 youths and a flexible workshop area for building, soldering, and sewing. Also in the space is a small woodshop that includes saws, drills, a laser cutter, and a computer numerical control mill.

- Advantages:
 - Less preparation and setup needed for activities
 - Increased sense of belonging by members (i.e., a "clubhouse" feel)
 - Easier management for longer term projects
 - A branded physical location for people to gather in
- Disadvantages:
 - High cost of rent and utilities
 - Responsibility for maintenance, renovation, and custodial service
 - Responsibility for adapting the facility for equipment needs (e.g., Internet, power, ventilation)
 - Responsibility for risk management related to equipment, youths, and volunteers

Distributed Makerspaces

Any room or space (e.g., Extension office, afterschool site, community center) can be transformed into a makerspace. Utah 4-H's original maker efforts started this way.

- Advantages:
 - Low cost
 - Easy start-up

- Less commitment related to managing a physical space
- Disadvantages:
 - Setup requirements for each activity/meeting
 - Constant transporting of equipment and supplies
 - Limited scope of projects that can be accomplished and tools that can be used
 - Need for storage space on- or off-site

Mobile Makerspaces

Utah 4-H has used two types of makerspace trailer options.

Trailer Option 1

One type of trailer has space for youths to work inside using tools (e.g., 3-D printer, laser cutter) but also allows maker projects to "spill out" into a classroom or park.

- Advantages:
 - Ability to move from place to place
 - Larger reach to serve more youths
 - Limited transporting of equipment and supplies
- Disadvantages:
 - Need for onboard power (e.g., generator) and storage
 - Need for frequent recalibration of certain tools, such as 3-D printer and laser cutter
 - Insufficient setup for long-term projects and youth engagement

Trailer Option 2

The second type of trailer is used only to haul tools and equipment to and from various locations.

- Advantages:
 - Need for only a small sized trailer or van
 - Flexibility in facilitating projects and activities across distant locations

- Disadvantages:
 - Insufficient setup for long-term projects and engagement
 - Limited scope related to projects and tools that can be used
 - Constant transporting of equipment and supplies

Strategies for Getting Started

If you are interested in establishing a makerspace, you can implement strategies that make the process manageable. Three such strategies are starting small, using available resources, and tapping the knowledge of others.

Starting a makerspace can be overwhelming, but the project can be scalable. Start small to gauge community interest and capacity and then grow over time to meet expanding needs.

Take advantage of easy-to-use resources that will help guide your process. Two examples are the Cognizant Maker Space Blueprint and the Youth Makerspace Playbook.

- The Cognizant Maker Space Blueprint (nysci.org/maker-blueprint) was written and published in 2013 by the New York Hall of Science. This resource guides one through the steps of creating a maker program and possible makerspace.
- The Youth Makerspace Playbook from Maker Ed (makered.org/makerspaces) is a valuable resource for anyone interested in starting a maker program. This playbook not only provides logistical information related to possible tools and space considerations but also addresses issues such as sustainability of the program and the space.

In addition to using these resources, consider talking to others in Extension as well as representatives of museums, schools, and libraries to learn from their experiences in developing programs and spaces. As tools once found only in manufacturing facilities and labs become more affordable and accessible, the time is right to engage communities in the maker movement. As you look to the future, remember that making is a human activity—try to involve makers from all generations and walks of life. Their expertise and enthusiasm will breathe life into your program.

Conclusion and Implications

The maker movement is expanding from basements and garages to a global community. In fact, the White House hosted its first maker faire in 2014 to raise awareness of the maker movement, and former president Barack Obama proclaimed June 18, 2014, a National Day of Making (The White House, 2014). The National Week of Making continues to be celebrated each June (Kalil & Coy, 2016). In the spirit of belonging, building, and sharing, the maker movement has emerged—giving voice and encouragement to all who seek to express themselves through the things they create (Denmead, 2013).

Extension has an opportunity to apply the skills and knowledge of land-grant educators and the organization's

substantial volunteer network in new ways by meaningfully participating in the maker movement. As traditional face-to-face Extension office interactions decrease and online dissemination of information increases, makerspaces can become authentic assembly places for Extension and the community. Makerspaces provide opportunities for people to make and learn from one another in cooperative learning environments. Creating and supporting makerspaces will increase the visibility of Extension, allow for the delivery of content to a new audience, and help ensure that Extension stays relevant in the 21st century.

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