Assessment 3: Informal Learning - Makerspaces

Stephanie Peborde Burke

New Jersey City University

Introduction

Before Makerspaces made their way into schools, they first got their start commercially. First hitting the scene as Hackerspaces in Europe in 1995, they were a physical space for programmers to gather (Cavalcanti, 2013). Hacking expanded to include working on physical objects including electronic circuit design and manufacturing, as well as physical prototyping. Users had access to tools and classes via their membership payments. Eventually the word made it over to the United States and individuals visited these European locations to bring back their own versions around 2007. The popularity of the internet and the ability for it to provide an ever growing number of e-resources is one of the main contributors to the surge in "making" and DIY-culture (Kelly, 2013; Van Holm, 2015). Additionally, the access to high-grade tools and a natural human desire to create tangible items are some other contributing factors to the popularity of making (Van Holm, 2015).

These spaces which can have the name Hackerspace, Makerspace, FabLab, TechShop, or others are physical locations where users of diverse ages, genders, and backgrounds can come together and create, collaborate, and innovate (Honey & Kanter, 2013). According to Popular Science, across the globe there are nearly 1,400 active spaces (Lou & Peek, 2016). In the United States alone, California, New York, Florida, Texas, and Michigan have the most Makerspaces. Besides commercial locations, Makerspaces have found homes in public libraries and even as mobile Makerspaces. These spaces provide users the ability to create just about anything. Makerspaces that have received significant funding or membership fees are able to purchase some of the most recent and innovative tools like 3D printers, laser cutters, and CNC (Computer Numerical Control) routers. Ultimately, being able to create can actually help local economies and provide individuals the opportunity to engage in entrepreneurship (Tierney, 2015).

Engagement

Making has gained momentum and interest fairly rapidly. Known as "the Greatest Show (and Tell) on Earth -a family-friendly festival of invention, creativity and resourcefulness, and a celebration of the Maker movement" the first World Maker Faire was held in the Bay Area (San Mateo, California) in 2006 and has since spread to New York and Chicago as annual faires. Other Maker Faires have also popped up all over the world. These faires bearing the "Maker" name are all affiliated with Maker Media and provide a way to demonstrate the popularity of making among many aspiring makers (Maker Faire - A Bit of History, n.d.). According to Maker Media, "a record 215,000 people attended the two flagship Maker Faires in the Bay Area and New York in 2014, with 44% of attendees first timers at the Bay Area event, and 61% in New York." Maker Media also reports that 50% of attendees bring children supporting the family friendly nature of these events.

In addition to the faires run by Maker Media, the Obama Administration also hosted a Maker Faire in 2014. The Obama Administration was very supportive of the Maker Movement with the interest of preparing America's youth to take on future STEM careers and to contribute to our success as a global leader (The White House - Office of the Press Secretary, 2014; (*Science, Technology, Engineering and Math: Education for Global Leadershi*p, n.d.). The efforts of the White House Maker Faire were to create jobs and support makers launching new businesses, expand the number of students having access to become makers, and challenge makers to tackle the most pressing problems we face. This event alone featured over 100 Makers from more than 25 states in more than 30 exhibits with an audience of entrepreneurs, students, business leaders, mayors, and heads of non-profit organizations (The White House - Office of the Press Secretary, 2014).

Maker Faires put on by both the federal government and private companies have definitely shown that there is interest in this movement. With many attendees and involvement, it is clear the Maker Movement and Makerspaces have the support and things are going well within this culture.

Locations

Makerspaces and similar spaces outside of schools generally exist in two different places; commercial spaces or public libraries, though these spaces could be permanent, mobile or both. Additionally, Makerspaces are now finding their way into museums.

One might ask why Makerspaces are popping up in public libraries. With close to 10,000 public libraries across the United States, patrons have increasingly been relying on them for access to technology (Newcombe & Belbin, 2012). Now that, what used to be expensive technology, is more affordable, these library locations are able to acquire these devices through their own budget or donations and provide them to library-goers. The Fayetteville Free Library near Syracuse, NY is considered the first public library to offer a FabLab. While the technology may be easier to get, there can still be some challenges in staffing the space. One model relies on volunteers from community members and non-profit groups. This helps bring people of all ages together to a place where people naturally gather. According to Newcombe and Belbin (2015), "volunteers are the lifeblood of makerspaces, because they share their expertise and skills with novices" (p. 32).

Libraries and museums see many families with children, causing their needs to be very different than that of a commercial or business Makerspace (Honey & Kanter, 2013). A study by Wang, Dunn, and Coulton (2015) compared several different commercial Makerspaces, how they are run, and some of the challenges they face. One of the biggest challenges is funding.

Commercial Makerspaces end up relying heavily on membership to maintain what they offer in terms of tools, technology, and maintenance.

Success

Makerspaces as public workshops can provide tools and knowledge to both amateurs and professionals (Taylor, Hurley, & Connolly, 2016). The main roles of these spaces has been and continues to be innovation and peer learning, but they can provide more than just that. In as study by Taylor, Hurley, and Connolly (2016), it was found that Makerspaces are considered hubs of community. People can visit the space to work together, learn from one another, or just simply socialize. Some of the locations in the study provided kitchen facilities or places to make hot drinks; an equivalent of the office water cooler providing a place for people to gather and chat. Commonly, many Makerspaces worked to serve the communities in which they were located. Some of the the locations in the study helped to create custom parts for local industry. Other Makerspaces, as the one discussed by Pines, Sullivan, and Nogales (2015), have been developed with the main purpose of outreach and targeting specific populations. The Makerspace focused on in their presentation was in New Mexico and was a collaborative effort with the local college. Many of the mobile Makerspaces have also served the function of targeting specific groups of people who could really benefit from access to such a space. The Mini Makerlab in the Chicago Public Library found that by moving the Mini Makerlab to each library branch for an extended period of time, more people would be able to access making as opposed to when it was left only at the main branch (Moorefield-Lang, 2015). Originally, people wouldn't travel to the main library, they would only go to their branch. An entire population of people in Chicago weren't accessing the Mini Makerlab until it moved into their neighborhood for 6 weeks at a time.

One major outcome of Makerspaces is its ability to help local economies. With major changes in American manufacturing, thanks to newer technologies like 3D printing, more people can be creators, designers, and entrepreneurs (Tierney, 2015). The Maker Movement is a big development in the American economy. Some businesses have gotten their start in Makerspaces and have grown from there. Two examples of businesses that started in Makerspaces are DODOcase, which creates stylist iPhone and IPad cases, ad Square, the credit-card-processing and payment system. Crowdfunding through Kickstarter and Indiegogo have been helpful in these entrepreneurs getting a start. 3D printing in and of itself has been one of the biggest success-stories recently changing the face of manufacturing. BitGo cofounder Will O'Brien notes that the Maker Movement and 3D printing started around the same time (Tierney, 2015). With the original patents expiring and the technology becoming smaller and less expensive, more people could afford to 3D print. Ultimately, 3D printing provides the ability to create anything out of plastic and other materials making the possibilities for creation and design endless.

Conclusion

Makerspaces are a relatively new trend in both informal and formal learning. Having gotten its start in a more commercial setting, Makerspaces have taken off and found themselves in public libraries and museums, in addition to commercial spaces. Different companies and even the federal government have made efforts to spread awareness and speak to people's interest through Maker Faires, and it has worked. People from all walks of life can connect to DIY-culture and the Maker Movement. Makerspaces provide individuals the resources to be a creator, innovator, or an entrepreneur and this is a major appeal these days. Makerspaces are empowering and engaging, and because of this they are continuing to gain popularity.

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