Grassroots or returning to one’s roots? Unpacking the inception of a youth-focused community makerspace
Grassroots or Returning to One’s Roots? Unpacking the Inception of a Youth-focused Community Makerspace

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ABSTRACT
In this paper, we describe the individuals and factors contributing to the emergence of a community makerspace in a small city in the United States. As research into how makerspaces have come into existence is still in a nascent stage, this single case study is intended to describe highlight some of the complexities involved in creating such a facility. Based on analysis of onsite observations, interviews of adults connected with the space, and electronic communications, we present a story of how two co-founders of a youth-focused makerspace went from having initial interest in extracurricular activities for their own children to creating a makerspace serving all interested youth in the community. Following the resultant narrative, we also observe that while the co-founders were important agents in establishing this makerspace, awareness of the broad set of social, material, and institutional resources to which the co-founders had unique access helps to explain how this still new makerspace was ultimately established. This observation has important implications for other groups and organizations that are being encouraged to establish their own makerspaces.

Categories and Subject Descriptors
K.3.0 [COMPUTERS AND EDUCATION]: Collaborative learning, Computer science education

General Terms
Documentation, Human Factors

Keywords
Youth organizations, informal learning environments, makerspaces, afterschool clubs

1. INTRODUCTION
As the maker movement continues in its momentum to engage learners of multiple ages in practices associated with digital fabrication and making, the community is beginning to see some early research that richly describes the activities that take place within established makerspaces [9]. Such research is valuable in that it is both helping researchers to understand the nature of teaching and learning that take place within these designed environments. It also helps to build a design-centered knowledge base regarding what routines and activities could be strategically “imported” into other educational settings [11]. Moreover, it also helps to empirically affirm the sense that makerspaces are not simply places for enthusiasts to meet and have a good time; they are actually powerful settings for interest-driven learning.

Yet there is a basic question that remains unanswered related to makerspaces that is of contemporary concern, particularly in communities that have yet to establish one of their own: How does a makerspace come into existence? For our purposes, we consider makerspaces to be a self-identified “third space” [13] where people can informally gather to engage in digital fabrication practices and produce digital or digitally-enhanced artifacts. They may cater to adults, youth, families, or some other population entirely. Some may have membership dues and some may be open at no cost. They may have classes or formal group meetings, but they may also just operate on a drop-in basis.

While there is likely to be variety given the broad range of what may count as a makerspace, our aim with this paper is to understand in detail how one self-identified youth makerspace came into existence. In our case, we are focusing on a youth-focused makerspace in a small city (population less than 50,000) with which we have become quite familiar over the past year. Through a process of archival and concurrent data collection with founders and participants in this makerspace, we have worked to understand the people involved in the creation of this makerspace and what resources and circumstances enabled it to be established.

2. LITERATURE REVIEW
To date, there have been very modest research and documentation of the processes and people involved in the creation of new makerspaces. Often, the presence of makerspaces within communities is noted and simply described as an indicator of the successful “grassroots” maker movement1. That particular bit of language – that making has captured imagination because it is “grassroots” – is already quite telling and consistent with the larger maker movement zeitgeist. It implies that the increased attention to making was not a formally planned initiative from a

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1 As an example of how “grassroots” is used in relation to making, consider how Peppler & Bender [14] describe the maker movement: “Lessons learned from the grassroots spreading of the maker movement can help us reimagine schools…”, “The maker movement is spread by demand at the grassroots level…”, and “The grassroots energy behind this movement can be a model for how to successfully scale…”. There are several other instances of this by other authors.

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group of leaders in an established power hierarchy, but rather something that emerged from those people most often considered to be the end users. It is a counter to the consumer culture that has separated the masses from the creation of frequently used artifacts, and instead based on the needs, desires, and actions of the many rather than those of a powerful few. But to push some on the metaphor, we should acknowledge that while labeling something as “grassroots” creates compelling rhetoric, it does little to say how the “grass” has been placed, whether it was started as seed or sod, why it took hold, how it spread, and what it needed in order to grow. Granted, metaphors are inherently limited, and we should only push them so far. But a little push can still bring some worthy issues to light. With respect to the spread, growth, and formalization of making and places for making to happen: we lack knowledge about who were the individuals involved, what resources they needed, what roles those resources served, and how knowledge about and interest in the makerspace had ultimately spread.

Our lack of knowledge in these areas does not necessarily mean we have no grounds for reasonable inference. We can look to the existing literature for some ideas about how and why making has been able to take hold and spread. For example, Gershengeld and Blikstein [2] have both highlighted the democratization of access to fabrication materials and equipment as being especially critical to the maker movement. The presence of lower cost consumer level fabrication tools enables more people to learn about opportunities for fabrication and to acquire canonical maker equipment (e.g., circuit boards, soldering irons, 3D printers). Undoubtedly, free online resources and programming tools have played a role too.

We also can infer that more traditional large-scale information dissemination media, such as the print editions of Make magazine, have played and continue to play an important role in the development and propagation of the maker community [3]. Businesses that specialize in providing access to materials featured in Make have also been important enablers. Relatedly, in other publications, such as ones geared toward librarians or school teachers, it has become increasingly common to see practitioners advocate for the creation of makerspaces. In articles like those, the authors will offer general tips and recommendations for people interested in establishing such a space, thus providing an initial resource for people new to but still curious about making [5].

Additionally, we can infer that the creation of a makerspace can be driven, to some extent, by strong personal interest or orienting disposition of its founders. Litts [12] notes in her study of makerspaces as learning environments, that one especially successful community makerspace (Sector67 in Madison, Wisconsin) came into existence because a small group of undergraduate students who were already interested in making wanted a space where they could work together. In probably the most thorough public documentation of the creation of a make-oriented space, Brahmns & Werner [4] described how the Pittsburgh Children’s Museum maintained an overarching disposition toward supporting specific design processes and practices, such as letting children (and their families) “play with real stuff”. They noted a gap in the interests of a particular age group of visitors, and given the interests of the museum leadership in simple, accessible, and tangible exhibit experiences, they made a deliberate choice to focus on making. Through an explicit collaboration with Carnegie Mellon University and the University of Pittsburgh, coupled with design and test cycles a series of visitor-tested prototypes, they have turned floor space in the Children’s Museum into the well-established MakeShop, a model of how a museum could successful embody key aspects of makerspaces.

Beyond those reports, we also can infer how strategic use of existing facilities and resources can be important as well. Computer Clubhouses [9] as technologically enriched after-school settings, for instance, have been co-opted as spaces for making. The YouMedia project relied very heavily on the resources at the Chicago Public Library so that youth could meet and engage in media authorship. Even in a more formal setting, such as when a university course on making has been created [7], existing spaces and facilities serve as critical resources above and beyond the enthusiasm provided by a few individuals.

Taken together, the current literature related to the creation of makerspaces is piecemeal and largely still in its infancy. Much of what we know is based on inferences from literature that is intended to highlight things taking place within makerspaces rather than on their origins. However, we can glean that likely necessities for a makerspace to emerge include some key individuals who have particular dispositions and a range of both material and informational resources. Exactly what those dispositions and resources are in the case of our focal makerspace will be discussed in detail below.

3. DATA
3.1 Data Sources
Empirically, this paper can be seen as a report from a largely qualitative research study that focused on documenting the recent history leading to the creation of a youth-focused community makerspace in a small city in the Mountain West region of the United States. This space, referred to as the “Maker Place” has only recently (i.e., May 2015, just two months before the writing of this paper) formally opened an official space (see Figure 1.) with signage that is visible on one of the busiest roads in town and begun to offer its first official round of summer camps for local youth. As the Maker Place was being originally conceived, one of the organization’s founders contacted the first author for making education related consultation. This initial contact then led to an ongoing conversation about the founder’s maker activities, and ultimately yielded the opportunity to more formally document who and what eventually led to the creation of the Maker Place.

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2 This also raises some legitimate equity concerns about how making is represented – refer to Voussoughi & Bevan [15], Buechley [6] for more discussion on this issue.

3 All proper names have been replaced with pseudonyms
There were four primary data sources for this study. First, there were public materials available about the Maker Place that included local news articles or radio interview recordings and on the groups modest website and Facebook and Flickr pages. These sources provided information about schedules, participants, and sample completed fabrication projects. The next two data sources were observations and interviews. Observations were done by one or two researchers on site each week over 9 weeks. At the time that data collection had taken place, the Maker Place was more of an afterschool club meeting in an improvised setting. It had three groups of adult-supervised teenaged youth meeting in the basement of a local building on different days of the week. An observer came and recorded field notes during 1-2 hours of observed activity with the same group of youth and adults each week in order to document the kinds of activities taking place in Maker Place. In addition, interviews were conducted in person or over the phone with the two individuals designated as Maker Place founders and other adult leaders (such as volunteer parents who helped supervise and assist during weekly youth meetings). These interviews focused primarily on these individuals’ firsthand accounts of how they came to be involved in the Maker Place. For the founders, there were also questions about the aspects of their own background and experiences that led them to help create the Maker Place. This latter topic was intended to help inform the research team what sorts of preferences those individuals had that led them to pursue a “line of practice” in making that emphasized mentorship and administrative leadership. When possible, parents of participating children who did not serve as volunteers were also interviewed briefly on site or over the phone when they came to pick up their child or at another time they were available to speak. Interviews were audio-recorded and subsequently transcribed.

The final data source was email correspondence. For all individuals interviewed and for other individuals mentioned as being involved in some way with the early inception of the Maker Place who could not be scheduled for an interview, emails with specific questions from a member of the research team and participant answers were exchanged. The final tally of the observations interviews, and emails appear below in Table 1.

![Figure 1. One of the three rooms at the Maker Place.](image)

Table 1. Summary of data collected

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Observations of single youth group and adults at Maker Place—September through</td>
<td>9 days, ~16 hours</td>
</tr>
</tbody>
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3.2 Data analysis

Once data were obtained, a major task was to establish a chronology of major events that were reported by the participants and could be corroborated across multiple sources (i.e., multiple interviews, records on the internet or social media, etc.) (see Figure 2). Major events were those that were ones that insiders in the Maker Place, particularly the founders, had deemed as important. It could range from key meetings, acquiring funding or equipment, to group or space expansions. The exact dates were not as critical for us as much as the order of events and the relative time in between certain events.

Additionally, the data were inspected in terms of Azevedo’s Lines of Practice [LoP] theory [1]. Briefly, LoP theory is an approach to modeling participation in interest-driven activities, such as hobbyist groups. It characterizes the manner of participation that one takes on in a community as being driven by longstanding preferences and more immediate conditions of practice. For instance, a blogger of informal astronomy has a different way of engaging in astronomy practice compared to someone who is enthusiastic about building and showing off new telescopes at star parties. The blogger may, upon more detailed inspection of life history and life activities, exhibit a lifelong preference for activities that emphasize writing and communications. The particular astronomy group to which that blogger belongs may also have an active web site with high traffic and an immediate need for someone to update and maintain the site to publicize events, thus enabling a condition to support astronomy blogging. There are a number of other aspects of LoP theory that can help to model how and why one engages in a practice in a given way, but the two features listed here were the most critical for this analysis.

Data, specifically those associated with the founders of Maker Place, were annotated and coded on the basis of what preferences and conditions seemed to be available that enabled their participation. Our operating assumption was that the creation of Maker Place represented some line of practice and we could understand the creation of that makerspace, at least in part, in terms of individual preferences and situational conditions.

4. Results

According to our timeline, Maker Place came into existence within 24 months (May 2013 – May 2015). There were two key founders, two directly influential resource organizations, and a series of timely events that led to the development and growth of the Maker Place. While many forces were in play, what we wish to highlight as especially important was the ability of the founders to use existing connections that predated the creation of Maker Place. They had longstanding dispositions that led to the creation of Maker Place, and they tapped resources within their own personal and professional networks. They also benefitted through access to two resource organizations. In addition, a number of other more general informational and community resources were available in the background to help them get Maker Place started.
4.1 Two men with maker roots

While “grassroots” is used to describe the early success of the maker movement, an analysis of the preferences and prior experiences of the two founders of Maker Place suggest that each already had long-standing and lifelong interests that led to their involvement in creating this youth-focused makerspace.

Upon data inspection, it became evident that one of the founders, Michael (a father in his late 40s or early 50s), had a longstanding preference for activities that encouraged making. In his youth, he had participated in 4-H educational activities, which often focused on youth ‘learning by doing’. His father was also an extension agent for 4-H in Michael’s home county, making 4-H activities very familiar to him. At the age of 17, Michael had created what was believed to be the state’s first youth computer club through 4-H. As an adult this tendency toward technological tinkering activities continued, and he was formally employed at the management level in the information technology division at the local university. As an adult, he pursued and completed a master’s degree in the field of educational technology. In subsequent years, he also served as an adjunct instructor at least once yearly for a web development course. Building things, particularly electronic and digital things, was a longstanding preference for him.

In addition, Michael showed a tendency toward mentorship roles. This is captured both in his ongoing efforts as an adjunct instructor and also in his role as a father who started an amateur radio club for some of his kids and their friends when they were in school. He was also frequently serving as a scout leader for his sons when they participated in their local boy scouts troop.

The other founder, Richard (a father and business owner in his late 40s), also had previous tendencies toward making. He had a strong preference for activities that encouraged self-driven exploration. This was demonstrated through his own enrollment as a child in an “open classroom” school where the students created contracts for what they wanted to learn, and how it fit objectives across core subjects like English, math, and science. He was especially appreciative of this model of learning even well into adulthood, and he described this open classroom experience as being critically important and unique because in contrast to traditional schooling, it enabled children to “take the reins” of their own education.

His preference for self-driven exploration manifested itself in other ways, Richard had access to a computer at home when he was a child and frequently played with it and explored how to program it. As a husband and father, he regularly took on home improvement projects rather than hire a contractor so he could learn more about how things worked. As an adult and professional, he pursued a doctorate in educational technology (and was in graduate school with Richard), and later went on to create, with another former graduate student, a small software consulting firm. This firm, housed in the top floor of an office building downtown, built custom software for clients, and thus Richard was frequently directly involved in programming. As evidenced by his own “open schooling” and by the creation of his own business, Richard was also familiar with starting new long-term enterprises.

Though Richard and Michael knew each other, they only reconnected through a Facebook encounter – both having signed up for what was by then already a defunct local electronics hobbyist organization page – through which they discovered that both felt an interest in providing some space for their own children and their children’s friends to participate in some tinkering activities. This conversation, and initial recruitment of their own children, their children’s friends, their neighbor’s children, and the children of a couple of coworkers, led to the creation of the first group of youth makers.

When these bits of personal history and recent collaborative actions are considered as belonging to people who helped to launch a makerspace, is noteworthy in that the two key individuals both had many years of prior experience of tinkering and making things on their own with technology and that it even went so far as to extend into their occupations. They were already makers before “making” had been officially sanctioned and popularized as a learning activity or as an identity. They had strong personal ties to activities that incorporated teaching and learning, as reflected in their own educational pursuits and some of their own extracurricular activities. They were interested in finding or starting something for their own children rather than something for children throughout the community. They also knew each other from simultaneous graduate schooling several years prior, and that graduate program would also prove useful for them later as Maker Place became a reality.

Figure 2. Timeline for the emergence of the Maker Place.
4.2 Two Instrumental Resource Organizations

Often mentioned during interviews, both with founders and other adults, were two organizations who made important contributions to or reduced start up burdens on Maker Place: 4-H and Information Technology. Both were affiliated with the local university where Michael was employed and where both Michael and Richard had attended graduate school, and both were accessible because of longstanding histories and relationships that Michael had with key individuals in those organizations.

First was 4-H, which existed as part of the university’s extension office. Recall that Michael had been involved in 4-H as a youth, and on top of that, his own father was a regional 4-H employee. That gave him a great deal of informal knowledge about the workings and offerings from 4-H. On top of that, he personally knew the head of one area of 4-H programs, as they had participated in 4-H programs together in their youth and again when Michael had worked to lead programs for his own kids several years prior to starting Maker Place. Given that history, Michael had ready access to talk with leaders at 4-H about how they could partner with one another to promote making in an afterschool setting for adolescent youth. He also knew from local press that the 4-H was looking for new ways to expand their offerings to support STEM education. Michael’s interest was appealing to 4-H, who had recently become more aware of popular interest in making but did not have much in the way of existing programming in that area. From 4-H’s viewpoint, Michael was the right person at the right time for 4-H to participate in some way in the maker movement.

Ultimately, 4-H served several roles. One was that by becoming affiliated, the nascent Maker Place fell under the umbrella of the local university. Both 4-H and the local university served as the encompassing organizational body for 4-H. This was critical because Maker Place could, through its affiliation, be considered a university entity, and thus had non-profit and educational status and also the protections provided to university activities (such as liability insurance and protocols for legally approving adults who might be involved in youth programming). These technical details would span a number of protections that any nascent youth serving organization needs to establish, but are complicated enough that they would deter most motivated individuals from moving forward.

Also, 4-H already offered a number of workshops and programs throughout the state, meaning they already had computer-based registration and payment systems in place and existing support staff who handled registration for all 4-H programs. This took care of logistical work for Michael and Richard and essentially provided what would normally be costly administrative services to Maker Place for free. In addition, 4-H could provide this program with a very modest amount of money ($700) for equipment purchases.

The connection to an existing and rather large youth serving organization did a great deal for Michael and Richard and their nascent afterschool group of kids. And while the initial seed money was greatly appreciated and needed, that amount of money would barely even cover the cost of even one low-end computer or one piece of basic fabrication equipment. Yet the larger affiliation to the university and to the information technology department helped Michael and Richard navigate this constraint.

Because Michael worked in IT, he was well aware of the life cycle of office equipment at the local university. Typically, the university made substantial investments in new workstations and displays every few years, as is often the case for a large organization. When previous generation of workstations became outdated, they would typically be put into a ‘bid sale’ so that the university could recoup some of their earlier investment.

One alternative to putting things into a bid sale was for the university to find another university division that could use the equipment further (and then put those items up for sale at a later date when that division was done with that equipment). Michael was able to get a hold of the better “old” machines that were headed toward the bid sale and secure those for use by the nascent youth group. As an IT professional, he was able to get help from his coworkers to voluntarily configure and network the repurposed computers. He also was able to secure high quality furniture, such as computer desks, tables, and chairs, that were headed to the bid sale for use with the newly affiliated 4-H group. In essence, being connected to and familiar with the university allowed Maker Place to get access to much costly equipment for free.

4.3 A place for everything and everything in its place

Securing equipment and larger organizational affiliation had been important steps, but that equipment and the people who would use it would need a place to go.

Recall Richard had his own software consulting business in a building downtown. As a multiyear occupant in that building, he came to know the space and the manager of that space quite well. He was aware that the basement of the building was unused except for miscellaneous building storage, and when the opportunity to start encouraging an afterschool youth group in making arose, he spoke with the building manager about using the basement. This was considered fine, and from that moment, a maker ‘space’ came into existence. The borrowed equipment could move in, and youth could officially meet at a designated, centrally located venue. On top of all that, no rent or utilities costs needed to be paid, as Richard had plenty of goodwill with the building manager. This means that another very costly resource was obtained, through relationships and resources that predated the creation of Maker Place, essentially for free.

Word that an official place for kids to meet and make things afterschool spread quickly, but through select channels. Recall that the starting group of youth were actually Michael and Richard’s children and some of their children’s friends. Word spread to Michael and Richard’s own friends and coworkers and through their respective neighborhoods. Parental interest increased to the point that the number of youth who would be participating doubled. While these youth came from existing networks that all still connected back to Michael or Richard, this represented quantifiable growth. This growth created a greater sense of legitimacy as an organization and created the opportunity to make more formal requests from granting agencies for funds for expansion, which is what Michael and Richard, with the support of 4-H, did next. They obtained some of their own funding ($14,000), and then learned about a substantial state grant opportunity through 4-H, which they decided they wanted to pursue as well.

4.4 Other general community resources

While the main focus here has been on Michael, Richard, their personal pasts and current social connections, and the contributions made from established organizations, it is important to note that other resources were broadly available at the time.
The publication of Make magazine and the involvement of large companies such as Google in maker activities provided models and ideas for activities one could do. Michael had commented that some of the early ideas he had for activities to do with the first group of kids came from these sources and from kits purchased through these organizations. Even though they had not been directly involved with Make media or the MakerEd initiative, Michael and Richard were able to use widely disseminated print and online materials to emulate what was happening in other areas in the country. Existing organizations and funding programs encouraging making, such as Cognizant’s “Making the future” initiative, were also available to provide guidance.

In addition, the state government was becoming very interested in STEM education activities. The maker movement was not as familiar to those serving in state offices, but there was interest for state investment in initiatives that could increase interest in STEM education. Legislation had passed recently to create funds to support STEM education and industries. This created a larger atmosphere of local interest in new ways to support STEM learning both in and out of school.

More immediately, there were a number of close neighbors and friends, many of whom had ‘enrolled’ their own children into what was becoming Maker Place, who were willing to help with other basic activities. The basement that Michael, Richard, and the initial group of youth occupied was a space in need of substantial physical improvement. Parents who were friends of Michael or Richard and their children agreed to come out and install lighting, lay out carpeting, clean out storage rooms, assemble furniture, and paint to help out the folks who were helping their kids get involved in making.

![Figure 3. Volunteers building a countertop for computers.](image)

And while he would say that this was an area where he was least comfortable, Michael took the initiative to contact some local businesses about possibly donating equipment to respond to more friends and friends of friends wanting their own kids to get involved. For instance, he was able to solicit modest equipment donations from a local hardware store and from an electronics store. Richard spoke with a friend who was involved in a well-known local fundraising event that had no affiliation with making and even got a small financial donation ($500) from them as well.

Beyond that, the department where both men had completed their graduate work had begun to focus more heavily on maker education research, and become a ready and available body for consultations and recommendations. While they did not need to go to that body often, access to the individuals involved in maker related work helped in the selection of equipment and in exchanging ideas.

4.5 What happened next and is happening now

The existence of an official physical afterschool space (even though it was a repurposed basement) and the growing number of youth groups led to the local newspaper and local radio asking Michael and Richard to talk about their efforts. This ultimately helped generate more attention in the community that began to extend outside of existing social networks. Additionally, Michael was able to get in contact with an old friend and neighbor who was serving in state government and let her know what was going on. This proceeded to create even more awareness outside of the local area of what was beginning to more formally be called “Maker Place”.

Michael and 4-H then capitalized on the state’s interest in STEM education investments and applied for a state grant of several hundred thousand dollars (mentioned briefly above). Much to their surprise, they discovered a month later that they were awarded that grant. Part of what had been proposed was to move Maker Place into a new and larger space and to actively recruit youth from underrepresented populations and communities in the area to participate in various afterschool programs. They also had requested and obtained funds for a dedicated staff person of their own, and they quickly hired another alumnus of their former graduate program who had been exposed to making through the new research direction of that department. This individual began working full time for Michael and Richard, and they also began soliciting volunteer mentors from the community, including from the university. They moved their equipment out of Richard’s office basement and into a larger, remodeled (but unfortunately, not rent-free) space (see Figure 1). This was then christened with a community open house and was again publicized in the local newspaper. A number of youth who had been involved in 4-H generally or who were in the community then learned about Maker Place, and the club grew from one consisting largely of youth who in some way were already connected to the founders to a broader selection of youth from the larger community.

At the time of this writing, the first summer of official youth summer camps have launched. (Summer camps are largely consistent with what the state 4-H typically offers for youth programming outside of the school year). Multiday and multiweek camps involving Scratch, robotics, electronic textiles, programming, CAD, soldering, laser-cutting, and 3D printing have been launched and are currently running. Afterschool weekly teenage maker groups for the fall are now being organized, with some experimentation with new technologies and activities being tested. A drop-in or dues-based arrangement for adults or youth hobbyists to use the space has not yet been arranged, but there is discussion of a sustainable model to support that. A very aggressive effort has begun to recruit youth from the region's growing Latino community is underway as well.

Currently, Michael and Richard are both maintaining their respective full time jobs. Their dedicated staff person handles day-to-day operations, but both Michael and Richard are also spending as much free time as possible continuing to lead the development and growth of Maker Place. For now and the foreseeable future, a space dedicated to youth making exists where there had only been fatherly ideas and hobbyist imaginations two years prior.
5. Discussion

In considering the creation of Maker Place when the opportunity first presented itself to us as researchers, we believed we had an opportunity to see a “grassroots” movement take hold in a new locale. In many respects, that is what we did observe: a small city, far from the much larger urban locales most prominently known for hosting maker activities for youth and adult hobbyists, went from having no formal maker groups to now having an official presence and set of established camps and afterschool programs for youth. They also went from having no dedicated funds to having a substantial amount of funding that will allow it to continue to grow over the next few years. Those who started this space, namely Michael and Richard, were not tied to Make media or any other formal organizations who are most prominently leading the maker movement. Yet these two men who had no initial outside investment nor initial capital helped a small city to get its own makerspace. That seems to qualify as a grassroots effort.

Yet it as we inquired into who these men were and how they were able to bring people and materials together, we came to an important realization: these individuals were actually already well positioned, both within their immediate communities and within their long-term life trajectories, to launch Maker Place. These men were already technology experts and hobbyists. They knew people through personal contacts that went into their pasts (even going back to their childhoods) and into their professional lives that provided access to resources. The group of youth with whom they started doing maker activities were their own children, their children’s friends, and their neighbors’ children. This group of youth did not assemble through happenstance, but rather were already part of existing social networks and because of existing relationships. The organizations that they partnered with were able to provide them with quick access to registration systems, certifications, technology, equipment, space, and legitimacy. What Richard and Michael had accomplished is admirable and laudable, but it also relied heavily on an expansive network of connections from a range of contexts that each of these men brought with him. It also was relied on personally held and sustained interest in maker related activities and in youth programming. In those regards, this grassroots effort seemed to be realized because these men already had deep roots to which they returned in order to make Maker Place happen. Being able to access what was available and established already because of these deep roots seems to be of near equal importance to having talented and motivated individuals pushing things along. Where one could see a case of unique individual persistence, another could see a more complicated milieu of longstanding social, material, and institutional resources being tapped.

We believe this is an important observation and comparison to make especially now that making and digital fabrication spaces are being suggested in a range of existing settings. K-12 schools, public libraries, afterschool clubs, and museums are all being encouraged to revamp and become some form of makerspace. In many of these settings, this is ultimately a request for individuals who are skilled at doing one set of things (i.e., managing and accessing information resources, as may be the case for a traditionally certified librarian), being urged to do something entirely new to them. When the “organic” creation of a Maker Place is looked at as a model, it seems that one path for success involves leaders who are already expert in making and already personally interested in promoting it, independent of its current popularity. That expertise and longstanding interest may not be what professionals in other settings already have. Thus, the pathway toward establishing makerspaces in those settings may be quite different and may involve unique and substantial challenges.

Another noteworthy observation from this study is that the path that Maker Place took also involved a relatively core group of already connected youth at the beginning. The democratization opportunities that can come from making are enticing, and there is often a push to make sure that new maker initiatives are broadly inclusive and begin by reaching out to new communities and to youth who have not been involved with making before. Maker Place actually began with a core group of youth that was already connected to makers and likely had initial interest in making because it was connected to family and friends. Only after the numbers of core and already connected youth grew did Maker Place gain the resources and attention that enabled more diversification. Our view is that democratization of access to making should absolutely be a long-term goal for the digital fabrication and education community. However, this particular case raises questions about what is a realistic pathway to such democratization. It may be that had Maker Place started with a group that was not already connected to the founders, they would not have found similar success. Or it may be that additional resources would need to be in place to help that less initially-connected group to become a stable core.

Success for Maker Place also came about because many of the facility and administrative costs involved in the early stages of its creation were effectively eliminated. This was due to partnerships with long-established organizations that covered issues related to personnel, utilities, and management. With those forms of support already in place, the initiative was able to present itself as a group that really focused primarily on making and ultimately develop into a larger and more formal organization. While obtaining funds was important, getting money so that they could simply “keep the lights on” was not an immediate concern. It is also worth noting that this makerspace effort also launched at a time when making had been publicly sanctioned and encouraged nationally and within the founders’ home state. The time was right for Maker Place to be built.

Taken all together, it is unclear to us as to whether Maker Place would have come into existence had any of those initial ingredients – already acquainted lifelong technology hobbyists turned educators, umbrella and partner organizations that could eliminate startup costs, free space, a core group of committed early participants, a local network of personal friends willing to serve as adult volunteers, an institution that was already researching and training specialists in the area, mass media providing models for replication, and a political and financial environment that was interested in making certain kinds of investments – been missing.

A single case study like what we have presented here is not equipped to help those interested in the growth of the maker movement think fully through counterfactual situations. We cannot know from this what was and was not essential to creation of Maker Place. What this case does is provide us with an instance of success and some articulation of factors that could arguably be seen as playing substantive roles in that success. Our main contribution is in the lenses and interpretations we have applied to this live (and still unfolding) case; those may be applicable to understanding other makerspace creation cases as they are developed. As it stands, it remains to be seen what happens to Maker Place in the future and whether these factors we have identified and discussed are indeed sufficient for eventual
organizational sustainability and the continued “grassroots” growth of making.

6. ACKNOWLEDGMENTS
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7. REFERENCES