Creating a Taxonomy of Shared and Collaborative Spaces

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ABSTRACT

UPDATED—June 9, 2017. Makerspaces and shared working spaces have gained in popularity over the past decade as people have worked to organize these spaces around their interests. Recently more public centers have begun building their own spaces to capitalize on the perceived benefits that the DIY and Maker culture affords. This study seeks to create a taxonomy of the different types of spaces that exist, what their models are, who utilizes them, and why. With this taxonomy future studies will be better able to discuss the models for collaborative spaces that they are examining.

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; ; K.7.2 Computers and Society: Organizations; ; K.4.m Computers and Society: Miscellaneous;

Author Keywords

Makerspace; Collaborative Spaces; Professional Taxonomies

INTRODUCTION

Over the past decade collaborative spaces have grown steadily more common and have recently become the focal point of studies surrounding computational thinking and 21st century skills for kids. [5] However, these spaces are usually lumped together under the term Makerspace, often without considering how each collaborative space is governed, what opportunities it affords is members and the public, and what its members utilize the space for. [4]

Certainly, this paper is not the first to discuss this discrepancy in definition of the space's purposes and motivations. [2] Litts uses this discrepancy to frame the problem with trying to understand making and learning from the context of a single space. Litts also points to the dearth of research actually conducted on the maker movement to highlight the lack of understanding of the space and its community. One may also argue that makerspaces are hardly the only space in which making and learning are the primary outcomes, that using the term is ignoring a larger segment of a community that is active in the same capacity.

This paper seeks to create a more thorough taxonomy of these spaces to assist future research differentiate between the motivations and outcomes based on the classification of the space. It presents two comparative studies around the spaces themselves and the members who utilize them with a cross examination to identify traits which attract members to the specific space.

CHI'16, May 07–12, 2016, San Jose, CA, USA

ISBN 123-4567-24-567/08/06...$15.00

DOI: http://dx.doi.org/10.475/123_4

METHODS

For this study two surveys were created using the Qualtrics web survey platform. One survey was catered towards organizations so that organizing the spaces by size, mission, and organizational composition would assist in the initial categorization step for creating a taxonomy. The survey also asked for information about when and who can use the space and the types of activities offered. This information was intended to compare against the motivations its members reported in order to try and identify characteristics about why certain spaces might attract certain members. This survey was distributed to 14 diverse organizations in the Chicago and Milwaukee areas.

The other survey was created to gather demographic data and quantify motivational traits for the members of each space. The demographic data gathered was mostly standard [3] though names were not gathered to help with the appearance of anonymity, it also asked a few specific questions like *âĂIJHow many shared spaces are you a part of?âĂİ* The motivational data was a mix of quantifiable and qualitative questions which were geared towards identifying user types. The questions asked about how often and how long they used the spaces, what traits about the space were most important, what they do when they go there, and how knowledgeable they were in areas of interest for each space. The qualitative questions tried to gather information that might not have been addressed in the quantitative section, like why that particular space made it more suited to their needs and for them to explain what the space was in their own words.

The surveys were opt-in and distributed through an email that was sent to the main point of contact of each organization or its parent company. The email explained the motivation for the study and requested that whoever was the main point of contact for the organization pass it along to the members. This was done with this idea that coming from someone who governed or was involved with maintaining the space would increase

response rates from its members rather than one coming from an unknown individual.

RESULTS

Overall, we received 28 responses, six for the organizational survey and 22 for the member survey. Three of the organizational surveys were completed by different members of the same organization so in total four organizations filled out the survey. The duplicate responses were examined for the differences in how the responder described their organization. Two of the organizations that were reached out to responded that they no longer handled collaborative spaces or that the space was not operating. One organization only operated a few days a month in a governmental building and thus felt they did not fit within the scope of this study. Of the 22 member surveys received from the four responding organizations, half came from a single organization and eight came from the next largest response pool. Two responders did not fill in their organizational affiliation and one person filled in the areas they work in and thus it was not possible to determine what organization they belonged to.

Organizations

From the organizational survey, three of the four organizations labeled themselves as maker/hackerspaces. They were all 501(c)(3) nonprofit organizations. Two of them had paid employees with six and 15 employees respectively. Two of the spaces allowed 24-hour access for its members while the others had certain hours open for the space to be utilized. The public had access to all the spaces during set times, while three allowed partner organizations, two allowed employees not affiliated with the space, and one allowed business partners exclusive access not during public hours. Two of the spaces charge for memberships while the other two are free or included with admission price for the organization they were located in. One space had between 40-60 members, while all the others had more than 60 with one organization claiming 280 members. None of the spaces are supported through product sales of any kind, two are supported through grants, two depend on membership fees, and they all are supported in some degree through donations. All the spaces identified socialization as one of their main focuses, cooperation/collaboration was similarly important for two of the spaces, and innovation was important for one.

Members

In total 22 people responded to the survey though only 21 finished, the one that did not finish the survey did not answer any questions. Of the responders 57% were under the age of 35 with the next biggest age group being those between 55-64 at 28%. The three largest groups around income were 28% between 10-19k, 19% between 40-49k and 14% between 100-150k. 95% identified as white with the remainder identifying as Middle Eastern. 38% had a bachelor's degree, 28% had an associate's, 14% had a master's, and the rest had at least a GED or some college credit earned. Educational attainment to some degree likely reflected the younger skew in age of respondents. 66% were single, 23% were married, and 10% were divorced. 95% of participants belonged to a single space with only 5% belonging to two spaces.

The participants reported usage of the spaces showed they commonly used them with 26% using it daily or once a week, 21% using it 2-3 times a week, and the rest a few times a month. When participants did visit the space, they tended to spend a fair amount of time there. No one reported using the space for less than an hour per visit with 42% reporting they used the space for over 4 hours on average per visit, 36% reported 2-3 hours on average per visit and the rest were split between 1-2 hours and 3-4 hours.

Regarding the motivations, what the space was used for versus what was most important revealed some interesting factors. Tools appeared to be one of the main reasons people used the space. 73% said they visited the space for access to tools *most of the time* or *always* and was the only option where no responder selected *never*. Access to knowledgeable people was also important though relatively evenly split between *most of the time* or *always* with 52% of responses, and *sometimes* or *half the time* at 42%. Socializing was split with 52% saying they did so about *half the time or sometimes*, and 42% saying *most of the time* or *always*. Artistic expression proved to have some strong polarity with the same amount of people saying they *never* used the space for it as people who said they did it *most or all of the time*. Most people did not use the space to relax or as a quiet space. 52% and 42% of responders said they *sometimes* used the space to learn a new skill or trade respectively.

While tools were really important, a variety of tools was the most important with 57% of responders stating it was *extremely important* whereas having the newest tools was only *slightly important* to 63% of responders. The next most important features, where more than 70% of responders rated it *very to extremely important*, were that the space had people with similar interests as well as people with diverse interests, that the space was independent, that it had a casual atmosphere, and that sharing ideas with others was encouraged. A majority of responders did not find connections to industries, exclusivity, or its proximity to city centers important. *See Table 1 and Table 2 for percentages.*

DISCUSSION

Since the goal was to get a large breadth and variety of responses from these spaces, the results from this study should be considered very preliminary. The surveys did show there was a good variety from income brackets, education, and age groups. Ethnicity was very homogeneous but that might be more indicative of who uses the space, rather than a selection or sampling bias.

More work needed to be done to encourage organizations to participate. A majority of those reached out to never responded in any form. Going forward, it might be in the researcher's best interest to try and contact the organization in another form like a phone call or showing up to one of their public openings. Unfortunately, the feasibility of the latter, especially so when the survey is dispersed across the country, would prove incredibly difficult or impossible. Partnering with trusted organizations, like MAKE Media and Instructables, might help to encourage participation since they have already laid the groundwork for reaching out and talking to these communities.

	How often do you use the space for the following				
Question	*Never*	*Sometimes*	*About half the time*	*Most of the time*	*Always*
Socializing	5.26%	26.32%	26.32%	21.05%	21.05%
Access to Tools	0.00%	10.53%	15.79%	36.84%	36.84%
Access to Knowledgeable People	5.26%	21.05%	21.05%	36.84%	15.79%
Relaxing	26.32%	36.84%	15.79%	21.05%	0.00%
Learning new Skills	10.53%	52.63%	10.53%	15.79%	10.53%
Learning a new Trade	15.79%	42.11%	10.53%	21.05%	10.53%
Artistic Expression	31.58%	26.32%	10.53%	26.32%	5.26%
Relaxing	26.32%	42.11%	10.53%	21.05%	0.00%
Quiet Space	47.37%	21.05%	10.53%	21.05%	0.00%

	How important are the following				
Question	*Not At All*	*Slightly*	*Moderately*	*Very*	*Extremely*
The space has the newest tools	10.53%	63.16%	21.05%	0.00%	5.26%
The space has a variety of tools	0.00%	5.26%	0.00%	36.84%	57.89%
There are people like me with similar interests	0.00%	5.26%	15.79%	42.11%	36.84%
There is a mix of people with a diversity of interests	0.00%	5.26%	26.32%	47.37%	21.05%
The space has connections to important industries	42.11%	31.58%	15.79%	5.26%	5.26%
The space is independent	5.26%	5.26%	21.05%	31.58%	36.84%
Sharing of ideas with others	0.00%	5.26%	10.53%	57.89%	26.32%
Very strict with who and when people can be there	63.16%	15.79%	15.79%	5.26%	0.00%
A casual atmosphere	0.00%	5.26%	21.05%	42.11%	31.58%
The space is large	0.00%	0.00%	36.84%	47.37%	15.79%
The space is located close to important centers in the city	36.84%	21.05%	21.05%	5.26%	15.79%

Organizations

Insights related to organizations was hampered by the small number of organizations that responded. The intent was to get a variety of organizations to respond, at least one for each category: /textitMaker/Hacker space, coworking, incubator/accelerator, cooperative, shared studio, and repair cafÃl'. Some spaces responded in the belief that their organization did not fit the definition of the study even though they were specifically targeted with the belief that they were. This might require a more in-depth message to the organizations to stress that they do fit under the study in some capacity even if they might categorize their space as something else. One of the important takeaways, even with the small number of responses, is that these organizations tend to have a large number of members. The survey erred on the small side of numbers of members per space, but all the responses, save for one, had over 60 members. This means a future survey should accommodate a higher ceiling to help differentiate between small, medium, and large spaces. One of the organizations, who previously governed multiple spaces, but has since relinquished ownership, had created their own internal taxonomy and agreed to share it with us:

- Hackerspace
  - Primary function: manipulating computer hardware and software
- Makerspace
  - Primary function: the sharing of engineering, manufacturing tools and production space
- Coworking Space
  - Primary function: the sharing of work space, meeting rooms and basic services for knowledge work
- Citizen Science Lab
  - Primary function: the sharing of biological and chemical tools, resources and production space
- Open Democracy
  - Primary function: the convening and training of users around the ideas of politics and citizenship
- Creative Collaborative
  - Primary function: shared production space for those working in the creative arts and industries
- In-School Makerspace
  - Primary function: education in making and technology, often with a STEAM or STEM focus

Even with the low number of responses, we can examine what the spaces claim as the main focus of their space and what their members reported as their motivations for visiting the space.

Members

For the most part, what the spaces believed to be their main focus was reflected in the member responses. For example, socializing was the one they considered most important and it was the second most common activity that members *always* participated in. However, looking at what members did at least

most of the time to always, access to knowledgeable people was more common and access to tools was the most prevalent reason responders used the space. It would appear that while members do find socializing a factor in their motivation to use the space, it is access to tools that trumps everything else.

This is also reflected in what members reported as the most important part of the space. As with the motivations, socialization was among the most important to members, but tools were, again, what the members found most important. After tools, the next three most important attributes of the space included socialization and collaboration to some degree. These results reinforce what the spaces saw as their mission or at least indicate that such a factor is a large motivator for the people who use those spaces. Still it seems the most important factor was having access to a large variety of tools, which would make sense as that is generally a major component of makerspaces appeal as opposed to other social clubs.

Since the majority of the responses were from maker/hacker spaces, the results are likely skewed to reflect those spaces rather than a heterogeneous distribution. Other types of collaborative spaces could have revealed some very different factors for why the members use those spaces, or at least helped to speak about how the spaces do in fact share something in common. This response clustering might also be due to the high number of responders who said they used the space very frequently, 73% went at least once a week. With a larger sample, we could have compared members who went less frequently and their motivations against those who went more frequently, as those members likely have different motivations.

We may also consider that tools were such a large motivator due to the members' annual income, as 61% of members made 49,999 or less per year and may not have the financial ability to gather the large array of tools that the space offers. If not income, then the members' ages may also have some factor in this as 24% were 24 or younger and 56% were younger than 35. While it's entirely possible to have access to a variety of tools for someone in this age range, they are more likely to rent than own a home [1] and thus are likely not to have the space to store them. Similarly, because of their age they have also had less time to amass tools, especially the more expensive varieties that the spaces offer.

CONCLUSION

While initial results are promising and generally informative, there was not enough variety in the types of spaces to create any sort of taxonomy for collaborative spaces. The data does show that there appears to be some similar motivations amongst the populations at maker/hacker spaces, namely tools and some form of collaboration and socialization, but how those compare to any other sort of collaborative space cannot be determined. The internal taxonomy provided by one of the organizations might prove to be a useful starting point for classifying and defining the spaces in a larger study. However, reaching out to the members as was done with this study is still likely the best way to identify the actual motivations and reasons people use the spaces. For instance, none of the spaces talked about tools in their mission and yet it was the main motivation and most important factor for why people used the spaces. Without member responses and data, taking the spaces at their word for their raison d'Ãłtre would miss underlying information that could prove much more insightful and informative.

FUTURE WORK

Future surveys should include gender and housing type in the member surveys. Gender was left off on accident and housing type may prove informative for why members had certain motivations. Some of the qualitative data that was left talked about the space allowing them to use loud and noisy tools at any hour of the day which is usually not possible in an apartment and would likely be frowned upon in a house or garage that is near to others. Methods for reaching out need to be refined so that a greater variety of spaces would participate in the survey and thus give way for more in-depth analysis on the differences that exist between spaces. Sending out an informal definition might help spaces identify how they belong in the study, and thus participate, but there may also be a bias that is introduced from this method. While giving the space an initial reason to participate, this also primes them to answer based on the informal definition instead of attempting to self-identity.

ACKNOWLEDGMENTS

We thank all those who wrote and provided helpful comments on previous versions of this document as well as those who provided feedback on the initial study. We also extend thanks to DePaul University and Professor Adam Steele for guiding the study in all its stages until its completion.

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