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9B17m087

CHALLENGES AND OPPORTUNITIES AT THE PROTOSPACE MAKERSPACE

Professors Chris Street and J. Robert Mitchell wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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It was February 5, 2017, and Byron Hynes finished typing his quick response and pressed “send.” His post to the message board was part of a conversation related to some damage to a table saw at Protospace, a makerspace[[1]](#footnote-1) in Calgary, Alberta, Canada. At some point, metal shavings had been left on the table saw, and as the members of Protospace moved the table saw’s fence (which had been installed for safety reasons and to ensure the accuracy of cuts), the metal had scratched the surface, leaving noticeable damage. The person who noticed the damage did their best to clean it up, but others thought that more needed to be done. As one other member suggested,

Metal shavings should never occur in the wood shop. They embed into the wood surfaces (vise blocks and table tops) then into your work piece—plus, the cutting oils usually assisting with metal work will ruin the finish on a wood project. The table saw and outfeed table should not be used as a work bench.

This same member also wondered whether they were correct that “there is a zero tolerance [rule] for cutting metal on the table saw,” and asked, “Can we just make it an official rule of no metal work in that bay?”

In his response that evening, Hynes noted, “The ‘official rule’ status would depend on the definitions of ‘in that bay’ and ‘metal work,’ but certainly as far as the wood tools (including the table saw, the outfeed table, the wood band saw, joiners, planets, etc.) I would agree, absolutely.”

In his role as a director, Hynes was one of the people who sent messages to the Protospace forum that dealt with problems at the makerspace. Although this message was not really that critical, as the table saw still worked and the damage was primarily cosmetic, it brought to mind the challenges that Protospace was facing as a result of its growth. Indeed, Protospace had nearly doubled its space in October 2015, when it expanded to a neighbouring bay in the warehouse Protospace then occupied. Following an open house that same month, which attracted nearly 400 people, growth had continued. Such growth was exciting for Protospace—a non-profit makerspace that was volunteer-run and supported by members themselves who paid $50 per month[[2]](#footnote-2) to be part of the space—but was also presenting a challenge to Hynes and the other directors.

BACKGROUND

Historically, Protospace had been completely member-driven, with directors required mostly to sign cheques; however, that model had been changing. With growth, it could be more difficult to get all members to agree—but decisions needed to be made. The growth also increased the potential for conflict, which partly stemmed from new members not completely understanding the Protospace culture. Although Protospace had recently instituted an in-depth on-boarding process for new members (e.g., a mandatory orientation session and package that was required prior to receiving a key to the space and mandatory training before receiving access to tools), misunderstandings persisted. For example, new members might view Protospace as a cheaper alternative to renting a space and buying tools for a new business. They might monopolize the tools (e.g., the laser cutter) for their own business, not realizing that they were inconveniencing the other members of the community. New members might also not understand that Protospace was a shared workspace, with norms regarding bringing in new tools (e.g., approval was needed to bring in a new tool, which would then become available for use by the community), keeping the space clear and clean (e.g., if you cut wood, you cleaned up the resulting sawdust), and taking items from the space (e.g., you should not eat snacks without paying for them). One of the overarching norms at Protospace had been taken from the 1989 movie *Bill & Ted’s Excellent Adventure*: “Be excellent to each other.”

In the past, when norms had not been respected, the primary method of addressing the issue was informal, through a posting to the Protospace forum (see Exhibit 1). Although the forum remained useful, as a result of growth, there seemed to be a need for more formal processes that could address the challenges faced at Protospace. For example, in January 2015, Protospace had adopted some formal processes through its termination policy and procedures. However, a year later, it had become clear that Protospace was not yet out of the woods, or out of difficulty, in terms of upholding its informal norms. For example, in December 2015, as a result of some prior disagreements, a member abruptly removed a significant number of “personal” tools (which, according to the norms, were expected to remain there for the use of all members), demonstrating that the new policies might still be inadequate. This incident suggested to some members that more was needed in terms of conflict resolution procedures, tool-sharing agreements, and other organizational processes, especially if the organization continued to grow as it had been.

The Protospace directors and broader community saw a need to decide whether Protospace should continue to grow, whether membership should be capped at its current levels, or even whether the organization should work toward shrinking its membership. At the heart of this decision were several questions: If Protospace continued to grow, what would the growth mean for the organization itself? Should Protospace become more formalized, with a more hierarchical structure? Or should it remain as a volunteer-run, member-supported non-profit organization? Was its current structure leading it to miss opportunities?

Adding more complexity to the situation was the fact that, in the near future, additional space was likely to again become available in the warehouse adjoining Protospace. If Protospace decided not to expand into that space, it was highly probable that the space would then not be available for three to five years, thereby constraining the possibility of continued growth at that location. But was Protospace ready for another expansion? Did its non-profit community model fit what the organization represented? Or were there other opportunities that warranted exploration and pursuit?

the maker movement

As a makerspace, Protospace was part of the broader maker movement, which had its origins in a set of activities that had been around for years. But these activities had not necessarily been trendy in the past. Shop classes and home economics had been out of style for nearly a generation. As Brit Morin noted in a Huffington Post blog entry: “Compared to my mother’s generation, it’s clear that the domestic and creative arts education in schools has floundered over the past couple of decades. At some schools, Home Ec[onomics] and Shop classes are no longer even offered, and if they are, they are usually an optional course.”[[3]](#footnote-3)

What was now known as the maker movement had in the past been known as “do-it-yourself” and “tinkering” (see, for example, the 1973 *Reader’s Digest Complete Do-It-Yourself Manual* or the 1924 *Tinkering with Tools*[[4]](#footnote-4)). One of the earlier uses of the “maker” terminology to describe this do-it-yourself, tinkering-based movement came in 2005 with the publication of *Make*, a bi-monthly magazine publication for individuals interested in do-it-yourself projects. As Dale Dougherty, the maker of *Make* magazine described,

I think the magic of [the magazine] was simply that we connected a lot of different groups that were making things but saw themselves as doing something separate. . . . The artists saw themselves as different from people that do robotics and from people that do electronics. To some degree calling them all makers kind of allowed for a flourishing of some different people coming together and seeing commonalities.[[5]](#footnote-5)

In just eight years, *Make* grew from 22,000 subscribers to more than 125,000.[[6]](#footnote-6) Although *Make* provided an intellectual outlet and a place for individuals to come together, the first physical gathering of makers happened with a maker fair, held in San Mateo, California. This event was a self-described gathering of “tech enthusiasts, crafters, educators, tinkerers, hobbyists, engineers, science clubs, authors, artists, students, and commercial exhibitors” who simply want “to show what they have made and to share what they have learned.” In 2015, the San Mateo Maker Faire—one of more than 150 maker fairs worldwide—was attended by more than 145,000 individuals and had more than 95 different sponsors.[[7]](#footnote-7)

The sponsors of the maker fairs saw these events as important because they supported the larger maker movement, which was seen as having a major impact on the broader economy and society. Indeed, the United States was thought to have 135 million makers (defined as individuals who used their creativity to make items such as art, baked goods, clothing, crafts, furniture, jewellery, machines, robots, and toys), who contributed more than US$29 billion to the U.S. economy each year.[[8]](#footnote-8)

The maker movement was broad and far-reaching, but was not homogenous (as evidenced by the variety of items made by makers). Indeed, there was not one single term that described all makers. For example, an alternative term that was often applied was *hacker*. Whether using the term *maker* or *hacker*, hundreds and thousands of spaces existed worldwide to enable people to make, hack, and create.[[9]](#footnote-9)

In . . . [these] spaces in the U.S. and Canada, do-it-yourselfers are drilling, gluing, soldering and welding just about anything you can imagine. Some spaces consist of little more than a large room where they share tools and expertise, while others are equipped with expensive, computer-controlled power tools. While the focus at some [of these] spaces is primarily on electronics, at others, sawdust flies and sewing machines whir as members build hybrid objects of a less technological variety. The spaces also offer learning opportunities through classes on anything from brewing beer to picking locks, and demonstrations of new contraptions.[[10]](#footnote-10)

The focus of sharing, learning, creating, and making was central to the maker and hacker culture. In an interview with *Time* magazine, Zach Kaplan, the chief executive officer of Inventables—a company that made products to support makers and hackers—described the maker movement:

It has the potential of giving anyone the tools they need to become makers and move them from passive users to active creators. . . . The key driver is that the cost of the tools such as 3D printers, CNC [computer numeric control] Mills and things like Arduino and Raspberry PI mother boards and other core tech products have come down and are in reach of normal consumers.[[11]](#footnote-11)

Although options existed for selling the items they made—such as through Big Cartel, Craigslist, eBay, Etsy, and Kijiji—not all makers were making for commercial reasons. And not all makerspaces existed with commercial ends in mind. Indeed, these spaces themselves were often not even businesses. Most spaces were operated as democratic, community-directed non-profit organizations. This focus on community was important for these spaces. Indeed, a majority of makers reported that they had started making in an attempt to strengthen their relationships with friends and family, and that their projects’ inspirations came from their personal relationships.[[12]](#footnote-12)

PROTOSPACE HISTORY

After attending the Chaos Computer Club’s conference in Berlin at the end of December 2008, Paul Brodeur returned to Calgary with the idea of creating a space where like-minded computer and security hobbyists could gather. After Brodeur sent notices out on local e-mail lists and Linux user group websites, 30 people, including Brodeur, met at the Oolong Tea House in downtown Calgary. Brodeur explained what he had discovered in Berlin—the concept of a self-governing collective of technology hackers banding together in a “do-ocracy,” where membership had no central rules or expectations. Although the people at the meeting did not necessarily fully understand what being a member of this type of group would be like, they were attracted by the concept. By the end of this first meeting, many in attendance had decided to meet regularly and to call the group Protospace, a place to share and prototype new ideas. The organization would itself also be a prototype. Since its founding in January 2009, the organization had been in a cycle of settling, growing, and moving.

The founding members of what became Protospace were a group of like-minded computer enthusiasts who had interests in programming, hacking, and security. They started meeting informally at the Eau Claire Market in downtown Calgary, a spot they chose, in part, for the free Wi-Fi service available nearby. This loosely collected group of individuals came together to share ideas, compare projects they were working on in their spare time, and help each other solve problems. Through word of mouth, the group grew to include friends and relatives until moving into its first space, a vacant storefront on MacLeod Trail. While the old building with an unfinished basement and wood floor was not necessarily ideal for their purposes, it did provide space for storing the material for members’ various projects and for hosting technical lectures, meetings, and Tuesday night open-house events to attract new members.

Protospace continued to grow, quickly outgrowing the original storefront in terms of both the number of members and their interests, which had evolved to include information technology–related projects in addition to projects involving physical manufacturing processes (e.g., metalwork, woodworking and electronics). This growth prompted a search for a new location. In July 2010, the 40-member group decided that it needed a bigger space because it was outgrowing the MacLeod Trail space, which also had an insufficient number of electrical outlets and no place for heavy machinery. But for Protospace to gain a bigger place, it needed greater cash reserves, so the group left the MacLeod Trail space and became “nomadic” for a while (i.e., meeting in coffee shops and shopping malls) as a way to save money for a move into an industrial space.

In 2011, the group settled in to one bay of a building that it shared with the Calgary Cerebral Palsy Association, a non-profit organization that occupied a building in an industrial park. Having a space in the back half of the bay was an improvement in that it offered more space to set up equipment and had concrete flooring, which was more resilient to dropped equipment or other spills than the wood flooring at the previous location. The Tuesday night open-house events in the new, improved facility quickly drew more members to Protospace. Within two years, the group was again looking for a larger facility. This time, however, the move was prompted by more than simply growth, as the property owners were doubling the rent for 2013. The members of Protospace were back to meeting in temporary locations, such as the back of a bike shop. By October 2013, Protospace had moved to its current location, a large bay in a Vista Heights industrial park. This new space offered 300 square metres of shop and storage space. A continuation of the Tuesday night open houses led to continued growth. The most recent opportunity for expansion came in October 2015, when the adjoining bay became available. The members of Protospace made the decision to further expand the space to 600 square metres. Protospace had 206 members and was open to members on a 24-hour basis. While only a few of the original members remained active, some had come and gone and then returned, and six or seven current members had been present at the start or during the “nomadic” days. As the makeup of the membership had shifted over the years, “making things” had come to dominate the members’ interests, as opposed to the original focus, which had been more on computer hacking and security. Through all the changes in location and membership composition and size, two characteristics of Protospace had remained constant.

First, Protospace had operated with the bare minimum of governance and rule-making, deciding instead to operate with a set of up to nine member-directors, who were responsible for financial and operational management and annual reporting (see Exhibit 2). The six current directors were Katryna Chan, Hayley Ezra, Jamie Frost, Byron Hynes, Mike Morrow, and Ian Oliver (see Exhibit 3). The primary means of communication and decision-making was through a semi-formal discussion board that was accessible to all Protospace members. At the general meeting each year, or when a vacancy arose, interested members could volunteer to become, or continue as, directors. Most times, there were fewer volunteers than available positions, and all of the volunteer positions were confirmed by a membership vote. If more members were to seek positions, a more typical “election” would occur (which had not yet happened).

The directors of Protospace worked to ensure the smooth day-to-day operation of the facility, and in a legal sense, under Alberta provincial laws, they had the authority and fiduciary responsibility for Protospace. In practice, though, the history and culture of both the maker movement and Protospace limited what directors could (and should) do without first reaching a consensus with the membership. The founders had made a deliberate decision that the directors would not have fixed roles; that is, among the directors, there was no “president” or “chair.” This lack of a single leadership position could be both liberating and constraining—at the same time. Although the directors did not have formal “board meetings,” the active directors tended to bounce ideas among themselves, by email or in person. In the 2015–16 “report to members,” the directors wrote,

[A]lthough we each have independent opinions and don’t always unanimously agree on an issue, we work together well. One member (not a director) said: “[the current directors] are actually good at this and well suited to the whole *pick up the slack and tackle whatever you can when you have time* thing,” which sums things up pretty well.

Of course, for Protospace to function, the directors relied heavily on a group of established members who “had the directors’ backs” and took on tasks that need to be done (e.g., coordinating the laser-cutting area, teaching metalworking, processing new members, and chairing meetings).

Second, as noted, Protospace operated with an expectation of member engagement in what members referred to as a “do-ocracy:” members were encouraged to take initiative when something needed to be done. An articulation of the do-ocracy mentality in action was the explicit understanding that Protospace members would solve constructive problems that arose and “not try to fix problems that didn’t exist.” The process for making suggestions—such as what equipment to buy, how to recruit more members, and whether to continue growing—involved the posting of a proposal to the discussion board and an invitation for suggestions and opinions about the merits of the proposal. Discussion commenced and continued until it reached a general agreement (or sometimes a lack of disagreement). For more substantive issues, such as buying expensive equipment, the proposal went forward to a general meeting. The proposal was then voted on and was passed if the proposal received 90 per cent agreement from the members present. The group values reflected the open and practical nature of the maker culture, which one long-time member described: “[It’s] exciting, I enjoy it more than I did originally, because of the mix in people, I find them more approachable. As a maker and building it’s nice to talk to similar people, people actually making things as opposed to an IT [information technology] place or just a social place.”

However, as simple as it seemed, the simple organizational structure and do-ocracy mentality came with significant challenges and limitations. Some of the challenges were illustrated in the aforemention problem that occurred in December of 2015. A long-time member had provided several hand-operated and table-mounted power tools for use at Protospace. Typically, there was an implicit understanding that any tools housed at Protospace and any tools that were brought in were available for individuals at Protospace to use. Up to this point, there had not been any kind of formal and explicit understanding between the membership and the people who brought the tools in terms of who “owned” the tools and who had responsibility for operating and maintaining them. After a disagreement with some members about these tools, one member removed the tools from the space without notifying anyone. Losing the use of these popular tools was a wake-up call for the entire organization. It became obvious that it was a bad idea to have only a vague understanding of who owned the equipment, and most members thought it made sense to have Protospace own the tools for reasons of risk and control. This discussion reinforced the need to formalize some elements of Protospace that had previously been informal.

Growth, opportunity, and tension

By the end of 2016, the general membership had started wondering about the effects of the organization’s substantial growth. On December 30, 2016, one of the members posted a note on the message board highlighting his desire to generate some solutions to “some of the issues plaguing the space right now” as a result of the substantial growth. Specifically, he wondered, “what the long-ish term goal is that people see/hope/want” for Protospace:

Protospace is a fantastic place to not only have access to a large array of tools and the space to use them, but also to meet people and create relationships that expand beyond the space. . . . As a result it has grown rapidly in the one year that I’ve been a member to over double the number of members. This means that the space has had to overcome a lot of issues (space, tools, training, etc.), and now faces a whole bunch of new issues that need to be dealt with . . . [including] how we hold people accountable for their actions (for example damaging tools or leaving a mess for another member to deal with).

He went on to propose the creation of “a simple, clear cut set of general rules that pave the way for an also simple discipline (for lack of a better word) policy.” In making this suggestion, he acknowledged that a set of rules had been suggested before and that “with the sheer amount of members we have there will be objections the entire way.” But he also highlighted that if the growth in members and the expansion in space continued at Protospace, then a plan was needed to “deal with negative events before they happen.” As predicted, the responses varied, as highlighted in some example postings (see Exhibit 4). These interactions continued over a two-week period. And after observing these interactions, one member responded with a long message (see Exhibit 5), which he summarized as follows:

1. A membership cap is unnecessary and antithetical to our purpose.
2. We need to make it easier for all members to help out around the space (yes, still) and to avoid causing damage.
3. We need a balance between helping out and doing personal projects (which paid staff would be the opposite of).
4. We need to write and post all over the space both a code of conduct and a general rules list, as well as area-specific rules lists.
5. There is always more room to expand our capabilities.

Hynes saw this post and, although not necessarily agreeing with every word, thought it was “an amazingly complete, thought-out, researched, and balanced post” that highlighted critical issues related to the future of Protospace.

In responding to this post, Hynes highlighted the first point and noted that although he raised the question of the membership cap, he was not doing so to propose that they adopt a cap, but rather that they start thinking about and discussing it. For the second point, the original poster suggested that Protospace needed to “make improvement/maintenance/respect for equipment easier . . . [in that] you can’t blame someone for something they don’t know. You can blame them for not trying to find out, but learning effort is not unlimited.” Although he understood the perspective, he did think that you can “absolutely blame someone for not following what they are told at the MANDATORY orientation before they can get a key.”

For points three and four, related to volunteerism and the code of conduct, the original poster asked whether “we actually have ‘clean up after yourself’ codified as a rule anywhere, or is it just an informal expectation/part of ‘be excellent to each other’?” Hynes noted in response that cleaning up after yourself was more than just an informal expectation, and had actually been “encompassed in ‘Be excellent to each other’ since the beginning, but more importantly, it has been specifically described in EVERY new member orientation and safety course for at least 3 years.”

And with respect to point five, Hynes noted that Protospace had “less than two years on our lease” and needed to “get ready to negotiate.” In addition, he noted, “things are brewing with other maker avenues in Calgary for other spaces that may either be suitable for us, or take on some of the things we don’t [take on].”

In these comments and those of the other members of Protospace, Hynes alluded to the various issues that Protospace faced as a consequence of its growth. Growth could be good in terms of helping to alleviate financial pressures, but it also led to other kinds of pressures related to space and the overall do-ocracy culture that might be more difficult for Protospace to address as a result of its informal organizational structure. Included in the issues facing the organization was the possibility that other spaces in the Calgary area were emerging, some of which might be viewed as competition to Protospace.

decisions

As Hynes responded to the post regarding the damage to the table saw, he reflected on all the posts regarding the future of Protospace. Some decisions eventually needed to be made. Could membership be unlimited, or should it be capped? Did something in the training component need to change to ensure that Protospace remained a *community-based*, *member-driven* makerspace? In the absence of being community-based and membership-driven, the entire do-ocracy model would fall apart. But this situation led to another question: Should Protospace consider hiring a staff member so that all members could have more time to work on their projects?

These decisions related to core issues at Protospace regarding the structure, the policies, and the nature of the business model. Hynes and the other directors could not make these decisions alone; instead, the broader membership needed to resolve these challenges. For Hynes and the other directors, the question was how to go about making the required changes.

Exhibit 1: Protospace Forum posts: Clean Up, Especially Your Hazards

Thursday, March 24, 2016—MF

[T]he shop in general had about 30 tools left out. The workbenches below the tool storage seem to be a gathering place for tools people are too lazy to put back. Everyone please make more of an effort, and nag the people you see responsible for it to not make themselves a burden on the rest of us who clean up after them.

Thursday, March 24, 2016—CS

MF is being very kind here. . . . The wood shop today it was a disaster. I couldn’t do anything because there was crap all over the place. Drill bits everywhere, hoses left around, extension cords tangled and in the way, all the vacuums were out in the middle of the walk way, scrap pieces that someone couldn’t be bothered to clean up left all around. Dremels dangling off the benches, floors were a mess. It took me more time to clean up the shop than it did to work on my project. I’m getting tired of doing WAY more than my fair share of cleaning. It’s been getting worse lately. I understand if things get missed, but it was a disgrace. There was no accidentally missing that. Here’s a picture of what the shop looked like. . . . The second picture is what the shop should resemble when you leave. If it doesn’t look like that, you’re not done.



Friday, March 25, 2016—MF

So, I’m alone at the space right now, in the electronics room. I am not sensitive to wood dust. But the wood shop and metal shop are so dusty my eyes are burning, I’m coughing, and the normally grey concrete floor is brown. Tables full of stuff left out, again. This, what, 4 hours since CS left after cleaning? Different people than yesterday. I really hope we don’t have to start looking at the camera footage or naming and shaming people. If you use a wood tool, hook it up to a vacuum so it catches most of the dust. If you just spent 5+ hours in the wood shop and I watch you leave without hearing you push a broom or turn on a vacuum, how did you think the mess you left would get cleaned up? You’re not doing as you were taught in the orientation and not being excellent to the rest of the membership. I don’t intend to spend the whole night cleaning, so, it’s just going to be messy for whoever gets here Friday morning.

**Exhibit 1 (continued)**

Friday, March 25, 2016—CS

After my rant, that was probably me using the router. I didn’t realize the dust would be so airborne for so long. There’s no real way to catch the dust with what I was doing, but if it’s that bad, I should probably wait until I get the router table built with a vacuum on it before I use it.

Friday, March 25, 2016—MF

Ehn, some might’ve been you. Most of it happened after you left. I mean, I was here and I know who it was, but it’s different people every time so it warrants a message to the membership.

Friday, March 25, 2016—BH

At the last two meetings, I have mentioned air cleaners. I think the original suggestion was from T. I think they are needed. If you step on the stairs to the member storage, or “drop” a box by the shelves, notice that a cloud of dust is raised. Part of the issue is people not cleaning up after themselves (especially things being left out), and part is inadequate dust control systems. I posted twice last week about the condition of the front areas and got no replies and certainly no volunteers, so it was just mini-maker and me [to clean the front].

Friday, April 1, 2016—MF

New people, new mess. Every day. In a particular bout of irony, the brooms beside the safety cabinet are covered in about a ¼˝ of sawdust. I swept for 60 seconds around one table in the wood shop and yielded this. It’s over an inch thick, meaning no one who was there today did even that 60 seconds. . . . Since paying attention this last couple weeks or so, it really seems to me that the majority of wood shop users aren’t confused about how much to clean up or poor in the methods they choose, so that’s not a problem to solve. It’s that they’re choosing to put in ZERO cleaning effort. Make a mess, walk away. It’s a worse problem, but an easier one to solve. Teaching someone how to clean better is hard, telling someone to clean is easy. I guess we need to hold people’s hands a bit more and, the people reading this are probably not the problem. I’ll build an A-board sign facing the walkthrough more or less demanding that if you use a tool in this bay, you must spend 15 minutes cleaning up the wood shop. Then it will be impossible to be unaware of expectations. And then the people who ignore that will have no excuses about their efforts, so at that point it will be fair to say they’re being deliberately unexcellent and we’ll just start naming and shaming. Seems reasonable?

Source: Protospace documents (online Protospace forum interactions).

Exhibit 2: Protospace Financial Statements, 2016

Balance Sheet as of December 31, 2016 (in Canadian Dollars, Accrual Basis)

|  |  |
| --- | --- |
| **ASSETS** |  |
| **Cash and Bank Accounts** |  |
| Lock Box Cash | $1,051.45 |
| PayPal | $2,213.54 |
| Petty Cash | –$961.95 |
| Petty Cash (members) | $0.00 |
| Square Clearing | $0.00 |
| TD Chequing | $27,168.85 |
| USD PayPal | $0.00 |
| Kitchen Donation Bin | $0.00 |
| **TOTAL Cash and Bank Accounts** | $29,471.89 |
|  |  |
| **Other Assets** |  |
| Customer Invoices | $0.00 |
| Deposits and Prepaid Expenses | $6,200.26 |
| Equipment Purchased 2015–16 | $7,225.00 |
| Leasehold Improvements | $3,268.86 |
| Trotec Laser Asset | $27,544.75 |
| **TOTAL Other Assets** | $44,238.87 |
| **TOTAL ASSETS** | **$73,710.76** |
|  |  |
| **LIABILITIES** |  |
| **Other Liabilities** |  |
| Accounts Payable | $0.00 |
| Due to (From) Directors | $0.00 |
| Due to (From) Members | $2,295.94 |
| Trotec Laser Loan | $24,000.00 |
| **TOTAL Other Liabilities** | $26,295.94 |
| **TOTAL LIABILITIES** | **$26,295.94** |
| **EQUITY** | **$47,414.82** |
|  |  |
| **TOTAL LIABILITIES & EQUITY** | **$73,710.76** |

Exhibit 2: (Continued)

Profit and Loss Statement–—12-Month Summary (January 1, 2016 through December 31, 2016, in Canadian Dollars, Cash Basis)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **January** | **February** | **March** | **April** | **May** | **June** | **July** | **August** | **September** | **October** | **November** | **December** | **TOTAL** |
| INFLOWS |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Donations of Cash | 697.15 | 11.75 | 423.00 | 0.00 | 211.14 | 124.20 | 0.00 | 286.00 | 197.43 | 146.00 | 0.00 | 24.00 | 2,120.67 |
| Donations of Goods | 0.00 | 0.00 | 0.00 | 0.00 | 1,463.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,463.60 |
| Fundraising, Grants, Sponsorships | 470.00 | 80.00 | 645.00 | 85.00 | 80.00 | 359.65 | 80.00 | 4,000.00 | 850.00 | 482.00 | 15.95 | 0.00 | 7,147.60 |
| Group Buys (Net Income) | 0.00 | 0.00 | 22.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 22.50 |
| Memberships | 6,040.00 | 6,230.00 | 5,238.21 | 6,800.00 | 9,640.00 | 8,060.00 | 7,110.00 | 6,690.00 | 8,960.00 | 9,840.00 | 9,290.00 | 6,685.00 | 90,583.21 |
| Rental or Service Income | 0.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 60.00 |
| Snacks, Coffee, Pop (Net) | 33.75 | 235.30 | 246.39 | 192.73 | 207.82 | 55.87 | 479.07 | 500.58 | −145.08 | 314.01 | 136.01 | 258.30 | 2,514.75 |
| Training and Programs | 109.80 | 340.00 | 80.00 | 445.00 | 545.00 | −0.82 | 235.00 | −361.58 | 1,335.00 | 805.00 | 290.00 | 295.00 | 4,117.40 |
| TOTAL INFLOWS | 7,350.70 | 6,957.05 | 6,655.10 | 7,522.73 | 12,147.56 | 8,598.90 | 7,904.07 | 11,115.00 | 11,197.35 | 11,587.01 | 9,731.96 | 7,262.30 | 108,029.73 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| OUTFLOWS |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Advertising, Promotion, Printing | 0.00 | 0.00 | 1,575.00 | 38.50 | 596.50 | 0.00 | 0.00 | 429.21 | 76.04 | 653.14 | −45.00 | 1,482.00 | 4,805.39 |
| Consumables | 62.99 | 0.00 | 34.63 | 11.16 | 125.00 | 10.26 | 0.00 | 0.00 | 150.62 | 20.00 | 0.00 | 185.00 | 599.66 |
| Depreciation | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 400.00 | 400.00 |
| Equipment & Tools | 1,227.96 | 887.04 | 897.75 | 0.00 | 0.00 | 33.55 | 216.29 | 52.62 | 63.66 | 496.66 | 1,973.69 | 1,540.74 | 7,389.96 |
| Financial Fees | 181.69 | 198.55 | 164.71 | 226.40 | 267.59 | 214.04 | 182.76 | 190.00 | 287.97 | 281.95 | 255.38 | 204.20 | 2,655.24 |
| Insurance | 141.37 | 141.37 | 141.37 | 141.37 | 141.37 | 141.37 | 141.37 | 141.37 | 141.37 | 133.07 | 133.07 | 133.07 | 1,671.54 |
| Maintenance & Repairs | 320.39 | 819.66 | 553.17 | 191.42 | 1,481.46 | $90.49 | 173.11 | 623.29 | 164.34 | 428.19 | 75.00 | 75.00 | 5,295.52 |
| Office Supplies | 104.08 | 0.00 | 70.92 | 0.00 | 0.00 | 80.81 | 192.67 | 104.31 | 0.00 | 65.30 | 0.00 | 0.00 | 618.09 |
| Rent | 5,668.69 | 5,863.95 | 5,668.69 | 5,668.69 | 5,668.69 | 5,668.69 | 5,668.69 | 5,668.69 | 5,668.69 | 6,128.06 | 6,128.06 | 6,128.06 | 69,597.65 |
| Special Projects | 819.90 | 336.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 159.39 | 1,583.58 | 431.90 | 25.00 | 0.00 | 3,355.77 |
| Utilities | 1,199.09 | 862.28 | 1,263.06 | 1,016.58 | 1,106.83 | 874.85 | 883.63 | 896.11 | 989.31 | 947.54 | 988.19 | 1,292.42 | 12,319.89 |
| Write-Offs, Bad Debt, Other | 0.00 | 0.00 | 0.75 | 0.00 | 11.63 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12.38 |
| TOTAL OUTFLOWS | 9,726.16 | 9,108.85 | 10,370.05 | 7,294.12 | 9,399.07 | 7,414.06 | 7,458.52 | 8,264.99 | 9,125.58 | 9,585.81 | 9,533.39 | 11,440.49 | 108,721.09 |
| OVERALL TOTAL | −2,375.46 | −2,151.80 | −3,714.95 | 228.61 | 2,748.49 | 1,184.84 | 445.55 | 2,850.01 | 2,071.77 | 2,001.20 | 198.57 | −4,178.19 | −691.36 |

Source: Protospace files.

Exhibit 3: Protospace Director Background

**Katryna Chan** (Kat) is an administrator in her professional career, which has led her to take on a number of the organizational tasks associated with Protospace. She creates the agendas for meetings, and stays on top of reminding others of commitments that they have made. She ensures that important items and tasks do not “fall through the cracks.” She also brings a perspective that helps ensure that the directors and broader membership of Protospace group still have fun and continue to interact as a community and not just a business. Kat, along with Byron, responds to the majority of requests made to directors.

**Hayley Ezra** works for a large multinational company in emergency services. Hayley coordinated the first annual Protospace open house and has done much of the public relations for the space. Partly as a result of demands in other areas of her life, Hayley has been less active in 2016–17 than she was in previous years. She has been a director for a few years and has made significant contributions to the space.

**Jamie Frost** also works in public safety and emergency response for the City of Calgary. His role tends to be to respond to inquiries from members, and he also works to drive membership by inviting prospective members to visit Protospace. Like Haley, life changes and other commitments have led Jamie to be less active as a director in 2016–17, but he has had a long history as a director at Protospace and has made significant contributions.

**Byron Hynes**, an IT and management consultant and trainer, does most of the administration at Protospace. He set up a database and private website that tracks membership information, and does most of the bookkeeping. He works to connect with other maker-related organizations in the community and is seen as the “chief cat herder” at Protospace. His views are more often than not supported by the general membership.

**Mike Morrow** is seen as being the “elder statesman” among the directors. He is a retired postsecondary educator who brings a calm and methodical approach to issues that arise. He develops and presents skills and tool training courses, and has been instrumental in developing the new woodworking area at Protospace.

**Ian Oliver** is the youngest director of Protospace. He is currently a college student who is a dedicated and skilled maker. His career goal is to be an inventor. His approach is often to observe the situation, see how people respond, and then to prepare a complete synopsis of an issue along with his own opinions about it.

Note: IT = information technology.

Source: Byron Hynes, e-mail message to case author, March 14, 2017.

Exhibit 4: Protospace Forum: Future of Protospace (sample responses to an initial post)

Friday, December 30, 2016—JF

There is already a solution in place (member termination policy). My super short version is: Nobody wants to be the police. If you can solve that problem then the rest falls into place. The directors have their hands full with operational needs, let alone actually getting to use the space for projects. We don’t need a KGB committee. Play some Ultimate Frisbee. You’ll quickly note that there are no officials except in the highest level of play and the officials stay hands off unless absolutely necessary. You have to call your own fouls. In a sense, that’s what we do at Proto[space]—“Be excellent” is the guiding principle to all our policies. Yes, it was a same-but-different story as I’ve watched proto grow from 20–50–200 members in half a decade. If it’s equipment lockouts that let us trace the last user, that might be the solution. If it’s more cameras and dedicated time to scrutinize footage (not fun), that might be the solution.

Friday, December 30, 2016—SY

This is going to be a disjointed message: We also have what has been called the baseball policy for less major problems. One area that bothers me more than others is that we get a lot of new members who seem to think that they pay dues and then are entitled to use of the space, but don’t volunteer or help out. At the last meeting, I proposed making volunteering a requirement for vetting. The motion failed but I am hoping to revise it a bit for the next meeting. I don’t think we actually should grow any time soon. We can’t seem to get our culture across to all the members we have and there are very few things we can’t do that I wish we could. I think waiting until we have around 200 members like now but only need to sign up a couple members a month to maintain it is ideal. I might even support a cap in membership or more rigorous processes to become a member to avoid the freeloader type.

Friday, December 30, 2016—BH

I mentioned at the last meeting that members should start pondering on two thoughts (waaaay not a motion or policy, but a “start to think about”): Is it better to have 100 members at $100 per month or 200 members at $50? Would more or less than half continue if rates doubled? Do we want to consider a waiting list (capping) at some number? (250 maybe?)

Friday, December 30, 2016—CG

It’s a worthwhile discussion. Are there that many heavy users who would pay double? Are there that many people being defined as freeloaders? How is that defined? How many are gym membership types such as myself who rarely use the facilities at all? Waiting lists can generate urgency and scarcity, which is good for sales, but I don’t think behind the impetus that it is a quantity issue so much as culture issue, so first come first served lists might not help that. There seems to be a drive toward a cultural ideal, which is fine, but any such drive tends to, as a side effect, often also alienate people you would like to keep.

**Exhibit 4 (continued)**

Friday, December 30, 2016—KV

It’s basically been agreed in casual conversation that what we pay at Protospace is very cheap compared to other makerspaces. Our low membership fees have definitely been a large draw for people, especially with the wide range of tools and teaching we offer. Tailoring fees based on use would be hard, as who gets to judge what heavy use is or is not? And what if you use the space a lot, but also spend a lot of your own time and money improving the space? And while we do have a termination policy, as far as I know it’s never been used. And while that may be because we’ve been super lucky, it’s most likely because members feel that there is no recourse and would rather leave or just not say anything. What I’m suggesting is not a different termination policy, but more of a graduated system (3 Strikes, 2.738 Sad Faces, whatever). Why should people really care about sweeping up sawdust or putting their screwdrivers back when they can just leave it for a more responsible person to clean up? Yeah, they might get called out, but that won’t stop someone who doesn’t care in the first place. It’s a cynical view, sure, but there are a couple people that I can point out just by listening to other members when I come in on Tuesdays. We do have cameras, and if what’s needed is half an hour of footage review I’d happily be that guy. But if there’s no way to act on that evidence then it is a pointless endeavour. . . . As for member size? Protospace has the potential to grow a lot more, however the current “vetting” system that consists of “Have you taken out the garbage yet?” while positive and entertaining, does nothing to actually filter out people who would have a negative or completely neutral effect on the space. . . . I liked the way Protospace was when I joined, it’s /why/ I joined. But after being in the space for over a year, and seeing all the effort going into it by rather small percentage of the membership is enough to say something needs to change. And yeah, some people aren’t going to like it. They’ll pack up their toys and go home. But the people who actually care about the space, and what it represents, will hopefully be all for it.

Friday, December 30, 2016—SY

We have a 3 strikes policy as of the October meeting, it reads as follows: A “not being excellent” complaint can be emailed to the directors with a short note of who and why. For example, “I saw <name> use this tool without training, 4pm on Thursday.” The person making the complaint must first talk to the member that they feel is not being excellent. The complaint is intended to deal with minor but repeat problems. Each complaint expires 30 days after it is received. If a member accumulates 3 of them, they are required to retake the general orientation before being allowed to use tools or access the space alone. The rationale for this policy is to provide a means to deal with minor infractions that are habitual but not serious enough to warrant revoking a membership.

Friday, December 30, 2016—JB (1)

No offense, but I disagree with all of [the initial poster’s] points. You write: “. . . I’ve had a couple conversations with people about some of the issues plaguing the space right now . . . the space has had to overcome a lot of issues (space, tools, training, etc.), and now faces a whole bunch of new issues that need to be dealt with . . . one of the biggest issues we face now and will continue to face is how we hold people accountable for their actions (for example damaging tools or leaving a mess for another member to deal with . . . we need a plan in place to deal with negative events before they happen.” In contrast, what I have observed, is that when tools are broken, they are repaired in short order, when I enter the space, it is generally clean and in good order. I believe you are suggesting a solution to a problem that has not yet occurred.

**Exhibit 4 (continued)**

Friday, December 30, 2016—JB (1)

BH, these are excellent questions, which prompted another related question in my mind: At what point is the membership is too large? My answer: The membership is at capacity when any member finds they need to wait more than 50 per cent of the time before they can use a particular tool or shop area, due to another member currently using/occupying it. . . . The membership is at capacity (or majority of members are too inexperienced, inept, or inconsiderate) when any 50 per cent or more of the tools are broken or in dis-repair. At this point, I don’t think Protospace is anywhere close to either of the above limits. I would suggest then, it would be better to have 200 members at $50/month compared to 100 members at $100/month. Based on the criteria mentioned above, I would further suggest Protospace could expand to 400 members (at $25/month) before the space and tools became over-crowded and/or unusable.

Friday, December 30, 2016—SY

The majority of the time, yes, tools are fixed, but as an example, the face mill was grenaded a month ago and the last user didn’t speak up or fix it. I have now bought 4 blades for the metal cutting band saw and only ever gotten to use each one once as the next time I come back it’s wrecked. The problem isn’t things not getting fixed, it’s people breaking things and doing nothing about it so other members end up fixing it. It doesn’t take long to realize who the problem members are based on the mess they leave.

Friday, December 30, 2016—JB (2)

The place may appear clean and the tools appear to be repaired immediately because that is all some of us ever do. It’d be really nice if everyone did their part towards this. Believe it or not, I’d rather be doing my actual hobby. 50 per cent of the tools being broken!? Nope. I intend to have every woodworking tool in nearly perfect working order very soon and they better stay that way for the most part.

Source: Protospace documents (online Protospace forum interaction).

**Exhibit 5: Protospace Forum: Future of Protospace (Wrap-up Post)**

**Monday, January 16, 2017—IO**

Here’s the post I’ve been promising for two weeks now. I would have posted it last week, but I got distracted with some issues at school. When I was writing the majority of this post back on Dec 31st, for some reason, I felt as if this thread was attacking me specifically. That was probably an unreasonable feeling, but if I come across as at all defensive below, I guess that’s why. . . .

**TL;DR:\***

1. A membership cap is unnecessary and antithetical to our purpose.
2. We need to make it easier for all members to help out around the space (yes, still) and to avoid causing damage.
3. We need a balance between helping out and doing personal projects (which paid staff would be the opposite of).
4. We need to write and post all over the space both a code of conduct and a general rules list, as well as area-specific rules lists.
5. There is always more room to expand our capabilities.

**1. Do we need to cap membership?**

I can’t find it now, but I thought that somewhere in our founding documents was something to the effect of “Calgary Protospace Ltd. exists for the benefit of the people of Calgary.” If that is in there somewhere, I would interpret it as being against a membership cap, because then we wouldn’t be benefiting all Calgarians who want to benefit from Protospace, but only the 250 (and turnover) Calgarians who happened to be the first to hear of us and sign up. (Can anybody find what I’m remembering?) What I can find in the documents (specifically, the Memorandum of Association §7a) is a membership cap of 50. We have long since passed that, and have out of necessity declared what we think of as “a member of Protospace” to be a different concept than the “members” that are limited to 50. However, that is what is written, and while I am strongly against a membership cap at any number, I think 50 would be the easiest to get me on board with. If we institute a membership cap at all, I will seriously consider resigning my membership when we reach it to make room for someone who might make better use of the resources of Protospace.

However, I really think a cap on membership is not necessary, certainly not at this level. The following spaces all use some form of by-the-members-for-the-members model and have significantly more members than us:

* London Hackspace has over 1,200 members paying whatever amount they want (in the same floor area as us, and using a very similar governance model, but seemingly with no formal training courses whatsoever) and they don’t seem to be considering a cap. The most they’ve ever done is avoid talking to the press for a year, when they were cramped and looking to move, so that people who would’ve liked to join couldn’t find out about them as easily.
* Dallas Makerspace has over 1,100 members with pretty much the same membership levels as us ([US]$50 regular/[US]$35 subsidized) and as far as I can tell they’ve never even brought up the idea of capping membership.

**Exhibit 5 (continued)**

* Pumping Station: One (Chicago) has over 400 members and they operate pretty much exactly the same way we do (do-ocracy, direct democracy, no day passes, directors and trainers all volunteers, public and private Google Groups mailing lists, same major fields of making, etc.). I haven’t been able to find any mention of the idea of capping membership, but I can’t see their admin list.
* FabLab Munich has about 300 members and they operate similarly to us (all volunteer-run, community-focused). They don’t seem to have a membership cap, but I can’t find where they discuss stuff, so I don’t know if they’ve considered it.
* Stockholm Makerspace has over 500 members and they operate similarly to us (do-ocracy, direct democracy, no staff, volunteer directors, open 24/7 for members). Their FAQ [frequently asked questions] says they consider having too many members to be a “luxury problem” (Google Translate’s words) to be solved by expanding.

(Perhaps we should contact some of them and see how they’ve handled having so much membership. I’m willing to do some of this.)

Also, the more members we have, the more connections we have and the more improvement ideas and effort we have, which all benefit the rest of the membership.

**2. Being a good member needs to be easy.**

The general message we currently send is: “Tools! Space! Make a thing!” And while that is a great message to send and uphold, it also has to be made clear that if you wish to be part of the space, then at the very least you have to respect all the parts of it. Respect the tools by using them properly, and by making the effort to learn if you don’t know so that damage and loss of time/money does not occur. Respect the space by cleaning up after yourself, tools and work area. And respect the efforts of other members to improve the space by pitching in; take out a garbage, clean off a table you didn’t use, fix a tool you know how to fix, and so on.

We do a great job of saying “Thank You” to the people who put in the effort, but when we as a group don’t make every effort to prevent damage, unattended messes, etc. it’s like saying “Thanks for doing that thing, we appreciate it, but not enough to keep someone from wrecking it.”

We need to make improvement/maintenance/respect for equipment easier. Signage, wiki, etc. You can’t blame someone for something they don’t know. You can blame them for not trying to find out, but learning effort is not unlimited.

Each piece of equipment that requires training or special caution or care should be clearly marked as such, so that there’s no reason for someone to not know at least the basic information on how to avoid hurting themselves or the tool. This is part of what Pat and Isaac are working on. . . .

I think this is a good point to mention the access control system Byron’s building. I think helping more people become competent is a better approach than locking out the not-yet-competent people. Fortunately, we are already doing that with the training courses, so I’m somewhat in favour of the access control project at this point. . . .

**Exhibit 5 (continued)**

**3. Volunteerism and balance**

It seems that many of us have a goal of causing the membership to be made up mostly or entirely of people who usually put contributing to Protospace above their own projects. That sounds like a good thing, but as that kind of person (I think/I hope), I think it could turn out badly. First, obviously, this would result in more effort being directed toward improving Protospace rather than working on personal projects. That’s a good thing, but only up to a certain point. If all effort goes into improving Protospace and no personal projects get done, it defeats the purpose of Protospace. (On the other hand, of course, if all effort goes into personal projects, everyone has to deal with a huge mess and unmaintained equipment, which is bad for those same projects.) Second, if you somehow get all members to volunteer a lot, that will not last. People will see everyone else volunteering so much and will feel that they don’t need to volunteer much anymore, because it will get done by someone else in a few minutes. Therefore, I think that there must be a balance somewhere between almost no volunteering and almost all volunteering, where enough volunteering gets done to sustain the usability of Protospace, but the volunteering does not take away from personal projects so much that Protospace’s purpose is defeated. This seems to be an equilibrium point, which the amount of volunteering will naturally tend toward if it gets too high or too low, but just letting it self-regulate like that results in the volunteering load being unfairly shared between members. Therefore, we need to figure out some way to get exactly the necessary amount of volunteering done, no more and no less, and shared fairly between all members (which is the hard part).

Having paid staff is the opposite of achieving that balance. That’s just one reason I’m opposed to that idea. (Other reasons: I don’t want too much bureaucracy, possible conflicts of interest, paid staff cost money, I want to avoid becoming a managed space. . . .) I do agree that volunteering is necessary on top of dues, proportional [to] how much each member uses the space. But I think that the necessary per-member amount of volunteering is probably a lot less than most of us seem to think, because everyone who is volunteering currently is making up for everyone who isn’t. It’s just a matter of sharing it fairly. Many hands make light work. (Aside: The word “volunteer” implies “voluntary.” If we are going to enforce it as a mandatory part of membership, I agree that we might want to use a different word.)

Related to part 4: Do we actually have “clean up after yourself” codified as a rule anywhere, or is it just an informal expectation/part of “be excellent to each other”? LHS [London Hackspace] has a whole section of their rules list about it: https://wiki.london.hackspace.org.uk/view/Rules#Tidiness.

**4. Code of conduct and rules**

While I was doing research for this post, I noticed that a lot of other spaces have codified rules lists and codes of conduct. Maybe something is slipping my mind, but as far as I know, we currently only have a list of links to approved policies (one of which is about the logistics of membership but none of which covers how members should behave) and two separate member guidebooks that are both out of date and abandoned. I think we need to have some form of code of conduct and/or general rules list like other spaces have.

The codes of conduct usually go something like this and are generally pretty short:

* Be excellent to each other.
* Don’t be on fire.
* Maintain a clean and safe environment.
* Follow posted notices.
* Enforce the code of conduct.

**Exhibit 5 (continued)**

The rules lists are generally much longer and more specific to the way each space operates, each space’s equipment, etc. We could/should have a separate rules list for each area in addition to the general one, because you don’t want to make people scan past all of the woodworking rules when they want to see how to safely use the 3D printers. The “welding area” has a rules list printed nicely and posted on the wall already.

**5. Room to expand**

I must have been imagining it, because I can’t find it now, but I thought someone said that they thought Protospace doesn’t need to expand any more, and we have all the tools we will ever need. The person I thought said this seems to do mostly/only metalworking, so I think they might say the same if everything in bay 110 save the member shelves didn’t exist.

I think that claim is untrue and absurd, regardless of who made it. I think it shows that a declaration that Protospace is complete is unlikely to be true unless a majority of the members actually state their agreement with it, because any single member is unlikely to have a good idea what capabilities the other members want to add to the space.

For example, as far as I know, there is currently demand—though we don’t know how much—for the following: hot glass, more sewing, chemical photography (darkroom), chemistry, biology, physics, aerodynamics, more vacuum processing, cryogenics, vacuum tube repair/fabrication, semiconductor fabrication, and a few more woodworking tools (not to mention the ability to do woodworking in a clean shop). While some of these are unlikely to exist at Protospace any time soon, I feel that many members (and potential members) would benefit from each of these. (If the majority doesn’t agree, we won’t add them. They’re just examples.) There’s a somewhat maintained list on the wiki: http://wiki.protospace.ca/Tools\_We\_Want. (You can help maintain it by adding what you want and crossing off things we’ve acquired. You will need a wiki account—registration is at the top right corner.) Of course, fitting in new equipment without interfering with the use of our existing equipment and space can be challenging, but that doesn’t mean nobody wants it.

Note: \*TL;DR = “too long, didn’t read”; this signalled that a post that was too long for most people to read came with a summary.

Source: Protospace documents (online Protospace forum interaction).

1. Makerspaces were “physical locations where people can come together to make” a variety of different things (e.g., woodworking, metal working, electronics, 3D printing, and more). Brit Morin, “What Is the Maker Movement and Why Should You Care?,” Huffpost (blog), July 2, 2013, accessed April 5, 2016, www.huffingtonpost.com/brit-morin/what-is-the-maker-movemen\_b\_3201977.html. [↑](#footnote-ref-1)
2. All currency amounts are in Canadian dollars unless specified otherwise. [↑](#footnote-ref-2)
3. Morin, op. cit. [↑](#footnote-ref-3)
4. Reader’s Digest Association, *Reader’s Digest Complete Do-It-Yourself Manual* (Pleasantville, NY: Reader’s Digest Association, 1973); Henry H. Saylor, *Tinkering with Tools* (Boston, MA: Little Brown, 1924). [↑](#footnote-ref-4)
5. Noelle Swan, “The ‘Maker Movement’ Creates D.I.Y. Revolution,” *The Christian Science Monitor*, July 6, 2014, accessed April 5, 2016, www.csmonitor.com/Technology/2014/0706/The-maker-movement-creates-D.I.Y.-revolution. [↑](#footnote-ref-5)
6. Justin Lahart, “Tinkering Makes Comeback Amid Crisis,” *Wall Street Journal*, November 13, 2009, accessed April 5, 2016, www.wsj.com/articles/SB125798004542744219; O’Reilly Media, “MAKE Division Spins Out from O’Reilly Media as Separate Company,” press release, January 24, 2013, accessed April 5, 2016, www.oreilly.com/pub/pr/3185. [↑](#footnote-ref-6)
7. “Maker Faire: A Bit of History,” Maker Faire, accessed April 5, 2016, http://makerfaire.com/makerfairehistory/; “What We Do,” Maker Faire, accessed April 5, 2016, http://makerfaire.com/media-kit-press-resources/. [↑](#footnote-ref-7)
8. Martha Stewart, “Meet USA’s New Entrepreneurs,” *USA Today*, October 14, 2013, accessed April 5, 2016, www.usatoday.com/story/money/business/2013/10/14/martha-stewart-column-meet-the-makers/2980701/. [↑](#footnote-ref-8)
9. John Tierney, “How Makerspaces Help Local Economies,” *The Atlantic*, April 17, 2015, accessed April 5, 2016, www.theatlantic.com/technology/archive/2015/04/makerspaces-are-remaking-local-economies/390807/. [↑](#footnote-ref-9)
10. Jon Kalish, “DIY ‘Hackers’ Tinker Everyday Things into Treasure,” on *Weekend Edition Sunday*, National Public Radio, radio broadcast, 5:17, November 21, 2010, accessed April 5, 2016, www.npr.org/2010/11/12/131268511/diy-hackers-tinker-everyday-things-into-treasure. [↑](#footnote-ref-10)
11. Tim Bajarin, “Why the Maker Movement Is Important to America’s Future,” *Time*, May 19, 2014, accessed April 5, 2016, http://time.com/104210/maker-faire-maker-movement/. [↑](#footnote-ref-11)
12. Stewart, op. cit. [↑](#footnote-ref-12)