Comparing Male and Female Student Responses on MIT Maker Survey: Understanding the Implications and Strategies for More Inclusive Spaces

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ABSTRACT

This paper explores the differences in responses from male and female students in a "Making and Makerspaces Survey" at MIT to help understand potential difference and their implications for designing and running inclusive makerspaces. The goal of the work is to deliver better makerspaces at MIT and provide ideas for other universities to do the same.

INTRODUCTION

This paper explores the differences between responses from male and female students in a "Making and Makerspaces Survey" at MIT. The intent of this analysis is to understand potential differences amongst different genders, and understand what impact those differences may have on designing and running inclusive makerspaces. The import of this work is clear: elucidating the differences among different communities and their subsequent needs enables universities to improve makerspace accessibility among all users. Many students at MIT could be positively impacted by the delivery of spaces that better suit their needs. Even more students could be impacted if such spaces were implemented on a national scale. The implications of failing to register and adapt for these differences include failing to serve, or at the very least underserving, a large population of university students.

The 'making' movement originated with the intent of spreading the benefits of making to all - without regard for gender, cultural, or economic differences. Historically however, the making community has remained predominantly white, male, and upper- or upper-middle class [1]. One reason for these disparities may be the connection of "making" culture to "tech" culture and STEM education [2], industries and areas of study which have also historically struggled to attract female and minority employees and students.

Noting these disparities, recent research has begun to focus on the participation of female and minority students in academic makerspaces [3, 4, & 5]. This paper presents some of the results from an institute-wide survey carried out by MIT's Project Manus examining the making-activities of MIT students, focusing on responses that appear to have some gender-dependence. The paper concludes with recommendations for addressing the reported gender differences in students' use of makerspaces at MIT.

SURVEY PROCESS AND PARTICIPATION

At the end of the 2019 spring semester, with the help of the MIT Office of Institutional Research (IR), MIT Project Manus conducted a survey of all MIT students on the subject of making and makerspaces (see appendix A for survey questions). A similar survey was conducted 4 years prior, in the summer of 2015. The response rate for the 2019 survey was 15%: 1,600 students responded out of 10,675 students invited. The typical response rate for similar surveys at MIT is 15-30%; the low-end response rate is likely a result of the survey coinciding with the end of the semester and final exams. The respondent pool is over-represented by women and younger students when compared to the overall population of MIT students, as shown in Table 1. According to IR, both of these patterns are typical across MIT campus-wide survey projects, and the demographic profile of the respondents is within the realm of what IR expected.

The survey invitation was initially sent out via email from the Chancellor, Cynthia Barnhart, with two reminder emails: one from MIT Maker Czar, Professor Martin L. Culpepper, one week after the initial email, and a second from Project Manus Associate Director, Jonathan M. Hunt, two weeks after the survey was originally sent out. Incentives were provided to encourage the students to respond (appendix Y contains a summary of incentives). The results were analyzed overall and with breakouts by school, department, student level (grad/undergrad), student year, gender, and under-represented minority (URM) group. The remainder of this paper focuses on results where there was a notable difference in responses based on gender.

	Survey Participation Profile	MIT Population invited to take survey
Undergraduates	49% (N=793)	41% (N=4,424)
Graduates	51% (N=817)	59% (N=6,251)
Female Students	49% (N=778)	40% (N=4,297)
Male Students	51% (N=822)	60% (N=6,378)

Table 1- Survey participation compared to MIT population invited to take part in survey

SCHEDULE PREFERENCES - WEEKEND & EVENING HOURS

While a preference for weekend hours was present amongst students of both genders, 76% of female students (N=486) responded that they would use makerspaces on weekends, whereas only 67% of male students (N=422) indicated a similar interest shown in Fig. 1. The difference in these responses are consistent with the 2015 survey, in which 56% of female students, compared to 46% of male students, indicated a preference for weekend hours. The data does not indicate a reason for the twenty point increase among both genders in the past four years, but in both surveys, weekend hours was the most popular choice across genders, followed by 7-10pm on weekdays. It is possible that the approximately 40% increase in preference for weekend hours is related to an increased focus on hands on learning starting in the first year undergraduate curriculum.

One can assume that on weekends, students have fewer time constraints from classes and meetings than during the week. Having fewer time constraints may enable students to dedicate more time to a project. This is particularly salient for beginner makers who may take longer to complete their work.

In order to be inclusive of and meet the needs of the female community, university makerspaces should offer weekend hours. It is worth noting that not only is opening the space when female students want to make important for inclusivity and diversity in the space, but having open hours on weekends and weekday evenings is clearly beneficial to a majority of students regardless of gender. Because staffing weekend and evening hours with full time employees can be particularly challenging, spaces should explore alternative staffing models, using students to keep the space open, for instance, in order to serve this additional need.

UNDERSTANDING AND CONFIDENCE

Figures 2 and 3 show distinct differences between the reported level of both understanding and confidence between male and female students in a makerspace. 56% (N=361) of male students report understanding the variety of items they can create in a makerspace, while only 45% (N=287) of female students report the same. Similarly, 54% (N=355) of male students report having the skills needed to use a makerspace, while only 42% (N=269) of female students report the same. The data also shows that approximately 10% more women disagree or strongly disagree that they have the skills or understanding needed to use a makerspace. For a school the size of MIT, a 10-12% difference impacts over 1,000 students.

Figure 1 – Thinking about your own schedule during the school year, would you use makerspaces during any of these times if they were open?
**check all that apply, may add up to >100%*

While these responses lend themselves to multiple interpretations, it is clear that female students at MIT consider themselves less informed and less skilled than their male counterparts. This lack of understanding and confidence could be due to not having as many opportunities, either before or during their time at MIT, or less willingness to avail themselves of opportunities. It could also be attributed to a simple, if unwarranted, lack of confidence in their own abilities. The difference in understanding that seems illustrated in the survey is not readily apparent when anecdotally observing the survey population. There does not seem to be a difference between the abilities of male and female student makers at MIT. Both genders are well-represented as highly skilled makers on the more complicated equipment, as well as in student leadership in makerspaces at MIT [7]. Whether due to actual or

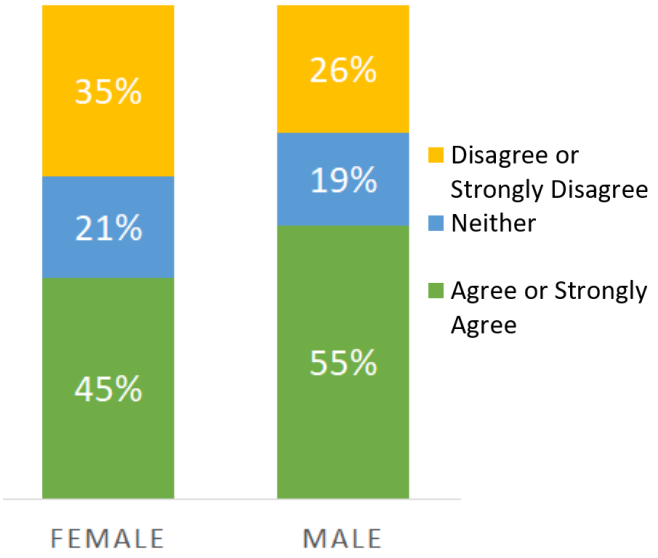

Figure 2** – Please rate the extent to which you agree or disagree with the statement, **"I understand the variety of things I can create in a makerspace."

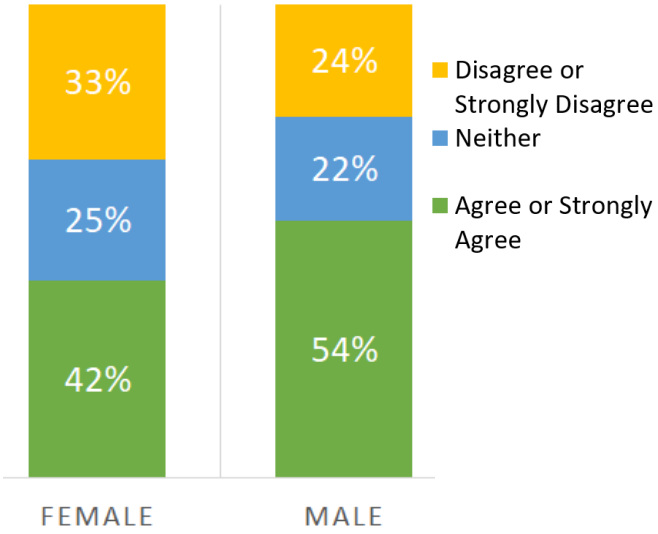

Figure 3** – Please rate the extent to which you agree or disagree with the statement, **"I have the skills needed to use a makerspace."

perceived lack of skill, it is imperative that university makerspaces address this disparity to make spaces welcoming to female users, as well as less skilled beginner makers regardless of gender.

While embracing beginner makers is a crucial aspect of the maker movement, addressing this concern beyond simply offering a single initial introductory training seems to have historically been a low priority in many spaces. By offering carefully tailored follow-up projects for beginner makers to practice their skills, university makerspaces can begin to address the disparity between both confidence and understanding between male and female students. MIT is piloting the use of skill-building project kits this fall; over 80% (N=962) of students responding in the survey indicated they were either likely or very likely to use them if available. Additionally, offering easy-access information about machine capability is crucial for novice makers. Finally, designating "beginner days," in which new makers are specifically catered to, can begin to address what may be a difficult power dynamic between experienced makers and new makers. Days designated for new makers can also ease the potential difficulty of new users breaking into a tight-knit shop culture.

TYPES OF TRAINING

When developing training modules for an academic makerspace, it is imperative to consider the implications of training methods. Video trainings serve as a helpful tool to increase the amount of information being conveyed in mass. The use of videos as a training tool potentially reduces the background information an in-person trainer must cover, thereby increasing the amount of interactive time available for the students in the training. Videos also enable students to refresh their skills by re-watching the video at a later date. As mentioned in a free response for the survey:

"YouTube is a great way to transfer tacit knowledge / basic primer so it offloads some of the pressure that a technician feels on training really basic stuff, and he/she can focus on transferring more advanced knowledge to the student."

That being said, different demographics appear to have a stronger affinity for hands-on versus video training. 77% (N=474) of female students chose hands-on training as one of their preferred training methods while only 61% (N=376) of female students noted a preference for video based training. In comparison, 71% (N=439) of male students indicated a preference for video based training and almost as many, 70% (N=436), listed a preference for hands-on training.

Based on the results of the survey, it is clear that video training is a desirable training tool, but it should be used to augment hands-on training, not as a replacement. It is possible that a lower preference for video training among female students is related to the aforementioned lack of confidence in their own skills. More work is needed to understand the reasons that male students are more interested in learning from videos than are female students.

Figure 4 – What are your preferred way to learn about making technologies/equipment? Check all that apply

FUTURE WORK AND CONCLUDING REMARKS

Further work is needed to understand the reasons for the gender discrepancies related to self-evaluation of skills and understanding tool capabilities. Additional understanding about the characteristics of good video-based training is needed to create more effective training videos. For example,

YouTube videos were one of MIT students' most-preferred methods of training while MITx -- long-form -- video training was the least preferred. Further exploration is also needed to understand the impact of gender on training preferences. It is possible that the male preference for YouTube videos may be related to higher confidence. Beginner makers, female or otherwise, may perceive a higher benefit to hands-on training, which increases their personal experience on a given tool or process, over a video in which they watch someone else interact with the tool or process. This personal, hands-on experience may be perceived as necessary before they can realize the full potential of video training.

There are many changes, large and small, that a makerspace can make in order to focus on inclusion. Whether it be by offering hours outside of common lecture and lab times, more introductory training, project kits, "new maker" days, or thoughtful options across different training methods to reach different kinds of learners, one can and should address the clear disparities among user groups in a makerspace. Most importantly, makerspaces should survey their own students to determine how to best serve the needs of their own population.

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APPENDIX

A: Full survey questions for MIT Maker Survey

B: Incentives for students to complete the survey

Grand prize: 1 respondent was chosen at random to receive their choice of $250 Amazon gift card or similarly priced 3D printer

Everyone: 1 in 15 chance to receive choice of $10 donation to favorite makerspace on campus or $10 Amazon gift card

Welcome

mak·er·space
/ˈmākər spās/
noun
A physical location with collective community ownership, responsibility and accountability; where members build physical prototypes and objects by using tools and technologies themselves, in a hands-on manner.

Welcome ${m://FirstName}!

MIT has a strong history and culture of hands-on "making" in every field of study at the Institute. The campus has more than 130,000 square feet devoted to shops and makerspaces.

Your responses to this survey will be used to gauge student demand for specific equipment and resources; assist existing shops and makerspaces understand if and how student needs might be changing; and help campus planners prioritize what is essential in any new makerspace to make it accessible to a range of builders, makers, and creators. If you have questions about this survey, or encounter difficulties in taking it, please contact maker-data@mit.edu.

Fine Print: This survey is voluntary and you may answer as few or as many questions as you wish. Please be assured that the data are confidential, and the results of any research or analysis using the data will be presented in a way that individual respondents cannot be identified. For the purposes of analysis, we may combine other data with your responses to our surveys.

What do you build, make, or create?

In the last year, have you built, made, or created in any of these areas? Please check all that apply.

- ☐ 3D printing, additive manufacturing, etc. (1)
- ☐ Architecture, drafting, etc. (2)
- ☐ Art, painting, graphic design, etc. (3)
- ☐ Biological/Biochemical processes, etc. (4)
- ☐ Biomechanical/medical device, etc. (5)
- ☐ Cinematography, animation, photography, etc. (6)
- ☐ Clothing, knitting, sewing, etc. (7)
- ☐ Cosplay, costuming, etc. (8)
- ☐ Culinary arts, creative cooking, etc. (9)
- ☐ Dance, performance art, etc. (10)
- ☐ Electronics, Arduino, etc. (11)
- ☐ Furniture, sets, shelving, etc. (12)
- ☐ Metal components, machining, etc. (13)
- ☐ Jewelry, soldering, enameling, stone setting, lost wax casting, etc. (14)
- ☐ Metalwork, smithing, foundry, etc. (15)
- ☐ Music recording, composition, etc. (16)
- ☐ Papercraft, origami, etc. (17)
- ☐ Product design, etc. (18)
- ☐ UI/UX, web design, etc. (19)
- ☐ Sculpting, ceramics, glass blowing, etc. (20)
- ☐ Software, code, programming, etc. (21)
- ☐ Welding, etc. (22)
- ☐ Woodworking, carpentry, etc. (23)
- ☐ Writing, poetry, book, etc. (24)
- ☐ Other (25)
- ☐ None of these (26)

Display if: In the last year, have you built, made, or created in any of these areas?!= None of these OR Selected Choices Count Is 0

Carry Forward Selected Choices from "In the last year, have you built, made, or created in any of these areas?"

Were the creations made for? Please check all that apply.

	Class (1)	Personal/Hobby (2)	Research (3)	Other (4)
	☐	☐	☐	☐

Carry Forward Unselected Choices from "In the last year, have you built, made, or created in any of these areas?"

Among the list you did not select, if you had access, would you have built, made, or created in any of these areas? Please check all that apply.

Do you identify as any of the following?

- ☐ Artist (1)
- ☐ Creator (2)
- ☐ Designer (3)
- ☐ Engineer (4)
- ☐ Entrepreneur (5)
- ☐ Innovator (6)
- ☐ Inventor (7)
- ☐ Leader (8)
- ☐ Maker (9)
- ☐ Mentor (10)
- ☐ Scientist (11)
- ☐ Software Developer (12)
- ☐ Technologist (13)
- ☐ Hobbyist (14)
- ☐ Other (please specify) (15) _____
- ☐ None of the above (16)

Have you or do you intend to take any classes, including lab classes, at MIT where you are expected to "make" something as a prototype or for a final project?

- ○ I have taken one or more such classes, or am taking one now (1)
- ○ I intend to take such a class (2)
- ○ I would like to, but I don't think I will be able to (3)
- ○ No (4)

Display if: Have you or do you intend to take any classes, including lab classes, at MIT where you are expect... = I would like to, but I don't think I will be able to

You selected that you would like to take a class where you "make" something, but don't think you will be able to. Which reasons do you feel are preventing you from taking the class? Check all that apply.

- ☐ Class is full/oversubscribed (1)
- ☐ Not enough time (2)
- ☐ Too expensive (3)
- ☐ Too many pre-requisites (4)
- ☐ Required shop access that I don't have (5)
- ☐ Doesn't fit into curriculum (6)
- ☐ Other (please specify) (7) _____

[Jump to Last Section if respondent does not identify as a maker (of any kind) or has not "made" anything]

Where do you build, make, or create?

While a student at MIT, where do you build, make, or create on MIT's campus? Please check all that apply.

- ▢ Where I live: My bedroom… (1)
- ▢ Where I live: Shop or hobby space in the building (2)
- ▢ Wherever my laptop is (3)
- ▢ Makerspace or department-based shop on campus (4)
- ▢ Other student group space (5)
- ▢ Off-campus (please specify) (6) _____
- ▢ I have not made things at MIT (7)

Display if: While a student at MIT, where do you build, make, or create on MIT's campus? = Makerspace or department-based shop on campus

While a student at MIT, where do you build, make, or create on MIT's campus? Please check all that apply.

- ▢ ACT Mars Fabrication Lab (1)
- ▢ Architecture shops (Fab, Wood, etc.) (2)
- ▢ Aero Astro Machine Shop (name) (3)
- ▢ Beaver Works (4)
- ▢ Bioinstrumentation Lab (5)
- ▢ CEE Student Machine Shop (7)
- ▢ Center for Bits and Atoms (8)
- ▢ Chemistry Machine Shop (9)
- ▢ CSAIL Machine/Wood Shop (10)
- ▢ Cypress Engineering Design Studios (EDS) (11)
- ▢ The Deep (12)
- ▢ D-Lab (13)
- ▢ Edgerton Center Area 51 CNC Shop (14)
- ▢ Edgerton Student Shop (15)
- ▢ Edgerton Student Project Lab (16)
- ▢ Gelb Laboratory/Shop (17)
- ▢ Forge/Foundry (18)
- ▢ Glass Lab (19)
- ▢ Global Engineering and Research Lab (20)
- ▢ Grad Student Machine Shop (AMP Lab) (21)

- ☐ Hobby Shop (22)
- ☐ Laboratory for Engineering Materials (23)
- ☐ Maker Lodge (24)
- ☐ Martin Trust Center Protoworks (25)
- ☐ ME Maker Workshop (26)
- ☐ ME Manufacturing (formerly LMP) (27)
- ☐ MITERS (28)
- ☐ MIT Museum Studio (29)
- ☐ Pappalardo Machine Shop (31)
- ☐ Physics Machine/Wood Shop (32)
- ☐ Student Art Association (START Studio) (33)
- ☐ SUTD International Design Center (34)
- ☐ Other department-based shop or research lab (38)
- ☐ Other (please specify) (40) _____
- ☐ I have not made things at MIT (41)

Approximately how much of your own money do you spend each academic year on the resources, raw materials, tools, etc. for things you make at MIT?
You don't need to be exact, just make your best guess.

- ○ $0 (1)
- ○ $1-$50 (2)
- ○ $51-$100 (3)
- ○ $101-$150 (4)
- ○ $151-$200 (5)
- ○ $201-$250 (6)
- ○ $251-$500 (7)
- ○ $501-$750 (8)
- ○ $751-$1,000 (9)
- ○ $1,001-$1,500 (10)
- ○ $1,501-$2,000 (11)
- ○ Over $2,000 a year (12)

During a typical week in the last academic year, how many hours did you spend building, making, or creating? Again, you don't need to be exact, just make your best guess.

- ○ None (1)
- ○ Up to 5 hours (2)

- ○ 6-10 hours (3)
- ○ 11-15 hours (4)
- ○ 16-20 hours (5)
- ○ 21-25 hours (6)
- ○ 26-30 hours (7)
- ○ More than 30 hours (8)

When trying to find machines and spaces on campus, what sources do you use? Select all that apply

- ☐ Peers (1)
- ☐ Staff/Instructors (2)
- ☐ Mobius (3)
- ☐ Web search (4)
- ☐ In class (5)
- ☐ Advisor (6)
- ☐ Other (7)

Access to Space

Please rate the extent to which you agree or disagree with each of the following statements.

	Strongly agree (1)	Agree (2)	Neither agree nor disagree (3)	Disagree (4)	Strongly disagree (5)
I know the location of makerspaces on campus. (1)	○	○	○	○	○
I know the hours makerspaces are open on campus. (2)	○	○	○	○	○
Current makerspaces have hours that are convenient for me. (3)	○	○	○	○	○
The machines I need to make are available at reasonable fees. (4)	○	○	○	○	○
I am able to get training to use spaces in a timely manner. (5)	○	○	○	○	○
I feel like I'm part of a maker community in at least one space where I work. (6)	○	○	○	○	○
I have the skills needed to use a makerspace. (7)	○	○	○	○	○
I understand the variety of things I can create in a makerspace (8)	○	○	○	○	○
I would "build, make, or create" more if more makerspace was available where I live. (9)	○	○	○	○	○

Thinking about your own schedule during the school year, would you use makerspaces during any of these times if they were open?

- ☐ 8 AM to 4 PM is usually sufficient for my needs (1)
- ☐ I would use makerspaces between 4-7 PM on weekdays (2)
- ☐ I would use makerspaces between 7-10 PM on weekdays (3)
- ☐ I would use makerspaces between 10 PM-1 AM on weekdays (4)
- ☐ I would use makerspaces on weekends (5)
- ☐ I would prefer makerspaces be open 24 hours a day (6)
- ☐ Other, please specify: (7) _____

Have you tried and been unsuccessful using a makerspace on campus?

- ○ Yes (1)
- ○ No (2)
- ○ Didn't try (3)

What are the barriers to you using makerspaces? Please check all that apply.

- ☐ Awareness – What's available (1)
- ☐ Permission – What can I use (2)
- ☐ Training – How to get trained (3)
- ☐ Training – How long it will take to get trained (4)
- ☐ Social – Is the community intimidating (5)
- ☐ Timing – When are spaces open (6)
- ☐ Time – Not enough time (7)
- ☐ Other (please specify) (8) _____

Carry Forward Selected Choices from "What are the barriers to you using makerspaces? Please check all that apply."

What was the most significant barrier to you using makerspaces?

- ○ Awareness – What's available (1)
- ○ Permission – What can I use (2)
- ○ Training – How to get trained (3)
- ○ Training – How long it will take to get trained (4)
- ○ Social – Is the community intimidating (5)
- ○ Timing – When are spaces open (6)
- ○ Time – Not enough time (7)
- ○ Other (please specify) (8) _____

Are there any other barriers to your use of makerspaces on campus? Please describe.

_____

_____

Your Ideal Space

If you could design your own makerspace, which tools, technologies, and equipment would be essential, nice to have, or excluded? You can also identify items you feel ambivalent about.

	Essential (1)	Nice to have (2)	Ambivalent (3)	Don't include (4)
Laser cutting tools (wood/acrylic) (122)	○	○	○	○
3D printers (123)	○	○	○	○
Paint booth (124)	○	○	○	○
Composites/lay up (125)	○	○	○	○
Woodshop tools - manual & CNC (e.g. planer, lathe, router) (126)	○	○	○	○
Metal machining tools - manual & CNC (e.g. mill, lathe) (127)	○	○	○	○
Metal cutting - Waterjet, CNC Plasma Cutter, Metal Laser Cutter (128)	○	○	○	○
Sheet and tube metal working (129)	○	○	○	○
Welding tools (130)	○	○	○	○
Metrology equipment (measuring precise features) (131)	○	○	○	○
Hand tools (wrench, hammer, saw, cordless drill) (132)	○	○	○	○
Plastics fabrication & manufacturing tools (e.g., injection molder, thermoformer) (133)	○	○	○	○
Bio/Wet lab bench space (134)	○	○	○	○
Music making & audio recording tools (135)	○	○	○	○
Video/Photography equipment (136)	○	○	○	○
Virtual Reality equipment (137)	○	○	○	○
Electronics tools (e.g. oscilloscopes, soldering irons, flow soldering) (138)	○	○	○	○
Forge & Foundry (139)	○	○	○	○
Cooking tools (140)	○	○	○	○
Pottery and ceramics (141)	○	○	○	○

Glass making and shaping tools (142)	○	○	○	○
Computers with design software (CAD, CAM, FEA) (143)	○	○	○	○
Textiles and vinyl tools (144)	○	○	○	○
Other (145)	○	○	○	○

Which amenities and other spaces would your ideal makerspace include?

	Essential (1)	Nice to have (2)	Ambivalent (3)	Don't include (4)
Class project storage (47)	○	○	○	○
Personal project storage (48)	○	○	○	○
Lounge space (2)	○	○	○	○
White boards (3)	○	○	○	○
Vending machines for parts & supplies (5)	○	○	○	○
Space for group work (49)	○	○	○	○
Space for remote conferencing (51)	○	○	○	○
Other (14)	○	○	○	○

Maker Training

What is your level of proficiency with the following tools?

	Do not know about it (1)	Heard of it (2)	Know what it can do (3)	Proficient and can make things with it (4)
Basic safety training (1)	○	○	○	○
3D printer (2)	○	○	○	○
Hand tools (3)	○	○	○	○
Laser cutter (4)	○	○	○	○
Lathe (5)	○	○	○	○
Mill (6)	○	○	○	○
CNC Machining (7)	○	○	○	○
Woodworking (8)	○	○	○	○
Circuit board fab (9)	○	○	○	○
Plaster and silicone molding (10)	○	○	○	○
Waterjet (11)	○	○	○	○
Welding (12)	○	○	○	○
Hot materials (e.g., glass blowing, foundry) (13)	○	○	○	○
Bio/Wet/Chemistry (14)	○	○	○	○
Music (15)	○	○	○	○
Other (16)	○	○	○	○

Display if: What is your level of proficiency with the following tools? [Proficient and can make things with it] (Count) >= 1

Carry Forward Selected Choices from "What is your level of proficiency with the following tools?"

Have you completed training to use any of the following?

	Completed training at MIT (1)	Completed training elsewhere (2)
	▢	▢
	▢	▢

Learning to use both simple and complex tools and technologies requires training and practice. Which of the following possible training options appeal to you the most? Please check all that apply.

- ☐ **Basic Training**: Sign up for a 1 hour basic safety training session, with training spots available in less than 2 weeks. This training allows you to enter makerspaces and use hand tools. After basic training, you may sign up for 1 hour training sessions with staff technicians to use specific equipment in that makerspace, with training slots available in the next 2-6 weeks. (1)
- ☐ **Intermediate Training**: Sign up for a 2 hour basic safety training session with expert staff technicians, with training spots available in 2-4 weeks. This training allows you to enter makerspaces and use hand tools. After basic training, you may ask peer mentors in the makerspace to show you how to use some machines. You may also sign up for advanced training with expert staff technicians to use complex machines, with training slots available in the next 2-6 weeks. (2)
- ☐ **Comprehensive Training**: Sign up for 6 training sessions held over 3-6 weeks, with training spots available in the next 2 months. This training allows you to enter makerspaces and use commonly used machines once complete. (3)
- ☐ **Class for Credit in Fall or Spring**: Enroll in a semester long class in fall or spring term to learn how to make (almost) anything. This course would provide a hands-on introduction to all the tools, technology, and equipment in the makerspace, with an emphasis on learning how to use the tools as well as understand how they work. (4)
- ☐ **Class for Credit during IAP**: The same as the class for credit in fall and spring, but scheduled to cover the same material in 8 hour days, 5 days a week, during IAP. (5)
- ☐ Other (please specify) (6) _____

Some advanced tools, technology, and equipment in a makerspace require annual retraining, or re-qualification. Please indicate which of the following represent your feelings about this requirement. Please check all that apply.

- ☐ I am less likely to use certain advanced tools, technology, and equipment because of the need to re-qualify. (1)
- ☐ I would prefer to be re-qualified by peer mentors in the makerspace. (2)
- ☐ I would prefer to be re-qualified by expert staff technicians. (3)
- ☐ I would prefer to be re-qualified to use all the tools, technology, and equipment in a space in one intensive session. (4)
- ☐ I would prefer to be re-qualified to use specific tools, technology, and equipment as I need it. (5)

Do you have any suggestions for how re-qualification could be made more appealing or less onerous?

_____

_____

When you have a question about a particular tool or technology, who would you go to first, assuming all were available?

- ○ Faculty Member (1)
- ○ Staff Technician (2)
- ○ Graduate Student Mentor (3)
- ○ Undergraduate Mentor (4)
- ○ Student Peer (5)
- ○ Not sure (6)
- ○ Other (7) _____

Encouraging Use of Maker Spaces

What are your preferred way to learn about making technologies/equipment? Check all that apply

- ☐ Read in book/magazine (1)
- ☐ Video from Youtube, etc. (2)
- ☐ Short MIT specific video (3)
- ☐ Website (images/text) (4)
- ☐ MITx style online course (5)
- ☐ Short lecture/demo/taster (less than 1 hour) (6)
- ☐ Hands on training (1-4 hours) (7)
- ☐ In depth hands on training (4+ hours) (8)

We'd like to understand what might encourage more students to take advantage of the facilities available on campus to build, make, or create. Which of the following are likely to encourage your use of makerspaces?

	Very Unlikely (1)	Unlikely (2)	Likely (3)	Very Likely (4)
Hands-on workshops to learn new creation technologies (1)	○	○	○	○
Seminars or presentations on how to create hosted by MIT faculty, staff, or students (2)	○	○	○	○
Tours of the makerspaces that publicize the tools and capabilities of each space (3)	○	○	○	○
Events to meet MIT alumni or other expert "makers" (4)	○	○	○	○
Industry seminars held by companies where making is central to their mission (5)	○	○	○	○
Reserved time for group events (e.g., members of a specific student activity may have some of the space to themselves for a period of time) (6)	○	○	○	○
Project kits that include instructions and materials to provide practice on certain machines/technologies (7)	○	○	○	○
Mini maker faire (8)	○	○	○	○
Community "Show and tell" days (9)	○	○	○	○

What other types of events might encourage you to use makerspaces on campus?

_____

Last Section

Is there anything else you would like to tell us about spaces to build, make, or create at MIT?

_____

_____

Which of the following best describes where you lived last year?

- ○ Residence hall or other campus housing (1)
- ○ Fraternity, Sorority or Independent Living Group (FSILG) (2)
- ○ Off Campus Residence (house, apartment, etc.) within a 15-minute walk from MIT (3)
- ○ Off Campus Residence (house, apartment, etc.) more than a 15-minute walk from MIT (4)
- ○ Other, please specify (5) _____

What will your class year be in fall 2019?

- ○ Undergraduate: Year 2 (1)
- ○ Undergraduate: Year 3 (2)
- ○ Undergraduate: Year 4 or later (3)
- ○ Graduated (4)
- ○ Graduate: Masters (5)
- ○ Graduate: Doctorate (6)

May we follow up with you if we have questions about your responses?

- ○ No (1)
- ○ Yes, the best email address to reach me is: (2) _____