

A Workshop to Build Community and Broaden Participation in Mathematics: Reflections on the Mathematics Project at Minnesota

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Abstract

We detail our experience running an annual four-day workshop at the University of Minnesota, called the Mathematics Project at Minnesota (MPM). The workshop is for undergraduates who come from groups underrepresented in mathematics and aims to increase the participation and success of such groups in the mathematics major at the University. In this paper, we explain how MPM is organized, discuss its objectives, and highlight some of the sessions that we feel are emblematic of the program's success. The paper concludes with an analysis of achievements and obstacles in the programs' first three years.

Keywords: equity, diversity, inclusion, under-represented groups, broadening participation

1 Introduction

MPM was a great opportunity for me to make new friends while also becoming more confident in myself and my mathematical abilities.¹

The Mathematics Project at Minnesota (MPM) is an annual four-day workshop through the School of Mathematics at the University of Minnesota (UMN). The workshop is designed for undergraduates interested in math who come

¹All block quotes in the following manuscript are taken from surveys of previous MPM participants.

from underrepresented groups², with the goal of increasing their participation and success in the mathematics major at UMN. MPM seeks to combat the “leaky pipeline” of students from marginalized groups leaving mathematics, particularly at R1 institutions (see [7, 8, 10, 12, 15]), by focusing on building community, providing role models, and instilling students with a sense of mathematical empowerment.

MPM is facilitated by graduate students in the School of Mathematics, with help from advanced undergraduate math majors, post-docs, and faculty, and takes place the week before the spring semester begins. The workshop has run successfully for three years, with a steady increase in the number of participants each year.

In the following paper, we describe our experience running MPM for its first three years. The remainder of Section 1 provides the institutional context and broad goals of MPM. Section 2 gives a description of the event, highlighting a few important sessions, funding and personnel details. In Section 3, we provide evidence of the success of MPM, and in Section 4 we discuss challenges we faced, as well as some of our solutions.

1.1 Institutional Context

The University of Minnesota is an R1, land-grant, public university located in the heart of Minneapolis, MN. Of the over 29,000 undergraduates on the main campus, there are approximately 600 declared math majors from both the College of Science and Engineering and the College of Liberal Arts. Prior to MPM, several factors contributed to underrepresented students being isolated in the department, including

- an underrepresentation of domestic students of color and women in the major relative to the overall distribution of the university,
- an absence of extracurricular math programming for students early in their undergraduate studies encouraging them to major in math, and
- an undergraduate advising system that lacked continuity, where a student could meet with a different advisor for each advising meeting over the course of their undergraduate career.

²Our definition of underrepresented includes racial minorities (Black, Latinx, Native American), women and people of minority genders, first generation college students, students from lower socioeconomic backgrounds, individuals with physical disabilities, and members of the LGBTQ community. We are also open to participants who are supportive allies committed to making mathematics more inclusive.

In contrast, the mathematics graduate program in the School of Mathematics at UMN is recognized nationally for its diversity. In the spring of 2017, the Director of Graduate Studies hoped to leverage this diversity to encourage undergraduates from underrepresented groups to go to graduate school by pairing newly declared majors with a graduate student mentor. The mentoring program did not get off the ground, but it inspired the development of the Mathematics Project at Minnesota, which was a direct adaptation of the Grinnell Science Project (which has run annually at Grinnell College, a small liberal arts college in rural Iowa, since 1993 [11, 17, 26]). A brief comparison of MPM with the Grinnell Science Project can be found in Appendix B. The first iteration of MPM ran in January 2018.

1.2 Goals for MPM

The primary goals of MPM are to increase the participation and success of underrepresented students majoring in mathematics at UMN. To this end, we aim to address three areas which the literature indicates are key in furthering the academic success of such groups [5, 10, 15, 21, 26].

1.2.1 Build friendships and community

Community support can be the difference between an undergraduate who thought about pursuing math but was intimidated and one who continues and succeeds in their mathematical pursuits [9]. Though the workshop only runs for four days, the bonds formed during MPM—between undergraduates, graduate students, post-docs and faculty—are strong, due in large part to the intensity of the programming and the emotional openness encouraged in many of the sessions. MPM runs from 9am-7pm; participants and MPM personnel eat all meals together and work collaboratively on a variety of activities. Moreover, MPM connects students who already have a lot in common: an interest in math, their experiences in math classes at UMN, and perhaps their identities as members of marginalized groups.

1.2.2 Provide participants with local role models and mentors

Participants are introduced to mentors at a range of levels, from undergraduate to professor throughout the workshop.

Small groups of participants are paired with advanced undergraduate or graduate students, who guide them through activities. Professors and post-docs lead and attend a handful of sessions and meals. In addition, each partic-

ipant is paired with a graduate student, called a Pal, who serves as a long-term mentor for the duration at the student's time at the University (see Section 2.5).

1.2.3 Increase the mathematical confidence of participants

At MPM, we aim to deconstruct prior notions of what it means to be “good” at math or to be a “math person.” Often, students have internalized a rigid interpretation of who can be a mathematician and what types of skills this requires. Many of these assumptions are gendered and racialized [13,14,21–25]. Our goal at MPM is to engage students by (1) asking them to critically think about the validity and origins of these assumptions, (2) convincing students that there is no prerequisite to study math (including perceived natural ability) other than enjoying it, and (3) fostering positive and collaborative mathematical experiences in a low-stakes and non-competitive environment.

2 Program Description

MPM was the first time I had ever given any sort of math presentation. Before MPM, I couldn't have imagined giving any sort of math talk...MPM built up my confidence.

The events at MPM fall under the categories of career and mathematical development, diversity and inclusion, and community building. Each event aims to address at least one goal described in Section 1.2. A sample schedule of MPM can be found in supplementary online material; here, we give descriptions of select events we see as emblematic of MPM programming.

2.1 Mathematical Development

2.1.1 Individual Projects

Each student reads an accessible math paper and gives a 5-minute presentation on the last day of the workshop. We provide a list of papers which can be understood by students early in their math major. There are 5-10 graduate students and advanced undergraduates on hand to help guide participants.

2.1.2 Problem sessions

A one-hour daily “break-out session” gives participants the chance to work on problem sets in pre-assigned small groups. The problem sets are meant to

encourage collaborative thinking and require little mathematical background.

2.1.3 Mini-workshops

Two faculty members or postdocs each give a one-hour, interactive lecture on an accessible mathematical topic. These talks are similar to those given at Math Circles; topics from past years include permutation groups, error-correcting codes and topological data analysis.

2.2 Career Development

2.2.1 Future Opportunities Panel

At least 10 former math majors with diverse backgrounds and degrees describe their jobs and answer questions. In the past, teachers, actuaries, financial analysts, professors, and research scientists from area Fortune 500 companies have attended. Panelists are invited to stay for dinner to socialize with participants.

2.2.2 Summer Opportunities Workshop

Participants first learn about research and internship opportunities available for math majors. Afterwards, they are given time to work on application materials in the company of a professor who has run an REU and a representative from the Career Services Department.

2.3 Diversity and Inclusion

Each day of MPM there is a one-hour session on diversity and inclusion; each consists of an informative activity or talk followed by small group discussions facilitated by a graduate student (see [1]). The activities include:

- Growth mindset: Participants are given a list of difficult math problems and asked to solve them “quickly.” After 5-10 minutes, they are asked to reflect on how they felt about themselves while working on the problems.
- Privilege walk: We conduct a math-focused privilege walk (see [18]). In order to avoid singling out less privileged participants, we make the walk anonymous. Sample questions can be found in supplementary online material.
- Imposter syndrome: After a discussion, participants decorate and have their picture taken holding a small sign saying “I am a Mathematician.”

- Implicit biases: We discuss biases in letters of recommendation and teaching evaluations.

2.4 Community Building

2.4.1 Resources of the Math Department

A facilities tour gives participants a sense of ownership and belonging in the Math Department. Math labs, seminar rooms and even study areas can feel like they belong to those who have been “initiated;” these tours give participants that initiation. A scavenger hunt familiarizes participants with the building and its resources in an engaging way.

2.4.2 Group meals

Having meals as a group facilitates bonding. In addition to MPM personnel and participants, these meals include student group leaders and other community members. In the future, there will be a Meet-the-Faculty dinner.

2.5 Leadership Structure and Volunteer Support

MPM is run on volunteer support, consisting primarily of graduate and advanced undergraduate students. The main roles are:

- *Organizers*: 3-4 graduate students obtain funding, recruit participants and other personnel, and oversee planning and implementation of all sessions.
- *Mentors*: 4-5 graduate students who each plan 3-4 sessions for MPM in small groups. Often, Mentors were previously Pals or Counselors. Mentors and Organizers meet bi-weekly during the fall semester.
- *Counselors*: 5-10 graduate students and MPM alumni (undergraduates) who assist the workshop sessions as directed by Mentors.
- *Pals*: 25-30 graduate students are each paired with an MPM participant. Pals are not required to attend MPM but meet with their assigned mentee at least once per semester after the workshop.
- *Other Volunteers*: 3-4 faculty members and post-docs run Mini-Workshops and advise on REU applications; 10 alumni sit on the Future Opportunities Panel; 2-3 representatives from Career Services assist with resumes.

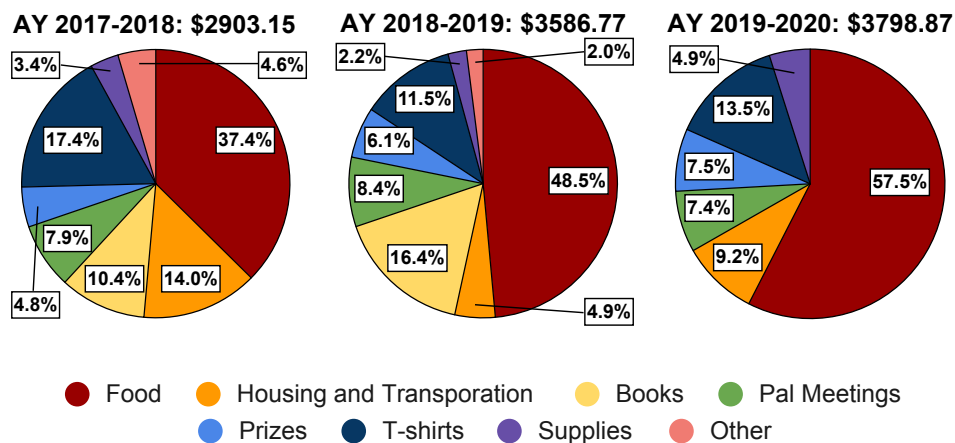


Figure 1: Budget summaries for each iteration.

When selecting volunteers, we prioritize diversity and experience working with underrepresented groups. We discuss challenges related to division of labor in Section 4.3.

2.6 Funding

The primary direct costs associated with MPM are food, housing, and transportation. Pie charts for the proportion of funds spent in different categories are given in Figure 1. The large increase from 2018 to 2019 was due to lunch changing from “Build your Own Sandwiches” to catered lunch from area restaurants. In 2020, we stopped buying books (used for discussions at dinner) and instead used open-source material. Housing and transportation costs are low because participants live in their own apartments or dorms during the event; participants returning to the dorms early are charged approximately \$24 per day (reimbursed by MPM).

For more detailed finances, contact the corresponding author. We discuss challenges related to obtaining funding in Section 4.4.

3 Evidence for Success

[MPM] really changed how I viewed math and helped me feel part of a community.

3.1 Participant Feedback

During each iteration of MPM, participants fill out an anonymous survey at the start and end of the workshop. The survey results from MPM 2020 are shown in Table 1 with average responses and median responses; note that the sample size is too small to be statistically robust. In 2018 and 2019, retention for MPM was lower, and fewer participants took the survey at the end of MPM than the initial survey. Thus the surveys in those years have more of a self-selecting bias; they are included in Appendix A. For more discussion on improving retention, see Section 4.1.3.

3.2 Success after MPM

We aim to measure whether MPM has a lasting impact on participants' mathematical activities. In February 2020, we conducted a follow-up survey with MPM participants from all years; 22 participants responded, with 73% from the 2020 cohort, 23% from the 2019 cohort and 4% from the 2018 cohort. We also collected anonymous feedback from former MPM Counselors and Mentors. Some of these results and anecdotal evidence of the lasting success of MPM are discussed below. In the long-term, we plan to monitor whether MPM alumni (1) completed a math major at UMN; (2) went or plan to go to graduate school; (3) are employed in a job that utilizes mathematics; and (4) feel that MPM had a long term positive effect on their lives.

3.2.1 Lasting Community

Despite its short length, the bonds formed during MPM appear to continue well after the workshop concludes: 82% of respondents report keeping in touch with undergraduates they met at MPM; 73% report keeping in touch with graduate student Mentors and Organizers from MPM; 14% have kept in touch with panelists from the Future Opportunities Panel. Students have reported that they take courses and work on problem sets with people they met at MPM, in addition to hanging out socially and keeping in touch on social media.

One graduate student involved with MPM observed “MPM has created more ties between the undergrads and the grad students, making the department feel like one community, not separate ones.” Another noted: “I currently have two MPM students in my class, and that’s helping dramatically with getting the class to talk and collaborate.”

Table 1: Aggregate responses to anonymous survey held just before and immediately following MPM 2020. The mean (median) are given for each question.

1 - Strongly disagree; 2 - Disagree; 3 - Not sure; 4 - Agree; 5 - Strongly agree		
Statement	Pre-MPM	Post-MPM
<i>Number of Participants</i>	25	24
Feelings of inclusion and community		
The mathematics department is welcoming to me and people like me.	4.08 (4)	4.64 (5)
I have friends who are math majors.	3.35 (4)	3.98 (4)
I know people that I can work with on assignments in most of my math classes.	3.44 (4)	3.52 (4)
I identify as a “math person.”	4.22 (4)	4.40 (5)
Advising and career opportunities		
I know about multiple career paths that are possible for me with my mathematics major.	3.89 (4)	4.56 (5)
I am interested in pursuing a Masters or PhD in mathematics or related field.	3.81 (4)	3.92 (4)
There is a professor in the math department who I feel comfortable approaching for math help and/or career advice.	3.15 (3)	3.52 (3)
Effectiveness of MPM		
MPM was a valuable experience for me.	N/A	4.72 (5)
I would recommend MPM to other students who haven’t participated.	N/A	4.80 (5)
I felt like I belonged at MPM.	N/A	4.6 (5)
I made friends at MPM.	N/A	4.32 (5)
I am more likely to seek out math research opportunities as a result of MPM.	N/A	4.32 (5)
I am more likely to take a challenging math course as a result of MPM.	N/A	4.16 (5)
My views on my mathematical abilities have shifted as a result of MPM.	N/A	3.72 (4)

3.2.2 Participation in Mathematical Activities

Results show that two-thirds of MPM alumni responding to the survey have taken an upper-division math course, and the other third planned to; 59% of respondents planned to do mathematical research before graduating. Thus

far, two respondents have participated in an REU, two have done research with UMN faculty, at least 10 participants have started doing research with a graduate student or postdoctoral researcher, and at least 5 have participated in the Directed Reading Program. At least three MPM alumni will enter PhD programs in Mathematics in the fall of 2020. Additionally, 60% have attended at least one math-related club or seminar since MPM, including: Women in Math (the AWM Chapter at UMN) (69% attended); Math Club (62% attended); the Undergraduate Math Research Seminar (16% attended); Women in Science and Engineering (16% attended); and Actuary Club (16% attended).

4 Challenges

The past few months I haven't felt like I belong in the math world, but this workshop helped me realize a lot of people feel this way.

4.1 Inviting and Retaining Participants

4.1.1 Identifying underrepresented students

In line with the principles of MPM, there is no application to participate, because underrepresented students are far more likely to discount their abilities and potential [3]. However, at a large school like UMN, this can cause logistical challenges because (1) it can be difficult to identify students with marginalized identities and (2) we aim to invite students that have not yet declared a major.

Due in part to the data available from the Mathematics Department, the first iteration of MPM was only open to participants who identified as female. We were able to acquire lists of women who were declared mathematics majors, along with students who had expressed a written interest in mathematics. From the second iteration onward, MPM has been open to all underrepresented groups. We have obtained data from the Mathematics Department identifying both racial minorities and women majoring and interested in math. We have also solicited recommendations from graduate students and faculty.

It was (and continues to be) more difficult to identify students with less visible marginalized identities, such as first generation college students, students from lower socioeconomic backgrounds, individuals with physical disabilities, and members of the LGBTQ community. The Mathematics Department does not collect data that would identify these marginalized identities.

MPM continues to be majority women: in 2020, 85% of participants were women, which was the lowest rate to date. The majority of participants have

been white, which is something we are actively trying to improve upon. As part of these efforts, when seeking participant recommendations from instructors and TAs, we now place greater emphasis on explaining which groups are eligible for MPM. Some instructors have since advertised MPM to their classes and allowed students to self-identify as interested. We also plan to advertise MPM to student groups centered around marginalized identities.

4.1.2 Acceptance rate of invitations

Students are invited to participate in MPM by personalized email, but a persistent difficulty is that these invitations yield a low response rate. In the first two years, roughly 9% of the students we invited accepted our invitation. In the third iteration—in addition to emailing students from a departmental list—we tried to utilize personal relationships by asking graduate students and professors to personally recommend and reach out to eligible students in their classes. Our positive response rate in this case jumped to 26%.

4.1.3 Retention During the Program

In the first two years of MPM, we struggled to retain all participants who signed up for the workshop. In 2018, of the 21 participants that attended the first day, 13 attended all four days (62% retention). In 2019, we started with 19 participants and ended with 14 (74% retention.) In 2020, we started with 25 participants and finished with 24 (96% retention).

We believe the increase in retention in 2020 was a result of two new policies. First, we held a dinner the month before MPM with the aim of setting expectations. At the dinner, the Organizers presented the workshop schedule and described some sessions. Second, we introduced a contract that participants were required to sign before participating in MPM. A copy of this participant contract can be found in Appendix C. The contract detailed community norms, attendance expectations, and data and privacy matters. We reiterated these expectations at the beginning of MPM. Participants seemed to take the contract to heart, even without any associated repercussions.

4.2 Participant Backgrounds

4.2.1 Different mathematical backgrounds

MPM participants have a wide range of mathematical maturity; in creating mathematical programming for the workshop, we want them to be challenged but not discouraged. This is particularly prescient during the Individ-

ual Projects session (2.1.1). To make this session less intimidating, Mentors pre-select math papers at various levels. Following feedback that some participants still felt anxious about preparing a presentation, in the third iteration we matched each Mentor and Counselor to a specific paper, giving each student a direct contact to answer questions. Additionally, we scheduled time for participants to give practice talks in front of a Mentor or Counselor.

4.2.2 Diverse cultural backgrounds

We aim to have a diverse group of participants in MPM. This comes with a responsibility to ensure students from all cultural and economic backgrounds feel comfortable, and to be aware of the nuances that accompany bringing together diverse groups of people. For instance, many participants come from small rural towns that are overwhelmingly white, and the majority of participants are white. It is imperative that we ensure our participants of color and queer participants feel welcome and do not experience micro or macro aggressions during the workshop [19].

Our strategy for making MPM a welcoming environment for all is three-fold. First, the aforementioned contract that outlines community norms explicitly condemns discrimination of any form. Second, we aim to make all discussions intersectional (i.e. not just about women in math, even though this is the dominant group in MPM). Third, we endeavor to make sure that in group discussions, no one feels the need to be the sole representative of their identity. We therefore pre-plan discussion groups with special attention to the different identities of participants and graduate students. With that in mind, we also want people from different backgrounds and identities to interact. It is a delicate balance to devise groups and activities that help create awareness without putting extra burden on people from marginalized identities.

4.3 Volunteer Support

4.3.1 MPM Leaders

In the first iteration, leadership consisted of three Organizers and six Mentors. This was sufficient personnel for acquiring funds and developing material for the sessions prior to the workshop. However, during the workshop, there were not enough people to facilitate the events and coordinate the logistics. The second year we created the new position of “Counselor” (see Section 2.5) to provide additional facilitators during the week of MPM.

4.3.2 Faculty Involvement

Faculty volunteers are an important aspect of MPM; having interactions with faculty during the workshop lowers the barrier for participants to engage with them afterwards. Faculty involvement has been lower than we would like because (1) there is a lack of awareness of MPM amongst the faculty, (2) the timing of the workshop means some professors are away at conferences, and (3) MPM seeks to highlight faculty from traditionally underrepresented groups, but these groups are not well-represented amongst the faculty at Minnesota.

Going forward, Department leadership has agreed to allow participation in MPM to count as service used to evaluate faculty tenure cases. We have also appointed a faculty liaison for the upcoming year; this professor will organize a Meet-the-Faculty dinner where participants dine with multiple faculty members.

4.4 Obtaining Funding

Our goal for funding is to ensure that (1) participants do not pay any direct cost for their participation in the workshop and (2) Organizers and Mentors are compensated for the significant amount of time required to plan and run MPM. For all three iterations, we have been able to meet our first funding commitment. We have not yet been able to fully meet our second funding commitment. The ideal scenario is to secure long-term institutional funding for both funding goals; leadership in the Mathematics Department has expressed interest in meeting both goals.

In the first three iterations, funding has come from several smaller grants, mostly from various funding sources at the University of Minnesota. On one hand, diversifying the funding in this way ensured some security if we did not receive one of the grants. On the other hand, the process of applying for so many funding sources took up a significant portion of the Organizers' time, which could have instead been spent recruiting participants or developing sessions. Furthermore, each grant is written for a specific funding purpose and the unpredictability of successfully obtaining the grants makes it hard to plan for the next iteration of MPM with certainty.

4.5 Workshop Timing

4.5.1 Daily Schedule

The schedule of MPM has changed over the three iterations to better integrate the diversity-themed activities into the rest of the schedule. We order these

sessions so that they build on each other, and so that the more serious topics happen on later days of the workshop when participants are more comfortable with each other. In our experience, the ordering described in Section 2.3 has led to the most fruitful discussions.

4.5.2 Workshop Dates

Holding MPM during UMN's winter break can be hard on participants who need to work over break or have familial obligations. Additionally, many professors, post-docs, and graduate students are out of town during this time. However, having MPM during the break allows participants to focus entirely on MPM and allows us to invite newly declared majors (who must declare in the fall semester at Minnesota).

4.6 MPM into the Future

Our plan for the future of MPM is twofold: (1) continuing to expand the reach of the current program and making it a permanent feature of the UMN Mathematics Department and (2) growing MPM programming to include students from other institutions throughout Minnesota.

For the former, substantial faculty involvement is required beyond what was discussed in Section 4.3.2. In particular, faculty would need to take a leading role in MPM to ensure sufficient institutional memory.

For the latter, we believe it is important to look beyond the Twin Cities campus to create a larger, more diverse network of undergraduates interested in mathematics. Major obstacles to this extension include funding sources and the difficulty in translating community across long distances and multiple institutions. Among our ideas moving forward are to (a) host a separate summer program at the UMN Twin Cities that invites participants from all over or (b) to coordinate a distributed event which occurs at separate satellite locations. The advantages to (b) are that participants would be able to form communities and become better aware of the resources at their own campuses. However, (b) requires coordination with and work from faculty at these locations. This is a process that we have not yet begun.

5 Conclusion

MPM provided a community of mathematicians who are like me, this allowed me to see myself as a mathematician.

The Mathematics Project at Minnesota (MPM) is a community-focused mathematics workshop that runs for four days before the beginning of the University of Minnesota’s spring semester. MPM has run each year for the past three years with increasing success due to deliberate changes in programming, volunteer structure, and participant support. Over the past three years we have seen increases in

- the number of participants, due in large part to successful recruitment strategies such as personalized invitations sent by TAs or professors;
- retention during the program, stemming from better communication about the workshop before it began, as well as pre-event contracts participants are required to sign; and
- participation in other mathematical extracurricular activities (e.g. undergraduate research) and student groups (e.g. Math Club) from students in groups traditionally underrepresented in mathematics.

By helping students feel as though they have (1) ownership of the University of Minnesota’s mathematical spaces, (2) a network of peers and mentors, and (3) the capacity to succeed, MPM has created a community in mathematics for those students who often feel like they do not belong.

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A Supplemental Data: 2018 and 2019

Table 2 shows the responses to participant surveys distributed during MPM 2018 and MPM 2019. Recall that during each iteration of MPM, participants fill out an anonymous survey at the start and end of the four-day workshop.

Table 2: Aggregate responses to anonymous surveys held just before and immediately following MPM 2018 and 2019. The mean (median) are given for each question.

1 - Strongly disagree; 2 - Disagree; 3 - Not sure; 4 - Agree; 5 - Strongly agree				
Statement	Pre- MPM 2018	Post- MPM 2018	Pre- MPM 2019	Post- MPM 2019
<i>Number of Participants</i>	21	13	19	14
Feelings of inclusion and community				
The mathematics department is welcoming to me and people like me.	4.10 (4)	4.38 (4)	4.37 (4)	4.5 (4.5)
I have friends who are math majors.	N/A	N/A	3.37 (4)	4.43 (4.5)
I know people that I can work with on assignments in most of my math classes.	N/A	N/A	3.21 (3)	3.93 (4)
Advising and career opportunities				
I know about multiple career paths that are possible for me with my mathematics major.	3.48 (4)	4.38 (4)	3.37 (4)	4.57 (5)
I am interested in pursuing a Masters or PhD in mathematics or a related field.	3.62 (4)	3.85 (4)	3.63 (4)	4.07 (4)
Effectiveness of MPM				
MPM was a valuable experience for me.	N/A	4.69 (5)	N/A	4.79 (5)
I would recommend MPM to other students who haven't participated.	N/A	4.69 (5)	N/A	4.93 (5)

B Brief Comparison with the Grinnell Science Project

The Mathematics Project at Minnesota is a direct adaptation of the pre-orientation portion of the Grinnell Science Project (GSP) which is run at Grinnell College in Grinnell, IA. The pre-orientation portion of GSP is an orientation program for incoming first year students that occurs the week before New Student Orientation. Participants are first generation-college students, domestic students of color, and/or women interested in physics or computational sciences [11]. Major differences between MPM and GSP come from the fact that the scope of the Grinnell Science Project is much broader than the Mathematics Project at Minnesota. The Grinnell Science Project has (limited) group programming throughout the participants' first year of college and provides ongoing support for second year students. MPM reunion events are scheduled once a semester; however, these events are a time to socialize rather than focus on specific programming. The Grinnell Science Project is organized by a small, rotating group of Grinnell faculty, staff and undergraduate students, and its implementation was accompanied by pedagogical and curriculum changes to Grinnell's introductory science and math classes. In contrast, MPM is organized by graduate students, and there has been no effort to change mathematics courses as a whole at the University of Minnesota as a result of the program.

The Mathematics Project at Minnesota has similar goals to the Grinnell Science Project. In particular, the goals of both programs include (1) building a community for underrepresented students at the home institution and (2) increasing the scientific or mathematical confidence of participants. The main categories of MPM events (career development, mathematical development, diversity and inclusion, and community building) are mirrored from the main categories of Grinnell Science Project sessions. Because the institutions are quite different³ and because GSP is focused on all STEM fields while MPM is focused only on mathematics, the implementation of individual sessions and events differs between the two programs.

Comprehensive information on the Grinnell Science Project can be found online [11, 17].

³The University of Minnesota is a large, research focused, land-grant, public university in a major metropolitan area and Grinnell College is a small, private, liberal arts college in rural Iowa.

C Participation Agreement

Below is a copy of the participant agreement students in MPM 2020 signed before attending the program.

MPM PARTICIPANT AGREEMENT

Please read all of the below and sign your name in all locations specified.

Name: _____

Community Norms. It is important to us that MPM creates a space that is welcoming, supportive and rewarding to all participants. To this end, we ask that all participants agree to the following:

- (1) Do not engage in discriminatory or harassing behavior towards any participants
- (2) Listen respectfully to the experiences of other participants
- (3) Exercise empathy and patience towards other participants
- (4) Keep discussions held at MPM within the MPM community

If a participant engages in discriminatory or harassing behavior, the organizers can take any action they deem appropriate, from warning to asking them to leave the workshop.

If you are made to feel uncomfortable by another participant, please contact one of the organizers (Esther Banaian, Sarah Brauner, Harimi Chandramouli, McCleary Philbin); any reports will be treated confidentially.

By signing below, you are agreeing to obey the community norms described above:

Signature: _____

Attendance and Commitment to MPM. There are many people that have worked hard for many months to make MPM a success. As a show of respect to the effort that we have put in, we expect you to participate in MPM to the fullest extent possible. *This means you are agreeing to attend every session at MPM unless you have explicitly communicated with one of the organizers*; valid excuses for missing MPM are sickness, emergencies, or one-time obligations that cannot be rescheduled. If you have questions, please contact one of the organizers.

By signing below, you are agreeing that as a participant of MPM, you will attend every session from January 14-17, 2020 unless you have communicated with the organizers:

Signature: _____

Data and Privacy. We would like to keep MPM running for many years to come. We conduct anonymous surveys from MPM participants for the following reasons:

- (1) Get feedback to improve MPM for future years
- (2) Research the effects of MPM in order to apply for grants to fund future MPM workshops
- (3) Collect data about MPM to help other schools pilot similar programs

By signing below, you are allowing us to use anonymous survey results collected in internal reviews, grant applications and research related to the efficacy of MPM.

Signature: _____