

# AIM Workshops: The Moderated Discussion Session

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## Introduction

The American Institute of Mathematics (AIM) runs around twenty mathematics workshops each year. Each workshop involves approximately thirty people, and is designed to have the participants collaborate on some topic of common mathematical interest. While a workshop has some specific mathematical goals, its real purpose is to enhance the research of the participants by fostering collaboration. There are few talks, usually two each day, and lots of time for people to work together.

A difficulty which presents itself immediately is: how can thirty mathematicians effectively work together? Is it possible for thirty mathematicians to have a productive conversation? Surprisingly, this is possible, and AIM has developed the *moderated discussion session* as a mechanism to help this happen.

## Example Discussion Sessions

AIM has developed several styles of moderated discussion sessions. The *moderated problem session* is the easiest to describe. We will use that example throughout this article and end by briefly mentioning some other scenarios in which the moderated discussion session can be useful.

A “problem session” is a gathering of mathematicians with a common research interest at which the participants identify open problems and share information about those problems. Problem sessions are common at many workshops and specialized conferences. Moderated problem sessions

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have the same purpose as a standard problem session; what is different is the format.

At a traditional problem session, a succession of people goes to the board and writes down problems. This is intended to popularize the problem and also to obtain feedback from the other participants. In our experience the usefulness of such events varies widely. Sometimes an interesting problem is discussed or some new idea about an old problem arises. Other times, someone spends a long time at the board writing out uninteresting or, worse, incomprehensible problems, often resulting in little discussion. It is rare for a traditional problem session to be useful and interesting for its entire duration and to its entire audience.

Often these traditional problem sessions do not take full advantage of the collective knowledge of their participants, and this led AIM to develop a new approach. The main feature of this new mode is the moderator, a participant who stays at the front of the room encouraging discussion and the exchange of ideas and who helps to organize the material on the board.

## The Rule

A moderated discussion session is easy to describe: a moderator at the front, people sitting in their chairs taking turns talking, the moderator responding to the people and occasionally writing something on the board. To watch it, it looks more like a traditional lecture than a traditional problem session. But it *is* a problem session, with people posing and discussing problems. And what makes it all work is one simple rule:

**The Rule:** *Only the moderator is allowed to write on the board.*

From this one rule flows a wealth of consequences. If you want to pose a problem, you

must first get the moderator to understand it. This usually leads most of the other participants to understand it too. During the discussion of the problem, the moderator can keep track of the conversation, occasionally giving a summary, and strike a balance between the more vocal and frequent contributors and those more reluctant to interrupt. This process also helps everyone to understand. And the moderator can fairly assess the amount of time to be spent on a topic, treating everything in sufficient depth but not spending too much time on little details. In fact, moderators may have to say, "This discussion is getting too technical; let's discuss it later."

The moderator listens to the problems as well as the discussion and puts a concise summary on the board, usually paraphrasing the information to ensure that the information is accurately conveyed. This keeps the conversation reasonably paced and also results in an organized summary. A simple glance at the board will reveal the progression of the session.

One of the main features of these moderated discussion sessions is that it seems to be an environment in which people are willing to share their thoughts on open problems. It is common for experts to begin debating basic issues, and this is a valuable experience for the other participants, who can listen to what the experts think. What often emerges is a picture of the current understanding of the open problems in the area.

### **Implementation**

The above description sounds simple, but there are several key elements that enable the moderated discussion session to be successful. AIM has developed this approach by trial and error over the course of many workshops.

### **Choosing a Topic**

Since the purpose of the moderated discussion session is to organize people's thoughts about open problems, it is helpful to choose a fairly narrow focus for the session. At AIM workshops, where there can be more than one discussion session during the week, we carefully choose topics that are appropriate to the overall plan of the workshop and the needs for that particular day. For example, many workshops have one problem session on fundamental problems and another session on possible applications to other areas. We work with the workshop organizers to determine the focus of each discussion session.

### **Choosing a Moderator**

The AIM staff works with the organizers to choose a moderator. After deciding on a topic for the discussion, we explain the purpose of the moderator and their role in facilitating the discussion.

### **Opening Statement**

Example statement to open a moderated discussion session:

The purpose of this session is to identify and discuss unsolved problems: big problems, little problems, any problem you find interesting. The premise is that you all have interesting ideas about the important problems in this area, and what we want to do is gather that material together and organize it in a way that can help form a clearer picture.

At AIM we have developed a simple mechanism to help these problem sessions run smoothly. We call this a "moderated discussion session". The way it works is that someone is chosen as the moderator, and she or he stands at the front. There is only one rule, and that is: only the moderator is allowed to write on the board. [pause] The rest of you stay in your seats and talk to the moderator. [pause] Your moderator is [name], so tell [him or her] your problems.

We stress that the moderator should be someone who can suppress the urge to contribute his or her own problems and who can occasionally "play dumb" to encourage others to explain their ideas more thoroughly. For these reasons it is often best to choose someone whose expertise is on the periphery of the focus for the discussion session. We also suggest that the moderator not be one of the organizers and not be someone who has already given a lecture.

Who would be a good moderator? We tell the organizers: someone you would be happy to put in front of a calculus class. Moderating is closer to good teaching than to good lecturing. The moderator helps slow down the conversation, making sure that everyone is absorbing the information. A slick presentation is not helpful and can even be counterproductive.

The moderator must keep control of a large group while simultaneously creating an environment where everyone can talk freely. This is slightly tricky, and just like giving a lecture, some people are better at it than others. And just like preparing a lecture, a small amount of basic training can go a long way. This is why we do "moderator training".

### **Moderator Training**

The workshop organizers choose a moderator, but the AIM staff does not approach the person until shortly before the session. Usually they agree to be the moderator, but occasionally we need to quickly find someone else to ask. We meet briefly, ideally no more than five minutes, to prepare the moderator for the discussion session.

### How to Be a Good Moderator

- After the session is introduced, begin by saying, “I’m ready”; then wait quietly for someone to say something. Be patient. Do not interject any of your own thoughts until the session is well under way, even if there is uncomfortable silence.

- Listen to the complete statement of a problem and restate it to the proposer before writing it on the board. *Don’t become a dictation machine.*

- If people start talking among themselves, just let them go. Once a point has been made, provide a summary and then write it on the board.

- If you notice that someone wanted to say something but didn’t get a chance, call on that person at the next opportunity.

- If someone introduces a new topic, first ask everyone if there was anything else to say on the previous topic.

- If people start trying to solve a problem or if a small group pursues a minor point too far, stop the discussion and suggest that they continue after the session.

- If possible, try to group related topics on the board.

- Occasionally “play dumb” so that the proposer will have to rephrase and expand on her or his idea. This will help other people to gain a better understanding.

This meeting is critical, because being a good moderator does not come naturally to most people. It is one of those tasks which, ironically, people perform worse the more they think about it. This is why we do the moderator training immediately before the discussion session.

We begin by explaining that the organizers suggested her/him as a moderator and we hope they are willing to give it a try. We then explain their main purpose: the participants have lots of information in their heads, and it is the moderator’s job to bring it out and to organize it.

We then explain “the rule” and its consequences: forcing everyone to explain things to the moderator usually leads to most of the other people understanding too. This also slows things down so that people don’t get lost. And since the moderator controls everything, she or he can help structure the discussion and put an organized summary on the board.

We then talk about some of the specific things to keep in mind, which are listed in the box “How to be a good moderator”.

We end by explaining that one of the AIM staff will introduce the session, and following the introduction the moderator should begin by just saying,

“I’m ready,” or words to that effect. Then just wait for someone to suggest a problem. We remind the moderator to listen to the whole problem and restate it to the whole group *before* writing it on the board.

### Introducing the Session

It is important that someone other than the moderator introduce the session and explain the rule. For AIM workshops, this is usually done by one of the staff. The reason is that you want the moderator and the participants to work together. If it appears that the moderator is forcing everyone to stay in their seats and preventing them from writing on the board, then the participants will not be receptive to the idea of explaining everything to the moderator. By having someone else explain the rule, it creates an environment of “we’re all in this together”, and the moderator and participants can join together to make the best of the situation.

A sample opening statement is given in the accompanying box.

### When Things Go Wrong

Sometimes the moderated discussion session is not successful, and we have identified two standard ways in which the session can fail.

1. Some moderators write everything on the board as the speaker says it. This fails to achieve the purpose of the moderator as a sounding board. The other extreme, writing very little on the board, is almost as bad, because it makes it difficult for the participants to follow the progression of ideas.

2. The other way we have seen these sessions fail is for the moderator to open with a little speech or, even worse, to begin by posing one of his or her own problems. The moderator is not a lecturer, and beginning with a lecture just stifles the conversational aspect of the session. This is why it is important for the moderator to begin by just waiting until someone suggests a problem. This pitfall is partially addressed by choosing a moderator who is not expected to be a major contributor to the discussion.

One problem which never seems to occur is people running out of things to talk about. Even a seemingly narrow topic can easily lead to a lively 90-minute discussion. We stress this point when we talk to workshop organizers and encourage them to choose a narrow focus for each session.

We believe that a moderated discussion session is a productive alternative to the standard problem session. It addresses the true purpose of the problem session: to convey research problems and to facilitate a discussion of those problems. We have described the features of a moderated discussion session that have been developed through trial and error over the course of several years at AIM,

and we hope that our description is sufficiently compelling to encourage others to give it a try.

### Other Uses of the Moderated Discussion Session

At AIM we use the moderated discussion session whenever the objective is to bring out the ideas of the participants and to give some organization to those ideas. We now list some examples.

For a workshop designed to:

•**Bring together two groups with different approaches to a common mathematical interest:**

Each group should identify *What do you think the basic concepts are?* and *Describe how you think about them.* This discussion session often follows an introductory lecture on each of the two areas. Having people go into detail about their perspective on the subject more effectively conveys the ideas to the other camps than would several more lectures.

•**Understand a difficult new proof:** *What steps of the proof need more clarification?* This discussion session identifies the steps people find difficult and allows the experts to suggest what background material would be helpful, as well as estimating how much time would be needed to fill in the gaps. Having all that information in one place makes it easier to plan other useful activities for the rest of the workshop. (Note that the purpose of the session is to identify the places where people need clarification and not to answer questions about the proof.)

•**Make progress on some open problems:** *What problems would people like to work on right now?* Participants are invited to suggest problems that they would like to work on with other workshop people. The discussion of each problem is much more brief than is typical for a problem session and centers on issues like: what background is needed to begin working? how is that problem related to a larger problem? and why is there reason to think that progress is possible? This session is immediately followed by the participants breaking into small groups to work on the problems. Note that it is not expected that the problems be solved immediately, merely that it may be useful for a small group to begin working on them.

For this session, sometimes we suggest that a workshop organizer be the moderator, in contrast to our usual policy. Breaking into groups in an organized manner is not common for mathematicians, and often there is some hesitation to do so. A workshop organizer is better able to exert some authority to overcome this apprehension.

•**On the last afternoon of almost any workshop:** *How should people concentrate their efforts over the next few years?* At the end of a workshop, it is natural to take stock of the progress that has been made and to plan for the future. What

problems have reasonable hope of progress? What approaches are more likely to be successful? What resources, such as a webpage of background information, would be useful to other people interested in this area?

While the above examples are quite distinct, they all involve eliciting and organizing information that is already in people's heads. These sessions are not intended for solving problems or for doing new work.

### Follow-up

Moderated discussion sessions are a mechanism for helping the advancement of some area, or areas, of mathematics. The discussion sessions lay the foundation for future advances, and what happens after the session is more important than the session itself.

For the first of the three examples in the previous section, those discussion sessions usually occur on the first or second afternoon of an AIM workshop. Their early placement in the week's schedule makes the session a part of the planning of the workshop. Through the discussion session, the participants help to shape the workshop activities. Often the later afternoons of the workshop involve the participants breaking into small groups to work on topics arising from the earlier discussion.

Problem sessions generally occur in the middle of a five-day workshop—after some basic material has been covered, but still early enough to be useful in planning later activities. A problem session generates a list of problems along with comments on those problems. This annotated list of open problems is valuable to the research community. Not only does it form the focus of working groups during the workshop, it also can serve as a blueprint for work after the workshop.

At AIM we feel it is important to preserve this information, so we ask the organizers to designate someone as the "Web liaison" to take notes which will be posted on the Web. Initially the notes are circulated just to the workshop participants shortly after the workshop. After incorporating comments, the notes are made public on the AIM website.

At the time they are created, these problem lists represent the current state of knowledge in a particular specialized field. Unfortunately, the lists quickly become dated as new results occur. To preserve their value, AIM is currently developing new tools to keep the problem lists continually up-to-date and relevant.