

# TIPS AND TECHNIQUES FOR EFFECTIVE WORKSHOPS

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This list provides examples of techniques to use for a variety of workshop situations.

## 1. Postmortem Summary

*Idea:* When your students give you an answer it is beneficial to have them summarize their thinking process. By summarizing the process, the students are forced to organize their thoughts and review their process.

Additionally, other group members may benefit from the explanation, and the leader can help fill in gaps.

*Tips:* This idea works well with students who generally try to rush through the workshop, because it forces them to slow down. It may also be useful with quiet groups to increase participation.

*Potential pitfalls:* If a student does not understand the problem, she/he, in summarizing may feel embarrassed, or the rest of the group may end up confused.

## 2. Asking general questions

*Idea:* Ask the student or group a more general question. The idea is to ask a question not specifically related to the problem being attempted. Asking a more general question should spark new ideas or a sense of direction while attacking the problem.

*Tips:* The question may have a guiding point, e.g., the answer may allude to a reference point from which to begin, or relate a process that may be applied. This is a useful strategy to prompt students to consider relevant concepts and to promote productive interactions among students.

*Potential pitfalls:* Students may not understand the point of your question. When the students have solved the problem, relate it back to the question that was posed so that the group can see the connection. This builds confidence in the leader as well as a deeper understanding of the material.

*Examples:* Schoenfeld (1985): "What are you doing?", "Why are you doing it?", "Where do you think it will get you?" King (1992): "What do we already know about ... .?"; "What is the difference between ... and ... .?"; "Are there other possible approaches?"

## 3. Redirecting questions

*Idea:* Use steering techniques to prompt the workshop in productive directions. Make the students re-evaluate what it is they are asking, and provide "just enough" guidance to nudge them in the right direction. Push them to answer the question among themselves as a group.

*Tips:* This technique is very effective in expanding the ceiling of group dynamics. By pushing the students to achieve it on their own you effectively "challenge" them to solve it as a group.

*Potential pitfalls:* Students may be upset or frustrated that you are asking a question in response to their question, or by the lack of problem-solving progress. Avoid mistakes such as "dodging" questions or leading too much. Find a balance and stick with it.

*Example:* Student: asks question about problem.

Leader: "That's a good question. What do you think?" Or, leader replies with a question that forces student or group to evaluate what they are asking and why.

#### 4. Waiting on a response

*Idea:* Give students time to respond to workshop problem or posed question (general or redirected).

*Tips:* You need to give students time to think about the answer. Don't just jump to another student who has the answer more quickly than the others. If you want students to give quality responses, you need to give them time to think and evaluate information.

*Potential pitfalls:* If the student does not answer after some reasonable waiting time (at least 30 seconds) you can: ask leading questions or ask others to help out.

#### 5. Focus on the process

*Idea:* Students estimate the answer, rather than using a calculator. This will give them a better sense of the qualitative process. Because students have to do the math for the exam, they will need to know how to do the calculation. However, allowing them to estimate first will provide them with the knowledge of whether their answer is reasonable.

*Tips:* Do not get hung up on the math; concentrate on the concepts and how to solve the problems rather than numbers. Possibly make known constants ambiguous in order to qualify the answers, but be sure to let them know what you are doing, so they do not get known values wrong on the test.

*Potential pitfalls:* Sometimes students get intimidated by the math on the exam or they want to get some final product and it irritates them, so you need to vary your approach, sometimes focusing on the problem (in the beginning of workshop) and then toward the end of that section, focus on all aspects of the problem, including the calculations.

#### 6. Giving hints

*Idea:* If your students are really stumped and cannot even start a problem you may want to give them a hint concerning the type of problem, or refer them to an earlier, similar problem. Or, help them discern what they are solving for and then "guide" them to the correct process. If these ideas do not work, you may want to help them set up the first step.

*Tips:* This idea works well with students who are really struggling or stuck at one point. It allows them to still solve most of the problem even when they may have been stumped at the start.

*Potential pitfalls:* If you use this approach too often your workshop students may become too dependent on you.

#### 7. The artistic approach

*Idea:* You may ask the group or an individual to go to the board and illustrate what they think is going on in the problem. The group, as a whole, can sit back and discuss their thoughts and may even revise the original artistry.

*Tips:* It is always helpful to visualize what is going on beyond the numbers and equations. All groups benefit from a visual interpretation.

*Potential pitfalls:* One possible pitfall would be a misrepresentation of the information.

#### 8. Moving on when not everyone understands

*Idea:* If the workshop is running long or some students are repeatedly holding up the group (despite efforts by the leader and/or students to explain), the leader may need to make the decision to move on. Encourage everyone to review on their own, discuss

with each other outside of workshop, see instructor and/or bring any questions the following week.

*Tips:* In private, let unprepared students know what other resources are available to them, e.g., tutoring, consultation with the professor, lab, textbook, online resources such as tutorials.

*Potential pitfalls:* This may offend a student so you will need to be polite.

## 9. Know your resources

*Idea:* Find workshop materials and themes while utilizing a variety of techniques. Use a broad base of ideas and styles in your groups, gathering resources from all available providers. Such resources can include other texts, other professors, other students, their labs, and different classes.

*Tips:* Be sure to avoid using one style of learning technique. Always maintain diversity in forming your base of activities. Do not become stagnant! Constantly strive to incorporate new ideas and topics.

## 10. Small group/Large group

*Idea:* Students work in groups of two or three on an assigned problem(s) and then present their work to the whole group.

*Tips:* The whole group is split into two or more smaller groups. This promotes student participation. *problem.* *Potential pitfalls:* Be sure the small groups are truly working together and not relying on one person to solve the problem.

## 11. Jigsaw Method

*(Note: Modification of the cooperative technique developed by Aronson, 1978.)*

*Idea:* Split the workshop into smaller groups. Each group is assigned a problem. When all groups have completed their problem, they switch group members. Members in the new group now explain their problems to each other.

*Tips:* Promotes student-student interaction. Everyone has to work together to understand the problem. Gives individuals practice articulating and explaining their understanding.

*Potential pitfalls:* This tactic may be hard for quiet and shy people. You may want to pair such students with another quiet person who will not take control. It also works to pair them with someone who will make them explain it and not dominate the interaction. To prevent the “telephone” effect, the leader needs to monitor the discussions and make sure the explanations are clear and correct.

*Example:* Form three groups of three students. Each group is assigned one problem. One person from each group moves, combining to form a new group, and each new member explains the problem-solving process for their problem.

## 12. Round Robin

*Idea:* The group works as a whole with each member going to the blackboard, responsible for one step of the problem. The group must reach consensus that the proposed step is appropriate before continuing. Roles can be switched in subsequent problems.

*Tips:* Helps break down a problem into more manageable chunks. Students can acquire practice with smaller steps and see how it fits into the overall process.

*Potential pitfalls:* Watch out for controlling students taking over at the board. This is not a problem if the leader is active in prodding people to take their turn at the board. For students who are stuck at the board, remind them that the whole group is a resource for them.

### 13. “Tell me what to write,” or act as scribe

*Idea:* Have one individual (student or leader) go to the board and the group simply tells the person what to write.

*Tips:* Good strategy if the group is too leader-dependent or needs to engage students who are not prepared or are struggling. This is good to use after a few weeks when the group knows it is OK not to have understood the problem initially.

*Potential pitfalls:* Initially enticing a student to come to the board may be difficult. Assure the student that the group will be responsible for ideas, and he or she just has to scribe.

### 14. “M&M” approach

*Idea:* At the beginning of the workshop, leader passes out 2-4 M&M's (or paper clips, or whatever) to each member. Each M&M represents one comment or question. Once a person has used up his/her allotment of M&M's, he or she must stay quiet until everyone has used up his/her M&M's.

*Tips:* This strategy is designed to encourage whole-class participation and discourage dominating personalities. Chocolate (or, food in general) always helps lighten the mood.

### 15. Let them “screw up”

*Idea:* Mistakes can be a great opportunity for learning. While the students are solving the problems, do not be afraid to let them screw up. Many times they will catch their mistake by the end. If they don't, rather than just correcting them, ask them to explain their answer and ask them if their answer makes sense.

*Tips:* This idea will be most successful with groups that are comfortable with one another. It also requires you, the leader, to have earned their trust. You don't want them to think that you just don't care whether they understand or not.

*Potential pitfalls:* Unfortunately, your students may not catch their mistakes, even after you ask them to explain and review their answer. If this happens, try to figure out where they went wrong and point out this area. Ask questions so that they can figure out their own mistakes. Some students may be discouraged or may feel embarrassed.

### 16. “Pass the beanie baby”

*Idea:* Working as a large group, only the person with the “beanie baby” (or other item to pass) is allowed to speak.

*Tips:* This strategy is designed to encourage participation and listening while discouraging people from talking over one another.

*Potential pitfalls:* Always give the option to “pass” so no one feels put on the spot.

### 17. “Ask me one question, and I'll tell you no lies”

*Idea:* The leader has the group working in groups of three or more. Each group is allowed to ask the leader only one question or ask for one hint for the assigned problem.

*Tips:* Useful strategy when students rely on the leader too much for hints and direction. Promotes student- student interaction as they solve the problem and also as they generate their one question.

*Potential pitfalls:* Leader needs to be aware of the capability of students and level of difficulty of the problem. If the problem is too difficult, the group will not be able to solve the problem even after asking one question.

### 18. "Take a load off"

*Idea:* It may be advantageous for you to take a 5 minute break sometimes. Leave the room for a few minutes and have them work in your absence.

*Tips:* The idea is that the students lose their "safety net." This makes them rely on each other for their answers. It also instills a sense of freedom and eliminates the overseer. This helps the group members depend on themselves rather than the leader.

*Potential pitfalls:* The students may feel stranded in a less advanced sense of community. Similarly, if the group is totally lost, they may not be able to effectively begin the problem. Being able to read your group should alleviate this problem. If you sense that they may not know how to get started, get them started before you leave.

### 19. "Top 10 list"

*Idea:* At the end of the workshop or the end of a chapter, students generate a list of important concepts.

*Tips:* Good review technique to prompt students to reflect back on and articulate important ideas.

### 20. Flowcharting (& other visual organizers)

*Idea:* A flowchart (as well as other types of charts and graphic organizers) can be used successfully both by individuals and by groups in order to break down complex problems. The first thing that a flowchart helps students with is defining the problem and sorting the material given: what is the goal, what is needed to find the goal, and what information is already known? Once the students have figured out what the problem is asking for, they can move on to thinking about the solution, and breaking down the solution into simpler steps. When the steps have been written out and the problem solved, the students need to verify the solution and reflect on it. This is where discussion comes into play, and students can voice their opinions about the problem, and talk about the process as well as the outcome.

*Tips:* A flowchart is great for problems that are complex and can be broken up into steps. Flowcharts and other visual organizers (such as concept maps) are excellent promoters of group work. Flowcharts can be used in conjunction with the Round Robin method, especially when used for the first time.