

Advice on Using "Thinking Aloud Problem Solving" (TAPS)

General Information:

This strategy involves a type of triad in which the partners have defined roles. One of the triad is the **problem solver**, one is the **scribe** or silent writer and the third is the **monitor or motivator**. Each has an active role. The solver attempts to solve the problem out loud, articulating all the logic, thinking, and principles behind the steps taken. If the solver cannot continue he/ she describes why they are stuck and what is needed for them to be able to proceed with the solution. The monitor/motivator "keeps the solver honest" asking such questions as "why did you do that?", "what principle did you invoke there?" and "why didn't you multiply by this instead of that?". The monitor/motivator attempts not to solve the problem or give big hints. The scribe is a silent partner and simply writes down what the problem solver tell him or her. This role is very important however, as it ensures that a record of the solutions and dialogue are available for further examination.

I. Directions for the Student who is the Problem Solver:

Rationale:

You should acquire the skill of being aware of what you are doing while you solve problems, of being able to identify where you are in the process of solving problems, and of being able to describe to others what you have done and where you are stuck. These skills usually have to be developed. One way to try to develop them is to slow the process down and describe what you are doing. Instead of working on your own, you will have a partner serve as a "mirror" for you, to help you see what you are doing.

Details:

- 1) Read the problem out loud.
- 2) Start to solve the problem on your own telling the other members of the group everything you are thinking and doing. You are solving the problem. The scribe is only listening to you and the monitor/motivator is checking that you are proceeding along the correct path.
- 3) Thinking aloud is not easy. At first, you may have trouble finding the right words; don't search for these -say whatever comes into your mind.

II. Directions for the Student who is the Monitor/Motivator

Rationale:

You have a challenging role to play. You are to help the problem solver see what he or she is doing and to help improve accuracy in thinking. This requires that you encourage -indeed, force -the problem solver to constantly talk about what he or she is doing. You should encourage ideas to be presented -no matter how foolish they may sound -and not provide hints yourself. You must NEVER give the correct answer or attempt to solve the problem. However, an important part of your role is to give feedback, with such statements

as...."great work, you are really demonstrating good understanding".....OR "are you sure that is what you should do next?"..."Can you tell me why you say that?" etc .

Details:

1) Establish that you are a question asker and not a critic. Explain that you are not criticizing when you ask such questions as "Can you tell me what you are thinking?" or "Don't worry about how it sounds -just say an idea."

2) Your role is to:

- a) demand constant vocalization, yet do not keep interrupting
- b) help reflect the mental process being followed
- c) make sure that you understand each step that the problem solver is taking.

3) Do not work out the problem on your own -actively follow and track the problem solvers procedures in solving the problem.

4) Do not let the problem solver continue if you do not understand what has been done. If you think a mistake has been made, ask him "to check that" or ask, "Does that sound right?" but do not correct the error.

III. Directions for the Student who is the Scribe:

Rationale:

Your role is crucial. You are to keep a **clear written record** of the conceptual issues and problem solving steps that emerge during the dialogue between the problem solver and the motivator/monitor. This is so that these steps and problems can be clarified at a later time if necessary. This means you have to stay attentive to the dialogue that is taking place. You (and your group) may be sharing these solutions with other small groups or the large group.

Details:

1) Explain that you are trying to keep track of what ideas seem confusing or difficult so that later these can get clarified.

2) Your role is to take notes neatly and concisely by listening and writing on a piece of paper. Every step in a particular problem or task should be written down in detail.

3) You may be reporting back to other small groups or the large group on the solutions and problems your group identified.

Revised from: Pestel, B. C. (1993) Teaching Problem Solving without Modeling through "Thinking Aloud Pair Problem Solving" *Science Education*, 77(1), 83-94