

MPS-1 Awareness

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Awareness is the ability to describe what goes on in our mind as we solve problems and make decisions. We are trying to describe the mental processes that we use. We use this "awareness" skill at describing the processes so that:

- we can describe to others "where we are in a problem",

- we can compare "how we do it" with how "others do it",

- we can get ourselves "unblocked" if we cannot seem to solve a problem,

- we need to be able to describe our thoughts for team problem solving,

- we can describe our thought processes to another so that we can improve, as in clinical problem solving.

Talking aloud and describing your thinking processes to others may not be usual in your culture. Indeed, it might be considered impolite to talk about your thoughts (and show mistakes) until you have carefully thought it all out and are sure. However, if we are to improve our skills, then our experience has been that talking aloud is the first important step.

In this UNIT the goal is to help you to become used to talking aloud and describing how you are thinking as you solve problems. In this activity, there is *no* right or wrong answer. We do not care if mistakes are made. We just want us all to be able to talk aloud about what our mind is thinking.

To help you get this skill, two of you will work together: one will play the role of a "TALKER" or problem solver; the other plays the role of the "LISTENER". This is called the Art Whimbey "pair" method after Dr Whimbey who developed this method. This is sometimes called the TAPPS method (standing for Talk Aloud Pairs Problem Solving method).

It is very difficult to realize how much we change in our thinking and research skills from the workshop activities that you are going to do. To help you develop your confidence and be proud of the progress you make, before you do the workshop activities, please mark your skill now .

Playing the role of the Whimbey TALKER.

Your listener will not give you any hints about how to solve the problem. Your listener will help you to talk about what you are thinking so that the listener can follow and understand what you are saying. Here is what you do in this role:

1. sit side by side; have paper and pencils available.
2. the talker starts by reading the problem statement aloud.
3. then start to solve the problem on you own. You are solving the problem. Your partner is only listening to you. He or she is not solving the problem with you or for you.
4. talking and thinking at the same time is not easy. At first you might find it hard to think of the right words to use. Do not worry. Say whatever comes to your mind. No one is testing you or marking you. You are playing the role and trying out something from Canada.
5.Go back and repeat any part of the problem you wish. Use such words as "I am stuck! I do not know what to do! Maybe I should read the problem statement again."
6. Try to solve the problem no matter how easy it is or no matter if you think it is a little child's problem. You are learning to talk about your thinking methods. We use simple problems to help make this activity as easy as possible.

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Playing the role of the Whimbey LISTENER

You have an important and difficult role to play. You are to help the Talker see what he or she is doing as they talk about the travels of their mind as they solve problems. First you are to encourage them to talk aloud. At the same time, you are to monitor their thinking. Can you understand what they are saying? Can you follow the path that their mind is following? Could you describe what they are thinking to others? You are to help them to talk about the mental processes they are using-no matter how silly or incorrect they might be. You must not laugh at them. You must not criticize them and tell them that they are wrong. If you think they made a mistake, then say "Can you check that?" or "Are you sure?" Do not tell them what they should be doing. Do not tell them what you think is the "correct" answer.

1. Help the talker to see that you are not a "critic". Instead, you are a question-asker. You might say " Please keep talking." or "I was not able to understand or follow what you just said; would you please explain." "Can you tell me what you are thinking now?" "Do not worry about how it sounds- just say an idea about what you are thinking." "Can you check?" "Are you sure?" "OK" "Ahmmm"

2.You might tell the talker that your role is to:
- remind them to keep talking,
- help them improve the accuracy of their talking about their thinking,
- be able to understand and follow each step of the talker's thinking,

3. do not turn with your back to the talker and try to solve the problem on your own. Do not solve the problem on your own and then tell the talker what they should do.

4. do not let the talker continue if:
- you do not understand what they have done,
- you think that a mistake has been made and therefore they should "check what they have done." If they still do not see what might be wrong, point out but do not correct the error.

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Table 1-4 : A Place for you to Record your ideas about the Whimbey Pair Method:

Being the TALKER:

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Being the LISTENER

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Activities: Whimbey Pair Method: AWARENESS: MPS Unit 1 (reprinted courtesy of Art Whimbey)

1.1 In a different language "luk eir lail" means " heavy little package". "Bo lail" means "heavy man"; and "luk jo" means "pretty package". How would you say "little man" in this language?

1.2 A ball, when dropped from any height, bounces one-third of the original height. If the ball is dropped from 54 m, bounces back up, and continues to bounce up and down, what is the total distance that the ball has gone when it hits the ground for the fourth time?

1.3 There are two clocks, A and B. Clock A keeps perfect time but clock B runs fast. When clock A says 4 minutes have passed, clock B says that 6 minutes have passed. Both clocks are set correctly at 5 a.m. What is the correct time when clock B shows 9 p.m.?

1.4 On a certain day I ate lunch at Tommy's, took out two books from the library (*The Sea Wolf* and *Martin Eden*, both by Jack London), visited the museum and had a cavity filled. Tommy's is closed on Wednesday, the library is closed on the weekends, the museum is only open Monday, Wednesday and Friday and my dentist has office hours Tuesday Friday and Saturday. On which day of the week did I do all these things?

1.5 Sally loaned 7$ to Betty. But Sally borrowed $15 from Estella and $32 from Joan. Moreover, Joan owes $3 to Estella and $7 to Betty. One day the friends got together at Betty's house to straighten out the accounts. Which girl left with $18 more than she came with?

1.6 The number of cows owned by farmer Smith is the number owned by Farmer Thompson divided by the number owned by farmer Jones. Farmer Thompson, who owns 42 cows, would own 8 times as many cows as farmer Jones if he owned 14 more cows. How many cows does farmer Smith own?

1.7 A student predicted that if part of a leaf is in the shade and other part of the leaf is in the sun, then equal amounts of starch will be found in both parts of the leaf. Which of the following hypotheses is the student most likely assuming is true?

1. Chlorophyll is present in both the shaded and sunny parts of the leaf.

2. In the shaded part of the leaf photosynthesis is increased.

3. Carbon dioxide and water can enter the leaf cells in both the sunny and the shaded parts of the leaf.

4. By shading part of the leaf, photosynthesis is increased in the sunny part of the leaf.

5. Starch can move to different parts of the leaf.

AWARENESS MPS -1

C-1 I am to write a report to my supervisor telling her about what I have done this past month on my research project. Which of the following topics are <u>most</u> important to be included?

1) the pump for the equipment broke and only half of the experiments could be completed,

2) the mechanics could not fix the pump; the new parts will arrive in 5 weeks,

3) the results for the experiments that were completed seem to show that the most important effect is the temperature--not the concentration of the reactants. But, we cannot do a statistical analysis of the data until all of the experiments are completed.

4) I went to the library and studied the literature for another project because I could not do the experiments.

5) the technician will not be able to do the experiments in 6 weeks because he will be in Kyoto.

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AWARENESS MPS -1

R-1 A researcher is studying the catalytic combination of two reactants A and B to form a single compound C. The reaction is first order with respect to the reactants. Ten minutes after the reaction has started, the researcher accidently adds chemical X that combines rapidly with A. Enough X is added to react with about 1/2 of A. Which of the following is most likely to occur when the clock reads 12 minutes after the reaction has started?

1) the reaction of A and B to produce C would proceed more rapidly.

2) the reaction of A and B to produce C would proceed at the same rate.

3) the reaction would stop; that is no more C would be produced.

4) the reaction of A and B to produce C would proceed more slowly.

5) other.

_____

Feedback about the process

Awareness _____ _____
problem listener

Number of silent periods	0	1	2	3	4	5	>5
number of checks, double checks	>5	5	4	3	2	1	0
Amount of writing/ charting	>5	5	4	3	2	1	0

Comments:

_____
_____
Validated by: _____
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_____ _____
problem listener

Number of silent periods	0	1	2	3	4	5	>5
number of checks, double checks	>5	5	4	3	2	1	0
Amount of writing/ charting	>5	5	4	3	2	1	0

Comments:

_____
_____
Validated by: _____
****

_____ _____
problem listener

Number of silent periods	0	1	2	3	4	5	>5
number of checks, double checks	>5	5	4	3	2	1	0
Amount of writing/ charting	>5	5	4	3	2	1	0

Comments:

_____
_____
Validated by: _____

Feedback to the listener:
problem _________________________ listener ___________________________________
I found the listener:
● The quality of the comments:
-10 -8 -6 -4 -2 ☺ -2 -4 -6 -8 -10
too passive little too passive about right a little interruptive too interruptive

● The attitude displayed:
-10 -8 -6 -4 -2 ☺ -2 -4 -6 -8 -10
too supportive little too supportive about right a little threatening too threatening

● The listener's emphasis was listening to me □; helping me verbalize □; helping me solve the problem □; solving the problem for me □.

validated by talker _______________________________
****
problem _________________________ listener ___________________________________
I found the listener:
● The quality of the comments:
-10 -8 -6 -4 -2 ☺ -2 -4 -6 -8 -10
too passive little too passive about right a little interruptive too interruptive

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● The listener's emphasis was listening to me □; helping me verbalize □; helping me solve the problem □; solving the problem for me □.

validated by talker _______________________________
****

MPS 1: Awareness
Awareness: is the ability to describe aloud your thoughts and feelings as you solve problems

Skill development:
1. Ability to talk about thought processes
2. Shift to a focus on accuracy (instead of on time)
3. Emphasis on being active and writing things down
4. Recognizing that others solve problems differently than they do
5. Acquire some skill at listening
6. Acquire some skill in self assessment
7. Acquire some skill in giving and receiving feedback
8. Through self awareness, begin to improve self confidence
9. Begin to realize that assessment is based on **evidence**
10. Begin to develop an environment of trust where risking is OK.

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Pretest:
Awareness: how aware are you of what you do when you solve problems? Rate with an "x"

0	1	2	3	4	5	6	7	8	9	10
Unaware I just do it				Aware of Some					I can describe The details of how I do it	Very aware

Skill: how skilled are you in doing this activity? Rate with an "x"

0	1	2	3	4	5	6	7	8	9	10
Poor		Fair		Good			Very good			Excellent

Comments:

_____
_____
_____
_____

Learning Objectives and example assessment

MPS 1 Awareness

1.1 given a term listed under "concepts introduced", you should be able to give a word definition, list pertinent characteristics and cite an example.

3.1 given an exercise, you will be able to verbally describe the mental processes you are using to solve the exercise such that there will be fewer than two silent periods of more than 10 s duration.

3.2 given that you are the listener in the TAPPS, Whimbey pair method, the feedback from the problem solver will be that you are within two scale ratings of "about what I wanted" on both the "degree of interaction" and the "tone of the interaction."

3.3 given that you are the problem solver in the TAPPS, Whimbey pair method, the feedback from the listener will be that you are within two scale ratings of being active, methodical, careful and that you check and double check as you describe the process.

3.4 given that you are a listener in the TAPPS, Whimbey pair method, and given a set of possible responses, you will be able to select the most appropriate response as judged by the tutor.

3.5 given a problem, you will be able to write out the process you used to solve the problem. This will be judged to be at least 70% "complete" by the tutor or by an independent judge. Your written description shall show that you are active, methodical, systematic, careful and that you check and double check.

4.1 given a problem in the context of a trouble-shooting, critical instant or OSCE situation, you can describe your thought processes so well that you will agree with the assessment given by the tutor, observer, assessor.

6.1 given that you are stuck in solving a problem, you will be able to identify where you are in the process of solving the problem and identify where you want to be. Your assessment should agree 90% with the assessment of a tutor, peer or trained assessor.

6.2 given a set of evidence and learning objectives related to the MPS 1 Awareness unit, you will be rate the degree to which you can achieve the objectives. Your assessment shall agree 90% with that of an independent judge (peer, tutor or trained assessor).

Concepts introduced

Awareness, characteristics of successful problem solvers, advantages of becoming aware of the process, TAPPS-Whimbey pair process, role of Listener, role of Problem solver.

MPS 1: Awareness: Example assessment tasks:

1. As a listener in the TAPPS-Whimbey pair method, the problem solver has misread the problem statement, has chosen an incorrect answer **D** and has said "That completes that problem."
Your response is:
   a. "You have misread the problem, please reread it and start again."
   b. "I'm sorry, I should have told you earlier but you misread the problem; let's reread it carefully again."
   c. "Are you sure?"
   d. "You are wrong, the correct answer is **C**; you can do better on the next problem."
   e. "Can you check?"
   f. "OK, Let's go on to the next problem."
   g. Other (provide your specific response)

2. Record in writing the first 10 minutes of the process you use to solve the following exercises:

3. From the in-class activity, you have the following evidence:
   - your reflections that you wrote three times during the activity.
   - your worksheets and the statement of the exercises.
   - the feedback forms as a listener and as a problem solver.
   - the DISCOVERY sheet.
   - your awareness and skill checklist **before** and **after** the activity.

Write up a reflective assessment of the degree to which you have achieved the objectives. Refer to the evidence by number and relate your evidence and claims to the objectives by number. For example, "The worksheets and statements in Table 1 show that I was active because I created charts, circled and underlined information in the problem statement. This suggests that I have achieved part of objective 2.3."

4. For one of the stations in an OSCE, describe your thinking process aloud.

Evidence-based targets for problem solving

Evidence-based targets	Progress toward internalizing these targets				
	20%	40%	60%	80%	100%
● Be skilled in describing aloud your thoughts as you solve problems (24)					
● Your problem solving skill improves if you pause and *reflect* about the process and about what you are doing (27)					
● You have your own particular style that works for you; others have a different preferred style (24)					
● Your problem solving is done in Short Term Memory: be active, write things down to help overcome the space limitations of STM (28)					
● Focus on accuracy and not on speed (6, 9, 20, 23)					
● Problem solving is a social process; you need to interact with others (29)					
● Assessment is about *performance* and not about you as a person					
● Assessment is based on *evidence* and not on gut feelings or wishful thinking					

1 - 25, references from the Novice vs expert evidence. In PS News **55**.
27. Kimbell, R. et al. 1991 “Assessment of Performance in Design and Technology,” SEAC report, UK
28. Psychology texts
29. Stanford research on the design process, Leifer, L., (1997) “Design team performance: metrics and the impact of technology,” in “Evaluating organizational training: models and issues,” S.M. Brown and C. Seidner, eds., Kluwer Academic publishers.

DISCOVERY

Activity	Discovered	So what? application

MPS1-12

Reflections about this as a learning activity (for teachers)

_____
_____
_____
_____
_____
_____
_____
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_____
_____
_____

	already do this	would work	might work	not my style
Writing reflections	O	O	O	O
Using TAPPS	O	O	O	O
Using content-independent exercises	O	O	O	O
Have to develop discipline style exercises	O	O	O	O
Using the feedback forms	O	O	O	O
Using the learning objectives	O	O	O	O
Using the DISCOVERY form to summarize	O	O	O	O
Other _____	O	O	O	O