

## Printout of MindLadder® Advisor

### Section B-5\*



#### R-10: Use of Multiple Sources of Information

To record an appointment we need to make a note of both space and time: Where do we need to be when? If we don't attend to both time and space simultaneously we might show up at the right time in the wrong place or the right place at the wrong time. This knowledge construction function orients the learner to include in the information collection process a check for the possibility that information resulting from the concurrent consideration of two or more separate sources may be required to solve a task. For example to identify a point in a Cartesian diagram both an X and a Y coordinate are needed. To determine one's position on the globe both latitude and longitude are needed. To identify our car we need make and year. When we buy clothing we need consider at once size, color, design, fabric, workmanship and price among other variables: In many situations the input for problem solving, decision making and action emerges only from the simultaneous consideration of two or more variables.

The need to mediate the development of this knowledge construction function is evident in many learners who engage in problem solving and decision making based on the isolated consideration of individual sources of information. One source of information may be considered, followed by the inspection of another, but the available sources of information are not considered simultaneously. The use of this knowledge construction function has the effect of increasing, most often only ever so slightly, the time the learner spends collecting information. The return on that investment comes in the form of a wholly different level of information; one which the learner could not have secured without this knowledge construction function.

Prior to the development of this function it is common for students when they register one source of information to lose it when another is added (see also T-5). The child does not attend to what the combined consideration of two or more information sources means

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for problem solving. For example, if you ask a student to look for a blue circle, she may select a blue square or a red circle. Or, a student may have difficulty completing a sorting task using various blocks because he doesn't consider at once the color, shape and size of the blocks.

Fragility in this knowledge construction function makes it difficult for the learner to form relationships between objects or events. For example, when we compare we consider at least two things at once and it is their simultaneous consideration that forms the basis for the comparison: The oak tree is older than the pine tree, Janice is taller than Virginia, and this class is easier than that class. Similarly, we form a relationship between them when we classify or order things because we need to compare the features of the object or event that needs to be classified with the characteristics of the available categories. Establishing relationships using multiple sources of information is basic to all higher order thinking.

As you can determine, this knowledge construction function is one that sees frequent use and its unavailability to a learner can affect a student's performance across the academic subject areas. There are many activities that you can do to mediate the development and use of this knowledge construction function:

a. *Model your own use of this function and create situations that require students to use it:* Ask questions, or make statements that refer to more than one attribute of an object or situation. "Can you find the tree with the gold leaves?" Have students specify each source of information. "Hand me the small, blue circle with a hole in the middle." (Small, blue, circle, hole, middle). Have students create situations that put into play more and more sources of information and give them practice in identifying objects or events that meet a specific number of informational requirements: "Select the artifacts that were made by women in the Polynesian village after the famine." (Artifacts, women, Polynesian, village, after famine).

b. *Model the search for multiple sources:* Help your students gain awareness and control of this knowledge construction function by prolonging their exposure to all parts of a problem and by modeling their joint consideration. Give cues or specific directions to the students to make them aware of the need to consider multiple dimensions of information: "In this geography problem, there are three things to consider. Be sure to look for and use all three." "You will need to look for both the degrees of latitude and longitude to locate the mystery site." "But there is one more dimension to consider

– yes, good, the dimension of time: Latitude, longitude and a specific moment in time”.

c. *Make data conspicuous*: Use cues to help students become aware of the need to use this knowledge construction function. Underline, use different colors, set off in brackets, use bold type or italics. "In this next problem, each source of information is underlined in a distinct color. Think about what each source of information adds and what they tell you when you consider them all at once as opposed to one by one. Be sure to use all the underlined information to discover the solution."

d. *Provide feedback for students' responses*: "That answer is partly correct. What else must you consider?" "You have selected the correct color. Now take a closer look at the shape that you need." "You have half of the solution. What else do you have to think about to solve your dilemma?"

e. *Discussion and examples*: Have students think about and discuss the many different times, contexts and situations when the simultaneous use of multiple sources of information is necessary. For instance, planning menus, planning events, diagnosing disease, planting crops, preparing meals, driving a car, buying a gift, selecting a project, choosing a career, selecting a spouse.

Students needing mediation of this knowledge construction function may have difficulty doing classroom activities that involve comparing and contrasting information because they fail to consider more than one aspect of a situation or a problem at the same time. For example, when writing reports they may list, one by one, the individual sources of data they have assembled but have difficulty pulling out the information that is generated when the separate sources are considered simultaneously. You can assist in the development of this knowledge construction functions also by mediating two transformation functions: T-13: Abstractions and T-14: Establishing Relationships. We turn to the transformation functions next.