Printout of MindLadder[®] Advisor Section B-5[•]



C-9: Use of Feedback for Self-regulation

This knowledge construction function orients students to use feedback to self-regulate their learning process. Students need to be taught how to use feedback for self-regulation. If you as the teacher always do for the student and correct the student's mistakes, you become the feedback system and the student does not develop his own. Instead guide your students to be on the lookout for the results of their own actions through mediation of this knowledge construction function. This will enable them to use the error feedback you provide to correct processes that lead to mistakes.

What is feedback? Feedback is information about a system's performance that is routed back into the system. There are two types of feedback. They are known by the value of the sign in the mathematical feedback equation: Positive and negative. Positive and negative do not imply that the feedback is good or bad. Positive means go on and do what you are doing. Negative means change the direction of what you are doing. The two types of feedback are used to regulate systems (T-15). Positive feedback tells the system to increase change in the current direction. Negative feedback tells the system to reverse and decrease the direction of change. Negative feedback has a stabilizing effect because it maintains balance or equilibrium. Unless reversed by negative feedback, the effect of positive feedback is to make the system change more and more in the current direction. Unchecked, forward feedback is dangerous because it moves a system beyond its safe mode of functioning.

Here are some examples of students who have difficulty using feedback to regulate their learning: George is pulling low grades but resists making changes in the way he studies saying he is used to his way of doing things. Jasmine has taken to drinking coffee whenever she studies. She keeps on even though she realizes it causes her to lie

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awake all night. George and Jasmine are not using the outcome information they have as feedback to regulate the way they learn.

Here is an example of a positive feedback loop that can occur in the human heart: Ventricular fibrillation is a condition in which a positive feedback loop causes the heart's electrical activity to become disordered. When this happens, the heart's lower chambers, which are responsible for pumping, contract in a rapid, unsynchronized way. Rather than beating the ventricles "flutter" - and the hearth pumps little or no blood. Collapse and cardiac arrest will follow in minutes unless medical help is provided right away. The irregular heart beat can be converted into a normal rhythm by shocking the heart with a defibrillator. Defibrillators are increasingly available in public places.

There are many examples of feedback in the human organism so it is easy for us to experience what positive and negative feedback is. Take for example the experience of feeling hungry. When we haven't eaten for a while we start to feel hungry. As time goes on we feel hungrier and hungrier: We are getting negative feedback i.e. feedback to reverse the direction of change – we are getting feedback, in a sense, to stop not eating and start eating. So we sit down and have a meal and we eat. As we eat and eat we start to feel full: In other words, we are, once again, getting negative feedback – we are getting feedback to stop eating and start not eating. Thus the cycle goes on from meal to meal.

Discover and analyze with your students additional examples of systems in the human organism that are regulated by positive and negative feedback loops. Here are two examples: sleep and thirst. -Have your students discover and analyze man-made systems that are regulated by feedback loops (e.g. the float valve that regulates the tank water level in the flush toilet; the fantail that keeps the face of the windmill pointing into the wind). Elections in democracies function as feedback loops as do audits in companies, the reaction in the stock market to publicly traded stocks and an employee's performance review.

The thermostat in a school building or home is another good example of a system that is regulated by feedback. When the temperature reaches a certain upper limit the room heating is switched off so that the temperature begins to fall. When the temperature drops to a lower limit, the heating is switched on again. When the upper and lower limits are set close to each other a steady room temperature is maintained. The same principle, in reverse, applies to a cooling system such as an air conditioner or refrigerator. As your students acquire an understanding of feedback begin to discuss how they can apply this concept to regulate their own learning. Help them to see how attention to outcomes (C-8) is a pre-requisite for the use of feedback for self-regulation. Have students discuss examples of the use of such feedback from their own lives. For example, Sue notices that she always does poorly when she studies right before she goes in to take an exam. She can see now how she ought to use this observation to change the way she studies.

As teachers, it is tempting to simply tell our students what to do or to correct their mistakes for them, but it is more important to enable your students to monitor what they do so that they will be able to learn how to self-correct and self-regulate. For example, encourage your students to look at a task and determine how their behavior can be regulated by their feedback. Use questions to do this. "Sam, I see you have made the same mistake several times in these math problems. Why don't you go back and carefully look at what you have been doing to find out what you have to change." or "Jack, I see that you are getting more and more anxious. Why don't you stop and think and find out what makes you feel this way? I will check back with you soon." It is also helpful if you talk about how you use it to regulate what you do. For instance, "I see this pattern I've been cutting is all uneven. I better slow down and be more careful or I will waste all my paper."

Information about the effects of one's own behavior acquires the value of feedback when it is used to regulate one's functioning. Students need to be aware of their mistakes so that they can correct them and make adjustments in their work. Keep in mind that young children are not mature enough to use feedback consistently on their own but children are typically able to attend to feedback more consistently during late childhood and early adolescence. When you mediate this function, it is important to keep in mind the age of the student so you provide feedback that is useful for the learners you work with.