

Conceptual Change Instructional Model¹

Cognitive conflict has been used as the basis for developing a number of models and strategies for teaching for conceptual change. The conceptual change teaching model has several steps including:

#1 Reveal Student Preconceptions

A basic assumption in teaching for conceptual change is the key constructivist idea that construction of new conceptions (learning) is possible only on the basis of already existing conceptions. Even though existing knowledge (be it correct or incorrect) allows us to make our way through the world, we are not necessarily conscious of it. Thus, the first and most significant step in teaching for conceptual change is to make students aware of their own ideas about the topic or phenomenon under study. To elicit students' conceptions, instruction begins with an *exposing event*. The exposing event is any situation that requires students to use their existing conceptions to interpret that event and represent their ideas. Students can represent their ideas in many ways. They can write descriptions, draw illustrations, create physical models, draw concept maps, design web pages, or create any combination of these to evidence their understanding of a particular concept. Once students' conceptions are made explicit, teachers can use them as the basis for further instruction.

#2 Discuss and Evaluate Preconceptions

The goal of this step is to have students clarify and revise their original conceptions through group and whole-class discussions. If this is the teacher's first conceptual change learning activity, it is wise to begin with the latter; such discussions allow the teacher to model the evaluation process before students evaluate each other's ideas in smaller groups. To begin, the teacher asks various students to describe their representations (conceptions). After all conceptions are presented, the teacher leads the class in evaluating each for its intelligibility, plausibility, and fruitfulness in explaining the exposing event. After the whole-class discussion, students with differing conceptions work in pairs or groups to evaluate each other's ideas. Each group selects one conception (or a different conception modified through evaluation), provides a rationale for the selection, and presents that rationale to the whole class. Student motivation can be increased by allowing the students to vote for the conception that they think best explains the exposing event.

#3 Create Conceptual Conflict

As students become aware of their own conceptions through presentation to others and by evaluation of those of their peers, students become dissatisfied with their own ideas; conceptual conflict begins to build. By recognizing the inadequacy of their conceptions, students become more open to changing them.

#4 Encourage Cognitive Accommodation

Students should be given time to reflect on and reconcile differences between their conceptions and the target theory. The teacher should incorporate reflective activities into lessons to promote cognitive accommodation or restructuring of the student preconceptions. A cooperative learning environment is necessary for successful conceptual change instruction. There must be opportunities for discussion; students must feel safe in sharing their viewpoints as they consider and evaluate other perspectives.

¹ excerpted from the Wikipedia entry on conceptual change