

**Green Star Group: ETEC602 final project literature writeup**  
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The subject of our project is focused on "sustainability education" as described by Mortensen (2000). Sustainability education is a new social paradigm for fostering involved, informed, and conscious citizens. The concept of sustainable education is complex and challenges the learner to consider the many interrelated facets of the Earth as a complete system. The implications of sustainability education are far-reaching into environmental, economic, and social dynamics. The educational implications cross several disciplines and create opportunities for new collaborations and partnerships. The real-world component of sustainability education is in the actual application of the learned material within one's sphere of influence. Once the sustainability concept is internalized the learner is changed by personal insight and formal application of concepts in daily life.

The use of visual imagery as an instructional tool within concept attainment lessons is a useful inductive "discovery" technique proven to build a learner's spatial conceptualization skills. Imagery in the form of pictures, diagrams, and mind maps provides learners with an opportunity to depart from conventional linear modes of thinking. According to Silverman (1998), visualized "pattern-finding" activities helps to foster a broader understanding of multifaceted interrelated concepts that may be lost via context-based strategies.

We believe pictorial representations allow for a more abstract learning experiencing over the conventional use of text. In this project, students will have an opportunity to come to their own conclusions based on logical and emotional stimuli as illustrated by visual imagery. The combined use of both types of stimulus "reinforcers" aid in eliciting positive and or negative forms of subjective sentiment that helps to foster concept attainment (Silverman, 1998).

According to information from Saskatoon Public Schools ([ca. 2009]), "concept attainment" is an indirect instructional strategy based on the work of Jerome Bruner that utilizes a structured inquiry process to figure out the attributes of a group or category that has already been formed by the teacher. In other words, it is the search for and identification of attributes that can be used to distinguish examples from non-examples that define groups or categories. Concept attainment can be used to introduce content (as we will be doing in our demo project), and/or to clarify ideas. In classic concept attainment, the teacher provides both examples and non-examples of the teacher's pre-chosen (but secret) category and works with students until they've narrowed the possibilities and guessed the category.

In this project, we're deviating from the classic steps of the concept attainment process (Johnson & Carlson, 1992), but still providing a structured inquiry process by which the (adult) learners will collaboratively determine a category (of their own invention) based on the attributes of the set of images we provide. We do not provide non-examples (hoping that the concept of non-example will be subconsciously determined implicitly), and we are not particularly concerned that the learners come up with the exact "hidden rules" we invented; rather, we imagine that their results will be at least comparable to the categories we had in mind when we assembled the images. We are allowing them to form their own concepts rather than holding them to a single "right answer" (van der Veer, 1998). We will likely learn something from the

students! (We'll certainly get some ideas after having gone through the process a few times to help feed back into the process and refine the activity to help evaluate our project (using the "E" in ADDIE).

In the next phase, the students reflect upon the thinking patterns that were used to attain the concept using questions such as those presented by Johnson and Carlson (1992). (We probably won't have time to do this during our classroom presentation.)

We're also counting on the supposition that adults have different strategies to solve problems than do younger children (van der Veer, 1998), and hope that this will allow our project to succeed with an older audience (where it might be a bit too complex/frustrating for a younger audience). If the students' categories don't match the "hidden rules" we had in mind, in classroom discussion after the exercise is completed (which we will probably not have time to include in our demonstration), the instructors could--directly or subtly--refer to each of the hidden rules formulated beforehand and compare/contrast the two ideas. Additional images might be found to transform the students' ideas into the hidden rule ideas, if appropriate.

We think that an activity like this might be effectively used in a younger group, but perhaps only after similar, less abstract versions of the "game" have been used previously with the class (e.g., the classic concept attainment process). In any event, activities like this could be used effectively to introduce (or further explore) any number of topics throughout a school year. The simple activities could be used at first, then--as the students become familiar with the process in general--variations can be included (e.g., devising competitive games, including non-examples, using words and/or pictures, having one student know the hidden rule and work with the others in his group to help them discover it, etc.) to add interest and/or to fit particular purposes.

Activities like this would seem to be excellent means to introduce new topics (or to expand upon previously-learned topics), as they serve to discover students' current knowledge/beliefs, foster group cooperation/social learning, and to pique students' interest in the subject matter. Additionally, these exercises could help teachers understand the learners' initial state of knowledge about relevant subjects in order to identify inaccurate cognitive illusions (Groves & Pugh, 2002) that learners may have so that these may be corrected during the course of study.

## References

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## Developing conceptual thinking: The concept attainment model

### Article summary

Johnson, J., & Carlson, S. (1992). Developing conceptual thinking: The concept attainment model. *Clearing House*, 66(2), 117-121. Retrieved from EBSCOhost.

Concept attainment is a teaching model that gives students experiences in conceptual thinking. A particular concept is studied inductively by examining examples and non-examples. Students work through the process together to come to shared meanings of the concept and then reflect upon their thinking. According to the authors there are four phases to this process.

#### Phase One

In this initial phase, the teacher will present the data (examples and non-examples). The role of the students is to identify and name the concept.

#### Phase Two

In the next phase, students confirm the concept and identify its' characteristics. After the students have narrowed their list of possible concepts and have selected the concept they believe is illustrated by the scenarios, they ask the teacher to verify this hypothesis.

#### Phase Three

In this phase, the students test the attainment of the concept. The teacher provides new examples and non-examples of the concept and the students label them yes or no. This activity assesses the students ability to identify examples and non-examples of the concept.

#### Phase Four

In the final phase, students reflect upon the thinking patterns that were used to attain the concept. Here are some of the questions that might be asked to generate this kind of thinking:

- How did you decide to eliminate concepts after hearing more examples?
- What did you do to generate the list of concepts?
- What thinking processes assisted you in adding and eliminating concepts?
- What use did the non-examples play in helping you to add to or eliminate concepts?
- How did you decide on the characteristics?
- What processes did you go through as you began to write a definition?
- What did you think about as you wrote your examples and non-examples?
- How can you use this thinking process in your everyday life? Give an example of how you've used this process.
- How might the definitions/ characteristics change if we did this activity with a group of students from another culture (age, race, sex)?
- What have you learned about understanding the meaning of concepts?