

EDU 6526 Survey of Instructional Strategies

Session 3: Concept Attainment and Bloom's Taxonomy

I. Definitions

A *concept* is an abstract idea generalized from particular instances or evidence, so involves an inductive process of thought. Contrast *concept formation*, or the establishment of conceptual categories, with *concept attainment*, or the understanding (*comprehension*) of attributes for categories. This is done through the comparison of examples (*exemplars*, or the “research data”) containing shared characteristics (*attributes*).

II. Conceptual Attributes

- A. **Attributes** are features of concepts (e.g., nations have boundaries, people, and governments)
- B. **Essential attributes** are critical to the conceptual domain (with nations, boundaries but not trees)
- C. **Attributive values** relate to the extent to which an attribute is present in any example, so the question is one of degree (at what point do boundaries form the concept of nationhood within the HRE?). Therefore, start with examples where the attributive value is high so students can understand the parameters and distinctions of the concept.
- D. **Multiple attributes** involve the range of concepts from those in which a single attribute is sufficient for membership (democracies: US, France, Japan, Canada, India) to those requiring several attributes (North American democracies: US and Canada).

III. Transdisciplinary Concepts

- A. Cause and Effect: What is this action and change in conditions?
- B. Commonality and Diversity: How are these the same or different?
- C. Systems and Patterns: How is this organized or arranged?
- D. Scale and Symmetry: How does the size and shape compare to others?
- E. Cycles and Change: Is this effect repeated over time?
- F. Interaction and Relationships: How do these relate to each other?
- G. Time and Space: When and where did this happen?
- H. Equilibrium and Order: Is there a balance or stability to this arrangement?

IV. Benjamin Bloom's Taxonomy of Intellectual Processes

6.00 Evaluation. This represents the highest leveling the taxonomy. It includes a combination of all the previous five categories. Evaluation is concerned with making judgments about value. In order to make such an assessment some yardstick or criterion is necessary as a standard against which things can be measured. The evaluation can be quantitative or qualitative, direct or indirect, subjective or objective. Usually judgments are made in terms of internal evidence; making judgments in terms of external criteria is regarded as the highest level of evaluative activity.

Some examples of objectives:

- Compare and contrast two major theories accounting for the formation of volcanoes
- Determine the logical fallacies in the arguments presented by Duplciis.
- Make an appropriate decision on the basis of the data presented.
- Evaluate a curriculum in terms of its announced aims and agreed objectives.
- Criticize the use of imagery in Rod McKuen's poem *Speak to me in silence*.
- Decide the several advantages for using a taxonomy of educational objectives.

Associated action verbs: to evaluate, judge, decide, assess, contrast, criticize, select, defend, support, compare, determine

5.00 Synthesis. Synthesis is the opposite to analysis. It involves combining together a number of elements in order to form a coherent whole. The process involves logical deduction, and in this sense the category is intimately concerned with thinking and creativity. Synthesizing or combining elements involves doing something in a unique or original way. The discovery of pattern or structure is an important part of the activity. The sub-categories of synthesis are production of a unique combination, production of a plan or proposed set of operations and derivation of a set of abstract relations.

Examples:

- Summarize the normal cycle of erosion for streams and rivers.
- Design a module dealing with the concept of the sonnet.
- Describe a personal experience that has happened to you whilst learning.
- Compose a three act play around the theme of self-fulfillment.
- Draw a generalization from the data that you have collected in the experiment that you have just performed.

Associated action verbs: to combine, restate, summarize, generalize, conclude, organize, design, classify, formulate, propose, compose

4.00 Analysis. Analysis involves the breaking down, or the separation of a whole into its component parts. It is a process of reasoning or thinking. In its simplest form, analysis includes a simple listing of elements. A higher level of analysis involves determining the nature of the relationships between these elements. The highest form of analysis includes identifying the organizing principle or principles behind the actual material or phenomena concerned. At this level, analysis begins to take on many of the features of synthesis.

Examples:

- Identify the assumptions that have been made in chapter five.
- Analyze this topic into its component parts.
- Distinguish the literary and stylistic techniques used in the following poem.

Categorize the relationships between the phenomena listed above.

Associated action verbs: to analyze, identify, separate, break down, discriminate, distinguish, detect, categorize

3.00 Application. Application involves using something in a specific manner. As such it includes relevancy, as well as the capacity for close attention to detail. Diligence and effort are also involved. The two lower categories of knowledge and comprehension are prerequisites to application. Interestingly enough, application involves an element of creativity, since it involves seeing how particular phenomena can be used in a new situation to which there is no specified solution. The skill of application underlies a great part of school learning, and is intimately concerned with some of the primary objectives of education.

Examples:

- Apply the principle of resistance to a novel situation in aerodynamics.
- Predict the possible consequences of a continued mixture of recession and inflation.
- Explain how Johann's conclusion was reached, when so little information was available.
- Infer the appropriate principle behind each of the following reactions.
- Transfer the concept of a field of force from physics to human behavior.

Associated action verbs: to apply, explain, show, demonstrate, use, perform, relate, develop, construct, infer

2.00 Comprehension. Comprehension involves understanding or perceiving. It includes taking in, grasping, insight, and as such is highly stressed in school learning. In many ways, comprehension necessitates the processing of information, which may include changing that information into some parallel form more meaningful to the learner. Three sub-categories of comprehension are recognized: translation (changing something into another form), interpretation (elucidate or clarify meaning), and extrapolation (going beyond the information given.)

Examples:

- Translate the following passage from Latin to English.
- Give two examples of the above rule.
- Draw a graph illustrating the relationships between the following two sets of data.
- Interpret the following situation.
- Illustrate what is meant by warranted and unwarranted conclusions.

Associated action verbs: to interpret, translate, illustrate, comprehend, predict, interpolate, extrapolate, draw

1.00 Knowledge. Knowledge involves the rather elementary skill of recalling, or remembering specific information or experiences. The information recalled may include specific pieces of information terminology and facts. A higher level form of knowledge involves knowing the ways of means of dealing with information. This includes conventions, as well as trends and sequences, classification and categories, criteria and methodology. The highest level of all involves a knowledge of universals and abstractions. This includes a knowledge of principles and generalizations, as well as theories and structures. The organizing principle behind these three broad sub-categories of knowledge is from highly specific and concrete knowledge to more complex and abstract ideas.

Examples:

Define the term 'light.'

State what is meant by the expression 'there's no fool like an old fool.'

Describe the stages in the so-called 'scientific method.'

Recognize the correct generalization that can be drawn about the behavior of metal when heated.

State the relationship between temperature and pressure.

Label the enclosed map of the major climatic regions of the world.

Measure the distance between London and Birmingham.

Associated action verbs: to describe, recall, define, state, identify, name, list, underline, measure, label