Session 8

Bloom's Taxonomy
The Rosetta Stone of Knowledge Management

Establishing and Evaluating Individual Learning Goals and Objectives

- Cognitive Domain: deals with the development of ascending levels of intellectual abilities and skills.
- Affective Domain: describes levels of the internalization process of the learners' interests, attitudes, values, appreciations and behavior.
- Motor Skills Domain: Deals with physical activity requiring coordination.

Cognitive Domain: Its Six Levels

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Knowledge may be thought of as a personal database which learners can recognize or recall. It is rote memory ranging all the way from recalling specific facts to abstract patterns and theories. There is no application of the knowledge except for the minimum amount needed for learners to recognize clues in the question that would trigger an appropriate answer filed in the learners' memory. This type of learning occupies a significant part of our educational system.

An example: In ethics, memorizing facts about a case, or things such as the Foreign Corrupt Practices Act; examples of Teleological and Deontological systems.
Three Sub-Levels of Knowledge (1st)

4 Knowledge of Specifics: Terminology and Specific Facts.
   — To be able to define technical terms by giving their attributes, properties, relations. It's the familiarity with a large number of words and their range of meaning.

Three Sub-Levels of Knowledge (2nd)

4 Knowledge of Ways and Means of Dealing with Specifics: As in conventions, trends and sequences, classification, criteria, and methodology.
   — Familiarity with forms and conventions of major types of work.
   — The knowledge of trends underlying the development of public programs.
   — It's the familiarity with a variety and range of literature.

Three Sub-Levels of Knowledge (3rd)

4 Knowledge of Universals and Abstractions in a Field: Principles and Generalizations.
   — The recall of generalizations about certain cultures.
   — The knowledge of theories and structures.
   — The recall of major theories about a particular culture.

Level 2, Comprehension

This level is probably the largest general class of intellectual abilities and skills emphasized in schools and colleges. Comprehension means meaningful-integrated learning. Here learners accommodate the given information and make it part of their own frame of reference and are able to solve problems similar to those presented in class. They are capable of knowing what is being communicated, and are able to make limited use of it.
Three Sub-Levels of Comprehension

1. **Translation**: Learners are capable of integrating the material into their own ordinary language without loss of meaning. The skill of translating mathematical verbal material into symbolic statements.

2. **Interpretation**: Learners are capable of seeing the whole picture. They are able to classify material into an overview anchored in their own experience and are able to identify the salient facts of a case.

3. **Extrapolation**: The ability to predict possible consequences or trends.

Level 3, Application

The use of abstractions in particular and concrete situations. The abstractions may be in the form of general ideas, rules of procedures, or generalized methods. The abstractions may also be technical principles, ideas, and theories which must be remembered and applied. Application to the phenomena discussed in a paper of the scientific terms or concepts used in other papers. The ability to predict the probable effect of a change in a factor on a biological situation previously at equilibrium.

Level 3, Application

This level with the next three could be lumped together and called either, Critical or Creative Thinking, Insight, or Problem-Solving-Learning. Application involves the use of abstractions and theories to solve new problematic situations or to find new slants to old problems. Here learners can encounter an unfamiliar problem, restructure it from their fund of knowledge, into a familiar context or classification. This in essence involves a process. One way to help learners in this regard is to help them learn processes similar to the Case Method.

**The Case Method**

1. Summarize the salient facts related to the case.
2. Prepare a list of Stakeholders. Why are they important?
3. Develop a clear statement of the issues involving all the stakeholders.
4. List all possible options with their likely consequences.
5. Prepare an Action Plan that involves both the creation of a corporate policy and a strategic implementation plan that will solve the problem and prevent it from recurring.
6. Flesh out a detailed justification of the Action Plan that applies the technical language and arguments appropriate to the case.
The Research Method

4 Clearly state the Consequential Question: Why are you doing this? What contribution will it make? Why is it important?
4 What literature base will you cite? To what community of scholars is this research addressed? Where will you publish this?
4 What framework or point of view will you employ? Do you plan to apply a framework or point of view in the literature? Which one?
4 What is your research approach? Do you plan to conduct a survey, build and test a simulation model, or conduct interviews?
4 What is your empirical base, e.g., mailed survey, field work, experimental data?

Level 4, Analysis

The skills of analysis are important for enriching every step of the Case Method. Analysis skills can be tested by asking for important unstated assumptions, for stated premises, or for facts supporting a conclusion. It can also be tested by asking learners to describe inductive or deductive kinds of arguments needed to support a conclusion.

Three Sub-Levels of Analysis

4 Analysis of Elements: The ability to recognize unstated assumptions. The skill in distinguishing facts from hypothesis.
4 Analysis of Relationships: The ability to check the consistency of hypotheses with given information and assumptions. The skill in comprehending the interrelationships among the ideas in a passage.
4 Analysis of Organizational Principles: The ability to recognize form and pattern in literary or artistic works as a means of understanding their meaning. The ability to recognize general techniques used in persuasive materials.

Level 5, Synthesis

Synthesis is the combining of the previous levels as part of a new integrated whole. It requires learners to draw from their previous knowledge and comprehension, organize it in a novel way that provides an independent and effective solution to an unfamiliar problem.
Three Sub-Levels of Synthesis

1. Production of a Unique Communication: The skill in writing, using excellent organization of ideas and statements. The ability to tell a personal experience effectively.
2. Production of a Plan or Proposed Set of Operations: The ability to propose ways of testing hypotheses. The ability to plan a unit of instruction for a particular teaching situation.
3. Derivation of a Set of Abstract Relations: The ability to formulate appropriate hypotheses based upon an analysis of factors involved, and to modify such hypothesis in light of new factors. The ability to make mathematical discoveries and generalizations.

Level 6, Evaluation

Very simply, evaluation is making judgements about the value or worth of something. Bloom classified as affective, any valuing done simply as a matter of personal preference or feeling. Cognitive evaluation, enhances all six steps of the Case Method. Most evaluation as are quick judgements about something, without much thought given to all the stakeholders and ramifications. Here system thinking i.e., there is no outside, is essential to the evaluation process.

Two Sub-Levels of Evaluation

1. Judgements in terms of Internal Evidence: That is judging by internal standards, the ability to assess general probability of accuracy in reporting facts from the care given to exactness of statement, documentation, proof, etc. The ability to indicate logical fallacies in arguments.
2. Judgement in terms of External Criteria: The comparison of major theories, generalizations, and facts about particular cultures. Judging by external standards, that is the ability to compare a work with the highest known standards in the field--especially with other works of recognized excellence.

Affective Domain: It's Five Levels

1. Receiving
2. Responding
3. Valuing
4. Organization
5. Characterization
Level 1, Receiving

At this level, we are concerned that the learner be sensitized to the existence of certain phenomena and stimuli; that is, that they be willing to receive or attend to them. This category has been further broken down into three sub-categories to indicate increasing levels of attending to a phenomena.

Three Sub-Levels of Receiving

1. **Awareness**: Here learners have no interest in the subject.
2. **Willingness to Receive**: Here learners are neutral with respect to the subject.
3. **Controlled or Selective Attention**: Learners may choose to learn about a subject, if there are no other distractions.

Three Sub-levels of Receiving

1. **Awareness**: learners are merely aware or conscious of something, that they take into account in a situation. It does not imply assessment. Examples of objectives include, they develop an awareness of aesthetic factors in fashion, design, etc.; develop some consciousness of color, form, arrangement and design in objects, structures, etc.
2. **Willingness to Receive**: at a minimum level we are describing here the behavior of being willing to tolerate a given stimuli, not to avoid it. Examples of objectives include, listen carefully when others speak; exhibits an appreciation for other cultural patterns, tolerance of cultures.
3. **Controlled or Selected Attention**: listen to music with some discrimination as to its mood, and meaning and with some recognition of the contributions of various instruments, alertness toward human values and judgements.

Level 2, Responding

At this level we are concerned that the learner go beyond merely attending to a phenomenon. Here the learner is not just willing to attend, but is actively attending.
Three Sub-Levels of Responding

4 Acquiescence: Here learners may decide to take a course, if it fits into his or her schedule
4 Willingness to Respond: Here learners voluntarily or more actively consents to assignments given by someone.
4 Satisfaction in Response: Here we begin to see that learners believe something worthwhile is going on. Emotional Responses are recognizable.

Level 3, Valuing

At this level, the learners’ interest builds and commitment slowly emerges. While the first two levels can be accomplished by lectures, marketing or other inducements, this level along with the next two require active learner-involvement.

Three Sub-levels of Responding

4 Acquiescence in Responding: obedience or compliance could also describe this behavior. At this level, learners make a response but have not fully accepted the necessity for doing so. There is a passiveness so far as the initiation of the behavior is concerned and the stimulus calling for this behavior. Examples of objectives include, the willingness to comply with health regulations or obey traffic regulations.
4 Willingness to Respond: the key term here is willingness with its implication of capacity for voluntary activity. It implies that learners are sufficiently committed to exhibiting behavior that they do not, not out of fear of punishment, but on his own voluntarily. Examples of objectives include, acquaints themselves with current issues in international political and social affairs through reading.
4 Satisfaction in Response: beyond a willingness to respond, it is important that there is a feeling of satisfaction, an emotional response. Examples of objectives include, finding pleasure in reading for recreation, or conversing with many different kinds of people.

Level 3, Valuing

This means quite simply that a stimuli or phenomenon has value to the learners. An important element of behavior characterized by valuing is that it is motivated not by the desire to comply or obey, but by the individuals commitment to the underlying value guiding the behavior.
Three Sub-Levels of Valuing

1. Acceptance of a Value: The subject or topic becomes important to the learners. Here the learner joins in discussions.
2. Preference for a Value: here the learners begin to read and research material that is not assigned.
3. Commitment: here the material, the topic, etc., becomes a conviction with a high level of feeling and certitude.

Level 4, Organization

This domain and the next sound very cognitive. What is important here however, is not the complexity of thought, but the degree of internal motivation and acceptance manifested in corresponding behavior.

Three Sub-levels of Valuing

1. Acceptance of a value: at this level learners ascribe worth to a phenomenon, behavior, object, etc. The term belief describes what may be the dominant characteristic here. One of the distinguishing characteristics of this behavior is consistency of response; the learners are perceived by others as having or holding the belief or value. Examples of objectives include, continuing desire to develop the ability to speak and write effectively; grows in their sense of kinship with human beings of all nations.
2. Preference for a value: behavior at this level implies not just acceptance of a value to the point of being willing to be identified with it, but the individual is sufficiently committed to it to pursue it, seek it out, and want it. Examples of objectives include, assumes responsibility for drawing reticent members of a group into conversations; deliberately examines a variety of viewpoints on controversial issues with a view to forming an opinion about them.
3. Commitment: belief at this level involves a degree of certainty. Loyalty to a position, group, or cause would also be classified here. The learners act to further the thing they value by seeking converts to their cause. Examples of objectives include, devotion to the ideas and ideals, which are the foundation of democracy; faith in the power of reason and in the methods of experiment and discussion.

Level 4, Organization

As learners successively internalize values, they encounter situations in which more than one value is relevant. Thus, the necessity arises for:

1. The organization of the values into a system;
2. The determination of the relationship among them;
3. The establishment of the dominant and pervasive ones.
Two Sub-Levels of Organization

4 Conceptualization of a Value: This means that the learners are committed to abstract thoughts and ideas. A clear judgement is formed, for example a judgement about the nature of social responsibility. The judgment becomes a dominant and pervasive attitude.

4 Organization of a Value System: Here the learners develop a more inclusive framework. In the field of Ethics, for example, a commitment to human rights extends beyond employees in the workplace.

Level 5, Characterization

Internalization culminates when a person is characterized by a value system. Here people become constant, dependable, and more predictable in their value choices.

Two Sub-Levels of Characterization

4 Generalization Set: This stage refers to a cluster of attitudes, beliefs, feelings and behavior that is highly generalized. Here a philosophy of life is taking place.

4 Characterization: This stage is the peak of the internalization process. It is more than a bundle of abstract rules, it is a world view and a set of imbedded virtues.
Level 5, Characterization

Characterization by a value or value complex: At this level of internalization, the values are organized into some kind of internally consistent system. The individual acts consistently in accordance with the values he has internalized at this level.

4 The integration of these values/beliefs into a total philosophy or world view.
4 That the person is known by these values

Two Sub-levels of Characterization

4 Generalized set: this gives an internal consistency to the system of attitudes and values at any moment. A generalized set is a basic orientation that enables the learners to reduce and order the complex world about them and to act consistently and effectively in it. Examples of objectives include: readiness to revise judgments and change situation issues, purposes, and consequences involved rather than fixed dogmatic precepts.
4 Characterization: this is the peak of internalization process. Here is where those objectives, which concern one’s view of the universe, one’s philosophy of life, one’s Weltanschauung—A value system having as its objective, the whole of what is known or knowable. Examples of objectives include, develops for regulation of one’s personal civic life a code of behavior based on ethical principles consistent with democratic ideas; develops a consistent philosophy of left.

Bloom’s Taxonomy

The Cognitive Domain

4 Knowledge: I can define it
4 Comprehension: I understand it
4 Application: I have used it
4 Analysis: I know how each part works
4 Synthesis: I can adapt it to other uses
4 Evaluation: I know when to use it

Bloom’s Taxonomy

The Cognitive Domain

In the Domain of Finance: Net Present Value

4 Knowledge: I have heard the term before. Isn’t that a method for ranking investment proposals.
4 Comprehension: The Net Present Value is equal to the present value of future returns, discounted at the marginal cost of capital, minus the present value of the cost of the investment.
4 Application: I used it recently to help make a decision concerning two investment proposals.
4 Analysis: The equation consists of several factors: the net cash flows, the marginal cost of capital, the initial cost of the project, and the project’s expected life.
4 Synthesis: I believe that this method can also be used as part of a method to determine the value of a firm’s intangible assets.
4 Evaluation: I know when to use NPV and when to use the IRR method
Bloom's Taxonomy

The Cognitive Domain

In the Domain of Prototyping

- **Knowledge:** I have heard the term before. Isn't that a method for developing an application in stages where at each stage the user works with the application and suggests additional functionality.

- **Comprehension:** Prototyping addresses the situation where users aren't able to specify what they want a system to do. You give them a simple version with only a few features and they learn more about what they want by using the system.

- **Application:** Last semester I completed a system for a hospital that followed the prototyping approach. It took 12 versions, but the hospital administrator was pleased.

- **Analysis:** The learn by using method is really quite powerful. While it was originally intended as a learning devise for users, it also works as a learning tool for the developer. I have found that I learn as much about the functional area as the user learns about the system's functionality.

- **Synthesis:** I see a good application of prototyping in the design phase. By creating several system designs, in phases much like in prototyping, we can cut the design time, have a better chance of getting the correct design in place, and save on programming changes.

- **Evaluation:** I think we should measure the characteristics of the system to be developed and based on those characteristics decide which SDM to use. Prototyping is especially useful when we are under severe time constraints. On the other hand, prototyping is not appropriate when data resources are not available, when users cannot commit the required time, or when we don't have appropriate software support tools.

Bloom's Taxonomy

The Affective Domain

- **Receiving:** I will listen even though I am not sure of the value of what I am listening to.

- **Responding:** Something important is happening here, perhaps I need to become more involved, even committed.

- **Valuing:** There is a value that underlies the behavior exhibited in the previous step.

- **Organization of a value complex.** Organizing and prioritizing values so that they enable one to act in a consistent way.

- **Characterization:** To be known by the values that one honestly and consistently exhibits.