Different levels of learning domain according to Bloom's Taxonomy and its correlation with NSQF

Objectives: At the end of this lesson you shall be able to
- **state the concept of Taxonomy of educational objectives**
- **state the features and necessity of Bloom's Taxonomy for education**
- **list out the three learning domains and their levels**
- **define the levels of each domain with examples**
- **correlate the learning domains of Bloom's Taxonomy with NSQF.**

Taxonomy of educational objectives

Taxonomy is the process of learning and classifying things such as animals and plants into groups within a larger system according to their similarities and differences.

The Taxonomy provides a classification of educational objectives that is similar to the classification scheme used for plants and animals.

The area of education has the emergence of a number of taxonomies specifying the educational objectives.

One of the most helpful guides in identifying and defining instructional objectives is "Bloom's Taxonomy" which is developed by the committee of educators under the direction of "BLOOM" (1956), and Krathwohi (1964)

Bloom's Taxonomy

Bloom's Taxonomy is a set of three hierarchical models used to classify educational learning objectives into levels of complexity and specificity and is classified into three levels.

This frame work become a Taxonomy of three domains.

- Cognitive - knowledge based domain with six levels.
- The affective - attitudinal based domain with five levels.
- The psychomotor - skills based domain with six levels.

The cognitive domain has been the primary focus of the most traditional education and is frequently used to structure curriculum learning objectives, assessments and activities. These models were named after Benjamin Bloom, who chaired the committee of Taxonomy.

He edited the first volume of standard text "Taxonomy of educational objectives".

Learning, teaching, identifying educational goals and thinking are all Bloom's Taxonomy -emerging perspectives on learning, teaching and technology.

After discussion during 1948, convention of the American Psychological association headed by Bloom and group of educators took the task of classifying educational goals and objectives.

They indented to develop a method of classification for thinking behaviour as important in the process of learning.

In 1956, the group first began work on the cognitive domain and completed a hand book referred as "Bloom's Taxonomy" which was later published.

Bloom's Taxonomy is a multi-tiered model of classifying thinking according to cognitive levels of complicity. These levels are depicted as a stairway, leading many teachers to encourage their students to "Climb to a higher (levels of) thought".

The lowest three levels are :

- Knowledge
- Comprehension and
- Application

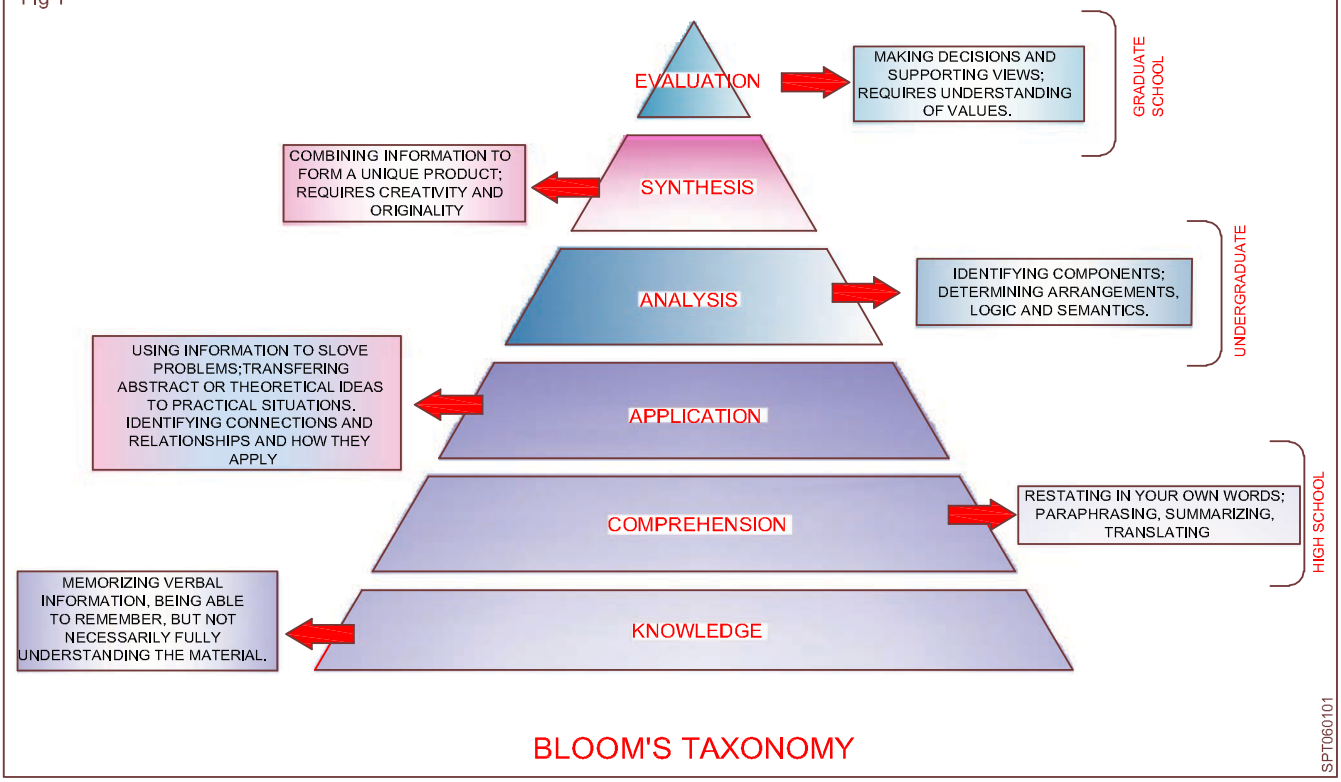
The highest three levels are

- Analysis
- Synthesis and
- Evaluation

The Taxonomy is done in a hierarchical manner in which each level is subsumed (absorbed) by the higher levels. In simple, a student functioning at the "application" level has also mastered the material at the 'knowledge' and comprehension levels.

Fig 1 shows this arrangement to natural divisions of lower and higher level thinking.

Fig 1



BLOOM'S TAXONOMY

Revised Bloom's Taxonomy (RBT)

A former student of Bloom's, Mr. Lovin Anderson and Krathwohi group spent six years to finalise and revise, with minor significant changes in the existing Taxonomy.

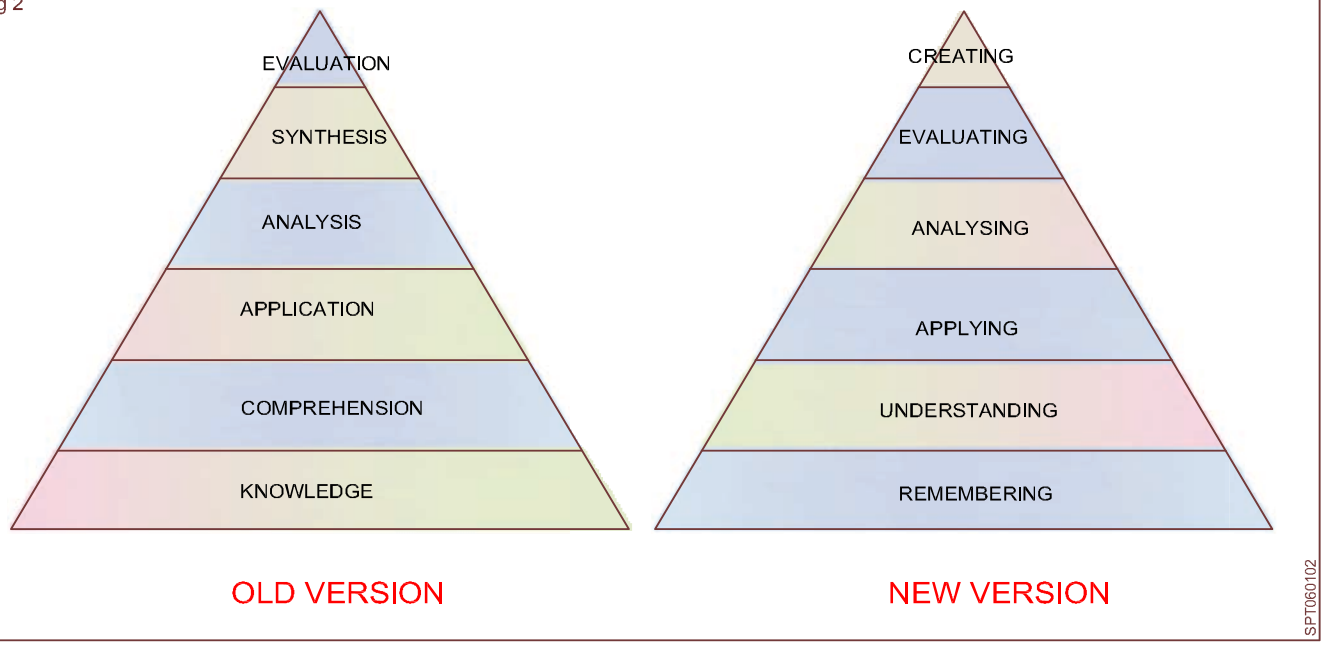
The changes occur in three broad Bloom's taxonomy emerging from perspectives on learning, teaching and technology and changes in 3 categories: (i) Terminology, (ii) structures and (iii) emphasis.

i Terminology changes

Basically, Bloom's six major categories were changed from noun to verb forms, additionally, the lowest level of the original 'Knowledge' was renamed as 'remembering'. Finally 'Comprehension and synthesis were renamed to 'understanding' and 'creating, comparison of old and new version are same as shown in Fig 2.

Comparison of old and new version

Fig 2



Definitions for the new terminology used in RBT is as follows:

i **Remembering** - Recalling relevant knowledge from long term memory.

ii **Understanding** - Constructing meaning from oral written and graphic, messages as well as classifying, summarising and comparing.

iii **Applying** - Carrying out (or) using a procedure through executing (or)/implementing.

iv **Analysing** - Breaking materials into constituent parts, overall structure, purposes and then organising them.

v **Evaluating** - Making judgements based on criteria and standards through checking.

vi **Creating** - Putting elements together to form a functional whole; reorganising elements into a new pattern.

ii Structural changes

Bloom's original cognitive Taxonomy was one dimensional form, and revised Taxonomy takes the form of two-dimensional table. One of the dimension identifies the knowledge and the second identifies the cognitive process. Dimensions are given in taxonomy Table 1.

Taxonomy table - 1

Knowledge Dimension	Cognitive process dimension					
	Remember	**Understand**	**Apply**	**Analyse**	**Evaluate**	**create**
1 Factual knowledge	list	summarize	classify	order	position	combine
2 Conceptual knowledge	describe	interpret	experiment	explain	assess	plan
3 Procedural knowledge	tabulate	predict	compute	distinguish	conclude	compose
4 Meta - cognitive knowledge	Appropriate	execute	construct	achieve	action	realize

iii Changes in Emphasis

Emphasis is the third and final category of changes. Bloom himself recognised that Taxonomy was being "unexpectedly" used by counter less groups so, he made revised version of taxonomy which is intended for much broader audience use as a movement tool for curriculum planning instructional and assessment.

Necessity of the use of Bloom's Taxonomy

In this taxonomy, the cumulative hierarchical frame work consisting of size categories, requires achievement of the prior skill (or) ability before the next, (more the complex the easier it is understandable).

For measuring students ability accurately, teacher requires classification of levels of intellectual behaviour important in learning.

Bloom's Taxonomy provides measurement emerging prospectives learning, teaching and technology tool for thinking.

The revised Bloom's Taxonomy provides more powerful tool to fit teacher's needs. It provides a clear visual representation of the alignment between standards educational goals, objective; products and activities.

The revised Bloom's Taxonomy Table clarifies the fit of each lesson plan's purpose, "essential questions' goal (or) objective.

Today teacher's must have a plan about how to spend their class room time with clear alignment of education objectives with local, state and national standards of necessity.

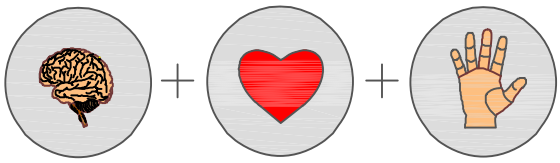
Revised Bloom's Taxonomy of learning Domains

Bloom's Taxonomy was created in 1956 under the leadership of educational psychologist Dr. Benjamin Bloom in order to promote higher forms of thinking in education such as **analysing** and **evaluating** than **remembering** facts.

The committee identified three domains of learning (educational objectives)

- **Cognitive** : Mental skills (knowledge) (or) (Mental ability)
- **Affective** : Growth in feelings (or) emotional areas (attitude)
- **Psychomotor** : Manual (or) physical skills (skills) Fig 3 shows the symbols for the above learning domains.

Fig 3



COGNITIVE AFFECTIVE PSYCHOMOTOR

SPT060103

Cognitive domain

The cognitive domain involves knowledge and the development of intellectual skills.

It includes the recall (or) recognition of specific facts, procedural patterns and concepts that serve in the development of intellectual abilities and skills. There are six major levels which are listed in order below starting from the simplest behaviour to the most complex.

The first ones must be mastered before the next one takes place.

Old version levels of cognitive domain

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

Definition of levels of 3 learning domains

Cognitive domains (old)

The cognitive domain is broken into six levels of objectives in 2001. In the revised edition of Taxonomy the levels are slightly different.

- **Knowledge**

It involves recognizing (or) remembering facts, terms, basic concepts (or) answering without understanding its meaning. e.g. Name the seven days in a week.

- **Comprehension**

It involves demonstrating and understanding of facts and ideas by organising, comparing, translating, interpreting and stating the main ideas.

- **Application**

It involves using acquired knowledge for solving problems in new situations by applying acquired knowledge, facts, techniques and rules.

Students should be able to use previous knowledge to solve problems.

- **Analysis**

It involves examining and breaking information into component parts by determining how the parts are related to one another as well as identifying motives or causes making inferences such as

- Analysis of elements
- Analysis of relationships
- Analysis of organisation

- **Synthesis**

It involves building a structure (or) pattern from diverse elements, It refers to the act of putting parts together to form a whole by:

- Production of a unique communication
- Deviation of a set of abstract relation

- **Evaluation**

It involves presenting and depending opinions by making judgements about information. The validity of ideas (or) quality of work is based on a set of criteria.

Its characteristics are

- Judgements in terms of internal evidence
- Judgements in terms of external

Revised Bloom's Taxonomy levels of cognitive domain: Lavin Anderson revised and made some changes in cognitive domain.

Revised Bloom's Taxonomy

Create

- **Produce new or original work:** Design, assemble, construct, conjecture, develop, formulate, author, investigate

Evaluate

- **Justify a stand or decision:** appraise, argue, defend, judge. select, support, value, critique, weigh

Analyse

- **Draw connections among ideas:** differentiate, organise, relate, compare, contrast, distinguish, examine, experiment, question, test

Apply

- **Use information in new situations:** execute, implement, solve, use, demonstrate, interpret, operation schedule, sketch

Understand

- **Explain ideas or concepts:** classify, describe, discuss explain, identify, locate, record, report, select, translate

Remember

- **Recall facts and basic concepts:** define, duplicate, list, memorize, repeat, state

The revised new Taxonomy reflects more active form of thinking more accurately.

- **Evaluation** → **Evaluating**
- **Synthesis** → **Creating**
- **Analysis** - **Analysing**
- **Comprehension** - **Under standing**
- **Knowledge** - **Remembering**

The affective domain (emotion - based)

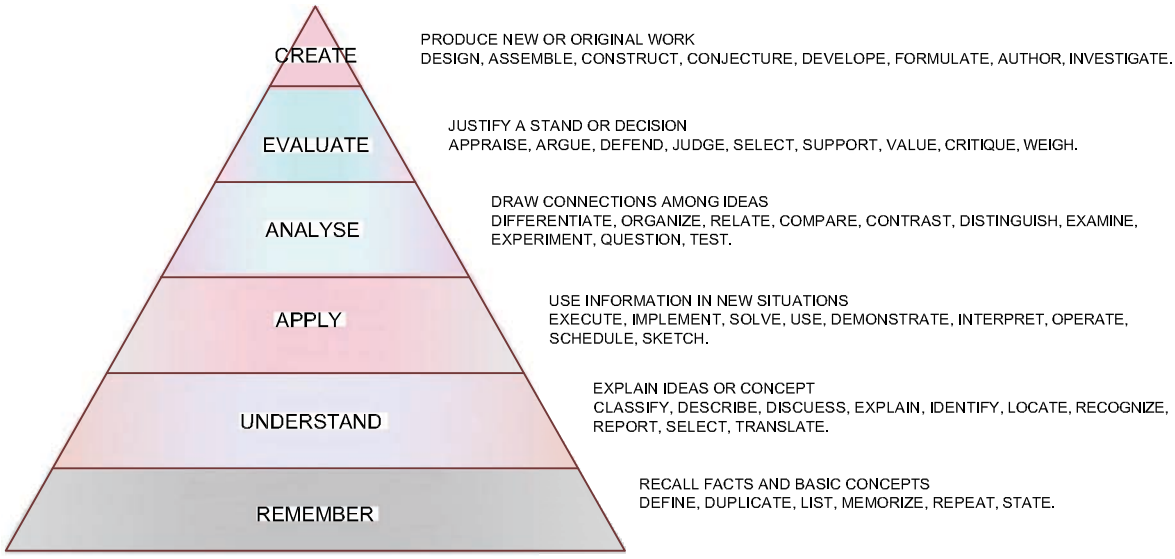
- Receiving
- Responding
- Valuing
- Organising
- Characterizing

The psychomotor domain (action - based)

- Perception
- Guided response
- Mechanism
- Complex overt response
- Adaption
- Origination

Revised cognitive criteria domain levels are described in a pyramid structure as in Fig 4.

Fig 4



BLOOM'S TAXONOMY

Fig 5 shows the climbing of stairs from lowest objectives to highest objectives (From remember to create).

Definition of the affective domain (emotion -based) levels

Skills in this domain, defines the way people react emotionally and their ability to feel other living things pain (or) joy. Its objective target is the awareness and growth in attitudes emotion and feelings.

The five levels in this domain moving through the lowest - order to the highest.

- **Receiving**

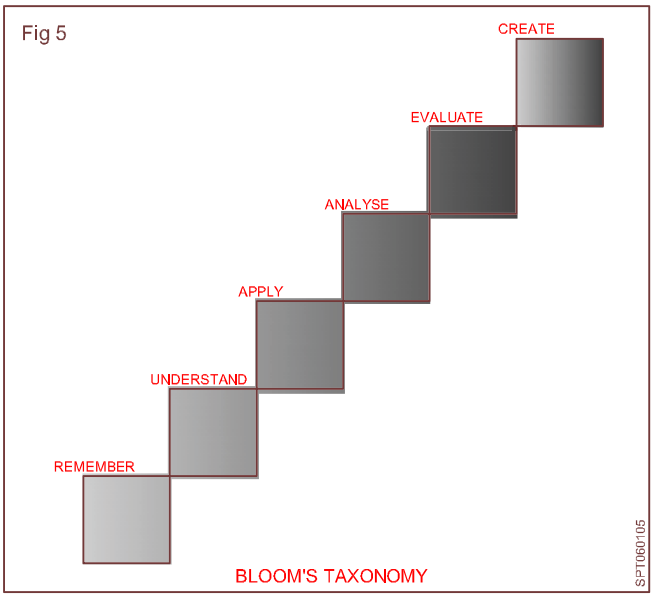
The lowest level: The student pays attention. Without this level no learning can occur. Receiving is about the students memory and recognition.

- **Responding**

The student actively participates in the learning process, not only by attending to the stimulers, he also reacts to it.

- **Valuing**

The student associates a value (or) some values to the knowledge they required.



- **Organising**

The student can put together different values, information and ideas, and can accommodate them within its own scheme and also he can compare, relate and elaborate on what has been learned.

- **Characterizing**

The student at this level tries to build abstract knowledge

Definition of the psychomotor domain's (action - based) levels:

Skills in the psychomotor domain describes the ability to physically manipulate a tool or instrument like a hand or a hammer. Psychomotor objectives usually focus on change/or development in behaviour of skills.

Bloom's and his colleagues never created sub categories for skills in this domain, but other educators have created their own psychomotor Taxonomies and proposed for the following levels.

- **Perception**

The ability to use sensor clues to guide motor activity. It ranges from sensor stimulation through selection to translation.

e.g. Adjust the heat of the stove to correct the temperature by smell and taste of the food.

Keywords : Chooses, defects differentiates, distinguishes identifies, isolates, relates, selects.

- **Guided response**

The early stages of learning a complex skill that includes initiation of trial and error additional performance is achieved by practicing.

e.g. Follows instructions to build a model

Keywords : Copies, traces, follows, react, reproduce, responds.

- **Mechanism**

The intermediate stage in learning a complex skills; Already learned responses have become habitual and the movement can be performed with same confidence and profiency.

e.g. Use a personal computer

Keywords : Assembles calibrates, constructs, dismantles, displays fastens, fixes, measures, mixes, sketches etc.

- **Complex overt response**

The skillful performance of motor acts that involves complex movement patterns.

This category includes performing without hesitation and automatic performance.

e.g. Operates a computer quickly and accurately.

Keywords : Builds, calibrates, constructs, dismantles, fastens, (same keywords as in mechanism, but with adverbs (or) adjectives like quicker, better, etc.)

- **Adaptation**

Skills are well developed and the individual can modify movement patterns to fit special requirements.

e.g. Modifies instruction to meet the needs of learner.

Keywords : Adapts, alerts changes, rearranges, reorganises, revises, varies etc.

- **Origination**

Creating new movement patterns to fit a particular situation or specific problem, learning outcomes emphasizes creativity based upon highly developed skills.

e.g. Develops a new and comprehensive training program.

Keywords: Arranges, combines, creates, designs, initiate, makes, originates.

Correlation of Bloom's Taxonomy with NSQF

National skill qualification frame work (NSQF) syllabus is based on learning and assessable outcome with different levels and each assessable outcome includes number of assessment criteria (learning objectives).

Correlation of Bloom's Taxonomy domain's levels with NSQF

Sl.No	Bloom's Taxonomy domain	Bloom's Taxonomy Levels	NSQF domains	Levels	Correlated subjects
1	The cognitive domain - Revised (knowledge based)	1 Remember 2 Understand 3 Apply 4 Analyse 5 Evaluate 6 Create	1 Process (General) 2 Professional knowledge	-Nil- • Depth of knowledge • Breadth of knowledge • Kinds of knowledge • Complexity of knowledge	All employbility skills Trade theory
			4 Core skill	• Basic skills involve in dextenity • Use of methods, materials, and instruments • IT (Information Technology) Skills for that level	Workshop calculation & science and Engineering Drawing
2	Affective domain (emotional based)	1 Receiving 2 Responding 3 Valuing 4 Organising 5 Characterising	-Nil-	-Nil-	-Nil-
3	Psychomotor domain (action based)	1 Perception 2 General response 3 Mechanism 4 Complex overt response 5 Adaptation 6 Origination	1 Process 3 Professional skills 5 Responsibility	• Cognitive & creative skills • Communication skills • Interpersonal skills • Nature of working relationship • Level of responsibility for self and others • Managing change • Accountability for action	All Practical Exercise