



ROLE OF BLOOM'S DIGITAL TAXONOMY IN SMART BOARD CLASSROOMS

Navita Malik

School of Education, Galgotias University, Greater Noida.

Abstract

"First, have a definite, clear practical ideal; a goal, an objective. Second, have the necessary means to achieve your ends; wisdom, money, materials, and methods. Third, adjust all your means to that end"

Aristotle, Greek Philosopher and polymath (384BC-322BC)

In every act of our lives, there are some objectives behind them and we all try very hard to achieve them. Similar is the case with teaching learning process. At the time of imparting instruction, i.e. teaching- learning of a particular lesson, unit or sub unit of a subject, the teacher has to place before him/her some definite and very specific objectives within a specified classroom period and resource in hand. These specific classroom teaching-learning objectives are known as instructional objectives. To frame them Benjamin Bloom and his associates gave them taxonomy of behavioral objectives in 1950. Nouns were used to frame objectives in different domains. With the passage of time when teaching had taken the student centered approach from teacher centered, the bloom's taxonomy was revised by Anderson and Krathwohl in 2001. The primary differences was not in the listings or recordings from nouns to verbs, or in the renaming of some of the components, or even in the re-positioning of the last two categories. The major differences lied in the more useful and comprehensive additions of how the taxonomy intersects and acts upon different types and levels of knowledge — factual, conceptual, procedural and metacognitive. This melding could be charted to see how one is teaching at both knowledge and cognitive process levels. Not only approach of teaching was changed with time also way of teaching has undergone a drastic change.

With the advent of technology in every sphere of life, the way of teaching had also changed, the traditional classroom are changed in to smart classrooms. The framing of objectives and choosing teaching methods both had a important place in Pedagogical Analysis of any subject .Since methodology is changing then taxonomy again undergone a change , now keeping in mind the revised bloom's taxonomy as a base Andrew Churches in 2009 gave Bloom's Digital Taxonomy. Both had an important place. In this paper a model is proposed which co relates Bloom' digital taxonomy with smart classroom. It also reflects that number of activities and methodology that are performed in smart classrooms are helping teachers to make objectives of teaching achievable.

Keywords: *Smart Classroom Technology, Bloom's Digital Taxonomy, High Order Thinking Skill, Low Order Thinking Skill.*

1. Introduction

In any classroom whether it's traditional or technology laced, teacher has to frame some specific objectives within specific time and resources. Though the specific teaching and learning objectives are instructional objectives, as a term, differ a lot from aim and objectives of teaching a subject. Aim is answer to the question of why a topic is taught and objective as an answer to the question what will be achieved after it has been taught. Aim is general declaration of intent which gives direction to a teaching program, and objective as a particular point in that direction (Norman, 1972). These specific classroom teaching-learning objectives are known as instructional objectives. To frame them Benjamin Bloom and his associates gave them taxonomy of behavioral objectives in 1950. Nouns were used to frame objectives in different domains. The taxonomy of educational and instructional objectives has been worked out on the assumption that the teaching-learning process may be conceived as an attempt to change the behavior of the pupils with respect to some subject matter or learning experiences. Behavior is divided into three domains-cognitive (knowing), affective and Psychomotor (doing). The Taxonomy of educational and instructional objectives has also been considered to be belonging to these three domains (Mangal, 2013).

Cognitive learning concerns comprehension and critical thinking skills, and is frequently used to master lower-level skills. The cognitive domain can be further divided into six subsections: Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. The affective domain refers to how students react emotionally and target learning in areas of student attitudes towards a subject. This area is further subdivided into five categories: Receiving, Responding, Valuing, Organizing, Characterizations. The Psychomotor area of learning refers to the ability to physically manipulate tools and the development of skills. Bloom and his colleagues never divided this area, but further research has created six subdivisions: Perception, set, guided response, mechanism, complex overt response, adaptation and origination.



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1.1 Bloom's Revised Taxonomy

Bloom's Taxonomy presents a system of classification of the objectives that has been worked out on the assumption that the teaching-learning process may be conceived as an attempt to change the behavior of the pupils with respect to some subject matter or learning experiences. This recognizes three major classes of objectives-cognitive, affective and psychomotor and has developed classification schemes for the cognitive and affective domains. Pupil teachers and teacher educators are all familiar with bloom's taxonomy created in 1950 by Benjamin bloom and are very well versed with importance or usability of instructional objectives. The blooms taxonomy educational and instructional objectives has been worked on the exemption that the teaching learning process is an attempt to make learning process more better and change the behavior of pupil. Taxonomy of objectives in the cognitive domain given by blooms in 1950 was revised by Lauren Anderson in 2001, original use of noun was replaced by verbs and top level categories are rearranged as shown in figure 1. The Process of Learning can be very well represented by Bloom's revised Taxonomy, like

1. Can understand a concept we have to remember it.
2. Before we can apply the concept we must understand it.
3. Before we analyse it we must be able to apply it.
4. Before we can evaluate its impact we must have analysed it.
5. Before we can create we must have remembered, understood, applied, analyzed, and evaluate.

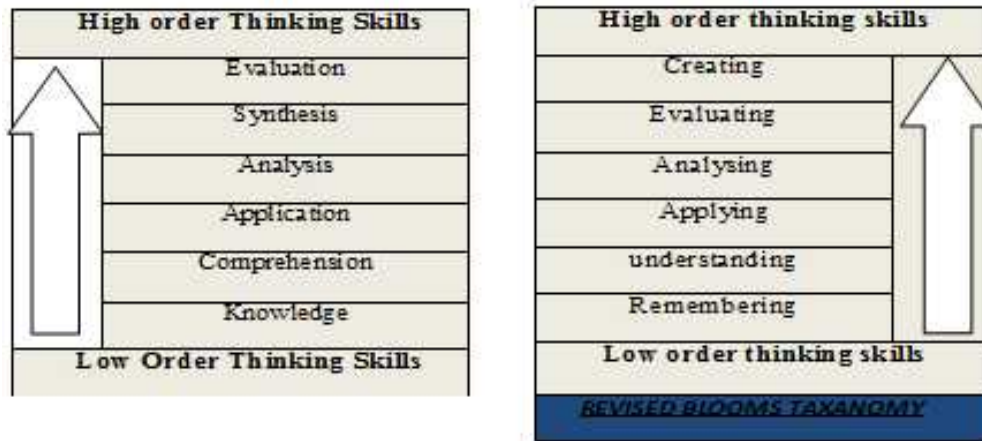


Figure 1: Evolution of Bloom's Taxonomy

1.2 Bloom Digital Taxonomy

Over the years, our learners are changing; young generation is more net savvy. Their lives are filled with lots of graphics, video, YouTube and apps all round and even classrooms are Technology laced Art. Days are gone when only furniture and black board was found in class as hardware, now Interactive whiteboard, projector, stylus, speaker is available most of the classrooms of all schools and these changes were reflected in developed countries decades ago. So in 2007, Andrew Churches further developed and refined Blooms Taxonomy to Bloom's Digital Taxonomy. In the words of Churches, "Bloom's revised taxonomy describes many traditional practices behaviors and actions, but does not account for new processes and actions associated with web 2.0".

1.2.1 Thinking Skills of Blooms Digital Taxonomy

Thinking Skills are key factors of Blooms Digital Taxonomy. The knowledge given by a teacher may be obsolete within a few years while thinking skills once acquired will remain with students for their entire lives. The 21st century pedagogy and learning focuses on moving students from Lower Order Thinking Skills (LOTS) to Higher Order Thinking Skills (HOTS) as shown in figure 1. The 21st century teacher scaffolds the learning of students, building on a basis of knowledge recall and



comprehension to use and apply skills; to analyze and evaluate Process, outcomes and consequences, and to make, create and innovate.

1.2.2 Phases Of Bloom's Digital Taxonomy

The knowledge given to the students forms the foundation of their learning cycle or process as shown in figure 2.

1. Knowledge Acquisition
2. Knowledge Deepening
3. Knowledge Creation



Figure 2: Learning Cycle of Blooms Digital Taxonomy

1. Knowledge Acquisition

In this phase, two sub domains of Remembering and Understanding is acquired. Learners are well acquainted with new concepts and then grasped the concept with illustrations and various examples.

2. Knowledge Deepening

It includes application part and involves the new knowledge learnt applied in real situations and further analyzing in two parts or further breaking it.

3. Knowledge Creation

This phase includes evaluation and creativity acquired through other phases. While Bloom's in its many forms, does represent the learning process, it does not indicate that the learners must start at the lowest taxonomic level and work up. Rather, the learning process can be initiated at any point, and the lower taxonomic levels will be encompassed within the scaffolded learning task. An increasing influence on learning is the impact of collaboration in its various forms. These are often facilitated by digital media and are increasingly a feature of our digital classrooms. This taxonomy is not about the tools and technologies, these are just the medium, instead it is about using these tools to achieve, recall, understanding, application, analysis, evaluation and creativity (Andrew Churches, 2009).

2. Smart Classroom

A smart classroom is a classroom that has an instructor station equipped with computer and audio-visual equipment which allow the instructor to teach using a wide variety of media.

2.1 The Smart Learning Methodology

In the smart school, curriculum and lesson planning is centralized at the smart school head office. This ensures that all teachers and students benefit from the programmes of learning prepared by experienced teachers and curriculum developers. The web-based system provides a single, common infrastructure to manage teaching, learning and training initiatives in the smart schools. The tech-savvy students not only enjoy their studies through these methodologies but keenly participate in the learning process. Smart classes have changed the process of learning.

Audio-visual aids in the classroom ensure that each child understands better and grasp better. At the smart school a combination of e-learning and traditional teaching method called as *blended learning method* is used. By using the relevant Information and Communication Technology (ICT) teaching and learning tools, the computer labs and web portals, the combination of e-learning and traditional teaching will assist every student to achieve his or her goals in the classroom (Kumari et al., 2013). The software provided in smart schools is referred as sophisticated learning tools in which every topic is covered in the software with the schedule and the topics. It means no need to open the textbook. The students looked at this software as new inventions that distinguish smart schools from other schools and at the same time offer them advantages compared to other schools (Hamzah, et al., 2009).



There are many firms which contact professionals having years of experience in teaching. They developed modules for smart classes according to curriculum followed by school. Each module present lesson in most excited way. Such classrooms provide not only ease of use but also standardize the education process. The technology enabled classroom use state of art hardware, infrastructure which include projector, interactive white board, server, computer, Uninterrupted Power Supply (UPS), podium other installation and network hardware.

3. Blooms Digital Taxonomy in Smart Board Classroom

This study presents a model which covers Blooms Digital Taxonomy concepts and Smart Board Classroom concepts.

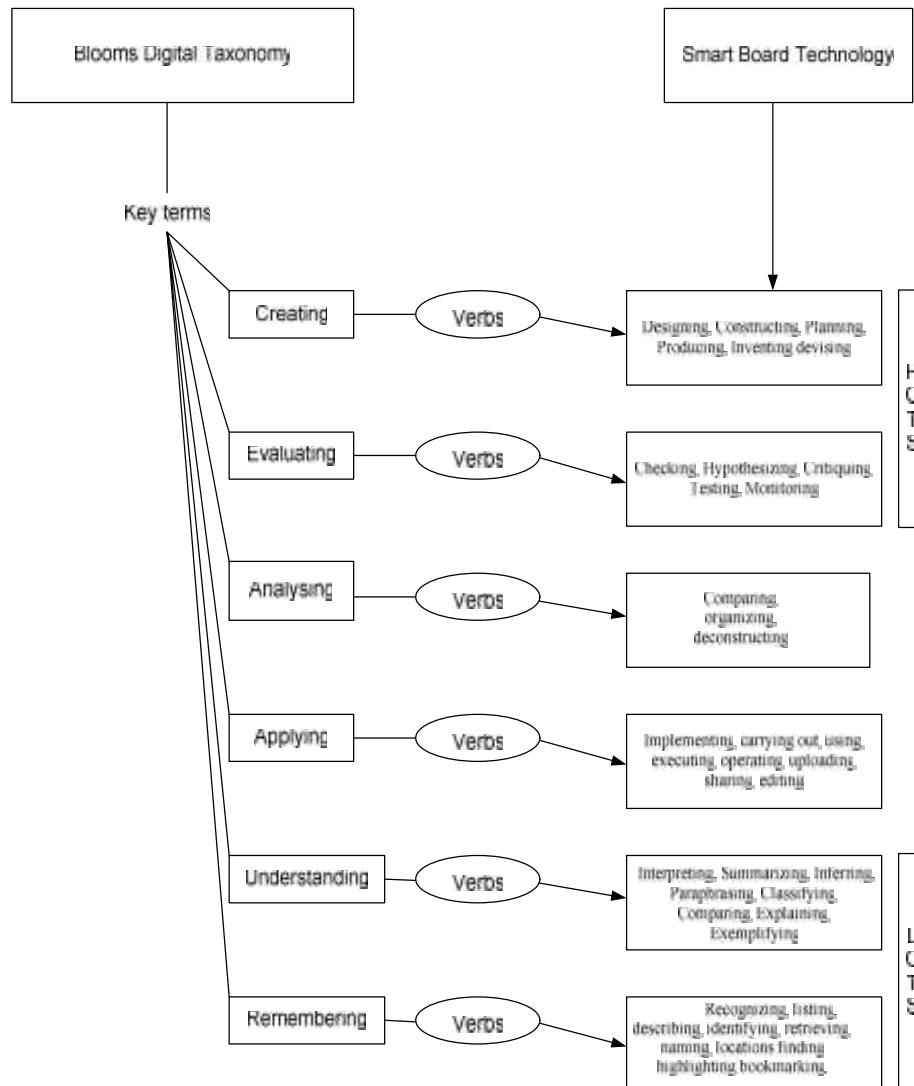


Figure 3: A Model using Bloom's Digital Taxonomy and Smart Classroom Technology

This model will be helpful to enhance learning, creativity and intelligence of the students with the help of web 2.0 as shown in figure 3.

- **Remembering**

This is the lowest level of Bloom's taxonomy but the foundation of all the higher level of the Cognitive Domain. The main activities under the skill are listing, writing, telling, naming. These are basic skill building type of activities that many teachers utilize on their interactive whiteboard. Teachers can show various videos, clips, images or using search engines certain activities involving them, to recall and recognize the previous topics.



✓ **Keywords for actions**

Recognizing, listing, describing, identifying, retrieving, naming, locations finding, highlighting bookmarking.

Present study uses Recitation (using speakers and flash cards), Quiz tests, Definition (recitation, using search engines), Videos and Images, Using word processing, Web Page, Social Networking, Bookmarking smart board classroom concepts resembles with remembering of blooms digital taxonomy.

• **Understanding**

This is the second level Bloom's revised digital that requires providing meaning to information. Understanding builds relationships and links knowledge. Students understand the processes and concepts and are able to explain or describe these. They can summarize and rephrase these into their own words. There is a clear difference between remembering, the recall of facts and knowledge in its various forms like listing, bullet points, highlighting etc., and understanding, constructing meaning, when students just repeat the sentence that they have remembered.

✓ **Keywords for actions**

Interpreting, Summarizing, Inferring, Paraphrasing, Classifying, Comparing, Explaining, Exemplifying.

Students are able to give answer of questions like –What, When, Where, How, Why, Who? It can be achieved through Videos, Concept Mapping, Mind mapping, personal web page, any activity through video, using search engine, advance search option.

• **Applying**

This is the third level of the Bloom's revised digital taxonomy requires the transfer of the knowledge learnt in real life situations. At this level, the learner solves practicable problems by applying the knowledge they understood. Carrying out or using a procedure through executing or implementing. Applying related and refers to situations when learned material is used through products like models, presentation, interviews and simulations.

✓ **Keywords for actions**

Implementing, carrying out, using, executing, operating, uploading, sharing, editing.

It can be achieved through etools like simulating science experiment, word processing, screen capture, zoom in, and zoom out presentation.

• **Analysing**

This is the fourth level of Bloom's taxonomy that requires the breakdown of information it smaller parts. It breaks material or concepts into parts, determining how the parts relate or interrelate to one another.

✓ **Keywords for actions**

Comparing, organizing, deconstructing.

It can be achieved through surveys, word processing, Graph, charts, presentation, pictures graphics. Excel sheets has the ability to enable learners derive meaningful information from data through use of various functions like sorting, filtering and meaningful information is represented in form of tables, graphs and charts.

• **Evaluating**

Evaluating is the fifth level of the Bloom's digital taxonomy. This level focuses on Justifying a decision solution, answer or course of action. The Level determines learning outcomes through constructive criticism, collaborations, hypothesis testing and validations of results.

✓ **Keywords for actions**

Checking, Hypothesizing, Critiquing, Testing, Monitoring

It can be achieved through quiz or different types of MCQ conducted in classroom and binding them by time.

• **Creating**

The sixth and top most level of the Bloom's Digital Taxonomy. At this levels elements are put together to form a coherent or functional whole. This phase recognizes Elements in to a new pattern or structure through generating, planning or producing.



✓ **Keywords for actions**

Designing, Constructing, Planning, Producing, Inventing devising.

This phase recognizes elements in to a new pattern or structure through generating, planning or producing. Learning can be measured through asking learners to create videos on a topic and use their own voice to comment on the video.

4. Conclusion

Aim is answer to the question of why a topic is taught and objective as an answer to the question what will be achieved after it has been taught. Bloom's Taxonomy presents a system of classification of the objectives that has been worked out on the assumption that the teaching-learning process may be conceived as an attempt to change the behavior of the pupils with respect to some subject matter or learning experiences. This recognizes three major classes of objectives-cognitive, affective and psychomotor-and has developed classification schemes for the cognitive and affective domains. But in a digital age, educators are thinking about it as Bloom's Digital Taxonomy. This updated version aims to expand upon the skills associated with each level as technology becomes a more engrained – and essential - part of learning. Like in our Smart Board Classrooms, all the domains of blooms digital taxonomy both High Order Thinking Skill(HOTS) and Low Order Thinking Skill(LOTS) are followed by using various activities in teaching and learning. Bloom's Digital Taxonomy is not about using the tools, its using the tool to facilitate learning. In this paper, we try to do mapping between bloom's Digital Taxonomy and smart board classroom and able to explain how different domains of taxonomy works with the use of Interactive Whiteboard. This study is useful for educators to know how traditional concept of framing objectives has perfectly turned to digital taxonomy for technology laced classrooms. It also reflects that number of activities and methodology are added in smart classrooms to make objectives of teaching achievable.

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