BLOOM'S TAXONOMY IN MATHEMATICS

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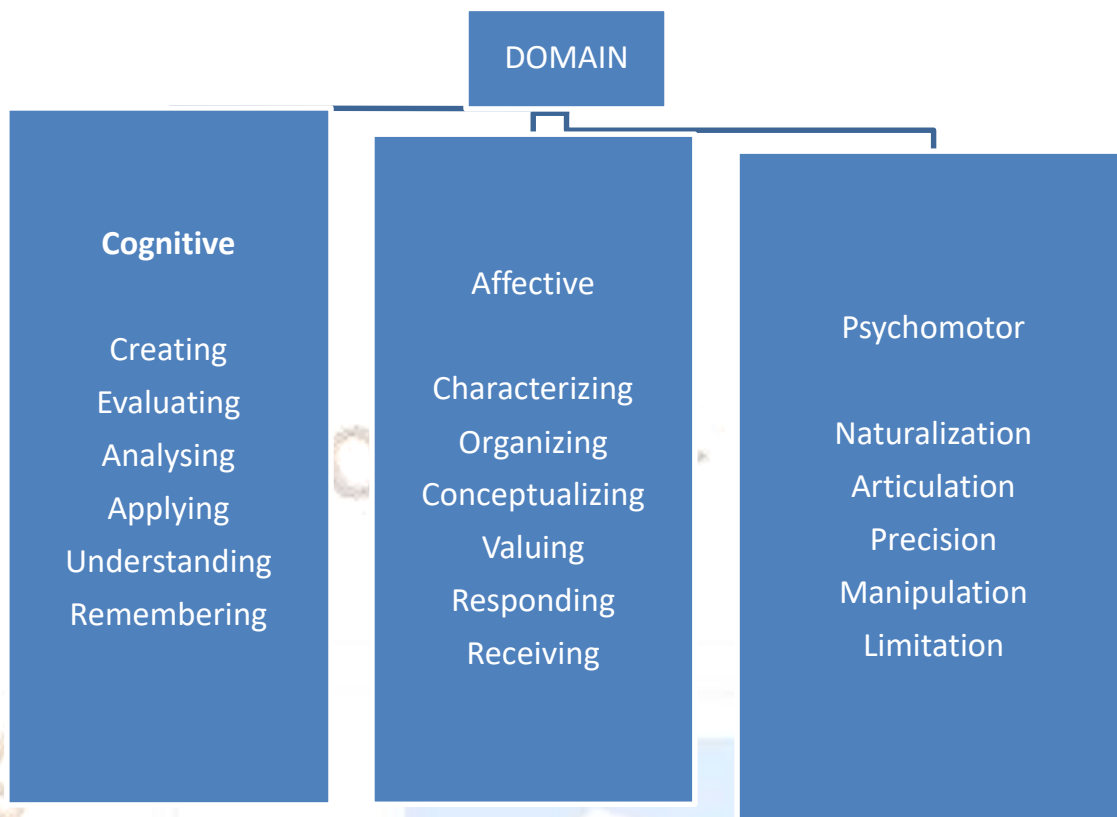ASST. PROFESSOR

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INTRODUCTION:

Math is not just steps or numbers. When students can understand and relate to the real world then only they enjoy and appreciate math. Mathematics education helps in emotional and intellectual development of a person and the cognitive domain focuses on the mind. Solving math problem using Bloom's taxonomy shows fascinating aspects of educational objectives in different domains. It is not same level of ease or difficulty for different students using different methods, following different domains, jumping from one hierarchy to other for solving and understanding the same math problem and is same for teachers also while teaching.

Taxonomy is a set of hierarchical models that is applied to classify educational learning goals and objectives into a certain level of complexity. It helps to create purposeful learning activities and instructional materials.

The original Taxonomy of Educational objectives was given by Benjamin Bloom in 1956 and it is called Bloom's Taxonomy.The first volume of taxonomy, Handbook I: Cognitive was published in 1956 and in 1964 the second volume Handbook II: Affective was published. A revised version of the taxonomy for cognitive domain was created in 2001. Bloom and his colleagues never created subcategories for skills in the psychomotor domain, but since then other educators have created their own psychomotor taxonomies.

According to the learning and teaching objectives, the three domains (of learning) are Cognitive domain which is knowledge based, Affective domain describes how people react emotionally, Psychomotor domain describes learning by doing.

DOMAIN

Cognitive

Creating
Evaluating
Analysing
Applying
Understanding
Remembering

Affective

Characterizing
Organizing
Conceptualizing
Valuing
Responding
Receiving

Psychomotor

Naturalization
Articulation
Precision
Manipulation
Limitation

Math is not just steps or numbers. When students can understand and relate to the real world then only they enjoy and appreciate math. Mathematics education helps in emotional and intellectual development of a person and the cognitive domain focuses on the mind.

Let's take a question and try to solve using Bloom's taxonomy. Though the cognitive domain focuses on the mind and while solving the students may go from understanding to creating or to analyzing. It's fascinating for the teachers to watch and observe students make these connections.

Question: Cost of painting a pipe and a cylindrical water tank. Both are cylindrical.

Let's take a circular cylinder whose base is circle. Pipe is also in the form of a cylinder.

$2\pi r$ A

h

h

B

$2\pi r$
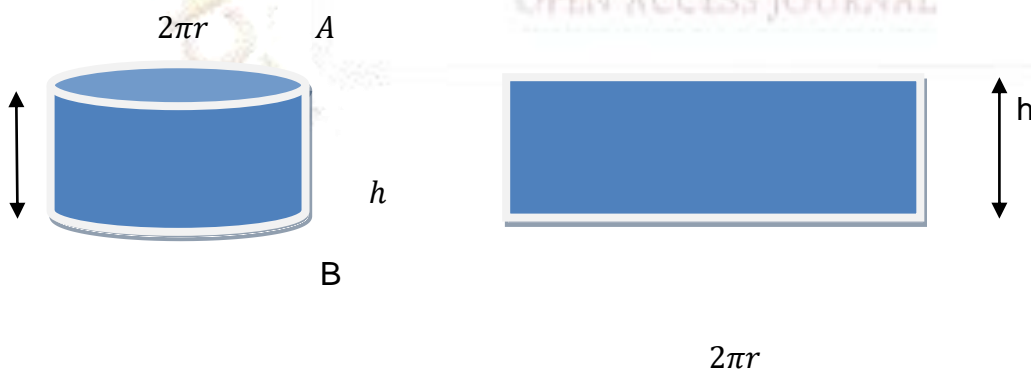
Let's cut from A to B. Then the outer part becomes like a rectangular sheet of length $2\pi r$ and breadth h.

Area is length x breadth, i.e. $2\pi rh$. So the surface area is $2\pi rh$ with the two circular areas base and top both πr^2. The total surface area is $2\pi rh + \pi r^2 + \pi r^2$.

For the pipe the area to paint will be $2\pi rh$. For the one side opened tank $2\pi rh + \pi r^2$.

We can solve he above question using cognitive domain ,keeping in mind the six hierarchy of learning objectives in cognitive domain.

1)Remembering: is the ability to recall precious knowledge be it concepts, formulas, methods, terms, facts etc. In this finding students try to recall the circle, n its circumference, area, rectangle, its area, cylinder.

2)Understanding: How a cylinder outer cover/surface can be considered as a sheet and how its length is same as that of the circumference of the base circle and breadth is the height of cylinder and how both are present is the cylindrical area.

3)Applying: Can ask the students to apply the concept and find the surface area of a cylinder and ask them to realize the difference between surface area and total surface area.

4)Analyzing: If a cylinder is given and cost of paint per litre then the cost of painting the cylinder can be found.

5)Evaluating: Two cylindrical tanks of different heights and volumes are given and what will be the cost of painting the two can be found when cost of the paint per litre is known. On which more money is needed. So the volume definition and concept should be explained. Then from volume and height how can we find the radius. Then find the surface area in the two cases and then the cost.

6)Creating: The student can relate and find the surface area by finding radius from volume and height given and vice versa. Students can realize that when the total cost of paint is known from there also the surface area and thus with known radius, height can be found.

Conclusion:

Taxonomy is a set of hierarchical models that is applied to classify educational learning goals . It helps to create purposeful learning activities and instructional materials. It is not same level of ease or difficulty for different students using different methods, following different domains, jumping from one hierarchy to other for solving and understanding the same math problem and is same for teachers also while teaching. It is nice to observe the students dealing different problems in different ways and in the process they explore and understand in a better way.

Reference:

- **www.google.com**
- Class experience of Mathematics students and teachers