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DOMAINS OF LEARNING: ART OF LEARNING IN MEDICAL EDUCATION PROGRAM

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ABSTRACT

The areas of learning can be arranged as cognitive domain (knowledge), psychomotor domain (skill) and affective domain (attitudes). This arrangement is best clarified by the Taxonomy of Learning Domains figured by a gathering of specialists driven by Benjamin Bloom alongside in 1956. The domains of learning were first created and portrayed between 1956-1972, while Bloom was associated with portraying both the cognitive domain and the affective domain, he showed up as the first creator of the cognitive domain. Subsequently, this drags his name for a considerable length of time and was regularly referred to among instructors as Bloom's Taxonomy despite the fact that his associate David Krathwohl was an accomplice in the 1956 distribution. Teaching and assessing the advanced competencies will continue to be a challenge. Incorporating new and nontraditional skills into an already complex and challenging clinical curriculum and practice is not easy. This makes development of methods for curricular design, teaching and assessment of undergraduate medical students. The Domains of learning, can serve as an organizing structure for developing objectives and selecting teaching and assessment techniques.

KEYWORDS: Cognitive domain, Affective domain, Psychomotor domain, Medical education.

INTRODUCTION

Learning is all over the place. We can learn mental abilities, build up our frames of mind and get new physical aptitudes as we play out the exercises of our day by day living. Learning is not an occasion. It is a procedure. It is the ceaseless development and change in the mind's engineering that outcomes from the numerous ways we learn, process it, interface it, inventory it, and use it (and now and again dispose of it). Learning can for the most part be sorted into three areas: psychological, full of feeling, and psychomotor. Inside every space are different dimensions of discovering that advancement from increasingly essential, surface-level figuring out how to progressively perplexing, further dimension learning. During 1950's, Benjamin Bloom led a team of educational psychologists in the analysis of academic learning behaviors. He aimed to develop a system with different categories of learning behavior to assist in the design and assessment of educational learning (1). The consequences of this examination delivered what is known today in the field of training as Bloom's taxonomy classification. Blossom's taxonomy categorization gives a reliable method for building up the absolute most useful asset for the evaluation of understudy program results by the learning or execution objective.

An objective of Bloom's scientific classification is to persuade facilitator to concentrate on all the three domains, making a progressively all encompassing type of training. Facilitators worried about learning hypothesis have given significant ideas to different sorts of learning in advanced education suppliers. Blossom's scientific categorization isolates the instructional goals in three domains: cognitive domain, psychomotor domain and affective domain. In every area are various degrees of discovering that progress from progressively essential, surface-level figuring out how to increasingly perplexing, further level learning. The degree of learning we endeavor to effect will change across learning encounters relying upon (1) the nature of the experience, (2) the formative degrees of the taking part understudies and (3) the span and power of the experience. Bloom's scientific classification is a multi-layered model of arranging thinking as indicated by six psychological degrees of unpredictability. All through the examination year, the levels have frequently been portrayed as a stairway, driving numerous educators to urge their understudies to "move to a more significant level of thought."The

most minimal three levels are: Knowledge, perception, and application. The most elevated three levels are: investigation, union and assessment. The scientific categorization is various leveled; each level is consolidated by the more elevated levels. As such, an understudy working at the 'application' level has additionally aced the material at the "information" and "perception" levels. One can easily see how this arrangement led to the natural divisions of lower and higher level of thinking, and it is applicable to affective and psychomotor domains also (2-3).

It is intriguing to take note of that while the intellectual, scientific categorization was depicted in 1956, and the emotional in 1964, the psychomotor domain were not completely portrayed until the 1970s. When distributing the depiction of the full of feeling area in 1964 Krathwohl[4] was named as first creator, however, Bloom likewise chipped away at building up this work. Krathwohl's contribution in the advancement of the intellectual area will be turned out to be significant when you take a gander at the creators of the 2001 updates to this scientific classification. And keeping in mind that I have utilized crafted by Anita Harrow here, there are really two other psychomotor scientific classifications to browse- one from Simpson EJ (1972) (5) and the other from Dave RH (1975) (6).

Experiential learning is a whole person learning. That is, it functions interactively, combining the affective and behavioral dimensions with the cognitive domain always found in the educational process (Hoover, 1974).

In 2001, a previous understudy of Bloom, Lorin Anderson, drove another get together, which met to refresh the scientific categorization pertinent to the 21st century understudies and facilitators (2-3). Design of learning area is completed depends on the contributions from intellectual analysts, educational program scholars and instructional specialists, and testing and appraisal experts.

The designed learning domains are:

Cognitive: Mental skills (knowledge), consisting six levels.

Affective: Growth in feelings or emotional areas (attitude), consisting five levels.

Psychomotor: Manual or physical skills (skills), consisting seven levels. (Fig. 1)

Fig 1: Domain of Learning

COGNITIVE DOMAIN

The cognitive domain contains learning aptitudes overwhelmingly identified with mental (thinking) forms. Learning forms in the subjective area incorporate a chain of command of aptitudes including preparing data, building understanding, applying information, taking care of issues, and leading exploration.

There are six dimensions of psychological multifaceted nature: information, perception, application, investigation, amalgamation, assessment. Sprout's scientific categorization centered on portraying dimensions of fulfillments instead of procedure abilities, and did not considerably address the way where the learner continues starting with one dimension then onto the next. The subjective space incorporates aptitude groups that sort out a total, compact, and correlative posting of the learning abilities most basic for each procedure. The fresher adaptation (2001) of Bloom's Taxonomy of Learning has various included highlights that can be helpful to instructors as they attempt to build ideal learning encounters (Fig. 2).

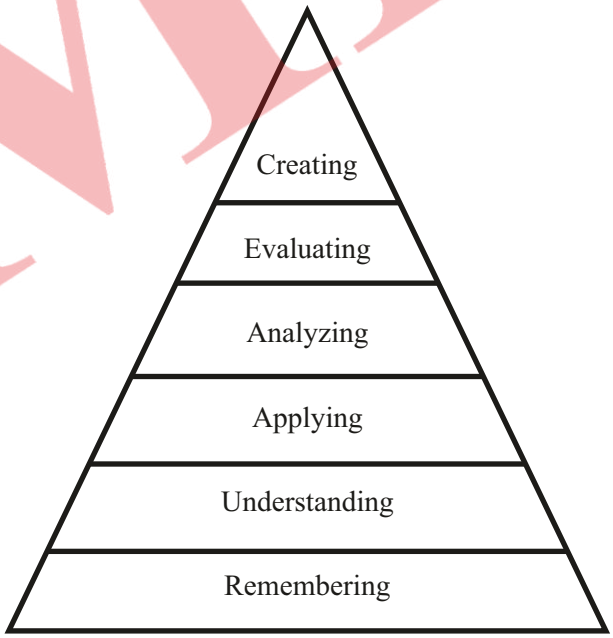

Fig 2: Revised Taxonomy (Krathwohl, 2001)

In the diagram appeared, higher the dimension, the apparently progressively complex mental task is required. More elevated amounts are not really more attractive than lower levels, since one can't accomplish the larger amounts without a capacity to utilize the lower levels. As one climbs into more elevated amounts, be that as it may, the more material the abilities are to those required in day by day life. The intellectual area contains learning abilities overwhelmingly identified with mental (thinking) forms (Fig. 3, 4) .

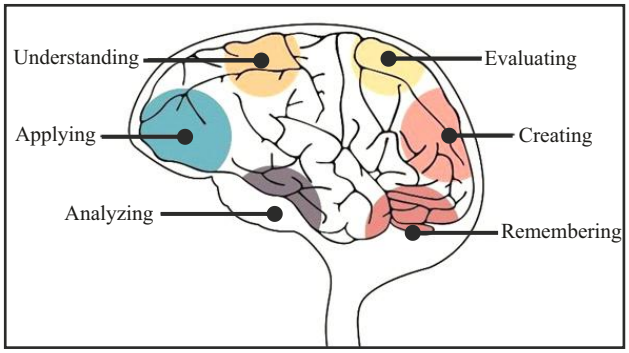

Fig.3: Cognitive Domain Brain Analysis

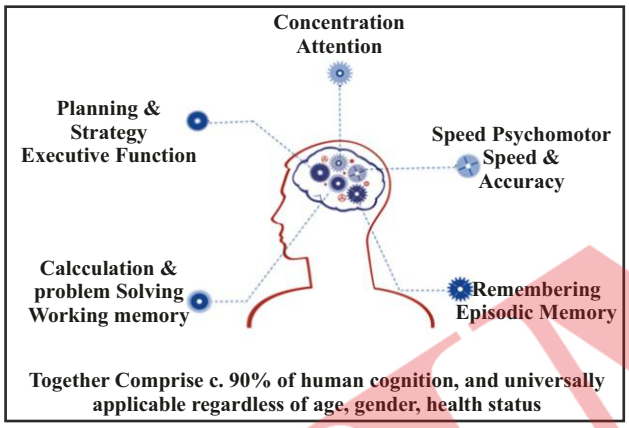

Fig 4: Five keys of cognitive domain

The subjective area includes the improvement of our psychological aptitudes and the obtaining of learning. The six classifications under this area are:

1. **Knowledge:** Knowledge is the capacity to review information and additionally data. Example: A youngster recounts the English letters in order.
2. **Comprehension:** Comprehension is the capacity to comprehend the importance of what is known. Example: An educator clarifies a hypothesis in his very own words.
3. **Application:** Application is the capacity to use a deliberative or to utilize learning in another circumstance. Example: An attendant assistant applies what she realized in her Psychology class when she converses with patients.
4. **Analysis:** the capacity to separate realities and feelings.

   Example: An attorney had the option to prevail upon a case in the wake of perceiving legitimate deceptions in the thinking of the guilty party.
5. **Synthesis:** Synthesis the capacity to incorporate various components or ideas so as to shape a sound example, or structure, so significance can be built up.
6. **Precedents:** A specialist joins yoga, biofeedback and care group treatment in making a consideration plan for his patient.
7. **Evaluation:** Evaluation is the capacity to concoct decisions about the significance of ideas. Example: A representative chooses the most effective method for selling items.

Exercises at Different Levels

Bloom's scientific categorization of learning goals is utilized to characterize how well an ability or competency is found out or aced. A more full portrayal of Bloom's scientific classification is given in the accompanying pages, however a short rundown of the exercises related to each dimension is given beneath:

1. At Knowledge Level of Learning an understudy can characterize terms.
2. At Comprehension Level of Learning an understudy can work relegated issues and can precede what they did.
3. At Application Level of Learning an understudy perceives what techniques to utilize and after that utilization the strategies to take care of issues.
4. At the Analysis Level of Learning an understudy can clarify why the arrangement procedure works.
5. At the Synthesis Level of Learning an understudy can join the piece of a procedure in new and helpful ways.
6. At Evaluation Level of Learning an understudy can make an assortment of approaches to tackle the issue and after that, in light of built up criteria, select the arrangement strategy most appropriate for the issue (Table 1).

Sr. No.	Hierarchy of cognitive domains	Writing learning outcomes
1	Knowledge	• Ability to recall realities without fundamentally understanding • Collect, characterize, portray, find, distinguish, list, remember, name, request, layout, review, perceives, rehash, appear, state

Table 1: Hierarchy of Cognitive Domains

2	Comprehension	• Ability to comprehend and decipher learned data • Clarity, differentiate, convert, unravel, safeguard, portray, separate, talk about, recognize, clarify, represent, foresee
3	Application	• Ability to utilize learned material in new circumstances • Apply, evaluate, ascertain, total, register, illustrate, create, look at, decipher, produce, select, appear, move
4	Analysis	• Ability to break down data into its segments • Analyze, assess, breakdown, sort, analyzes, interface, scrutinize, separate, isolate, look at, examine
5	Synthesis	• Ability to assemble parts • Arrange, gather, join, aggregate, form, build, make, structure, create, produce, design, make, plan, get ready
6	Evaluation	• Ability to pass judgment on estimation of material for giving reasons • Appraise, contend, finish up, persuade, censure, choose, assess, grade, decipher, judge, rate, prescribe

Cont. Table 1: Hierarchy of Cognitive Domains

Facilitators and learners need to comprehend the progressive system of procedures and abilities inside the psychological space so they acknowledge essential aptitudes for learning just as the manner in which these abilities should be changed to ace increasingly confused components of control explicit idea inventories. Improvement of learning aptitudes ought to never be underestimated in instructing or adapting new substance. Abilities related to lower-level procedures ought to be presented in establishment courses and raised in moderate dimension coursework. Aptitudes related to more elevated amount procedures ought to be astutely presented and strengthened in upper-division courses. Systematically conjuring key taking in abilities from various procedure regions and bunches over the psychological space likewise gives a technique for implanting lavishness in course exercises while fortifying long lasting learning aptitudes. Like the Social Domain, this module serves to advise us that improved intellectual space execution is constantly conceivable, regardless of what one's condition of realizing expertise advancement.

AFFECTIVE DOMAIN

The vast majority considers learning a scholarly or mental capacity. In any case, learning is certifiably not an only a subjective (mental) work. You can likewise learn dispositions, practices, and physical skills. The fullness of feeling space includes our sentiments, feelings and frames of mind. The full of feeling space includes our sentiments, feelings, and frames of mind (Fig. 5).

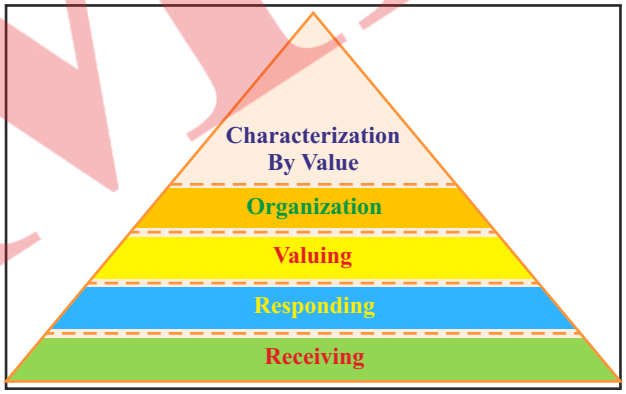

Fig 5: Affective Domain

This space incorporates the way wherein we manage things inwardly, for example, emotions, values, thankfulness, enthusiasms, inspirations, and dispositions. This space is arranged into 5 sub-areas, which include: (1). Accepting (2) Responding (3) Valuing (4) Organization (5) Characterization (Fig. 6).

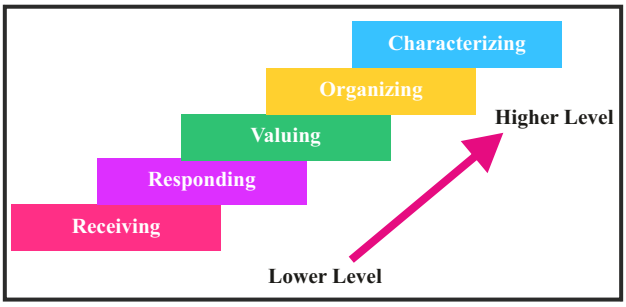

Fig.6: Affective Domain Level

1. **Receiving Phenomena**: The accepting is the consciousness of sentiments, feelings, and the capacity to use chosen consideration. Example: Listening mindfully to a companion. Listening mindfully to somebody; viewing a film, tuning in to an address; watching waves crash on the sand.
2. **Responding to Phenomena:** Responding is a dynamic investment by the learner. Example: Participating in a gathering discourse. Having a discussion; taking an interest in a gathering exchange, giving an introduction, consenting to strategies, "or following bearings.
3. **Valuing:** Valuing is the capacity to see the value of something and express it. Esteeming is worried about the value you join to a specific item, marvel, conduct, or snippet of data. This dimension ranges from basic acknowledgment to the more mind boggling condition of duty.

   The less complex acknowledgment may incorporate your longing for a group to improve its abilities, while increasingly complex dimension of responsibility may incorporate taking capably for the general improvement of the group.

   Example: Proposing an arrangement to improve group aptitudes, supporting plans to expand"[7] capability, or illuminating pioneers regarding potential issues. It is the capacity to see the value of something and express it. Example: A dissident offers his thoughts on the expansion in pay of workers.
4. **Organization:** capacity to organize an incentive over another and make an interesting quality framework. Example: A youngster invests more energy in her investigations than with her sweetheart.
5. **Characterization:** the capacity to disguise esteems and let them control the individual's conduct. Example: A man weds a lady not for her looks, but rather for what she is.

This space shapes at various leveled "structure and is masterminded from easier sentiments to those that are increasingly intricate. This various leveled structure depends on the guideline of disguise. Disguise alludes to the procedure whereby your effect toward something goes from a general mindfulness level to a point where the influence is disguised and reliably aides or controls your conduct."7 In this way, with development to greater intricacy, you become progressively included, submitted, and inside inspired.

PSYCHOMOTOR DOMAIN

Psychomotor goals are those particular to watchful physical capacities, reflex activities and interpretive developments. It is intriguing to take note of "that while the intellectual, scientific categorization was portrayed in 1956, and the emotional in 1964, the psychomotor area were not completely depicted until the 1970s." (8)

Generally, these kinds of targets are worried about the physics encoding of data, with development as well as with exercises where the gross and fine muscles are utilized for communicating or deciphering data or ideas. This zone additionally alludes to common, autonomic reactions or reflexes (Table 2).

Sr. No.	Class of Psychomotor domain	Definitions
1	**Perception**	The capacity to apply tangible data to engine movement. Example: A cook changes the warmth of stove to accomplish the correct temperature of the dish.
2	**Set**	The prepared to act. Example: A fat individual showcases inspiration in performing arranged exercise.
3	**Guided Response**	The capacity to mimic a showed conduct or to use experimentation. Example: An individual pursues the manual in working a machine.
4	**Mechanism**	The capacity to change over scholarly reactions into routine activities with capability and certainty. Example: A mother had the option to prepare a delectable supper subsequent to rehearsing how to cook it.
5	**Complex Overt Response**	The capacity to skillfully perform complex examples of activities. Example: Typing a report on a PC without taking a gander at the console.
6	**Adaptation**	The capacity to adjust learned abilities to meet unique occasions. Example: An architect utilizes plastic jugs to make a dress.
7	**Origination**	Making new development designs for a particular circumstance. Example: A choreographer makes another move schedule.

Table 2: The Psychomotor Domain is Contained Using Engine Abilities and Planning them. The Seven Classes Under this Include

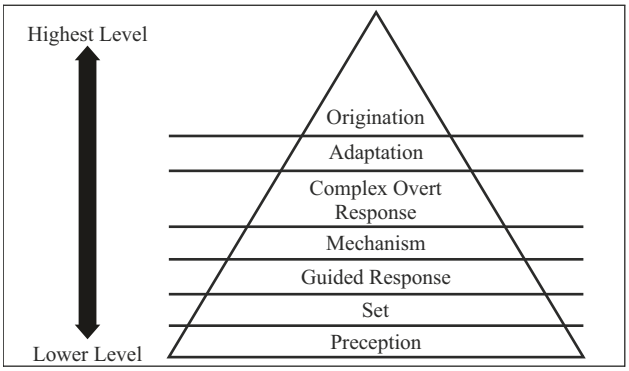

Fig.7: Psychomotor Domain Layout

Other Psychomotor domains as referenced before, the board of trustees did not create an assemblage for the psychomotor space model, yet others have. The one talked about above is by Simpson (1972)(5). There are two other mainstream forms:

Dave (1975) built up this scientific categorization: (6)

- **Imitation -** Observing and duplicating another person.
- **Manipulation -** Guided by means of guidance to play out ability.
- **Precision -** Accuracy, extent and precision exist in the aptitude execution without the nearness of the first source.
- **Articulation -** at least two aptitudes joined, sequenced, and performed reliably.
- **Naturalization -** at least two aptitudes joined, sequenced, and performed reliably and easily. The presentation is programmed with minimal physical or mental effort.

Harrow (1972) built up this scientific categorization. It is sorted out as indicated by the level of coordination including automatic reactions and educated abilities: (9)

- Reflex developments - Automatic responses.
- Basic essential development - Simple developments that can work to increasingly complex arrangements of developments.
- Perceptual - Environmental signs that enable one to alter developments.
- Physical exercises - Things requiring perseverance, quality, force, and nimbleness.
- Skilled developments - Activities where a dimension of proficiency is accomplished.
- Non-digressive correspondence - Body language.

Gagné RM guessed that different sorts of learning results required different conditions of learning. He proposed five arrangements of learning content: verbal data, scholarly aptitudes, psychological systems, engine abilities, and attitudes (10). Merrill MD considered the Component Display Theory (CDT) created on Gagne's logical classification of learning content. As indicated by Merrill, the sorts of substance incorporate realities, ideas, procedures, standards, and methodology and the ideal degrees of execution incorporate recollect, use, and find. It is entrancing to observe that Merrill's three degree of execution (recall, use, and find) by and large identify with Gagne's three subjective space in verbal data, scholarly aptitudes and intellectual procedures, respectively (11). Compared to Gagné or Merrill, who focused fundamentally on the psychological procedure of reasoning, Kraiger K et al., gave a multidimensional viewpoint on learning results by completely describing various sorts of learning results into three classes: intellectual, expertise based and full of feeling. According to them, subjective learning results incorporate three sub areas of verbal information, information association, and intellectual methodologies (like the scientific categorization by Gagné) (12). One by and large grasped see has been the logical arrangement proposed by Bloom B (13). His logical order of learning objectives, "proposed the six psychological levels extending from information (review), cognizance, application, examination, amalgamation, and assessment. According to Bloom, these six levels are progressive in nature. The degrees of information, understanding, and application are assembled as a low level, while investigation, blend and assessment are assembled as an elevated level. During the 1990's, Bloom and his protégé, Forehand, started refreshing the scientific categorization mirroring the adjustments in contemporary learning situations. Their first errand was changing the Bloom's six significant classes from thing to action word structures to mirror the move of accentuations on learner execution. In the recently confined model, information was changed to recalling, and appreciation and union were renamed to comprehension and making respectively (Table. 3) (14).

Content Domains	Gagne RM (8)	Merrill MD (9)	Kraiger K et al. (10)	Bloom B (11)
Cognitive Domain	Verbal information	Remember verbatim/ paraphrased	Cognitive learning	Knowledge Comprehension
	Intellectual skill	Use a generality		Application
	Cognitive strategy	Find a generality		Analysis Synthesis Evaluation
Psychomotor Domain	Motor skills		Skill based learning	
Affective Domain	Attitude		Affective learning	

Table 3: Comparison of Different Learning Content Taxonomies

CONCLUSION

People are long lasting learners. From birth forward we learn and acclimatize what we have quite recently realized into what we definitely know. Learning in the Geosciences, similar to all learning, can be categorized into the spaces of idea information. As ahead of schedule as 1956 Educational Psychologist Benjamin Bloom isolated what and how, we realize into three separate domains of learning. Cognitive

domain incorporates content information and the improvement of scholarly aptitudes. This incorporates the review or acknowledgment of explicit realities and ideas that serve creating scholarly capacities and aptitudes. There are six noteworthy classes, beginning from the least complex conduct (reviewing actualities) to the most unpredictable (evaluation). The affective domain incorporates emotions, values, thankfulness, enthusiasms, inspirations, and demeanors. The University of Dayton, School of Law affective domain site depicts each category in the space and gives illustrative precedents and watchwords to the psychological, full of feeling, and psychomotor domain. The psychomotor domain incorporates physical development, coordination, and utilization of the engine aptitude territories. Advancement of these aptitudes requires practice and is estimated as far as speed, exactness, separation, methodology, or procedures in execution.

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