Bloom's Taxonomy

The Three Types of Learning

There is more than one type of learning. A committee of colleges, led by Benjamin Bloom, identified three domains of educational activities:

- Cognitive: mental skills (Knowledge)
- Affective: growth in feelings or emotional areas (Attitude)
- Psychomotor: manual or physical skills (Skills)

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Cognitive Domain

The cognitive domain involves knowledge and the development of intellectual skills. This 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 categories, which are listed in order below, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulties. That is, the first one must be mastered before the next one can take place.

Example and Key Words

Level	Example	Key Words
Knowledge: Recall data or information.	**Examples**: Recite a policy. Quote prices from memory to a customer. Knows the safety rules.	**Key Words**: defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.
Comprehension: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words.	**Examples**: Rewrites the principles of test writing. Explain in one's own words the steps for performing a complex task. Translates an equation into a computer spreadsheet.	**Key Words**: comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives Examples, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.
Application: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place.	**Examples**: Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.	**Key Words**: applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.

Level	Example	Key Words
Analysis: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences.	**Examples**: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.	**Key Words**: analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.
Synthesis: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure.	**Examples**: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.	**Key Words**: categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.
Evaluation: Make judgments about the value of ideas or materials.	**Examples**: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.	**Key Words**: appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.

Affective Domain

This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories listed the simplest behavior to the most complex:

Example and Key Words

Level	Example	Key Words
Receiving Phenomena: Awareness, willingness to hear, selected attention.	**Examples**: Listen to others with respect. Listen for and remember the name of newly introduced people.	**Key Words**: asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits, erects, replies, uses.
Responding to Phenomena: Active participation on the part of the learners. Attends and reacts to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).	**Examples**: Participates in class discussions. Gives a presentation. Questions new ideals, concepts, models, etc. in order to fully understand them. Know the safety rules and practices them.	**Key Words**: answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes.
Valuing: The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner's overt behavior and are often identifiable.	**Examples**: Demonstrates belief in the democratic process. Is sensitive towards individual and cultural differences (value diversity). Shows the ability to solve problems. Proposes a plan to social improvement and follows through with commitment. Informs management on matters that one feels strongly about.	**Key Words**: completes, demonstrates, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works.

Level	Example	Key Words
Organization: Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating an unique value system. The emphasis is on comparing, relating, and synthesizing values.	**Examples**: Recognizes the need for balance between freedom and responsible behavior. Accepts responsibility for one's behavior. Explains the role of systematic planning in solving problems. Accepts professional ethical standards. Creates a life plan in harmony with abilities, interests, and beliefs. Prioritizes time effectively to meet the needs of the organization, family, and self.	**Key Words**: adheres, alters, arranges, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.
Internalizing values (characterization): Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable, and most importantly, characteristic of the learner. Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, emotional).	**Examples**: Shows self-reliance when working independently. Cooperates in group activities (displays teamwork). Uses an objective approach in problem solving. Displays a professional commitment to ethical practice on a daily basis. Revises judgments and changes behavior in light of new evidence. Values people for what they are, not how they look.	**Key Words**: acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, verifies.

Psychomotor Domain

The psychomotor domain includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. The seven major categories listed the simplest behavior to the most complex:

Example and Key Words

Perception: The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.	**Examples**: Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet.	**Key Words**: chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.
Set: Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets).	**Examples**: Knows and acts upon a sequence of steps in a manufacturing process. Recognize one's abilities and limitations. Shows desire to learn a new process (motivation). NOTE: This subdivision of Psychomotor is closely related with the "Responding to phenomena" subdivision of the Affective domain.	**Key Words**: begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.

Guided Response: The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	**Examples**: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds hand-signals of instructor while learning to operate a forklift.	**Key Words**: copies, traces, follows, react, reproduce, responds
Mechanism: This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.	**Examples**: Use a personal computer. Repair a leaking faucet. Drive a car.	**Key Words**: assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
Complex Overt Response: The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance.	**Examples**: Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano.	**Key Words**: assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
Origination: Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.	**Examples**: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine.	**Key Words**: arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.

Other Psychomotor Domains

As mentioned earlier, the committee did not produce a compilation for the psychomotor domain model, but others have. The one discussed above is by Simpson (1972). There are two other popular versions:
Dave's(4):

- Imitation: Observing and patterning behavior after someone else. Performance may be of low quality. Example: Copying a work of art.
- Manipulation: Being able to perform certain actions by following instructions and practicing. Example: Creating work on one's own, after taking lessons, or reading about it.
- Precision: Refining, becoming more exact. Few errors are apparent. Example: Working and reworking something, so it will be "just right."
- Articulation: Coordinating a series of actions, achieving harmony and internal consistency. Example: Producing a video that involves music, drama, color, sound, etc.
- Naturalization: Having high level performance become natural, without needing to think much about it. Examples: Michael Jordan playing basketball, Nancy Lopez hitting a golf ball, etc.

Knowledge-Cognitive Domain Examples

Level 1: Knowledge - exhibits previously learned material by recalling facts, terms, basic concepts and answers.

Key words: who, what, why, when, omit, where, which, choose, find, how, define, label, show, spell, list, match, name, relate, tell, recall, select

Questions:

- What is . . . ? How is . . . ?
- Where is . . . ? When did _____ happen?
- How did _____ happen? How would you explain . . . ?
- Why did . . . ? How would you describe . . . ?
- When did . . . ? Can you recall . . . ?
- How would you show . . . ? Can you select . . . ?
- Who were the main . . . ? Can you list three . . . ?
- Which one . . . ? Who was . . . ?

Comprehension-Cognitive Domain Examples

Level 2: **Comprehension** - demonstrating understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.

Key words: compare, contrast, demonstrate, interpret, explain, extend, illustrate, infer, outline, relate, rephrase, translate, summarize, show, classify

Questions:

- How would you classify the type of . . . ?
- How would you compare . . . ? contrast . . . ?
- Will you state or interpret in your own words . . . ?
- How would you rephrase the meaning . . . ?
- What facts or ideas show . . . ?
- What is the main idea of . . . ?
- Which statements support . . . ?
- Can you explain what is happening . . . what is meant . . .?
- What can you say about . . . ?
- Which is the best answer . . . ?
- How would you summarize . . . ?

Application-Cognitive Domain Examples

Level 3: Application - solving problems by applying acquired knowledge, facts, techniques and rules in a different way.

Key words: apply, build, choose, construct, develop, interview, make use of, organize, experiment with, plan, select, solve, utilize, model, identify

Questions:

- How would you use . . . ?
- What examples can you find to . . . ?
- How would you solve _____ using what you have learned . . . ?
- How would you organize _____ to show . . . ?
- How would you show your understanding of . . . ?
- What approach would you use to . . . ?
- How would you apply what you learned to develop . . . ?
- What other way would you plan to . . . ?
- What would result if . . . ?
- Can you make use of the facts to . . . ?
- What elements would you choose to change . . . ?
- What facts would you select to show . . . ?
- What questions would you ask in an interview with . . . ?

Analysis-Cognitive Domain Examples

Level 4: Analysis - examining and breaking information into parts by identifying motives or causes; making inferences and finding evidence to support generalizations.

Key words: analyze, categorize, classify, compare, contrast, discover, dissect, divide, examine, inspect, simplify, survey, take part in, test for, distinguish, list, distinction, theme, relationships, function, motive, inference, assumption, conclusion

Questions:

- What are the parts or features of . . . ?
- How is _____ related to . . . ?
- Why do you think . . . ?
- What is the theme . . . ?
- What motive is there . . . ?
- Can you list the parts . . . ?
- What inference can you make . . . ?
- What conclusions can you draw . . . ?
- How would you classify . . . ?
- How would you categorize . . . ?
- Can you identify the difference parts . . . ?
- What evidence can you find . . . ?
- What is the relationship between . . . ?
- Can you make a distinction between . . . ?
- What is the function of . . . ?

Synthesis-Cognitive Domain Examples

Level 5: Synthesis - compiling information together in a different way by combining elements in a new pattern or proposing alternative solutions.

Key Words: build, choose, combine, compile, compose, construct, create, design, develop, estimate, formulate, imagine, invent, make up, originate, plan, predict, propose, solve, solution, suppose, discuss, modify, change, original, improve, adapt, minimize, maximize, delete, theorize, elaborate, test, improve, happen, change

Questions:

- What changes would you make to solve . . . ?
- How would you improve . . . ?
- What would happen if . . . ?
- Can you elaborate on the reason . . . ?
- Can you propose an alternative . . . ?
- Can you invent . . . ?
- How would you adapt _____ to create a different . . . ?
- How could you change (modify) the plot (plan) . . . ?
- What could be done to minimize (maximize) . . . ?
- What way would you design . . . ?
- What could be combined to improve (change) . . . ?
- Suppose you could _____ what would you do . . . ?
- How would you test . . . ?
- Can you formulate a theory for . . . ?
- Can you predict the outcome if . . . ?

Evaluation-Cognitive Domain Examples

Level 6: Evaluation - presenting and defending opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria.

Key Words: award, choose, conclude, criticize, decide, defend, determine, dispute, evaluate, judge, justify, measure, compare, mark, rate, recommend, rule on, select, agree, interpret, explain, appraise, prioritize, opinion, ,support, importance, criteria, prove, disprove, assess, influence, perceive, value, estimate, influence, deduct

Questions:

- Do you agree with the actions . . . ? with the outcomes . . . ?
- What is your opinion of . . . ?
- How would you prove . . . ? disprove . . . ?
- Can you assess the value or importance of . . . ?
- Would it be better if . . . ?
- Why did they (the character) choose . . . ?
- What would you recommend . . . ?
- How would you rate the . . . ?
- What would you cite to defend the actions . . . ?
- How would you evaluate . . . ?
- How could you determine . . . ?
- What choice would you have made . . . ?
- What would you select . . . ?
- How would you prioritize . . . ?
- What judgment would you make about . . . ?

Verb List for Writing Educational Objectives

Knowledge

cite	recite
count	recognize
define	record
draw	relate
identify	repeat
indicate	select
list	state
name	tabulate
point	tell
quote	trace
read	write

Comprehension

associate	express
classify	extrapolate
compare	interpret
contrast	interpolate
describe	locate
differentiate	predict
discuss	report
distinguish	restate
explain	review
estimate	translate

Application

apply	predict
calculate	utilize
complete	relate
demonstrate	report
dramatize	operate
employ	review
examine	schedule
illustrate	sketch
interpret	solve
interpolate	translate
locate	use

Analysis

analyze	distinguish
appraise	experiment
question	infer
criticize	inspect
debate	inventory
diagram	separate
differentiate	summarize

Synthesis

arrange
assemble
collect
compose
construct
create
design
formulate
generalize
integrate
manage
organize
plan
prepare
prescribe
produce
prove

Evaluation

appraise
assess
critique
determine
estimate
evaluate
grade
judge
measure
rank
rate
recommend
revise
score
select
test

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