Learning Outcomes

Learning outcomes are statements of what students CAN DO as a result of a learning experience. The statements focused on student learning rather than our teaching.

What are learning outcomes?

Learning outcomes are statements that define what students will have acquired and can do as a result of completing their studies. When designing a course, the intended learning outcomes (ILOs) predict what students will have gained as a result of learning and should express from the students' perspective.
The key is that ILOs are measurable, achievable, and assessable.

Learning outcomes address 3 basic elements:

What the student is expected to do after learning (*behaviour/ performance*).
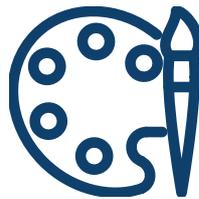
The circumstances under which the student will be able to perform (*condition*).

The level of acceptable performance (*degree/ standard*)

Effective learning outcomes statements should contain:

Behaviour — 01
an action verb that describes what students can do as a result of a learning activity.

Condition — 02
an environment or situation under which the behavior or performance is to be displayed.

Standard — 03
each learning outcomes should be measurable and include the desired level of achievement.

From the students' perspective, the outcomes approach communicates what they are expected to be able to do and the criteria that will be used to assess them.

Writing Learning Outcomes

Key questions to ask when writing outcome statements:
- Is what I want my students to be able to do clearly defined?
- Have I thought about the type and level of this particular outcome, and its relationship to other outcomes?
- Will I be able to show credible evidence that this outcome is achieved and, if so, how?
- Is this outcome written on the basis of a learning perspective, instead of a teaching perspective?
- Will I be able to design a learning experience that will actually deliver this outcome?

Actions verbs for the outcome statements:

Since outcomes are about performance and should be observable and measurable, when writing learning outcome statements, always think about how you might assess them and are these outcomes achievable for your students. The verbs chosen for the outcome statements should be an action verb, for examples: compile, create, analyse, design, apply, demonstrate, compute, discuss, and explain.

Certain verbs are unclear and cannot be observed or measured and should be avoid in writing our learning outcomes, such as "know" or "understand" which are not directly observable and measurable. Instead, they should be substituted with performative verbs such as "identify", "define", "describe", etc.

Basic structure of learning outcomes:

On successful completion of this course, [**who**] will be able to + [**action verb**] + [**activity**] + [**condition**].

Who: Describe your learner in as much details as possible, for example, Year 1 School of Engineering students   or Chemistry students.

Action Verb: Choose the action verb aligned with level of knowledge to obtain.

Activity: Describe the task your learn will be able to perform.

Condition: Describe the conditions under which your learners should be able to perform the task.

From the students' perspective, the outcomes approach communicates what they are expected to be able to do and the criteria that will be used to assess them.

Learning outcomes can be broadly categorized in three different domains:

1. Knowledge outcome	**2. Skill outcome**	**3. Attitude outcome**
Cognitive domain	Psychomotor domain	Affective domain
What you know	What you can do	A desire to do what needs to be done
(e.g. mathematics, engineering, etc.)	(e.g. communication, problem solving)	(e.g. work attitude, integrity)
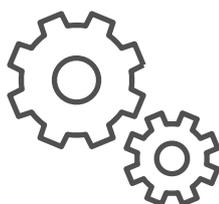
1. Cognitive Domain of Learning

Revised Bloom's Taxonomy in Cognitive Domain
 The revised Bloom's taxonomy specified six levels of cognitive process that represent a continuum of increasing cognitive complexity—from remember to create.

COMPLEX

SIMPLE

Creating
Action verbs: generate, plan, produce, construct, design, combine, develop.

Evaluating
Action verbs: check, critique, judge, monitor, test, assess, appraise, evaluate.

Analysing
Action verbs: differentiate, distinguish, organize, attribute, select, analyze.

Applying
Action verbs: apply, execute, implement, use, solve.

Understanding
Action verbs: exemplify, classify, infer, summarize, explain

Remembering
Action verbs: recall, recognize, identify, define, list

- **Remembering**: Retrieving relevant knowledge from long-term memory.

- **Understanding**: Construct meaning from instructional messages, including oral, written, and graphic communication.

- **Applying**: Carry out or using a procedure in a given situation.

- **Analysing**: Break material into constituent parts, determining how the parts relate to one another and to an overall structure or purpose.

- **Evaluating**: Make judgements based on criteria and standards.

- **Creating**: Put elements together to form a coherent or functional whole; reorganize elements.

For the revised Bloom's taxonomy, knowledge is at the basis of the six cognitive processes. There are 4 types of knowledge used in cognition, range from concrete (factual) to abstract (metacognitive).

- Factual Knowledge
    - o Knowledge of terminology
    - o Knowledge of specific details and elements
- Conceptual Knowledge
    - o Knowledge of classifications and categories
    - o Knowledge of principles and generalizations
    - o Knowledge of theories, models, and structures
- Procedural Knowledge
    - o Knowledge of subject-specific skills and algorithms
    - o Knowledge of subject-specific techniques and methods
    - o Knowledge of criteria for determining when to use appropriate procedures
- Metacognition Knowledge
    - o Strategic knowledge
    - o Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge
    - o Self-knowledge
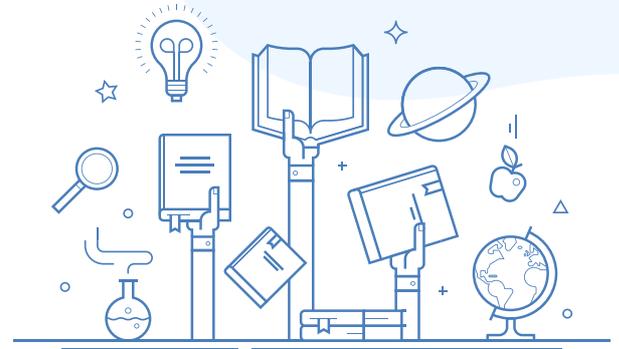
Matrix represent the knowledge outcomes:

		Cognitive Process Dimension From Simple to Complex					
		Remember	Understand	Apply	Analyse	Evaluate	Create
Knowledge Dimension Concrete to Abstract	Factual Knowledge	List	Summarize	Classify	Order	Rank	Combine
	Conceptual Knowledge	Describe	Interpret	Experiment	Explain	Assess	Plan
	Procedural Knowledge	Tabulate	Predict	Calculate	Differentiate	Conclude	Compose
	Meta-Cognitive Knowledge	Appropriate Use	Execute	Construct	Achieve	Action	Actualize

Reference: Anderson, L.W., & Krathwohl, D.R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* Longman: New York, NY

2. Psychomotor Domain of Learning

Dave's Taxonomy of Psychomotor Domain
Dave's axonomy of psychomotor domain (1970) contains five levels of motor skills represent different degrees of competence in performing a skill from initial exposure to final mastery. Imitation is the simplest level while Naturalization is the most complex level.

Dave's Taxonomy

Action Verbs: Create, Design, Develop, Invent, Manage naturally or perfectly

Action Verbs: Adapt, Construct, Combine, Create, Customize, Modify, Formulate, Alter, Originate

Action Verbs: Action Verbs: Achieve automatically, Excel expertly, Perform masterfully

Action Verbs: Act, Build, Execute, Perform, Complete, Accomplish, Follow, Play, Produce.

Action Verbs : Attempt, Copy, Imitate, Mimic, Follow,Repeat, Duplicate, Replicate, Reproduce

- **Imitation**: Copy action of another; observe and replicate.

- **Manipulation**: Reproduce activity from instruction or memory.

- **Precision**: Execute skill reliably, independent of help.

- **Articulation**: Adapt and integrate expertise to satisfy a non-standard objective.

- **Naturalisation**: automated, unconscious mastery of activity and related skills at strategic level

Reference: Dave, R.H. (1975). *Developing and writing behavioral objectives.* (R J Armstrong, ed.) Educational Innovators Pres.

3. Affective Domain of Learning

The affective domain involves the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. This domain forms a hierarchical structure and is arranged from simpler feelings to those that are more complex.

This hierarchical structure is based on the principle of internalization. Internalization refers to the process whereby your affect toward something goes from a general awareness level to a point where the affect is internalized and consistently guides or controls your behavior. Therefore, with movement to more complexity, you become more involved, committed, and internally motivated

High Level

Characterising
Action verbs: act, display, influence, solve, practice

Organising
Action verbs: build, develop, formulate, defend, modify, relate, prioritise, reconcile

Valuing
Action verbs: argue, challenge, debate, refute, confront, justify, persuade, criticise

Responding
Action verbs: react, respond, seek clarification, interpret, clarify, contribute, question

Low Level

Receiving
Action verbs: ask, listen, focus, attend, take part, discuss, acknowledge, hear,

- **Receiving**: Willing to be aware of the setting or situation, gives attention by choice, open to the experience.

- **Responding**: Willingly participating, obedient, volunteers, finds satisfaction in participating, ready to respond.

- **Valuing:** Motivated to invest. Chooses to behave in a certain way frequently. Begins to identify with a behaviour and commit to it.

- **Organising**: Values become systematic, can compare and contrast values and choices, begins to order and prioritize values, chooses to commit to certain values and behaviours.

- **Characterising by Value**: Acts consistently due to an internal belief. Can articulate a philosophy or world-view. Can break down complex situations and respond accordingly based on values, develops and lives by a code of personal behaviour.

Learning Outcomes Generator

The link below is free outcomes generators to walk you through the process of developing measurable outcome statements.
- Learning outcomes generator from Easygenerator.com : https://learning-objectives.easygenerator.com/