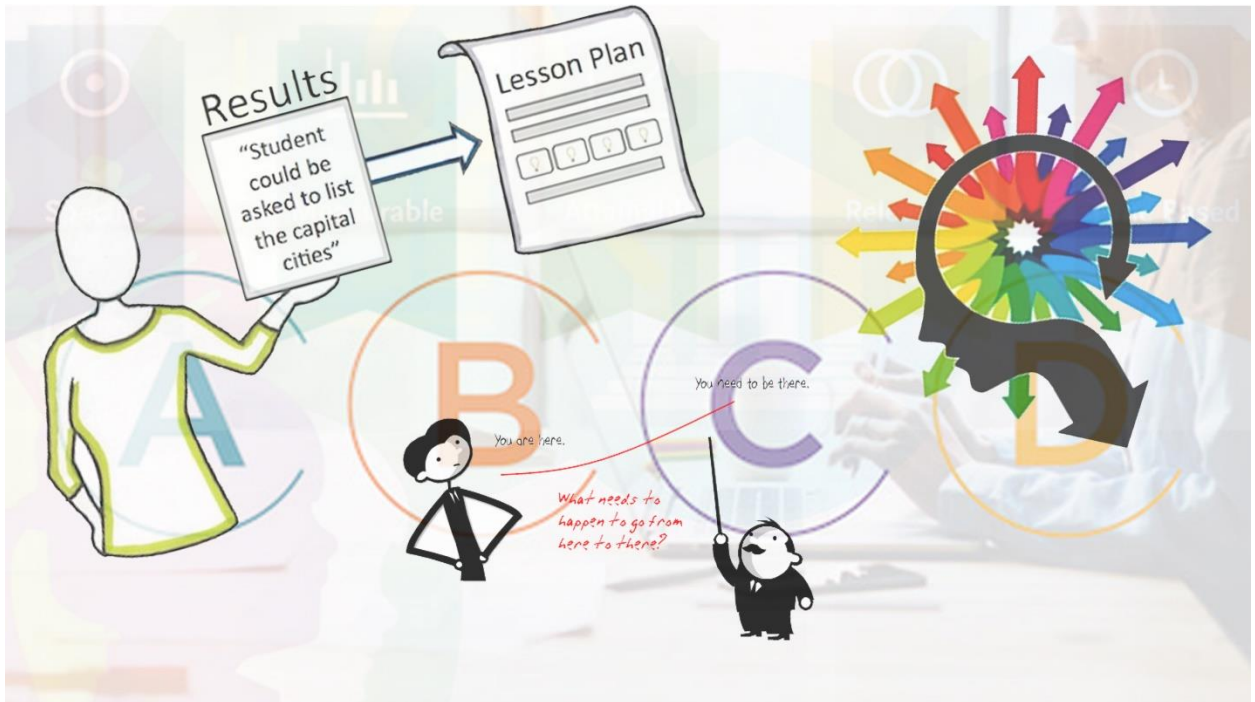


UNIT 3: INSTRUCTIONAL OBJECTIVES AND LEARNING OUTCOMES



Lesson - 4 Instructional Objectives and Learning Outcomes

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4.0 INSTRUCTIONAL OBJECTIVES AND LEARNING OUTCOMES

LEARNING OBJECTIVES

On completion of this unit the participants will be able

- To explain Aims, Goals and Objectives in the context of curriculum development
- To explain the need of stating Instructional Objectives
- To formulate Instructional Objectives for a lesson/topic
- To map a given instructional objective in appropriate knowledge dimension and cognitive process dimension of Revised Bloom's Taxonomy
- To write learning outcomes for a course, lesson, or any learning event.

4.1 CURRICULUM AIMS, GOALS AND OBJECTIVES

Aims, goals and objectives are sequentially related; they occur in hierarchical order. The limit or the height of society aspiration is encapsulated in its aim. Ritz (2014) considers aim as “a general statement that suggests direction”. It provides a guide for the educational and training processes by which a terminal point of live outcome is focused. Anderson, Krathwohl et al (2000) see goal as statement of academic intention which are more specific than aim (it is a subset of aim). The statement of goals denominates the amorphous terms of the aim which are not directly measurable. Nodding (2007) believes that aims and goals are “brushed aside in favour of objectives because the last can be cast in language conducive to measurement”. Curriculum development is concerned with putting activities in place in order to effect desirable change in learners' behaviour (Nilcholls, 1973). Therefore, objectives designed for classroom activities bring into fore the kind of knowledge and skills needed in the society. Lawton(1975) explains that the structures and elements of curriculum must be designed in such a way as to promote social utility, social responsibility, common culture and personal satisfaction.

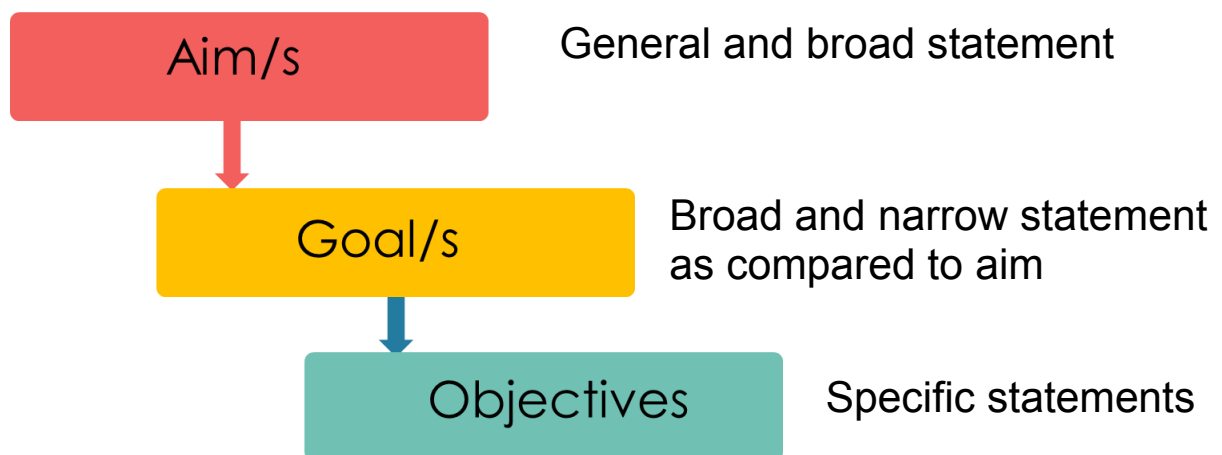


Figure 1 Aims, Goals and Objectives

AIMS and GOALS: Aims are general statements that provide direction or intent to educational action. Aims are usually written in amorphous terms using words like: learn, know, understand, appreciate, and these are not directly measurable. An aim is the product of a long term endeavour measured over a program or a course of one or more years

Goals are statements of educational intention which are more specific than aims. Goals too may encompass an entire program, subject area, or multiple grade levels. They may be in either amorphous language or in more specific behavioral terms.

Broad descriptions of purposes or ends stated in general terms without criteria of achievement or mastery. Curriculum aims or goals relate to educational aims and philosophy. They are programmatic and normally do not delineate the specific courses or specific items of content. Typically, they refer to the accomplishment of groups (e.g. all learners, learners in general, most learners) rather than the achievement of individual learners. They are broad enough to lead to specific curriculum objectives. Examples include: 'students will learn to respect and get along with people of different cultures'; 'students will develop a sense of civic responsibility'; 'students will attain an appreciation for literature, art, music'.

OBJECTIVES: Specific statements setting measurable expectations for what learners should know and be able to do, described either in terms of learning outcomes (what the learners are expected to learn), products or performance (what learners will produce as a result of a learning activity) or processes (describing the focus of learning activities). They can be seen as refinements of curriculum aims/goals that, for example, specify: performance standards or

those skills and knowledge the learners are expected to be able to demonstrate; inferred or precise degree of mastery; and the conditions under which the performance will take place. In terms of effectiveness, curriculum objectives should: be concise and understandable to teachers, learners and parents; be feasible for the teachers and learners to accomplish; encompass previous learning and require the learner to integrate and then apply certain knowledge, skills, and attitudes in order to demonstrate achievement; and be measurable on a cumulative basis and at different stages of the learner's educational career.

4.2 INSTRUCTIONAL OBJECTIVES

Curriculum, syllabus, text book, teaching methods, modes of evaluation - all these are based on certain theories of learning or teaching models. In order to implement the educational plan or improve the practice of teaching and learning, the necessary knowledge of various theories of learning and its outcomes is required. The concept of instructional objectives is based on those theories. In this unit you will understand the concept of instructional objectives based on learning theories and their relationship with instructional objectives for evaluating the teaching-learning process.

Educational research has established the fact that achievement is enhanced in a classroom, where students can perceive a sense of direction for learning. Classroom management and teaching blend together as a unified process when instructional objectives provide goal clarity for teachers and students.

Instructional Objectives is one of the most important components of the teaching learning process.

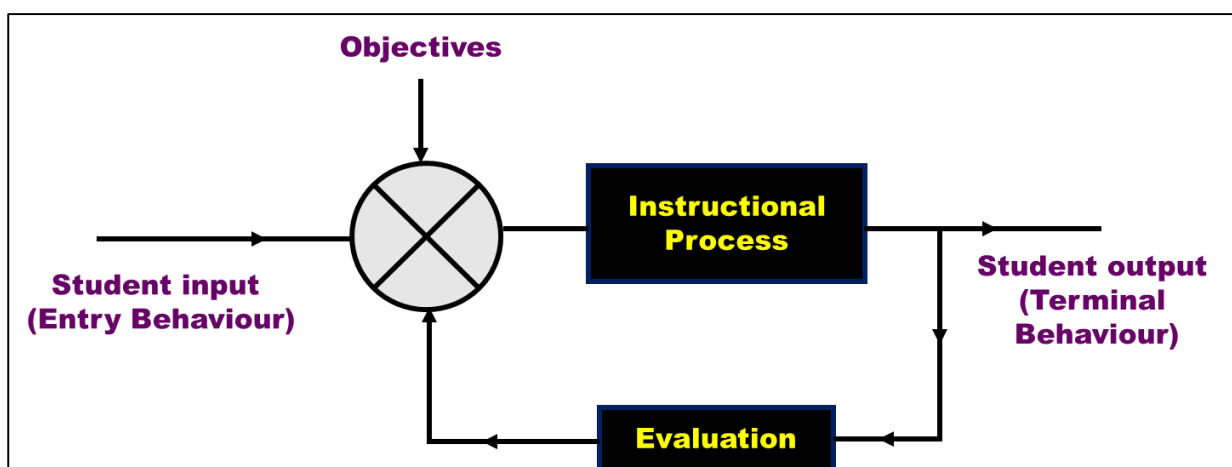


Figure 2: Block Diagram of Instructional System

Instructional objectives form the basis for the choice of the following:

- Instructional Planning
- Instructional Methods,
- Instructional Resources (Materials and Media)
- Evaluation Procedure.

DEFINITION OF INSTRUCTIONAL OBJECTIVES

Learning objectives, also called behavioural objectives or instructional objectives, are requirements for high-quality development of instruction.

A learning objective is a statement that specifies in behavioural (measurable) terms what a learner will be able to do as a result of instruction. It describes the intended outcome of your instruction rather than a description or summary of your content.

The purpose of objectives is not to restrict spontaneity or constrain the vision of education in the discipline; but to ensure that learning is focused clearly enough that both students and teacher know what is going on, and so learning can be objectively measured.

An instructional objective is a statement that will describe what the learner will be able to do after completing the instruction. According to Dick and Carey (1990), a performance objective is a detailed description of what students will be able to do when they complete a unit of instruction. It is also referred to as a behavioral objective or an instructional objective. Robert Mager(1984), in his book Preparing Instructional Objectives, describes an objective as "a collection of words and/or pictures and diagrams intended to let others know what you intend for your students to achieve"

4.3 REASONS FOR STATING INSTRUCTIONAL OBJECTIVES

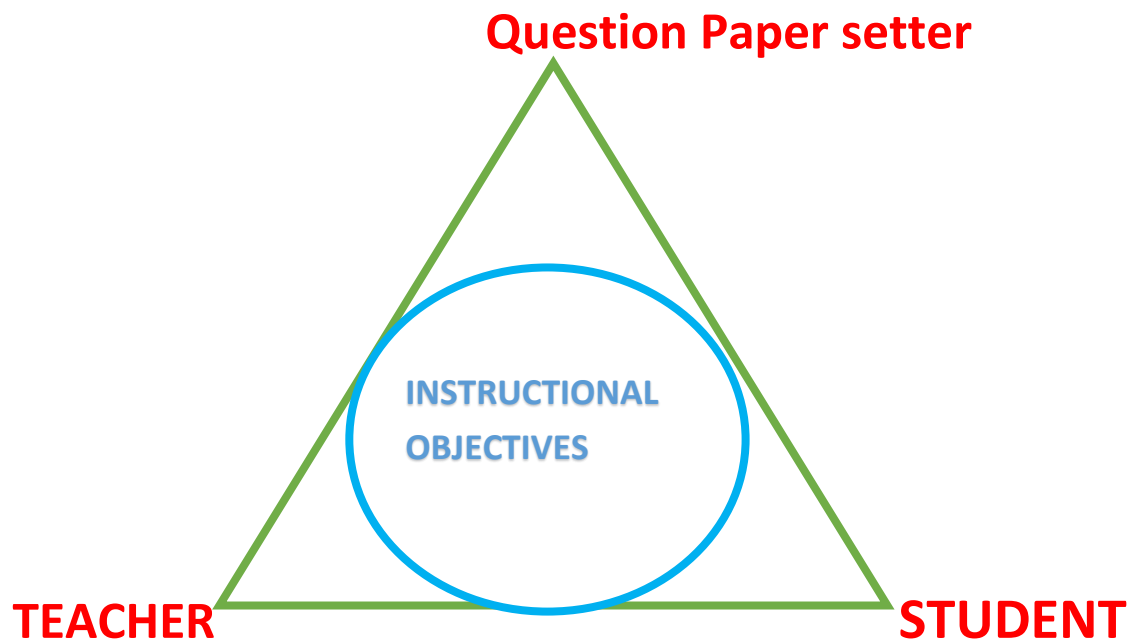


Figure 3: Instructional Objectives for teacher, learner and question paper setter

Instructional objectives form a basis to assess the learners and the teaching learning process by providing information to the following persons.

- Give direction to **teachers** in the selection of methods and instructional resources.
- Assist **students** in organizing and studying the content material and guide them what is expected from them.
- Provides scope for the **Question paper setter**.

The purpose of a behavioral objective is to communicate. Therefore, a well-constructed behavioral objective should leave little room for doubt about what is intended.

- Objectives communicate and guide development content materials, instructional methods and assessment.
- Objectives communicate the focus of learning that enables instructors and students to work toward a common goal.
 - The teacher can use objectives to make sure goals are reached.
 - Students will understand expectations. Any skill is learned more effectively if the learner understands the reason for learning and practicing it.

- Objectives communicate the assessment and grading. Objectives provide a means of measuring whether the students have succeeded in acquiring skills and knowledge.
- Objectives communicate and allow students the opportunity for self-evaluation.

4.4 WRITING INSTRUCTIONAL OBJECTIVES

When to write objectives?

Objectives should be developed:

- Before a lesson or course is developed (by designer).
- Before a lesson or course is taught (by instructor).
- Objectives should be reviewed with students at the beginning of the course/module/lesson.

How to write Instructional objectives?

When writing instructional objectives, focus on the learner, not the teacher!

Instructional objectives must be written to communicate **realistic, measurable, and learner centered outcomes**.

- Realistic objectives can be achieved by the learners within your time frame and in your given environment.
- Measurable objectives enable you to observe and determine how well learners have acquired skills and knowledge.
- Learner centered objectives state what the learner can do at the end of training. They always start with action verbs.
- Specify intended results or outcomes, and not the process. Teaching and lecturing is part of the process of instruction, but it isn't the purpose of the instruction. The purpose is to facilitate learning.
- Different types of learning require different learning experiences and hence different types of objectives.

Objectives can be written for three domains of learning ie

1. Cognitive

2. Psychomotor

3. Attitudes

- **Cognitive** objectives emphasize **THINKING**,
- **Affective** objectives emphasize **FEELING** and
- **Psychomotor** objectives emphasize **ACTING**.

I. The ABCD method of writing Objectives:

Heinich and his colleagues (2002) suggest that well written objectives have four parts. They call these parts the ABCD's of instructional objectives.

A. Audience

The **audience** is the group of learners that the objective is written for. Objectives are not written for the teacher.

This is often written "the learner" or "the student"; however, it could be written as specific as "The third year mechanical engineering student".

B. Behavior

The **behavior** is the verb or observable action/behavior that describes what the learner (audience) will be able to demonstrate, perform, or exhibit after the instruction.

This is the heart of the objective and MUST be

- measurable
- observable (visible or audible)
- specific

Examples:

- Be able to write C programming

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- Be able to perform the experiment to find the efficiency of a machine.
- Be able to draw the block diagram of a computer system
- Be able to participate in group discussion.

In each of these examples you can observe behavior. If a statement does not include an observable, visible, or auditory behavior or performance, then it isn't yet an objective. Therefore, you should modify your objectives until it answers the question, "What will the learner be DOING when demonstrating achievement of the objective?"

Here are a couple of poor examples:

- Be able to understand mathematics.
- Develop an appreciation of music.

If you apply the question above, what would somebody be doing if they were "understanding" mathematics or "appreciating" music? There's really no way to observe "understanding" or "appreciating" since both of those statements describe abstract states that are not directly observable.

C. Conditions

Conditions are the circumstances (under commands, materials, directions, etc.) which the objective must be completed. All behavior relevant to intended student learning outcomes can best be understood within a context of the conditions under which the behavior is to be performed or demonstrated. The location of the condition component in an objective may be at the beginning of the sentence or after the behavior component.

- What will the learners be expected to use when performing (e.g., equipment, tools, forms, calculator, charts, etc.)?
- What will the learner be allowed to use (or not use) while performing (e.g., checklists, notes, textbook, or other study aids)?
- What will be the real-world conditions under which the performance will be expected to occur (e.g., on top of a flagpole, under water, in front of a large audience, in a manufacturing plant)?

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Examples:

- Given a case study, diagram, clinical problem....
- After completing the reading....

Order and Tense

There is a preferred order when writing objectives. The condition is usually placed first, followed by the behaviour or verb and then the criteria. Objectives are written in the future tense

Rules for Writing Objectives

- Rule 1 :** State the objectives in terms of the learner i.e. what the learner does after instruction and not in terms of what the teacher does.
- Rule 2 :** Instructional objectives should not be stated in terms of either the process of instruction or process of learning, but in terms of observable behaviour described by an action verb.
- Rule 3 :** An objective should consist of only one learning outcome, not many.
- Rule 4 :** Begin every objective with an action verb which precisely indicates the learning outcome in definite terms.
- Rule 5 :** Objective should not be mentioned as a mere topic / sub topic / subject matter.
- Rule 6 :** Objective should specify the standards of minimum acceptable performance.

4.5 INSTRUCTIONAL OBJECTIVES and REVISED BLOOM'S TAXONOMY

A statement of a learning objective contains a verb (an action) and an object (usually a noun).

- The verb generally refers to actions associated with, ie, the intended cognitive process
- The object generally describes the knowledge students are expected to acquire or construct.

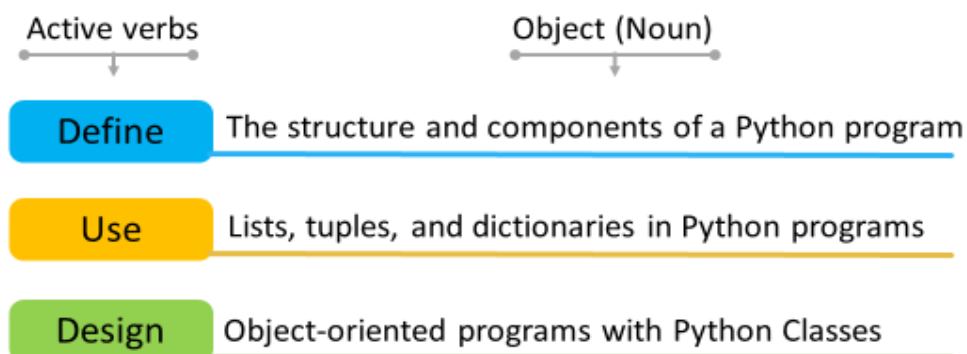


Figure 4: IO = Action Verb + Object (Noun)

The cognitive process dimensions represent a continuum of increasing cognitive complexity from remember to create. Anderson & Krathwohl identified 19 specific cognitive process that further clarify the bounds of six categories

The knowledge dimension represents a range from concrete (factual) to abstract (metacognitive) i.e. factual , conceptual, procedural and metacognitive. Representations of the knowledge dimension as a number of discrete steps can be it misleading.

For example, all procedural knowledge may not be more abstract than all conceptual knowledge. And metacognitive is a special case as. in this model, metacognitive knowledge Is knowledge of one's own cognitive and about oneself in relation to various subject matters.

Factual – the basic elements a student must know to be acquainted with a discipline or solve problem in it .

Conceptual -The inter relationship among the basic elements within a larger structure that enable them to function together.

Procedural -How to do something, methods of inquiry and criteria for using skills, algorithm techniques and methods.

Metacognitive -Knowledge of cognitive in general as well as awareness and knowledge of one's own cognition.

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Example: The student will learn **to apply the reduce-reuse-recycle approach to conservation**

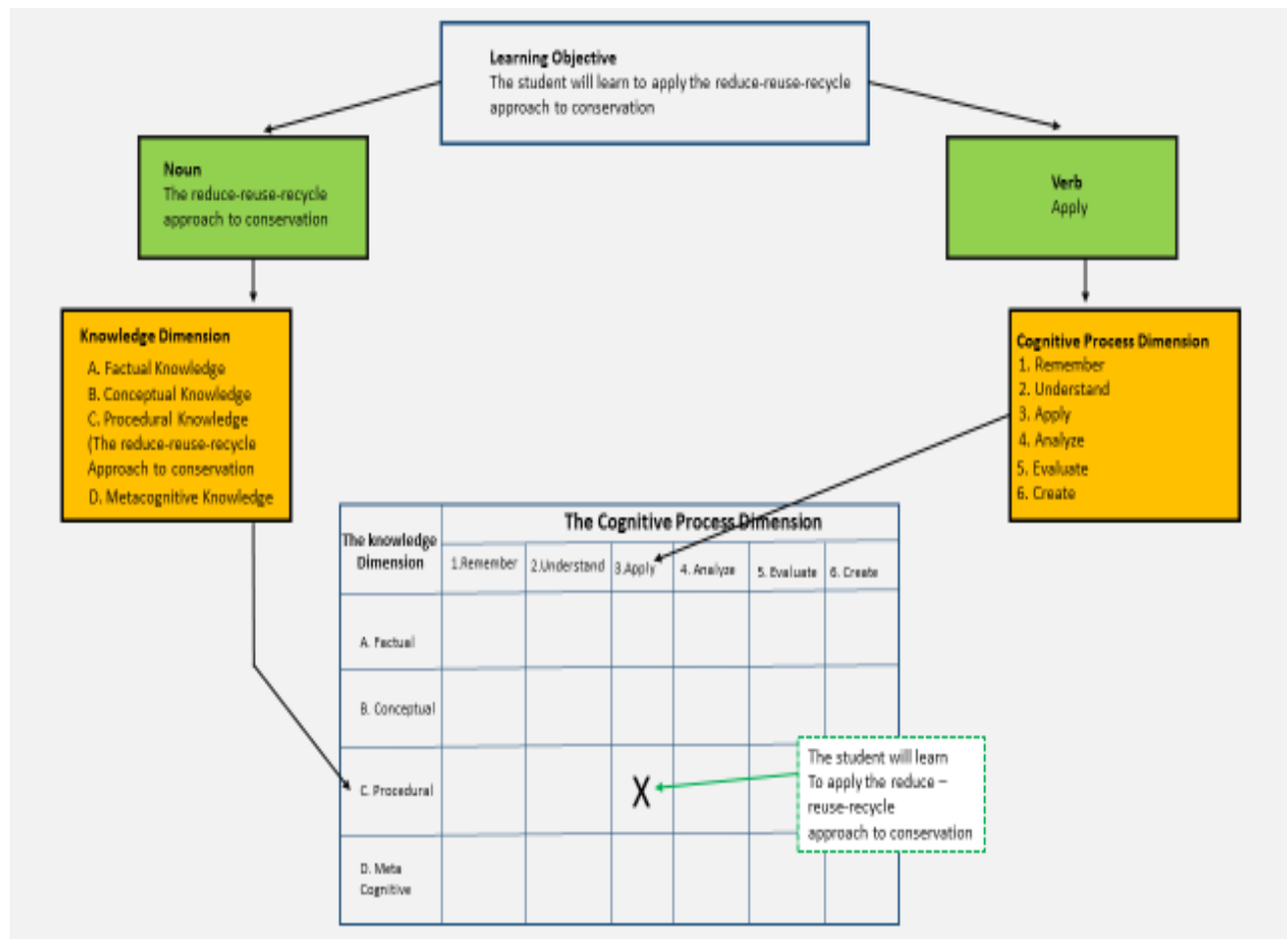


Figure 5: Instructional objective mapping using Revised Bloom's Taxonomy

Let us take few more examples:

- 1) **Summarize** the features of a new product
Cognitive Process Dimension: Understand
Knowledge Dimension: Factual
- 2) **Recognize** symptoms of exhaustion
Cognitive Process Dimension: Remember
Knowledge Dimension: Conceptual
- 3) **Carry out** pH tests of water samples
Cognitive Process Dimension: Apply
Knowledge Dimension: Procedural
- 4) **Use** techniques that match one's strengths
Cognitive Process Dimension: Apply

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Knowledge Dimension: Metacognitive

5) **Select** the most complete list of activities

6) Cognitive Process Dimension: Evaluate

Knowledge Dimension: Factual

7) **Design** efficient project workflow

Cognitive Process Dimension: Create

Knowledge Dimension: Procedural

The objectives reflect different levels of learning. They are:

1. Mastery objectives

2. Developmental objectives

Mastery objectives are typically concerned with the minimum performance essentials --- learning tasks/ skills that must be mastered before moving on to next level of instruction.

Next is developmental objectives. It is concerned with more complex learning outcomes- those learning tasks on which students can be expected to demonstrate varying degrees of progress.

Rules for Writing Objectives

Rule 1 : State the objectives in terms of the learner i.e. what the learner does after instruction and not in terms of what the teacher does.

Rule 2 : Instructional objectives should not be stated in terms of either the process of instruction or process of learning, but in terms of observable behaviour described by an action verb.

Rule 3 : An objective should consist of only one learning outcome, not many.

Rule 4 : Begin every objective with an action verb which precisely indicates the learning outcome in definite terms.

Rule 5 : Objective should not be mentioned as a mere topic / sub topic / subject matter.

Rule 6 : Objective should specify the standards of minimum acceptable performance.

Imprecisely stated objectives related to classroom instruction can be vague and open to many interpretations. Badly written objectives are of little use to the instructor concerned. Objectives prefaced with ambiguous statements such as, at the end of the session, “the

participant will have a sound knowledge of ...” should be avoided because the words “sound knowledge of” could be interpreted in many ways.

- Action verbs for Cognitive Domain, Affective Domain and Psychomotor Domain are given in Appendix-I

4.6 LEARNING OUTCOMES

In Revised Bloom’s Taxonomy, the Remember, Understand and Apply are considered as lower level abilities or cognitive skills. Higher-order thinking skills are reflected by the top three levels in Bloom’s Taxonomy: *Analyze, Evaluate, and Create*.

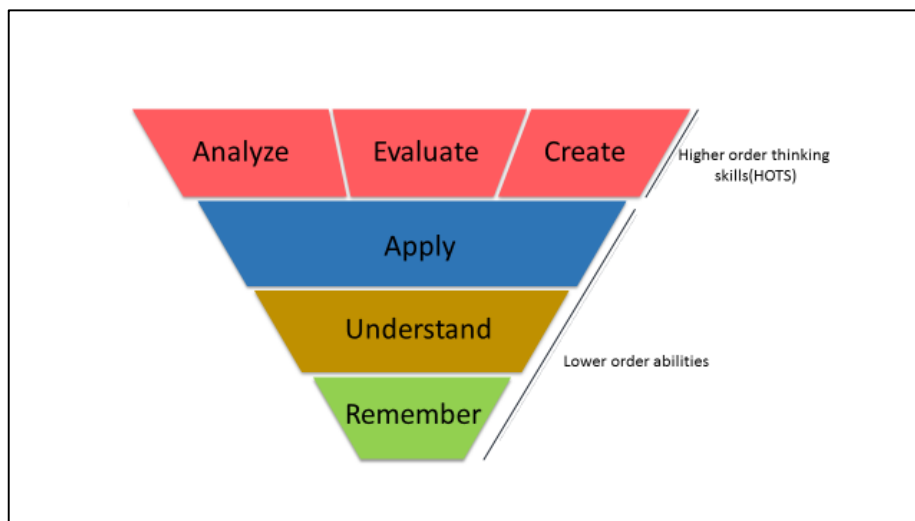


Figure 6: Higher Order Thinking Skills

How do you incorporate High order thinking skills into your syllabus?

The most obvious space to embed critical thinking in a **Syllabus** is in the **Student-Learning Outcomes** section. Learning objectives contain an action (verb) and an object (noun), and often start with, “Student’s will be able to...” Bloom’s taxonomy can help you to choose appropriate verbs to clearly state what you want the students to do at the end of the course, and at what level.

Higher-order thinking, known as **higher order thinking skills (HOTS)**, is a concept of [education reform](#) based on learning [taxonomies](#) (such as [Bloom's taxonomy](#)). The idea is

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that some types of learning require more cognitive processing than others. In Bloom's taxonomy, for example, skills involving analysis, evaluation and synthesis (creation of new knowledge) are thought to be of a higher order than the learning of facts and concepts which requires different learning and teaching methods.

Higher-order thinking involves the learning of complex judgmental skills such as **critical thinking** and problem solving. Higher-order thinking is more difficult to learn or teach but also more valuable because such skills are more likely to be usable in novel situations.

Course outcomes are broad statements of what is achieved and assessed at the end of a course of study. The concept of learning outcomes and outcome-based education is high on today's education agenda. The idea has features in common with the move to instructional objectives which became fashionable in the 1960s, but which never had the impact on education practice that it merited. The distinction between learning outcomes and learning objectives is not universally recognized, and many instructors may find that the term 'learning outcomes' describes what they have already understood by the term 'learning objectives'. Some scholars make no distinction between the two terms; those who do usually suggest that learning outcomes are a subset or type of learning objective. Learning objectives, for example, may outline the material the instructor intends to cover or the disciplinary questions the class will address. By contrast, learning outcomes should focus on what the student should know and realistically be able to do by the end of an assignment, activity, class, or course. The same goals addressed by learning objectives can be equally addressed by learning outcomes, but by focusing on the application and integration of the course content from the perspective of the student, learning outcomes can more explicitly and directly address expectations for student learning.

Many instructors may find that the reflective process of developing learning outcomes is something that they have already incorporated into their course planning processes. The phrase 'learning outcomes' thus simply offers a more precise term for discussing the creation of learning aims and expectations that centre on application and integration of course content.

4.6.1 Why Learning Outcomes?

An outcomes-based approach presents a range of advantages for those who teach and design courses in higher education. For example, they bring clarity, precision and transparency to curriculum design,

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teaching practice and assessment. The shift to learning outcomes opens course design to better curriculum alignment and accountability in teaching and learning. Well-designed learning outcomes bring clarity of expectations for student performance, and open up new possibilities for increased student satisfaction. Learning outcomes and taxonomies of learning are now central for teaching and learning in higher education. They provide possibilities to achieve what is commonly called ‘curriculum alignment’. Curriculum alignment involves organizing curriculum in a coherent structure with aims, learning outcomes, teaching strategies, content and assessment all aligning in order to improve both the coherence of curriculum and student learning.

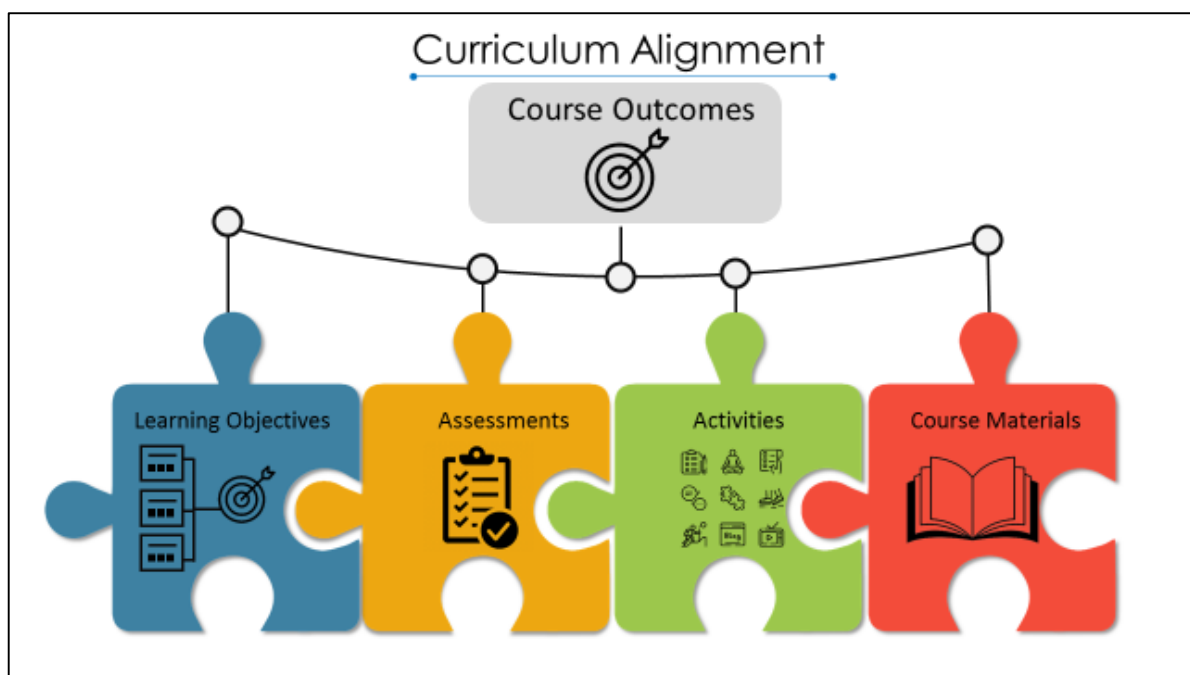


Figure 7: Curriculum Alignment

4.6.2 Importance of Learning Outcomes

Learning outcomes are statements of desired results of learning that are expressed in words that make it clear how measurement can be achieved. Therefore, learning outcomes provide a basis for measuring and reporting on student achievement. It can be stated as ‘personal changes or benefits that follow as a result of learning’, and these changes or benefits can be measured in terms of abilities or achievements.

Learning outcomes can be precisely defined as statements of what a learner is expected to know, understand, and/or be able to demonstrate after completion of a process of learning.

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The learning outcomes are constructed as a taxonomy of what graduates are expected to know, understand and be able to do as a result of learning. They are expressed in terms of the dimensions of knowledge, skills and the application of knowledge and skills.

The focus in recent years on learning outcomes represents a shift from the traditional 'teacher centred' approach, where the common practice was to design courses starting from the content or what the teacher was to deliver in a certain amount of time, to a 'student-centred approach'. In the student centred approach the focus is shifted towards what students are expected 'to know, understand, and/or be able to demonstrate after completion of a process of learning'.

Learning outcomes have the potential to improve course design and quality in higher education. The writing and use of learning outcomes shifts the focus to effective learning and teaching and can lead to greater transparency for students and all stakeholders involved in higher education. Learning outcomes can serve as a general organising principle for practice in learning and teaching and encourages a shift to student-centred pedagogies. They open possibilities for diverse assessment practices that are able to connect curricula to new contexts created by the fast pace of change in technology and workforce demands.

The advantages of learning outcomes for a clear and transparent curriculum design and assessment and prescriptive nature of learning outcomes have been disputed by some scholars. It is important to take into consideration the risks and critical points when we design and write learning outcomes. Teaching and learning should stay flexible and consistent with a pedagogic ethos that encourages scholarship, creativity and the unrestricted pursuit of ideas. No one approach has the ability to solve the complexity that is good curriculum, teaching and learning. Nevertheless, the shift towards learning outcomes aims to improve learning and in this sense, students, academics, course designers and policy makers can use learning outcomes as a starting framework for teaching, learning and assessment.

4.6.2 How to write Learning outcomes

A learning outcome is a statement that indicates what students should represent, demonstrate or produce as a result of what they learn. It describes an intended result of instruction, rather than the process of instruction itself (Mager, p.5)

Figure 8: Different Outcomes

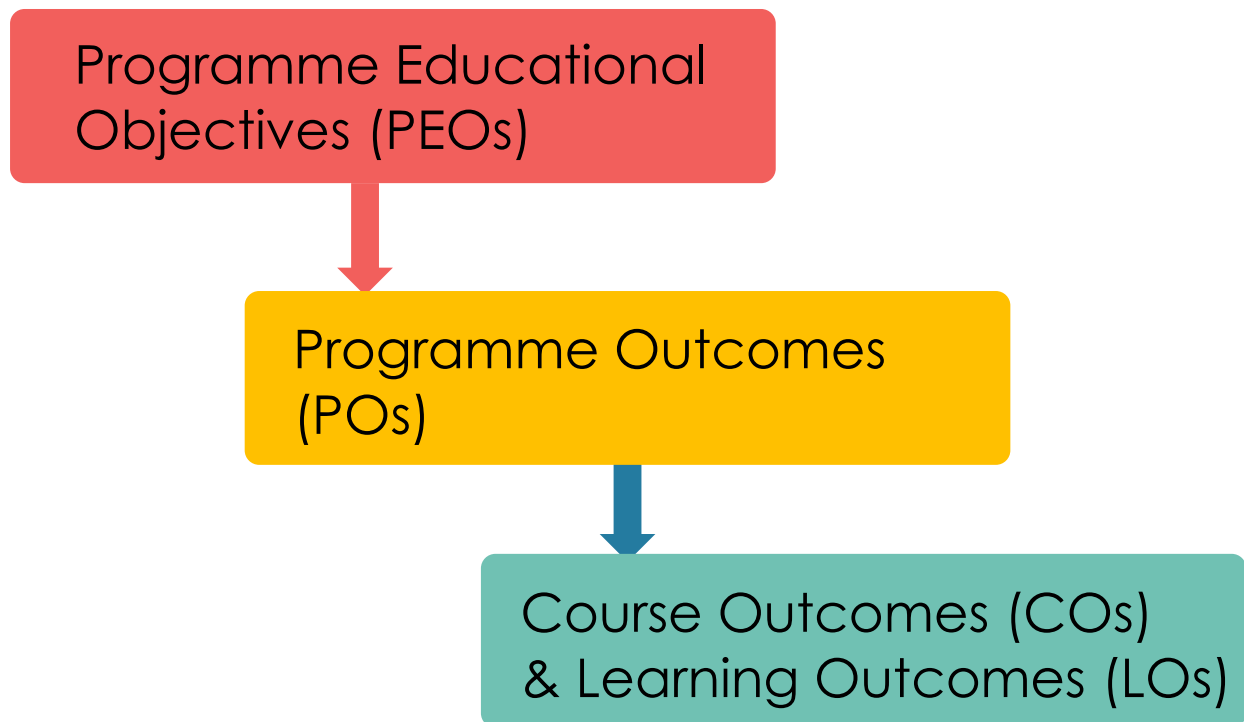


Figure 8: Different Outcomes

Course Learning Outcomes (CLOs) are central to your course's curriculum. They articulate to students, faculty, and other stakeholders what students will achieve in each course and how their learning will be measured. A Learning Outcome (LO) is a measurable, observable, and specific statement that clearly indicates what a student should know and be able to do as a result of learning.

Well-written learning outcomes involve the following parts:

- Action verb
- Subject content
- Level of achievement
- Condition of performance (if applicable)

A learning Outcome (LO) is a measurable observable and specific statement that clearly indicates what a student should know and be able to do as a result of learning.

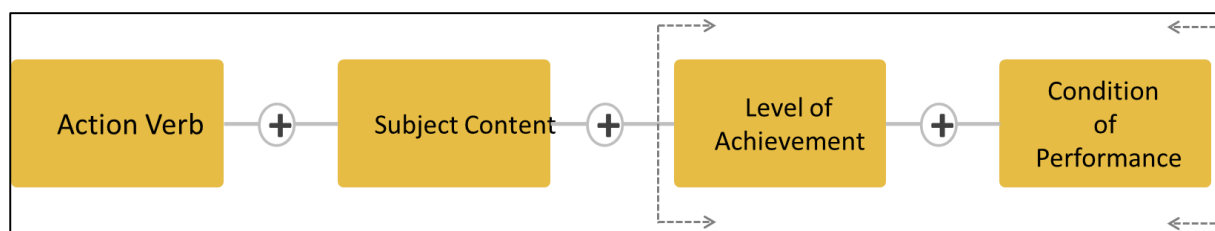


Figure 9: Format for Learning Outcomes

Steps to Writing Course Learning Outcomes for Your Course

Step 1

Select an action verb using Bloom’s Taxonomy; Make sure that you select a verb that you can observe and measure. There are many verbs that, can’t be directly observed and therefore are difficult to assess in the classroom. **Do not** use the following verbs:

- Understand
- Know
- Comprehend
- Appreciate
- Be familiar with
- Study
- Be aware
- Become acquainted with
- Gain knowledge of
- Cover
- Learn
- Realize

Step 2

Next, select the subject content students are performing that task for. For example,

- To define the structure and components of a Python program
- to use lists, tuples, and dictionaries in Python programs
- to write loops and decision statements in Python.
- To write Python functions to facilitate code reuse,
- to use exception handling in Python applications for error handling.
- to design object-oriented programs with Python classes.

Step 3: Levels of Achievement

Next, decide if your LO requires either a level of achievement or a condition of performance. A level of achievement identifies how proficient students need to be in a task. For example, in an English Language course, you might say “Write a literature critique with no grammatical

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errors”. This tells students the level of achievement that’s expected of them. Importantly, you don’t need a level of achievement for every LO. It is not necessary to say “effectively”, “accurately”, or “correctly” on a LO, these are all implied. We expect students to achieve all outcomes in all courses correctly and accurately. Levels of achievement are for specific cases.

Step 4: Conditions of Performance

A condition of performance identifies if students are only performing the outcome in a specific context. For example, in a Welding course with a field placement, you might say “Demonstrate oxy-fuel-gas cutting techniques with limited supervision”. This tells students that they will be performing this task, but that they will be supervised while they do so.

Let us see the difference between aims or goals, learning objectives and learning outcomes?

The structural distinction between learning objectives and learning outcomes is that learning objectives relate to learning from a teachers’ point of view and are closer to a teacher-centred approach, while learning outcomes refer to what a student will be able to do as a result of learning, hence are sources of evidence in the student-centred approach.

Aims or goals in teaching and learning are broad sentences reflecting general intentions and desired outcomes of an institution, program or course. These important statements stay clearly distinct from learning outcomes. Aims serve the important function to indicate and promote the main values and general directions that guide the process of teaching and learning. Aims reflect vision and general intentions, and the overall desirable results. Example: Curriculum and teaching practices aim to link students’ learning experiences to the world graduates will confront.

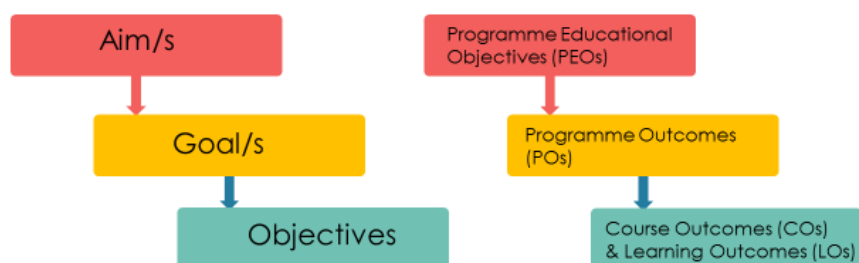


Figure 10: Objectives vs Outcomes

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- Learning outcomes are statements of what a student will be able to do or demonstrate at the completion of a certain sequence of learning (course, program). Learning outcomes are mainly concerned with the achievements of the learner and less with the intentions of the teacher. Learning outcomes inform students of what is expected of them in terms of performance, to achieve desired grades and credits. Example: At the end of the course students will be able
 - To demonstrate the ability to use mathematical and statistical techniques.
 - To design Entity Relationship Model for a database system.

Learning Objectives tend to describe specific discrete units of knowledge and skill can be accomplished within a short time frame

SUMMARY

- The objectives are important to the teacher because they make goals more realistic. Having specific instructional objectives allows you to look at the overall lesson in a more analytical way and break it down into parts.
- Instructional objectives state what specifically is to be learned. They state the expected learning outcome. They may be phrased similar to this, “Upon completion of the lesson, the student will be able to...”
- Clearly articulated learning objectives can provide a roadmap for the instructor and the student so that both share the same perspective of where their instructional journey is taking them.
- Instructional objectives serve as central unifying elements for instructional strategy, instructional media, and assessment.
- **Learning Outcomes** are statements that describe or list measurable and essential mastered content-knowledge—reflecting skills, competencies, and knowledge that students have achieved and can demonstrate upon successfully completing a course.

REFERENCES

1. Anderson, L. W. and Krathwohl, D. R., et al (Eds..) (2001) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Allyn & Bacon. Boston, MA (Pearson Education Group)
2. Eugene E. Haddan, (1970) *Evolving Instruction*, London: The Macmillan Co.
3. Gagne R.M (1970) *The Condition of Learning*, (Revised Edition). New York: Holt, Rinehart and Winston Inc.
4. Robert M. Gagne & Leslie L. Briggs (1974) *Principles of Instructional Design*, New York: Holt, Rinehart and Winston Inc.
5. Walkin. L (1982), *Instructional Techniques and Practice*, (ELBS Edition). Avon, Great Britain: Stanley Thornes (Publishers) Ltd.
6. Learning outcomes resources from DePaul's Office for Teaching, Learning and Assessment.

Elaboration of the six levels of thinking in Bloom's taxonomy						
1 Remembering <i>Can the student RECALL information?</i>	2 Understanding <i>Can the student EXPLAIN ideas or concepts?</i>		3 Applying <i>Can the student USE the new knowledge in another familiar situation?</i>	4 Analysing <i>Can the student DIFFERENTIATE between and RELATE constituent parts?</i>	5 Evaluating <i>Can the student JUSTIFY an opinion, decision or course of action?</i>	6 Creating <i>Can the student GENERATE new products, ideas or ways of viewing things?</i>
<p>Recognising Locating knowledge in memory that is consistent with presented material. <u>Synonyms</u></p> <ul style="list-style-type: none">IdentifyingFindingSelectingIndicating <p>Recalling Retrieving relevant knowledge from long-term memory. <u>Synonyms</u></p> <ul style="list-style-type: none">RetrievingNamingReproducingRecounting	<p>Interpreting Changing from one form of representation to another <u>Synonyms</u>:</p> <ul style="list-style-type: none">ParaphrasingTranslatingRepresentingClarifyingConvertingRewritingRestatingExpressing <p>Exemplifying Finding a specific example or illustration of a concept or principle <u>Synonyms</u></p> <ul style="list-style-type: none">InstantiatingIllustrating...RepresentingGiving examples of Showing <p>Classifying Determining that something belongs to a category (e.g., concept or principle). <u>Synonyms</u></p> <ul style="list-style-type: none">Categorising	<p>Summarising Drawing a logical conclusion from presented information. <u>Synonyms</u></p> <ul style="list-style-type: none">AbstractingGeneralisingOutliningPrécising <p>Inferring Abstracting a general theme or major point <u>Synonyms</u></p> <ul style="list-style-type: none">ExtrapolatingInterpolatingPredictingConcludingExtendingGeneralising <p>Comparing Detecting correspondences between two ideas, objects, etc <u>Synonyms</u></p> <ul style="list-style-type: none">ContrastingMatchingMapping <p>Explaining Constructing a cause-</p>	<p>Executing Applying knowledge (often procedural) to a routine task. <u>Synonyms</u></p> <ul style="list-style-type: none">Carrying outMeasuringConstructingDemonstratingComputingCalculatingManipulatingOperatingPreparingProducingDrawing upPractising <p>Implementing Applying knowledge (often procedural) to a non-routine task. <u>Synonyms</u></p> <ul style="list-style-type: none">UsingEstimatingPredictingSolvingChangingDiscoveringExplaining howVerifying	<p>Differentiating Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material. <u>Synonyms</u></p> <ul style="list-style-type: none">DiscriminatingSelectingFocusingDistinguishing betweenSeparating(Sub)dividingExaminingRelating <p>Organising Determining how elements fit or function within a structure. <u>Synonyms</u></p> <ul style="list-style-type: none">OutliningStructuringIntegrating(Re)arrangingCategorisingOrderingDeriving <p>Attributing Determining the point of view, bias, values, or intent underlying presented material. <u>Synonyms</u></p> <ul style="list-style-type: none">Deconstructing	<p>Checking Detecting inconsistencies or fallacies within a process or product. Determining whether a process or product has internal consistency. <u>Synonyms</u></p> <ul style="list-style-type: none">TestingDetectingMonitoringConcludingAssessingAppraisingDiscriminatingDetermining <p>Critiquing Detecting the appropriateness of a procedure for a given task <u>or problem</u>. <u>Synonyms</u></p> <ul style="list-style-type: none">JudgingQuestioningJustifyingDefendingDiscussingCriticisingArguingIncludingRating	<p>Generating Coming up with alternatives or hypotheses based on criteria <u>Synonyms</u></p> <ul style="list-style-type: none">HypothesizingProposingDevelopingEngenderingSynthesisingProviding options <p>Planning Devising a procedure for accomplishing some task. <u>Synonyms</u></p> <ul style="list-style-type: none">DesigningFormulatingCombiningCompilingDevisingRevisingPutting togetherSuggesting <p>Producing Inventing a product <u>Synonyms</u></p> <ul style="list-style-type: none">(Re)constructingComposingModifyingAlteringBuilding

Elaboration of the six levels of thinking in Bloom's taxonomy					
1 Remembering <i>Can the student RECALL information?</i>	2 Understanding <i>Can the student EXPLAIN ideas or concepts?</i>		3 Applying <i>Can the student USE the new knowledge in another familiar situation?</i>	4 Analysing <i>Can the student DIFFERENTIATE between and RELATE constituent parts?</i>	5 Evaluating <i>Can the student JUSTIFY an opinion, decision or course of action?</i>
	<ul style="list-style-type: none"> • Subsuming • Organising 	and-effect model of a system. <u>Synonyms</u> <ul style="list-style-type: none"> • Elucidating • Constructing models 	<ul style="list-style-type: none"> • Finding 	<ul style="list-style-type: none"> • Comparing • Contrasting • Diagnosing 	<ul style="list-style-type: none"> • Ranking • Valuing
					6 Creating <i>Can the student GENERATE new products, ideas or ways of viewing things?</i> <ul style="list-style-type: none"> • Enlarging

Revised Taxonomy of Educational Objectives*

Cognitive Process Dimension							
Knowledge Dimension	This revised Bloom's Taxonomy will assist you as you work to improve instruction to ensure that	1. Remember: retrieving relevant knowledge from long term memory 1. Recognizing 2. Recalling	2. Understand: determining the meaning of instructional messages 1. Interpreting 2. Exemplifying 3. Classifying 4. Summarizing 5. Inferring 6. Comparing 7. Explaining	3. Apply: carrying out or using a procedure in a given situation 1. Executing 2. Implementing	4. Analyze: Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose 1. Differentiating 2. Organizing 3. Attributing	5. Evaluate: making judgments based on criteria and standards 1. Checking 2. Critiquing	6. Create: putting elements together to form a novel, coherent whole or make an original product 1. Generating 2. Planning 3. Producing
	A. Factual Knowledge: basic elements that students must know to be acquainted with a discipline or solve a problem in it a. Knowledge of terminology b. Knowledge of specific details and elements						
	B. Conceptual knowledge: the inter-relationships among the basic elements within a larger structure that enable them to function together a. Knowledge of classification b. Knowledge of principles and generalizations c. Knowledge of theories, models and structures						
	C. Procedural knowledge: how to do something: methods of inquiry, and criteria for using skills, algorithms, techniques and methods a. Knowledge of subject specific skills and algorithms b. Knowledge of techniques and methods c. Knowledge of criteria for determining when to use appropriate procedures						
	D. Metacognitive knowledge: knowledge of cognition in general as well as awareness of one's own cognition a. Strategic knowledge b. Cognitive tasks, including appropriate contextual and conditional knowledge c. Self-knowledge						

* Adapted from Lorin W. Anderson, David R. Krathwohl et al (Eds.) *A Taxonomy For Learning, Teaching, and Assessing: A Revision of Bloom's Educational Objectives* © 2001; published by Allyn and Bacon, Boston, MA © 2001 by Pearson Education; reprinted by permission of the publisher.

Psychomotor Domain – Simpson's Model

Psychomotor Domain (Simpson)				
Level	category or 'level'	Description	Examples of activity or demonstration and evidence to be measured	Action verbs which describe the activity to be trained or measured at each level)
1	Perception	Awareness, the ability to use sensory cues to guide physical activity. The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation.	<p>use and/or selection of senses to absorb data for guiding movement 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.</p> <p>"By the end of the music theatre program, students will be able to relate types of music to particular dance steps."</p>	chooses, describes, detects, differentiates, distinguishes, feels, hears, identifies, isolates, notices, recognizes, relates, selects, separates, touches,
2	Set	Readiness, a learner's readiness to act. 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).	<p>mental, physical or emotional preparation before experience or task</p> <p>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.</p> <p>"By the end of the physical education program, students will be able to demonstrate the proper stance for batting a ball."</p>	arranges, begins, displays, explains, gets set, moves, prepares, proceeds, reacts, shows, states, volunteers, responds, starts,

Psychomotor Domain (Simpson)				
Level	category or 'level'	Description	Examples of activity or demonstration and evidence to be measured	Action verbs which describe the activity to be trained or measured at each level)
3	Guided Response	Attempt. The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	imitate or follow instruction, trial and error. Examples: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds hand-signals of instructor while learning to operate a forklift. "By the end of the physical education program, students will be able to perform a golf swing as demonstrated by the instructor."	assembles, builds, calibrates, constructs, copies, dismantles, displays, dissects, fastens, fixes, follows, grinds, heats, imitates, manipulates, measures, mends, mixes, reacts, reproduces, responds sketches, traces, tries.
4	Mechanism	basic proficiency, the ability to perform a complex motor skill. 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.	Competently respond to stimulus for action Examples: Use a personal computer. Repair a leaking faucet. Drive a car. "By the end of the biology program, students will be able to assemble laboratory equipment appropriate for experiments."	assembles, builds, calibrates, completes, constructs, dismantles, displays, fastens, fixes, grinds, heats, makes, manipulates, measures, mends, mixes, organizes, performs, shapes, sketches.
5	Complex Overt Response	expert proficiency, the intermediate stage of learning a complex skill. 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. For example, players are often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football,	Execute a complex process with expertise Examples: Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano. "By the end of the industrial education program, students will be able to demonstrate proper use of woodworking tools to high school students."	assembles, builds, calibrates, constructs, coordinates, demonstrates, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches. NOTE: The key words are the same as Mechanism, but will have adverbs or adjectives that indicate that the performance is quicker, better, more accurate,

Psychomotor Domain (Simpson)				
Level	category or 'level'	Description	Examples of activity or demonstration and evidence to be measured	Action verbs which describe the activity to be trained or measured at each level)
		because they can tell by the feel of the act what the result will produce.		etc.
6	Adaptation	adaptable proficiency, a learner's ability to modify motor skills to fit a new situation. Skills are well developed and the individual can modify movement patterns to fit special requirements.	<p>alter response to reliably meet varying challenges</p> <p>Examples: Responds effectively to unexpected experiences. Modifies instruction to meet the needs of the learners. Perform a task with a machine that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task).</p> <p>“By the end of the industrial education program, students will be able to adapt their lessons on woodworking skills for disabled students.”</p>	adapts, adjusts, alters, changes, integrates, rearranges, reorganizes, revises, solves, varies.
7	Origination	creative proficiency, a learner's ability to create new movement patterns. Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.	<p>develop and execute new integrated responses and activities</p> <p>Examples: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine.</p>	arranges, builds, combines, composes, constructs, creates, designs, formulates, initiate, makes, modifies, originates, re-designs, trouble-shoots.

Adapted and simplified representation of Simpson's Psychomotor Domain ('The classification of educational objectives in the psychomotor domain', 1972). Elizabeth Simpson seems actually to have first presented her Psychomotor Domain interpretation in 1966 in the Illinois Journal of Home Economics. Hence you may see the theory attributed to either 1966 or 1972.

The Affective Domain

<http://www.humboldt.edu/~tha1/bloomtax.html> &
<http://academic.udayton.edu/health/syllabi/health/lesson01b.htm>

The Affective Domain addresses interests, attitudes, opinions, appreciations, values, and emotional sets. This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The Taxonomy is hierarchical (levels increase in difficulty/sophistication) and cumulative (each level builds on and subsumes the ones below). The levels, in addition to clarifying instructional objectives, may be used to provide a basis for questioning that ensures that students progress to the highest level of understanding. If the teaching purpose is to change attitudes/behavior rather than to transmit/process information, then the instruction should be structured to progress through the levels of the Affective Domain.

Level	Category	Description	Examples	Action Verbs
1	Receiving	The student passively attends to particular phenomena or stimuli [classroom activities, textbook, music, etc.] The teacher's concern is that the student's attention is focused. Intended outcomes include the pupil's awareness that a thing exists. Emphasis is on awareness, willingness to hear, selected attention.	Listens attentively, shows sensitivity to social problems. Listens to others with respect. Listens for and remembers the name of newly "By the end of the women's studies program, students will listen attentively to alternative views on select issues."	Attends, accepts, asks, chooses, describes, follows, gives, holds, identifies, listens, locates, names, points to, selects, selectively attends to, replies, uses.
2	Responding	The student actively participates. The pupil not only attends to the stimulus but reacts in some way. Emphasis is on active participation on the part of the learners. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).	Completes homework, obeys rules, participates in class discussion, shows interest in subject, enjoys helping others. Gives a presentation. Questions new ideals, concepts, models, in order to fully understand them. Knows safety rules and practices them. "By the end of the elementary education program, students will be able to comply with PL 94-142."	Acclaims, aids, answers, applauds, approves, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes, Volunteers.
3	Valuing	The worth a student attaches to a particular object, phenomenon, or behavior. Ranges from acceptance to commitment (e.g., assumes responsibility for the functioning of a group). Attitudes and appreciation.	Demonstrates belief in democratic processes, appreciates the role of science in daily life, shows concern for others' welfare, demonstrates a problem-solving approach. Is sensitive towards individual and cultural differences (value diversity). Shows	Assists, completes, debates, demonstrates, denies, differentiates, explains, follows, forms, increases proficiency in, initiates, invites, joins,

		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.	the ability to solve problems. Proposes a plan to bring about social improvement and follows through with commitment. Informs management on strongly felt matters. "By the end of the political science program, students will be able to debate numerous sides to an argument."	justifies, proposes, protests, reads, relinquishes, reports, selects, shares, studies, supports, works.
4	Organization	Brings together different values, resolving conflicts among them, and starting to build an internally consistent value system-- comparing, relating and synthesizing values and developing a philosophy of life. Organizes values into priorities by contrasting different systems. The emphasis is on comparing, relating, and synthesizing values.	Recognizes the need for balance between freedom and responsible behavior, understands the role of systematic planning in solving problems; accepts responsibility for own 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. "By the end of the environmental studies program, students will be able to organize the conservation efforts of urban, suburban and rural communities."	Accommodates, adheres, alters, arranges, balances, combines, compares, completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes.
5	Internalizing values: Characterization by a Value or Value Complex	At this level, the person has held a value system for a sufficiently long time to control his/her behavior, has developed a characteristic "life style." Behavior is	Concerned with personal, social, and emotional adjustment: displays self reliance in working independently, cooperates in group activities (displays teamwork), maintains	Acts, discriminates, displays, influences, interprets, listens,

		<p>pervasive, consistent, predictable, and most importantly, characteristic of the learner.</p> <p>Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, emotional).</p>	<p>good health habits. 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 appear. "By the end of the counseling program, students will be able to objectively interpret evidence presented by clients during a therapy session."</p>	<p>maintains objectivity modifies, performs, practices, proposes, qualifies, questions, respects, revises, serves, solves, uses evidence, verifies.</p>
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