

Learning Outcomes

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Student Learning Outcome

- Student Learning Outcomes should be S.M.A.R.T
 - Specific-Outcome is focused on a specific category of student learning. If it is too broad it will be difficult to measure.
 - Measureable- Data can be collected to measure student learning.
 - Attainable- The outcome is attainable given the educational experience.

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What is a Student Learning Outcome?

- Learning outcomes are the knowledge, skills, attitudes, and habits of mind that students take with them from a learning experience. (Suskie, 2009).
- A statement that defines what a student should know or be able when he/she leaves a given course, degree program, etc.

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Student Learning Outcome

- Results-Focused- The program outcome is aligned with Course-Level Student Learning Outcomes.
- Tailored- Outcome is specifically tailored to the program.

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Student Learning Outcome

- Focus on the most important "take-aways" of the course/program/learning experience.
- Think of this as "backwards design" or "reverse engineering"
- Plan all assignments, assessment measures (AKA "assessments"), and facilitating technologies to help students reach the learning outcomes

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Parts of a Student Learning Outcome

- Introductory phrase
- Action verb (driven by Blooms taxonomy)
- Explicitly stated and observable skills and/or knowledge

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Parts of a Student Learning Outcome

- Examples:
 - Students will understand the learning patterns of middle-school students.
 - Students will be able to explain the scientific method.
 - Students will be able to analyze intended and unintended effects of policies in higher education.

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Bloom's Taxonomy

- It's important to note that the different levels of thinking defined within each domain of the Taxonomy are hierarchical.
- In other words, each level subsumes the levels that come before it.
- So, if we look at the cognitive domain for example (which is represented in Figure below)

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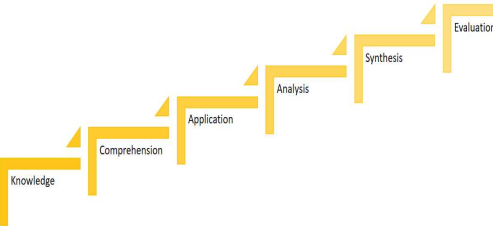
Bloom's Taxonomy

- Educators often use Bloom's Taxonomy to create learning outcomes that target not only subject matter but also the depth of learning they want students to achieve, and
- to then create assessments that accurately report on students' progress towards these outcomes

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Bloom's Taxonomy



The hierarchy of the cognitive domain of Bloom's Taxonomy

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Bloom's Taxonomy

- Bloom's Taxonomy comprises three learning domains:
 - the cognitive, affective, and psychomotor, and
 - assigns to each of these domains a hierarchy that corresponds to different levels of learning.

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Bloom's Taxonomy

- We can infer that before a student can conduct an analysis, they first might need to
 - know the methods of analysis,
 - understand the different elements to review, and
 - consider which method to apply.
- It is only then that they will be ready to conduct the analysis itself.

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Bloom's Taxonomy revised

- The new revised version introduced a key change to the cognitive domain of Bloom's Taxonomy:
 - it shifted the language used from nouns to verbs (see Figure below) and thereby focused the attention away from acquisition and toward active performance of the types of learning involved in each stage of the hierarchy.
 - "Synthesis" was also dropped and "create" was moved to the highest level of the domain.

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Cognitive domain

- The cognitive domain is focused on intellectual skills such as critical thinking, problem solving, and creating a knowledge base.
- The cognitive hierarchy extends from simple memorization designed to build the knowledge of learners, to creating something new based on previously-learned information.

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Bloom's Taxonomy revised

Anderson and Krathwol's (2001) revision to Bloom's cognitive hierarchy.

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Cognitive domain

- In this domain, learners are expected to progress in a linear manner, beginning at "remember" and ending at "create."
- When writing learning outcomes, you can choose verbs that best describe what is expected (e.g., for remember, you might consider define, identify, list, recall, recognize, match, etc.).

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Bloom's Taxonomy in practice

- To provide a deeper look at how Bloom's Taxonomy works in practice, we break down each domain — the cognitive, affective, and psychomotor — examples of learning outcomes and assessments mapped to each level of the domain hierarchies.

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REVISED Bloom's Taxonomy Action Verbs						
Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences, and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	<ul style="list-style-type: none"> Choose Define Find How Label List Match Name Omit Recall Relate Select Show Spell Tell What When Where Which Who Why 	<ul style="list-style-type: none"> Classify Compare Contrast Demonstrate Explain Explain Illustrate Infer Interpret Outline Relate Rephrase Show Summarize Translate 	<ul style="list-style-type: none"> Apply Build Choose Construct Develop Identify Interview Make use of Model Organize Plan Select Solve Utilize 	<ul style="list-style-type: none"> Analyze Assume Categorize Classify Compare Conclude Criteria Dissect Distinguish Divide Examine Function Inference Inspect List Motiv Relationships Simplify Survey Take part in Test for Theme 	<ul style="list-style-type: none"> Agree Appraise Assess Award Choose Compare Conclude Criteria Criticize Decide Deduct Defend Determine Disprove Estimate Evaluate Explain Importance Influence Interpret Judge Justify Mark Measure Opinion Perceive Prioritize Prove 	<ul style="list-style-type: none"> Adapt Build Change Choose Combine Compose Conclude Construct Create Delete Design Develop Discuss Elaborate Estimate Formulate Happen Improve Invent Make up Maximize Minimize Modify Original Originate Plan Predict

Cognitive hierarchy

- **Remember**
 - **Sample learning outcome:** Remember the database development lifecycle.
 - **Sample assessment/activity:** definition of database concepts designed to test the memory of learners.



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Cognitive hierarchy

- **Sample assessment/activity:** Write an analytical paper comparing the advantages and disadvantages of using the different types of conceptual database design methods.
- **Evaluate**
 - **Sample learning outcome:** Evaluate the results of using the different types of conceptual design methods.



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Cognitive hierarchy

- **Understand**
 - **Sample learning outcome:** Understand and explain the different database models.
 - **Sample assessment/activity:** Write a short (1 page) paper summarizing the differences between the three common types of database models



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Cognitive hierarchy

- **Sample assessment/activity:** Write a response as to why you would one design method to the other.
- **Create**
 - **Sample learning outcome:** Create a conceptual database model.
 - **Sample assessment/activity:** Create an ER diagram from the conceptual design..



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Cognitive hierarchy

- **Apply**
 - **Sample learning outcome:** Apply the design principals to come up with a conceptual design.
 - **Sample assessment/activity:** Given the requirements specification documents to come up with a conceptual design.
- **Analyze**
 - **Sample learning outcome:** Be able to analyze the different types of database conceptual design strategies.



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Affective domain

- The affective domain focuses on the attitudes, values, interests, and appreciation of learners.
- The hierarchy associated with it begins with receiving and listening to information, and to internalizing of values and acting upon them.
- It focuses on helping learners understand what their own values are and how they have developed.



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Affective hierarchy

- **Receiving**
 - **Sample learning outcome:** Listen to other students with respect.
 - **Sample assessment/activity:** Be an audience member to another student's presentation, and then write a summary.



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Affective hierarchy

- **Organization**
 - **Sample learning outcome:** Compare value systems and understand evidence behind values.
 - **Sample assessment/activity:** Organize and compare different cultural value systems, evaluating the differences between them and why these differences may have arisen.



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Affective hierarchy

- **Responding**
 - **Sample learning outcome:** Speak effectively in front of an audience and actively respond to others.
 - **Sample assessment/activity:** Present on a subject in front of the class, and answer questions from peers about their presentation.



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Affective hierarchy

- **Characterization**
 - **Sample learning outcome:** Work well in a team of peers.
 - **Sample assessment/activity:** A group project, including group work on any assignment.



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Affective hierarchy

- **Valuing**
 - **Sample learning outcome:** Demonstrate and explain own values regarding various topics.
 - **Sample assessment/activity:** Write an opinion piece on any issue, explaining one's own stance and reasons supporting that stance.



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Psychomotor domain

- The psychomotor domain encompasses the ability of learners to physically accomplish tasks and perform movement and skills.
- The hierarchy ranges from reflexes and basic movement to non-discursive communication and meaningfully expressive activity.




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Psychomotor Hierarchy


- **Reflex**
 - **Sample learning outcome:** Instinctively respond to a physical stimulus.
 - **Sample assessment/activity:** A game of dodgeball.
- **Basic fundamental movements**
 - **Sample learning outcome:** Perform a simple action (including running and throwing).
 - **Sample assessment/activity:** A game of dodgeball.



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Psychomotor Hierarchy


- **Non-discursive communication**
 - **Sample learning outcome:** Express oneself through purposeful movement and activity.
 - **Sample assessment/activity:** A soccer or other strategic game (football, hockey)



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Psychomotor Hierarchy

- **Perceptual abilities**
 - **Sample learning outcome:** Use more than one ability to integrate different sensory perceptions.
 - **Sample assessment/activity:** A game of catch or soccer (or other game involving movement and passing).



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Questions

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Psychomotor Hierarchy

- **Physical abilities**
 - **Sample learning outcome:** Sustain an activity for a set period of time.
 - **Sample assessment/activity:** Run for 25 minutes steadily.
- **Skilled movements**
 - **Sample learning outcome:** Adapt one's behaviour and movement to better achieve goals.
 - **Sample assessment/activity:** A soccer or other strategic game (football, hockey).



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