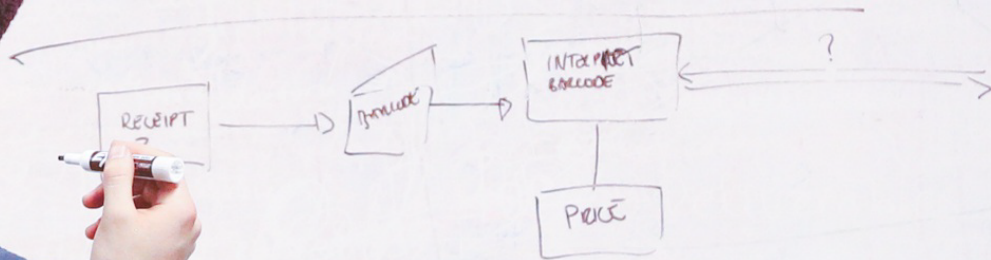
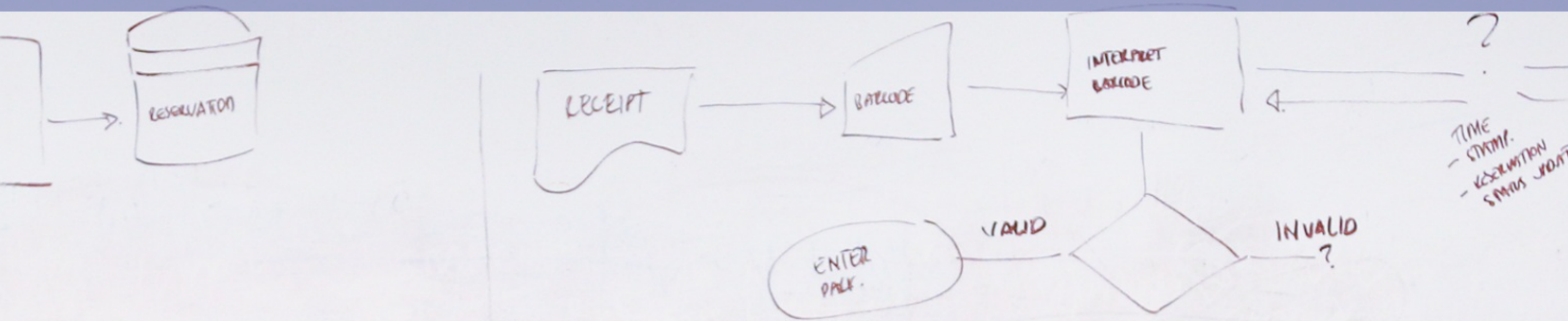


Treatment Plan



STEM100: Teaching with Technology
in the STEM Disciplines

Prepared for Dr. Wendy Howard

Prepared by group 4.0 Apply
Evaluation Strategies

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Unit Descriptors

This Instructional Treatment Plan includes course objectives derived from the subordinate skills analysis completed in the Analysis Report. The subordinate skills analysis was edited to reflect revisions to course content (Appendix C). The course plan includes one terminal objective and seven enabling objectives. Methods of assessment selected to match objectives are explained in detail below.

Course Title: STEM100: Teaching with Technology in the STEM Disciplines

Module Number and Title: Module 4.0 Apply Evaluation Strategies

Terminal Objective: 4.0 Given instruction via a Web Page on applying STEM evaluation strategies, learners will be able to discuss how they can apply STEM evaluation strategies in the Canvas online learning management system in accordance with rubric criteria.

Enabling Objective 1: 4.1 Given a statement regarding evaluation strategies, learners will be able to classify the evaluation strategy as formative or summative to a suggested 80% accuracy.

Enabling Objective 2: 4.2 Given a statement regarding formative evaluation strategies for writing prompts, learners will be able to identify the correct statements to a suggested 80% accuracy.

Enabling Objective 3: 4.2.1 Given a scenario and a list of online tools, learners will be able to identify the appropriate tool for given scenario to a suggested 80% accuracy.

Enabling Objective 4: 4.2.2 Given an example of a STEM writing prompt, learners will be able to discuss how they could create a similar prompt for their courses in accordance with rubric criteria.

Enabling Objective 5: 4.3 Given a statement regarding summative evaluation strategies for performance-based projects, learners will be able to identify the correct statements to a suggested 80% accuracy.

Enabling Objective 6: 4.3.1.1 Given a scenario and a list of online tools, learners will be able to identify the appropriate tool for given scenario to a suggested 80% accuracy.

Enabling Objective 7: 4.3.2 Given an example of a performance-based STEM project, learners will be able to discuss how they could create a similar project for their courses in accordance with rubric criteria.

Prerequisites: Learners have experience using Canvas in an online, mixed-mode, or face-to-face courses. Learners may have taken IDL6543, a non-credit professional development course that introduces learners to skills necessary to manage an online course in Canvas.

Time Requirements: Module 4 will take approximately two hours over a period of two weeks to complete.

Resources: Canvas LMS

Instructional Design Strategy & Media Selection

For unit 4.0, the design team opted to create an instructional strategy based on the 5 Component Lesson Model by Walter Dick, Lou Carey, and James O. Carey. The Dick and Carey model is a cognitivist approach that stems from Robert Gagné's 9 Events of Instruction, also known as Gagné's conditions of learning. As cited in Dick, Carey, and Carey (2014), "Gagne's cognitive view of instruction is often characterized as quite purposeful and prescriptive, more teacher-centered than student-centered" (p.175). The design team selected this instructional strategy because "it is grounded in learning theory," and "it conforms to currently prevailing views of instruction" (Dick, Carey & Carey, 2014, p.175).

Instructional Strategy

The first column in Table 1 includes the Instructional Events of Dick and Carey's 5 Component Lesson Model. These events are Preinstructional Activities, Content Presentation and Learner Guidance, Learner Participation, Assessment, and Follow-Through Activities. Content in the second column explains how Gagne's conditions of learning will be incorporated into each instructional event. Column three discusses the media and tools selected to deliver and support each instructional event.

Table 1: Instructional Strategy for Module 4.0

Instructional Events	Description	Media & Tool Selection
Preinstructional Activities	<p>According to Dick and Carey's 5 Component Lesson Model, the following should be addressed prior to starting the instructional unit: "motivating the learners, informing them of what they will learn, and stimulating recall of relevant knowledge and skills they should already know" (Dick, Carey & Carey, 2014, p. 175). The preinstructional activities for unit 4.0 can accomplish these tasks in the following ways:</p> <p>Motivation</p> <p>The designers based their understanding of learner motivation on Keller's ARCS model, which includes Attention, Relevance, Confidence, and Satisfaction (Dick, Carey & Carey, 2014). In order to motivate learners, instruction must grab their attention, demonstrate relevance, and increase confidence and satisfaction.</p> <p>Attention grabbing: The instruction will begin by posing interesting questions that will elicit a response from the learner via text on a Canvas classroom Web Page:</p> <p><i>"How comfortable do you feel with the effectiveness of assessment methods currently used in your class?"</i></p> <p><i>"How do you create assessment methods for your classes?"</i></p> <p><i>"Would you feel more comfortable with the effectiveness of your assessments if you knew they aligned with evidence-based practices?"</i></p>	

Instructional Events	Description	Media & Tool Selection
Preinstructional Activities	<p>Relevance: The learners, who are STEM instructors, must create evaluations in their courses. STEM100 Unit 4.0 offers practical suggestions for creating such evaluations. The instruction will remind learners, via text in a Canvas classroom Web Page, that the content of the course is directly related to tasks they must complete on a regular basis. Additionally, the instruction will stress the fact that implementing the suggested methods will allow learners to provide better feedback to students and assist them in evaluating and improving their own instructional practices, outcomes that are both relevant and desirable.</p> <p>Confidence: Learners will be addressed as experienced faculty with relevant skills, particularly in their knowledge of STEM concepts. The instructional content in Unit 4.0 is meant to provide additional tools that are shown to be a valuable addition to what the learner already knows via links in the Canvas classroom Web Page. Additionally, by breaking the instructional material down into Enabling Objectives, learners will not feel overwhelmed by being exposed to too much information at once.</p> <p>Satisfaction: This course offers both intrinsic and extrinsic rewards, which can boost learners' sense of satisfaction in the instruction. Intrinsically, learners will be able to master a new skill and apply it in their courses to reach more students. Extrinsically, student perception of the instructor's abilities can be improved. This could lead to better course evaluations and/or recognition from the learners' colleagues and superiors.</p> <p>Objectives As previously mentioned, learners must be informed of what they will learn. Terminal and Enabling Objectives will be listed clearly via text on the Canvas classroom Web Page, so that learners can relate to what they will be learning and what is expected of them at the time of assessment. Terminal and Enabling Objectives are outlined in the Unit Descriptors section above.</p> <p>Recall of prerequisite skills: Learners should be reminded of prerequisite skills needed to begin instruction. The entry-level skills include basic proficiency in Canvas. Based on information outlined in the learner analysis, learners have had at least some experience using Canvas in either online, mixed-mode, or on-campus courses. Given this fact, it will not be necessary to administer an entry-level skills test. However, it will be useful to describe entry-level skills, via text in the Canvas classroom Web Page, and tell learners that instruction will continue with the assumption that they have mastered these skills. This will help</p>	<p>Web Page (text)</p> <p>Web Page (text)</p> <p>Links</p> <p>Web Page (text)</p> <p>Web Page (text & links)</p>

Instructional Events	Description	Media & Tool Selection
Preinstructional Activities	remind learners of entry-level concepts they can then build on with the new instruction. Additionally, supplementary information regarding the necessary entry skills will be provided via links embedded in the course materials.	
Content Presentation	<p>As recommended in the 5 Components of Learning Model, attention must be paid to the sequencing of the instruction, organization of instruction, headings used in instruction, and review of the instruction's terminal objective. In addition, learning guidance methods, such as hierarchy of information and examples and non-examples, must be considered, to effectively guide learners through the content.</p> <p>Sequence</p> <p>The design team will use a deductive pattern to organize the course content, allowing the learners to identify structural relationships and piece together pieces of the whole instruction, by grouping content into meaningful and understandable chunks of information. The first chunk will be related to how the learner can classify evaluation strategies as summative or formative (4.1) The second chunk (4.2) will identify a formative strategy (STEM writing prompts), present online tools for implementing that formative strategy (4.2.1), and present an applied example of that formative strategy (4.2.2). The third chunk (4.3) will identify a summative strategy (performance-based projects), present online tools for implementing that summative strategy (4.3.1), and present an applied example of that summative strategy (4.3.2).</p> <p>Organization, Headings, and Review</p> <p>Per Dick, Carey, and Carey, a fixed outline keeps the content structured by incorporating necessary subsections (i.e. headings, sub-headings, and paragraphs) and assists students in recollection while providing the opportunity to showcase skills in identifying related concepts.</p> <p>The major headings and sections will include <i>"Introduction and Objectives," "Formative and Summative Evaluation Strategies," "Formative Strategies – Writing Prompts," "Online Tools for Formative Assessment," "Example of Formative Assessment," "Summative Strategies – Performance-based projects," "Online Tools for Summative Assessment," "Example of Summative Assessment,"</i></p> <p><i>"Review and Resources," and "Practice and Assessment."</i></p>	

Instructional Events	Description	Media & Tool Selection
Preinstructional Activities	remind learners of entry-level concepts they can then build on with the new instruction. Additionally, supplementary information regarding the necessary entry skills will be provided via links embedded in the course materials.	Web Page (text & links)
Content Presentation	<p>1. Introduction and Objectives: Students will be presented with topic sentences followed by explanation regarding the importance of the content. Intrinsic and extrinsic rewards will then be presented, and finally, the terminal objective will be provided in a separate section identified by the appropriate subheading.</p> <p>2. Alternatives for Expression This section contains essay-based and assessment-based means of expression. Learners are primarily engaged with reflective writing prompts in order to thoroughly discuss applying STEM formative evaluation strategies (4.2.2) as well as ways in which performance-based STEM projects could effectively assess the presented course material (4.3.2)</p> <p>3. Reflection and Feedback Techniques Reflective writing prompts are the main reflection tool used. As stated above, Learners are given the opportunity to engage with reflective writing prompts in order to thoroughly discuss STEM learning evaluation strategies whether they are Formative or Summative. Stem learners are also asked to reflect on given scenarios as well as a list of online tools from which they will be identify the appropriate tool for the given scenario (4.2.1). Feedback for assessments and writing prompt exercises is evaluated per the assessment rubrics.</p> <p>4. Review and Resources Previously presented factual information will be summarized and presented in paragraph form. The previously presented scenarios along, with the correct answers, are posted again for learner review. Examples taken from students' reflective writing prompts will also be presented for review by every STEM learner. This provides the opportunity for learners to read the reflective thoughts of other learners thus prompting avenues of individual learning not previously explored. Learners are prompted with Canvas and other online learning resources to allow for the deeper understanding the STEM principles and assessment strategies.</p>	<p>1. Web Page (text and links)</p> <p>2. Web Page (text and links)</p> <p>3. Web Page (text and links)</p> <p>4. Web Page (text and links)</p>

Instructional Events	Description	Media & Tool Selection
Content Presentation	<p>remind learners of entry-level concepts they can then build on with the new instruction. Additionally, supplementary information regarding the necessary entry skills will be provided via links embedded in the course materials.</p> <p>5. Practice and Assessment Designers ensure STEM learner participation using the following:</p> <p><i>Reflective writing prompts</i> This practice strategy serves as a method for learners to reflect on current and future evaluation strategies as a means to further evaluate current evaluation practices. These reflective writing exercises are immediately graded using a Rubric scale and later displayed to all STEM learners as a means of cooperatively sharing information.</p> <p><i>Scenario driven assessment questions</i> Stem learners reflect on given scenarios as well as a list of online tools from which they are prompted to identify the appropriate online tool for each given scenario.</p> <p><i>Assessment Questions</i> Assessment questions are used to gauge learner's factual retention. These assessments are written in the traditional multiple choice and true/false evaluation formats.</p> <p><i>Examples/Non-examples</i> In order to maximize knowledge retention in learners, it is imperative that examples of proper STEM evaluation strategies are provided. In this case, it would not be prudent to share examples displaying improper STEM evaluation strategies, so non-examples will not be provided. It is also important to incorporate both online and traditional class methods as a means of providing multiple uses via contrasting scenarios. This will allow learners to better understand the basis of the STEM principles through multi-faceted approaches and applications.</p>	<p>5. Canvas Assessment Tool (Canvas Quizzes) and Canvas Discussion Forums</p>

Instructional Events	Description	Media & Tool Selection
Learner Participation	<p>The group will guarantee learner participation by:</p> <p>Practice Test/Feedback The practice test will function as a formative tool allowing users to gauge their understanding and application of the content. Questions will be designed to progressively increase in difficulty to gradually train learners to apply a deeper understanding of the content. Upon completion of the test, learners will be present with explanation for both correct and incorrect answers to reinforce understanding and illustrate reasoning of the content.</p> <p>Discussion Forum Discussion forums will be provided to encourage participation and increase understanding of the content by allowing learners to freely posit questions and spark conversation regarding STEM principles with other faculty members across the STEM spectrum.</p>	<p>Canvas Assessment Tool (Canvas Quizzes)</p> <p>Discussion Forum in Canvas</p>
Assessment	<p>Assessments applied continuously throughout instruction will incorporate practice tests and post tests (in the form of written discussion posts). We will not be testing learners on entry skills as the learner analysis concluded that our audience is comprised of masters or doctorate level participants who have experience in Canvas via teaching online, mixed-mode, and face-to-face courses. Though an entry-level skills test will not be administered, supplementary information regarding the necessary entry skills will be provided via links and resources embedded in the course materials.</p> <p>Hierarchical skills will be assessed via practice tests that are presented at appropriate stages as the nature of the content increases in comprehensive understanding.</p> <p>Assessing the terminal objective of applying formative and summative evaluation, learners will be required to write a reflective essay outlining how the principles will be applied in their courses once instruction is complete. A rubric outlining the essay requirements will be provided.</p>	<p>Canvas Assessment Tool and Feedback Tools (Canvas Quizzes) and Discussion Forum in Canvas</p>

Media Selection Rationale

Web Pages (text, links, and video): Web pages may include text, links, hyperlinks, hypermedia, and video. Canvas, UCF's online learning management system, allows for the creation of a web page (online classroom) to include all of these elements, making it an appropriate choice for Module 4.0. Learners are familiar with the Canvas environment as knowledge of its basic functionality is a prerequisite entry skill. Additionally, Canvas is the mode of instruction for both the learning and performance contexts.

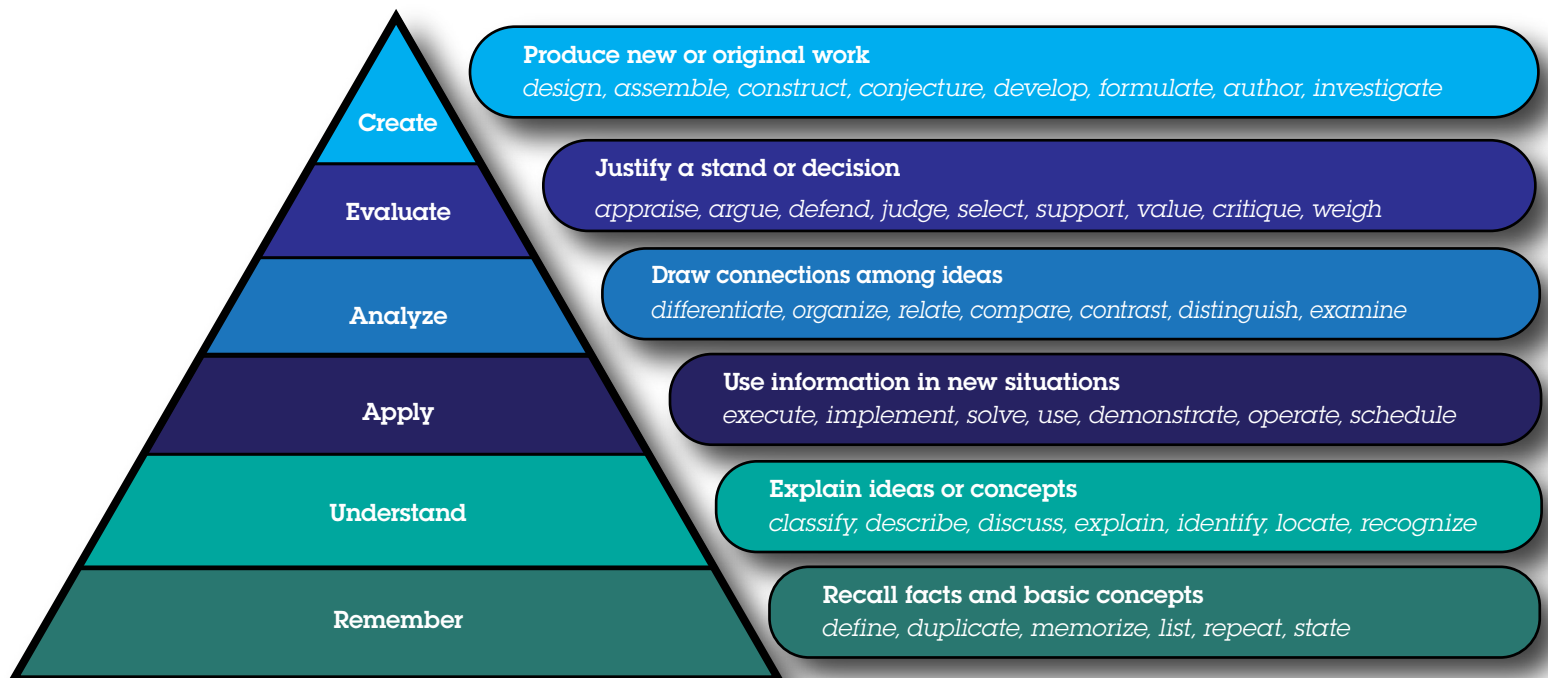
Canvas Assessment and Feedback Tools: The Canvas Quizzes tool allows for the creation of practice tests to check learners' understanding of enabling objectives. Learners receive immediate feedback on their submissions as they are graded electronically by the LMS. Instructors can also provide robust feedback via email, assignment comments, discussion comments, and rubric score breakdowns.

Discussion Forums: Discussions provide an opportunity for asynchronous communication between learners and the course instructor. Learners can demonstrate knowledge of terminal and enabling objectives via short discussion posts. Learners benefit from feedback offered by peers and the instructor in the online course.

Table 2: Learner Assessment Alignment Table for Module 4.0

Skill	Objective	Domain	Method	Item/Criteria
4.0 Apply evaluation strategies	<p><i>Terminal Objective: 4.0</i></p> <p>Given instruction via a Web Page on applying STEM evaluation strategies, learners will be able to discuss how they can apply STEM evaluation strategies in the Canvas online learning management system in accordance with rubric criteria.</p>	<i>Intellectual Skills</i>	<p>Post-Test:</p> <p>Reflection</p> <p>Rubric</p>	<p><i>In a 2-paragraph discussion post, reflect upon the application of STEM evaluation strategies in the Canvas online learning management system. Think about how you would apply these strategies in your online assessments. Address the following questions in your response:</i></p> <ul style="list-style-type: none"> ▪ <i>How do you currently evaluate your students' learning in STEM? Are you satisfied with the current methods used?</i> ▪ <i>What types of formative and summative STEM evaluation strategies could work for your students?</i> ▪ <i>How can you encourage online students to self-assess using a formative evaluation strategy, like a writing prompt?</i> ▪ <i>How can you encourage students to apply STEM knowledge using a summative strategy, like a performance-based project?</i>

Skill	Objective	Domain	Method	Item/Criteria
<p>4.1 Classify evaluation strategies:</p> <ul style="list-style-type: none"> ▪ Formative strategies allow students to gauge learning during instruction ▪ Summative strategies allow instructors to gauge learning after instruction 	<p><i>Enabling Objective 1: 4.1</i></p> <p>Given a statement regarding evaluation strategies, learners will be able to classify the evaluation strategy as formative or summative to a suggested 80% accuracy.</p>	<p><i>Intellectual Skills</i></p>	<p><i>Practice Test:</i></p> <p>Multiple Choice</p>	<p>Evaluations that are used throughout the course as diagnostic tools to help students improve their learning progress are classified as (see graphic below):</p> <p>Formative Summative</p> <p>Evaluations that address lower levels of Bloom's Taxonomy, such as knowledge recall and procedures, are classified as:</p> <p>Formative Summative</p> <p>Evaluations administered at the end of the instruction to gauge student mastery of course materials are:</p> <p>Formative Summative</p> <p>Evaluations that address higher levels of Bloom's Taxonomy, such as applying and analyzing knowledge, are classified as:</p> <p>Formative Summative</p>



Skill	Objective	Domain	Method	Item/Criteria
<p>4.2 Identify formative evaluation strategy – reflective STEM writing prompts</p>	<p><i>Enabling Objective 2: 4.2</i></p> <p>Given a statement regarding formative evaluation strategies for writing prompts, learners will be able to identify the correct statements to a suggested 80% accuracy.</p>	<p><i>Intellectual Skills</i></p>	<p><i>Practice Test:</i></p> <p>True or False</p>	<p>Guided writing prompts allow students to reflect on learning objectives and course material.</p> <p>True False</p> <p>Discipline-specific genres of writing (lab reports, historiography essays, case studies, etc.) need to be taught by disciplinary faculty alongside less-formal writing assignments designed to foster critical thinking and active learning.</p> <p>True False</p> <p>Writers always work alone, so regular and constructive feedback from the instructor and peers is not crucial for student learning.</p> <p>True False</p>
<p>4.2.1 Identify online tools for formative evaluation strategy – reflective STEM writing prompts</p> <ul style="list-style-type: none"> ▪ <i>UCF Writing Across the Curriculum</i> ▪ <i>Canvas discussion posts</i> 	<p><i>Enabling Objective 3: 4.2.1</i></p> <p>Given a scenario and a list of online tools, learners will be able to identify the appropriate tool for given scenario to a suggested 80% accuracy.</p>	<p><i>Intellectual Skills</i></p>	<p><i>Practice Test:</i></p> <p>Multiple Choice</p>	<p>Suppose an instructor is looking for information about how to develop a writing prompt. The best online tool available is:</p> <ul style="list-style-type: none"> a. UCF Writing Across Curriculum b. Online discussion forums in Canvas c. The online library resources. <p>Suppose an instructor wants to deploy and evaluate writing prompts. The best available online tool is:</p> <ul style="list-style-type: none"> a. UCF Writing Across Curriculum b. Online discussion forums in Canvas c. The online library resources.

Skill	Objective	Domain	Method	Item/Criteria
<p>4.2.2 Apply formative evaluation strategy – STEM writing prompts</p> <ul style="list-style-type: none"> ▪ STEM example 	<p>Enabling Objective 3: 4.2.2</p> <p>Given an example of a STEM writing prompt, learners will be able to write an essay describing how they could create a similar prompt for their courses in accordance with rubric criteria.</p>	<p>Intellectual Skills</p>	<p>Practice Test:</p> <p>Essay</p> <p>Rubric</p>	<p>In a 2-paragraph discussion post, reflect on the formative STEM writing prompt example provided. Create a STEM writing prompt that could effectively assess students on your course material. Discuss how the prompt will allow students to reflect on their knowledge.</p>
<p>4.3 Identify summative evaluation strategy – performance-based STEM projects</p>	<p>Enabling Objective 4: 4.3</p> <p>Given a statement regarding summative evaluation strategies for performance-based projects, learners will be able to identify the correct statements to a suggested 80% accuracy.</p>	<p>Intellectual Skills</p>	<p>Practice Test:</p> <p>True or False</p>	<p>Performance-based projects allow students to demonstrate mastery of learning objectives and course material at the end of a course.</p> <p>True False</p> <p>Students should complete performance-based projects alone and should never work in groups.</p> <p>True False</p> <p>Performance-based projects ask that learners recall, not apply, concepts presented throughout the course.</p> <p>True False</p>
<p>4.3.1 Identify online tools for summative evaluation strategy – performance-based STEM projects</p> <ul style="list-style-type: none"> ▪ Canvas Assignments ▪ Canvas Groups 	<p>Enabling Objective 5: 4.3.1.1</p> <p>Given a scenario and a list of online tools, learners will be able to identify the appropriate tool for given scenario to a suggested 80% accuracy.</p>	<p>Intellectual Skills</p>	<p>Practice Test:</p> <p>Multiple Choice</p>	<p>Suppose an instructor wants to deploy and evaluate a performance-based project. The best available online tool is:</p> <p>d. Canvas quizzes e. Canvas discussions f. Canvas Assignments</p> <p>Suppose an instructor has determined it will be most beneficial for learners to work in teams on a performance-based project. The best online tool available is:</p> <p>a. Canvas quizzes b. Canvas Groups c. Canvas discussions</p>

Skill	Objective	Domain	Method	Item/Criteria
<p>4.3.2 Apply summative evaluation strategy – performance-based STEM projects</p> <ul style="list-style-type: none"> ▪ STEM example 	<p><i>Enabling Objective 6: 4.3.2</i></p> <p>Given an example of a performance-based STEM project, learners will be able to write an essay describing how they could create a similar project for their courses in accordance with rubric criteria.</p>	<p><i>Intellectual Skills</i></p>	<p><i>Practice Test:</i></p> <p>Essay</p> <p>Rubric</p>	<p>In a 2-paragraph discussion post, reflect on the performance-based STEM project example provided. Describe a performance-based STEM project that could effectively assess students on your course material. Discuss how the project would allow students to demonstrate mastery of concepts learned by the end of the course.</p>

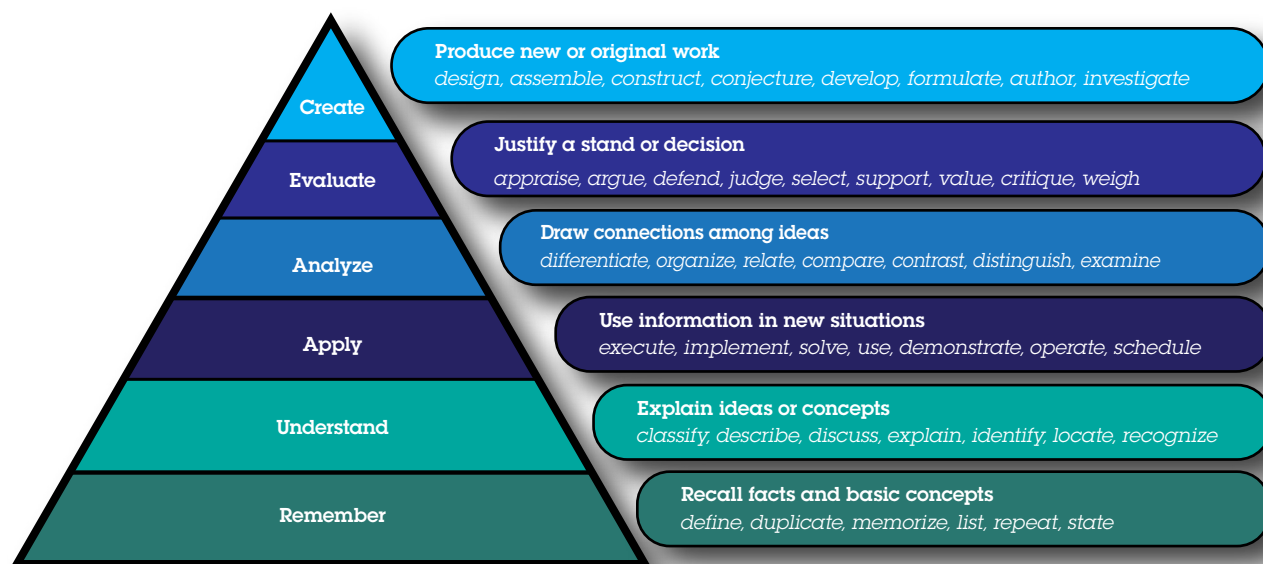
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Appendix A: Practice Test Questions

Below are the multiple choice/true false items from objectives 4.1 through 4.3.1 of the Instructional Strategies Table. The bold type indicates the correct answer to the question.

- Evaluations that are used throughout the course as diagnostic tools to help students improve their learning progress are classified at:
 - Formative
 - Summative
- Evaluations that address lower levels of Bloom's Taxonomy, such as knowledge recall and procedures, are classified as:
 - Formative
 - Summative
- Evaluations administered at the end of the instruction to gauge student mastery of course materials are:
 - Formative
 - Summative
- Evaluations that address higher levels of Bloom's Taxonomy, such as applying and analyzing knowledge, are classified as:
 - Formative
 - Summative



5. Guided writing prompts allow students to reflect on learning objectives and course material.
- a. True
 - b. False
6. Discipline-specific genres of writing (lab reports, historiography essays, case studies, etc.) need to be taught by disciplinary faculty alongside less-formal writing assignments designed to foster critical thinking and active learning.
- a. True
 - b. False
7. Writers always work alone, so regular and constructive feedback from the instructor and peers is not crucial for student learning.
- a. True
 - b. False
8. Suppose an instructor is looking for information about how to develop a writing prompt. The best online tool available is:
- a. [UCF Writing Across Curriculum](#)
 - b. Online discussion forums in Canvas
 - c. The online library resources
9. Suppose an instructor wants to deploy and evaluate writing prompts. The best available online tool is:
- a. UCF Writing Across Curriculum
 - b. [Online discussion forums in Canvas](#)
 - c. The online library resources

Appendix B: Rubrics and Reflection

Reflection for Terminal Objective 4.0

In a 2-paragraph essay, reflect upon the application of STEM evaluation strategies in the Canvas online learning management system (LMS). Things about how you would apply these strategies in your online assessments. In your discussion post response, address the following questions:

- What methods do you currently use to evaluate your students' learning in STEM?
- Are you satisfied with the current evaluations methods?
- What types of formative and summative STEM evaluation strategies could work for you students?
- How can you encourage online students to self-assess using a formative evaluation strategy, like a writing prompt?
- How can you encourage online students to apply STEM knowledge using a summative strategy, like a performance-based project?

Table 2: Assessment Rubric for Terminal Objective 4.0

Performance Level	Descriptors
Distinguished (90-100 points)	<ul style="list-style-type: none">▪ Specifically identifies currently used methods for evaluating students' learning in STEM▪ Thoroughly describes the satisfaction level of current evaluation methods▪ Specifically identifies the types of formative and summative STEM evaluations strategies▪ Specifically identifies ways online students are encouraged to self-assess using formative evaluation strategies▪ Specifically identifies ways online students are encouraged to apply STEM knowledge using summative evaluation strategies
Satisfactory (80-89 points)	<ul style="list-style-type: none">▪ Reflects upon the application of STEM evaluation strategies▪ Identifies currently used methods for evaluating students' learning in STEM▪ Describes the satisfaction level of current evaluation methods▪ Identifies the types of formative and summative STEM evaluations strategies▪ Identifies ways online students are encouraged to self-assess using formative evaluation strategies▪ Identifies ways online students are encouraged to apply STEM knowledge using summative evaluation strategies
Unsatisfactory (<80 points)	<ul style="list-style-type: none">▪ Fails to reflect upon the application of STEM evaluation strategies▪ Fails to identify currently used methods for evaluating students' learning in STEM.▪ Basically describes the satisfaction level of current evaluation methods.▪ Fails to identify the types of formative and summative STEM evaluations strategies.▪ Fails to identify ways online students are encouraged to self-assess using formative evaluation strategies.▪ Fails to identify ways online students are encouraged to apply STEM knowledge using summative evaluation strategies.

Discussion for Enabling Objective 4.2.2

In a 2-paragraph discussion post, reflect on the formative STEM writing prompt example provided. Create a STEM writing prompt that could effectively assess students on your course material. Discuss how the prompt will allow students to reflect on their knowledge.

Assessment Rubric for Enabling Objective 4.2.2

Given an example of a STEM writing prompt, learners will be able to discuss how they will create a similar prompt for their courses.

Table 4: Assessment Rubric for Enabling Objective 4.0

Performance Level	Descriptors
Distinguished (90-100 points)	<ul style="list-style-type: none">Specifically reflects on the formative STEM writing prompt provided.Thoroughly creates a well-thought-out STEM writing prompt that effectively assesses students on the respective course material.Specifically identifies ways that the writing prompt allows students to reflect on their knowledge.
Satisfactory (80-89 points)	<ul style="list-style-type: none">Reflects on the formative STEM writing prompt provided.Creates a STEM writing prompt that effectively assesses students on the respective course material.Identifies ways that the writing prompt allows students to reflect on their knowledge
Unsatisfactory (<80 points)	<ul style="list-style-type: none">Fails to reflect on the formative STEM writing prompt provided.Fails to complete STEM writing prompt that assesses students on the respective course material.Fails to identify ways that the writing prompt allows students to reflect on their knowledge.

Discussion for Enabling Objective 4.3.2

In a 2-paragraph discussion post, reflect on the performance-based STEM project example provided. Describe a performance-based STEM project that could effectively assess students on your course material. Discuss how the project would allow students to demonstrate mastery of concepts learned by the end of the course.

Assessment Rubric for Enabling Objective 4.3.2

Given an example of a performance-based STEM project, learners will be able to discuss how they will create a similar project for their courses

Table 4: Assessment Rubric for Enabling Objective 4.0

Performance Level	Descriptors
Distinguished (90-100 points)	<ul style="list-style-type: none">Describes in specific detail a performance-based STEM project that will effectively assess student on the respective course material.Discusses in specific detail how the project would allow students to demonstrate mastery of concepts learned by the end of the course.

Performance Level	Descriptors
<p>Satisfactory (80-89 points)</p>	<ul style="list-style-type: none"> ▪ Describes a performance-based STEM project that will effectively assess student on the respective course material. ▪ Discusses how the project would allow students to demonstrate mastery of concepts learned by the end of the course.
<p>Unsatisfactory (<80 points)</p>	<ul style="list-style-type: none"> ▪ Fails to describe a performance-based STEM project that will effectively assess student on the respective course material. ▪ Fails to discuss how the project would allow students to demonstrate mastery of concepts learned by the end of the course.

Appendix C: Revised Subordinate Skill Analysis

Figures 1, 2, and 3 reflect updates to the subordinate skills analysis based on the Terminal and Enabling Objectives. :

Figure 1: Revised Subordinate Skills Analysis for Module 4.0

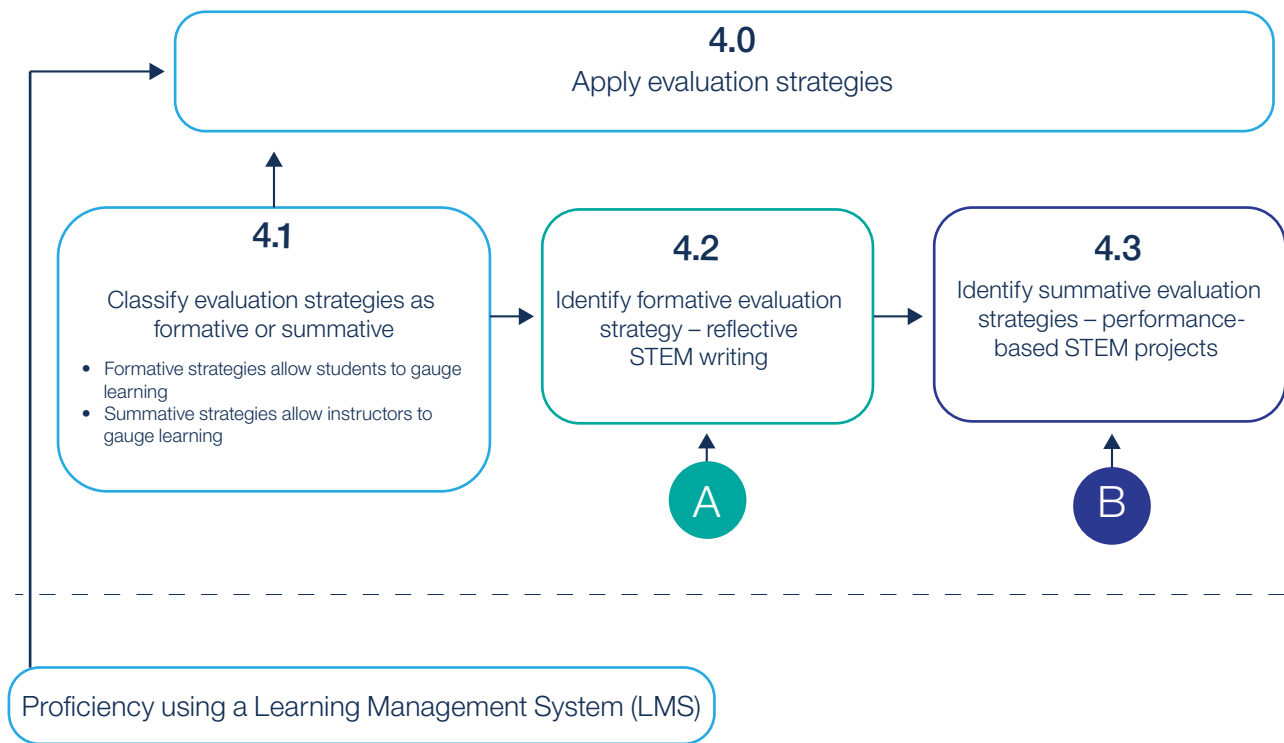


Figure 2: Revised Subordinate Skills Analysis for Step 4.2: Identify Formative Evaluation Strategies - Reflective STEM Writing

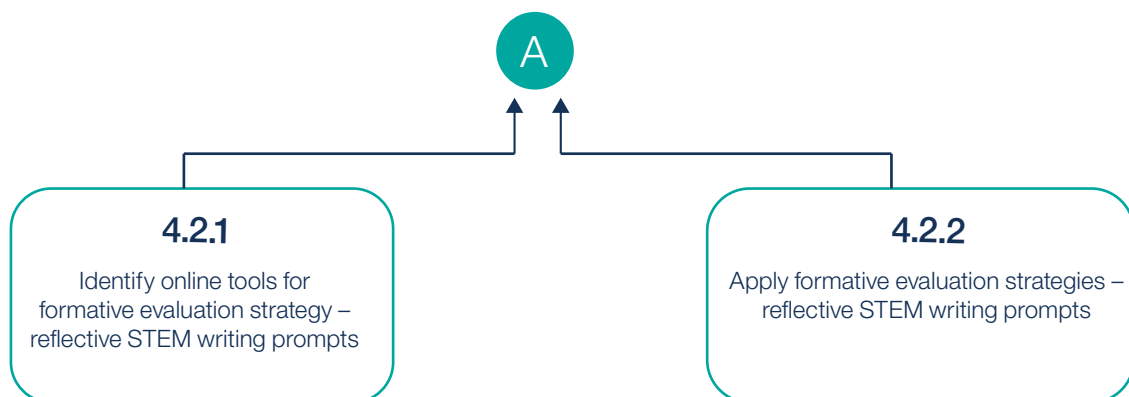


Figure 3: Revised Subordinate Skills Analysis for Step 4.3: Identify Summative Evaluation Strategies - Performance Based STEM Projects

