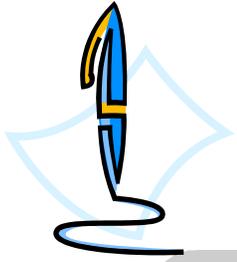


PREPARING EFFECTIVE ESSAY QUESTIONS

A Self-directed Workbook for Educators



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Preface

Although essay questions are one of the most commonly used methods for assessing student learning, many are poorly designed and ineffectively used. Writing effective essay questions requires training and practice. There are subtle characteristics of effective essay questions that are often difficult to discern for those without adequate training. This workbook was developed to provide training and practice in discerning the often difficult to see characteristics of effective essay questions and to support educators in the development and use of essay questions.

This workbook supports educators from all schools and disciplines. In addition, it supports teaching assistants who work with educators and often have exam development and grading responsibilities.

This workbook is the first in a series of three workbooks designed to improve the development and use of effective essay questions. It focuses on the writing and use of essay questions. The second booklet in the series focuses on scoring student responses to essay questions. The third workbook focuses on preparing students to respond to essay questions and can be used with both educators and students.

To support educators, this workbook is divided into sections answering the following three questions:

1. What is an essay question?
2. When should essay questions be used?
3. How should essay questions be constructed?

The format of this workbook is suitable for use with seminars or workshops and can be facilitated by an instructor. However, it is primarily designed to be studied alone as a self-directed learning tool. Each section contains assessments, practice exercises and review activities that will foster understanding and improve writing and use of effective essay questions. Each exercise includes feedback for users to check their progress and understanding. To maximize learning with this workbook, the authors recommend that users follow the order of material sequentially.

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Introduction

When was the last time you used an essay question to assess student performance? Why did you choose an essay item over other forms of assessment? How comfortable did you feel with developing the essay item and scoring student responses? The answers to these questions vary from educator to educator.

Educators choose essay questions over other forms of assessment because essay items challenge students to create a response rather than to simply select a response. Some educators use them because essays have the potential to reveal students' abilities to reason, create, analyze, synthesize, and evaluate. In short, essay items are used for the advantages they offer.

Despite the advantages associated with essay questions, there are also disadvantages. Have you ever labored over the wording of an essay question in an effort to make it clear and precise so that the students know exactly what you expect of them? Or have you ever felt the frustration of trying to develop reliable and fair scoring criteria for grading students' responses to essay questions only to discover that you were as unsure of what was asked for in the essay question as the students? These are some of the difficulties of essay questions. This workbook addresses the advantages and disadvantages of essay questions and illustrates ways of improving the use of essay questions.

There are two major purposes for using essay questions. One purpose is to assess students' understanding of and ability to think with subject matter content. The other purpose is to assess students' writing abilities. These two purposes are so different in nature that it is best to treat them separately. *This workbook will focus on essay questions that assess students' thinking skills.* When going through this workbook it is important to keep this focus in mind and to understand that some of the rules and principles discussed may even contradict rules and principles that apply for essay questions that assess students' writing skills.

Workbook Objectives

Specifically, the workbook is designed to support educators in:

1. Understanding the main advantages and limitations of essay questions and common misconceptions associated with their use.
2. Distinguishing between learning outcomes that are appropriately assessed by using essay questions and outcomes that are likely to be better assessed by other means.
3. Evaluating existing essay questions using criteria of effective essay questions.
4. Improving poorly written essay questions by using the criteria for effective essay questions to identify flaws in existing questions and correct them.
5. Constructing well-written essay questions that assess given objectives.

Section 1:

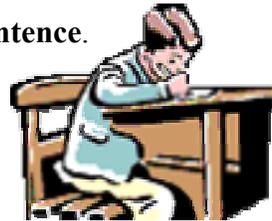
What is an Essay Question?

There are few definitions for what constitutes an essay question. Of those definitions that can be found, a definition given a long time ago by John M. Stalnaker (1951, p.495) appears to be the most helpful.

"A test item which requires a response composed by the examinee, usually in the form of one or more sentences, of a nature that no single response or pattern of responses can be listed as correct, and the accuracy and quality of which can be judged subjectively only by one skilled or informed in the subject."

Based on Stalnaker's definition, an essay question should meet the following criteria:

1. **Requires examinees to *compose* rather than select their response.**
2. **Elicits student responses that must consist of more than one sentence.**
3. **Allows different or original responses or pattern of responses.**
4. **Requires subjective judgment by a competent specialist to judge the accuracy and quality of responses.**



Multiple-choice questions, matching exercises, and true-false items are all examples of selected response test items because they require students to choose an answer from a list of possibilities, whereas essay questions require students to compose their own answer. However, requiring students to compose a response is not the only characteristic of an effective essay question. There are assessment items other than essay questions that require students to construct responses (e.g., short answer, fill in the blank). Essay questions are different from these other constructed response items because they require more systematic and in-depth thinking. *An effective essay question will align with each of the four criteria given in Stalnaker's definition and provide students with an indication of the types of thinking and content to use in responding to the essay question.*

To review the criteria for an effective essay question, evaluate Example A. Determine if it meets the criteria for an effective essay question. Then check to see if your evaluation is consistent with the explanation provided.

Example A

List the 7-step path to making “ethical decisions.” List them in their correct progressive order.

Explanation

Example A does not meet the criteria for effective essay questions for the following reasons:

1. The question does not require students to use complete sentences or more than one sentence. Students may respond to Example A by simply listing the name and number for each step.
2. Depending on where students learned the steps, all the responses they give to the essay question may be identical. Students will basically repeat the 7-step path word for word. The question does not allow for original responses or response patterns.
3. Although the question does require a list of steps, it does not require systematic and complex thinking about the ideas. While some essay questions may serve their purpose in requiring students to list certain ideas, the most effective essay questions require deep and original thinking. Effective essay questions elicit a depth of thought from students that can only be judged by someone with the appropriate experience and expertise in the content matter. Thus, content expertise is essential for both writing and grading essay questions.

To gain a better understanding of the basic elements of an essay look at Example B. Again, determine whether the given example contains the basic elements of an essay question and then compare your answer with the explanation below the example.

Example B

Explain in what ways a person's failure to apply step 5 of the seven-step path for making ethical decisions will impact his or her ability to make ethical decisions. Provide an example that illustrates this impact.

Explanation

Example B is an effective essay question. Not only do students need to compose a response, but they also need to write several sentences in order to provide an answer that sufficiently meets the demands of the given task. Moreover, the task given to students in the essay question is constructed in such a way that it allows for different responses and response patterns. Students can provide a wide variety of examples to illustrate the impact, and they can structure their response in various ways. They could give the example first and then provide an explanation, or they could state the impact first and then provide an example. Students could also go back and forth between their explanation and their example as they write their response. They could look at the interaction between step 5 and other steps of the seven-step path in various ways. For example, one student might focus on the interaction between step 5 and step 4 and another student might focus on the interaction between step 5 and step 6. Hence, the task allows for original responses and response patterns. Because of the variety of possible answers, a competent specialist in the seven-step path for making ethical decisions must judge the accuracy and quality of the student responses. The grader must have a good understanding of the model to judge the accuracy, quality, and relevance of students' explanations and examples. This closer look at Example B shows that it contains the basic elements of an effective essay question.

**Review: What is an Essay Question?**

An essay question is a test item which contains the following elements:

1. Requires examinees to *compose* rather than select their response.
2. Elicits student responses that must consist of more than one sentence.
3. Allows original responses and response patterns.
4. Requires subjective judgment by a competent specialist to judge the accuracy and quality of student responses.
5. Provides students with an indication of the types of thinking and content to use in responding to the essay question.



Review Exercise: What is an Essay Question?

For each of the following essay questions, decide whether it matches the definition given for effective essay questions. Mark “Yes” if the essay question matches the definition and “No” if it does not match the definition. If the question does not match the definition for an effective essay question, reconstruct the question in such a way that it matches and write your answer in the space below the original question. Check your answers with the answers in the Appendix A (p. 42).

Yes	No	Essay question
<input type="checkbox"/>	<input type="checkbox"/>	1. Restate the definition for ‘opportunity cost’ that was provided in class.
Improved essay question:		_____

<input type="checkbox"/>	<input type="checkbox"/>	2. Should Olympic games ever be cancelled because of the threats of terrorist attacks?
Improved essay question:		_____

<input type="checkbox"/>	<input type="checkbox"/>	3. What are the 3 basic steps of <i>photosynthesis</i> ?
Improved essay question:		_____

<input type="checkbox"/>	<input type="checkbox"/>	4. Compare and contrast descriptive research and empirical research?
Improved essay question:		_____

Advantages, Limitations, and Common Misconceptions of Essay Questions

In order to use essay questions effectively, it is important to understand the following advantages, limitations and common misconceptions of essay questions. Without understanding them, educators may use an essay question when another item type would be more appropriate, or educators may grossly underestimate what would be required to effectively use essay questions.

Advantages

1. Assess higher-order or critical thinking skills.

Essay questions provide an effective way of assessing complex learning outcomes that cannot be effectively assessed by other commonly used paper-and-pencil assessment procedures. In fact, some of the most complicated thinking processes can only be assessed through essay questions, when a paper-and-pencil test is necessary (e.g., assessing students' ability to make judgments that are well thought through and that are justifiable).

2. Evaluate student thinking and reasoning.

Essay questions require students to demonstrate their reasoning and thinking skills, which gives teachers the opportunity to detect problems students may have with their reasoning processes. When educators detect problems in students' thinking, they can help them overcome those problems.

3. Provide authentic experience.

Constructed responses are closer to real life than selected responses. Problem solving and decision-making are vital life competencies. In most cases these skills require the ability to construct a solution or decision rather than select a solution or decision from a limited set of possibilities.

Limitations

1. Assess a limited sample of the range of content.

Due to the time it takes for students to respond to essay questions and for graders to score responses, the number of essay questions that can be included in a test is limited. Thus, essay questions necessitate testing a limited sample of the subject matter, thereby reducing content validity. A test of 80 multiple-choice questions will most likely cover a wider range of content than a test of 3-4 essay questions.

2. Are difficult and time consuming to grade.

Answers to essay questions are likely to be graded less reliably than other types of test questions and take considerable time to grade. One of the advantages of essay questions is that they allow students some latitude in formulating their responses. However, this advantage comes at the cost of time spent scoring and reliability in scoring.

Different readers may vary in their grading of the same or similar responses (interscorer reliability) and one reader can vary significantly in his grading consistency depending on many factors (intrascorer reliability). Therefore, essay answers of similar quality may receive notably different scores. Gender and ethnic bias, the length and legibility of the response, and the personal preferences of the grader with regards to the content and structure of the response are some of the factors that can lead to unreliable grading.



3. Provide practice in poor or unpolished writing.

The way in which students construct their responses to essay questions differs in several ways from real-world writing tasks. Ebel and Frisbie (1986) point out that "the practice that essay tests give in writing may be practice in *bad* writing—hasty, ill considered, and unpolished" (p. 128).

Misconceptions

1. Assess higher-order or critical thinking skills regardless of how the responses are written.

An essay question does not automatically assess higher-order thinking skills. Essay questions often simply assess recall. Also, if a teacher designs an essay question meant to assess higher-order thinking but then scores students' responses in a way that only rewards recall ability, that teacher is not assessing higher-order thinking.

Compare the following two examples and decide which one assesses higher-order or critical thinking skills.

Example A

What are the major advantages and limitations of essay questions?

Example B

Given their advantages and limitations, should an essay question be used to assess students' abilities to create a solution to a problem? In answering this question provide brief explanations of the major advantages and limitations of essay questions. Clearly state whether or not you think an essay question should be used and explain the reasoning for your judgment.

Example A assesses recall of factual knowledge, whereas Example B requires more of students. It not only requires students to recall facts, but also to make an evaluative judgment, and to explain the reasoning for the judgment. Example B requires more complicated thinking than Example A.

2. Essay questions are easy to construct.

Essay questions are easier to construct than multiple-choice items because there is no need to create effective distracters. However, that doesn't mean that good essay questions are easy to construct. They may be easier to construct in a relative sense, but constructing

them still requires a lot of effort and time. Essay questions that are hastily constructed without much thought and review usually function poorly.

3. The use of essay questions eliminates the problem of guessing.

The use of essay questions introduces bluffing, another form of guessing. Some students are adept at using various methods of bluffing (vague generalities, padding, name-dropping, etc.) to add credibility to an otherwise vacuous answer. Thus, the use of essay questions changes the nature of the guessing that occurs, but does not eliminate it.



4. Essay questions benefit all students by placing emphasis on the importance of written communication skills.

Written communication is a life competency that is required for effective performance in many vocations. Essay questions challenge students to organize and express ideas and solutions in their own words, thereby giving them a chance to practice written communication skills that will be helpful to them in future vocational responsibilities. At the same time, the focus on written communication skills is a serious disadvantage for students who have marginal writing skills but know the subject-matter being assessed. To the degree that students who are knowledgeable in the subject obtain low scores because of their inability to write well, the validity of the test scores will be diminished.

5. Essay questions encourage students to prepare more thoroughly.

Some research seems to indicate that students are more thorough in their preparation for essay questions than in their preparation for objective examinations containing multiple-choice or matching questions. However, after an extensive review of existing literature and research on this topic, Crook concluded that "student expectations of the cognitive level and content of tasks probably exert much more influence on their study behavior and achievement than do their expectations of the task format (for given content and cognitive level)" (1988, p. 448). Thus, Crook concludes that students prepare more

based on the expectations teachers set upon them (more complicated thinking, critical thinking and breadth and depth of content) than they do by the type of test question they expect to be given.



Review: Advantages, Limitations, and Misconceptions of Essay Questions

Advantages

Essay Questions:

1. Assess higher-order or critical thinking skills.
2. Evaluate student thinking and reasoning.
3. Provide authentic experience.

Limitations

Essay Questions:

1. Assess a limited sample of the range of content.
2. Are difficult and time consuming to grade.
3. Provide practice in poor or unpolished writing.
4. Provide practice in poor or unpolished writing.

Misconceptions

1. Assess higher-order or critical thinking skills regardless of how they are written.
2. Essay questions are easy to construct.
3. The use of essay questions eliminates the problem of guessing.
4. Essay questions benefit all students by placing emphasis on the importance of written communication skills.
5. Essay questions encourage students to prepare more thoroughly.

Section 2:

When Should Essay Questions Be Used?

In order for assessment of student learning to accurately represent the degree to which a student has achieved an intended learning outcome, it is essential that the kind of test question used be suitable for testing the intended learning outcome. Essay questions are generally most suitable for the following purposes:

- To assess students' understanding of subject-matter content
- To assess students' abilities to reason with their knowledge of a subject

To determine what type of test item to use, the first step is to consider the intended learning outcome or objective that the test item is meant to assess. Learning objectives almost always contain verbs that can provide direction for the choice of assessment method. The verbs that best describe the ability or abilities the instructor intends to assess are sometimes referred to as “directive verbs” (Moss & Holder, 1988, p.17). The term “directive verbs” refers to verbs that are thoughtfully and carefully selected to indicate what thought processes and actions students must exhibit to provide evidence that learning has occurred (see Appendix B for a sample list). The “directive verb” used in the statement of the intended learning outcome can, in some cases, also be used in the test question. In this case, the directive verb provides students with clear directions for their responses. Regardless of whether the verb in the intended learning outcome is the same as the one in the test question, verbs in essay questions should serve to channel and focus the student responses towards the performance to be assessed.

Some directive verbs clearly indicate that students need to construct rather than select their answer (e.g., “explain”). Other directive verbs indicate that the intended learning outcome requires students to select the answer (e.g., “identify”). The skill to recall or remember information is generally best assessed through objectively scored items such as multiple-choice items. Directive verbs that are meant to elicit students' understanding of subject matter, content, or other forms of higher-order or critical thinking but do not specify whether the student is to construct or to select the response (e.g., “interpret”) can be assessed either by essay questions or by objective items. There are no perfect criteria for determining which type of test question should be used, but there are some considerations

that should be given to the directive verbs within learning objectives and within intended learning outcomes. Answering a few questions about the verbs used in the intended learning outcome to be assessed can guide educators in selecting test items.

Educators can mentally proceed through several questions about the intended learning outcome to determine if the use of essay questions is appropriate to assess the intended learning outcome. In essence, the answers to the questions about the intended learning outcome become the criteria that will point to essay questions or away from essay questions. And, the directive verb is the place to focus when answering the following questions meant to illustrate the mental process an educator can go through.

Criteria to Determine if Essay Questions Should be Used

1. Can students demonstrate the action and thinking processes indicated by the directive verb in the intended learning outcome by selecting answers from options and/or by constructing answers?

Selecting or constructing → Essay or Multiple-Choice

Selecting only → Multiple-Choice

Constructing only → Essay

2. If students can demonstrate the action and thinking processes related to the directive verb in the intended learning outcome in either an essay question or an objective item such as a multiple-choice question, then consider the following:

- Your skill in writing objective questions
- Your resources and time available for grading

Low skill in writing objective questions and ample resources and time for grading → Essay Questions

High skill in writing objective questions and limited resources and time for grading → Multiple-choice

3. How critical are original and authentic student responses? If it is important to make students' thinking explicit, then original work is required.

Original and authentic → Essay Questions

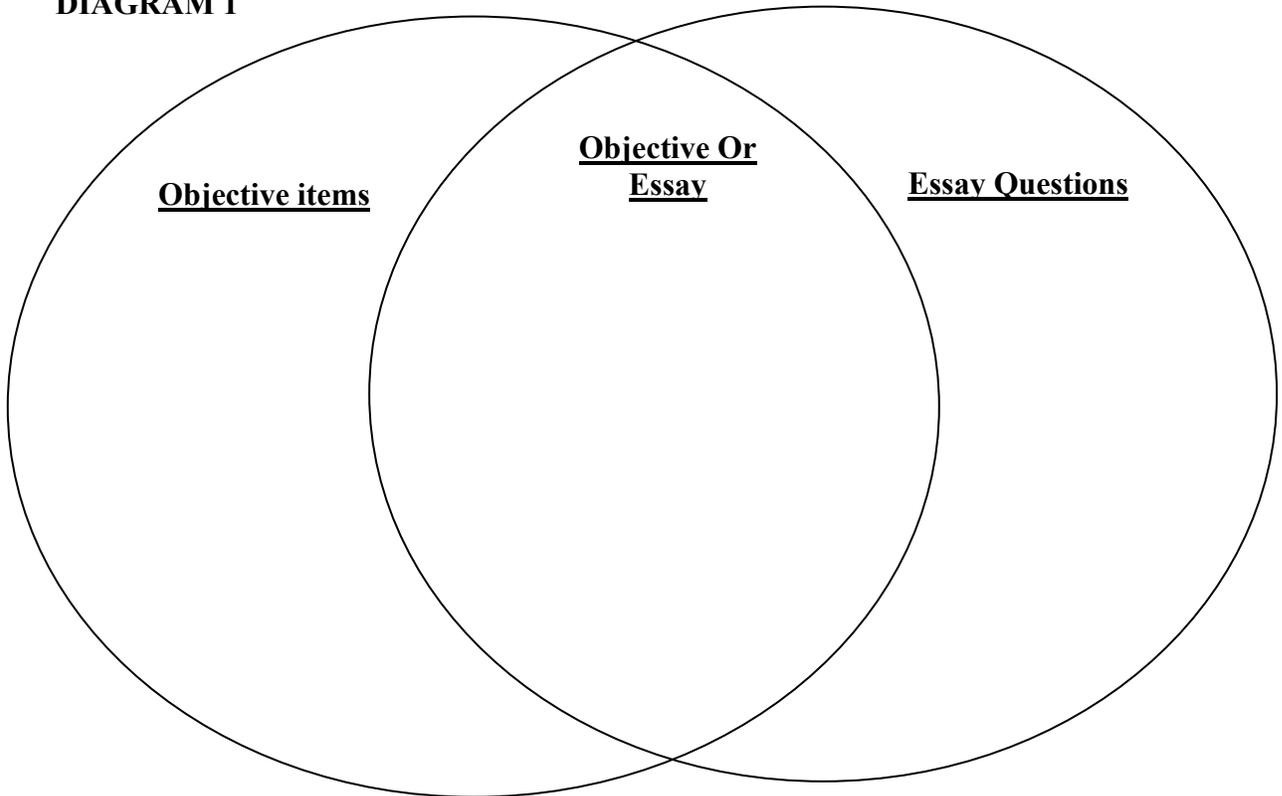
Not necessary that responses be original → Multiple-choice

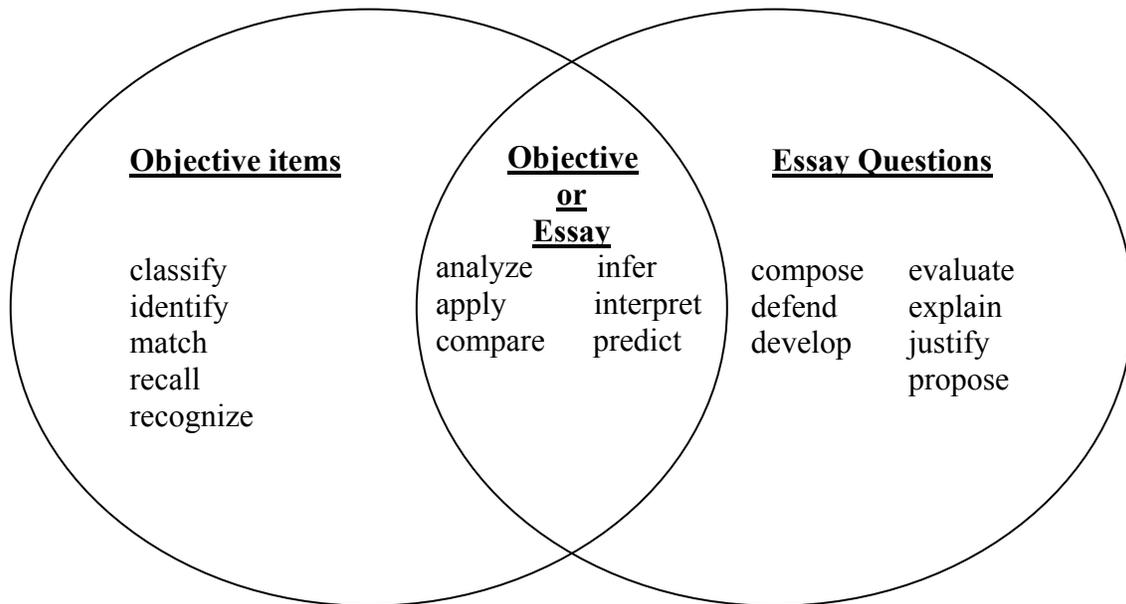
Based on these guidelines, decide for the following list of directive verbs whether the skill described is best assessed by essay questions, by objective items, or if it could be assessed by either objective or essay items. In the exercise below, write each directive verb in its corresponding circle of Diagram 1 and compare your answers with the answer key on the page following this exercise. If necessary, use the definitions for the given directive verbs that are found in Appendix B.

DIRECTIVE VERBS EXERCISE

analyze	develop	justify
apply	explain	match
classify	evaluate	predict
compare	identify	propose
compose	infer	recall
defend	interpret	recognize

DIAGRAM 1



Answer Key:

Concerning the ranking of students based on test scores, educators should know that some research suggests students are ranked about the same order relative to each other on essay questions and multiple-choice questions when tests results are compared (Chase & Jacobs, 1992). Thus, the decision to use one item type over another for intended learning outcomes that can be assessed by either objective or essay can be based on teacher preference. The choice will probably produce little change in student rankings once grades are assigned.

Table 1 contains several samples of intended learning outcomes and the appropriate test items to use for assessing them. The directive verb in each intended learning outcome can be analyzed to provide clues about the method of assessment that should be used. For example, the verb “recall” means to retrieve relevant knowledge from long-term memory. Students’ ability to recall relevant knowledge can be most economically and reliably assessed through objectively scored test items. There is no need for students to explain or justify their answers when they are assessed on recall.

The verb “analyze” means to determine how parts relate to one another and to an overall structure or purpose. Students can demonstrate their ability to analyze the function of humor in Shakespeare’s *“Romeo and Juliet”* by either describing the function

of humor in their own words or by selecting the right or best answer among different options of a well drafted multiple choice item.

The verb “create” means to put elements together to form a coherent or functional whole. Creating a solution to a problem requires complex and critical thinking. Hence, students’ ability to create should be assessed with essay items because they allow students’ reasoning and coherence of thought to be analyzed by the instructor.

Table 1: Sample Intended Learning Outcomes and Item Type

Intended Learning Outcomes Students will:	Objective items	Objective or Essay	Essay Questions
1. Analyze the function of humor in Shakespeare's “ <i>Romeo and Juliet</i> ”.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Describe the attributes of a democracy.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. Distinguish between learning outcomes appropriately assessed using essay questions and outcomes better assessed by some other means.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Create a solution to economic inequality in the United States.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Know the definition for the Law of Supply and Demand.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Predict the outcome of an experiment.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Propose a solution for the disposal of batteries that is friendly to users and the environment.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. Recall the major functions of the human heart.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Understand the “Golden Rule”.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Use a literary theory to analyze a poem.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Review: When Should Essay Questions Be Used?

It is appropriate to use essay questions for the following purposes:

- To assess students’ understanding of subject-matter content.
- To assess students’ abilities to reason with their knowledge of a subject.

Use essay questions for intended learning outcomes that require complex thinking and constructed responses.

If an intended learning outcome could be either assessed through objective items or essay questions, use essay questions for the following situations:

- When your skill in writing objective items is poor, but your resources and time for grading are high (e.g., small classes, grading assistants).
- When student reasoning needs to be evaluated.



Review Exercise: When Should Essay Questions Be Used?

For each of the following intended learning outcomes, decide whether teachers should assess it with an objectively scored test item, an essay question, or whether teachers could assess it with either type. Mark the box of the corresponding answer for each intended learning outcome and check your answers with the answers in Appendix A (p. 42).

Intended learning outcome	Objective Items	Objective or Essay	Essay Questions
1. Abstract the major ideas of the movie “ <i>Forrest Gump</i> ”.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Apply Heisenberg's Principle of Uncertainty to an unfamiliar task.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Critique the usefulness of a solution to a given problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Determine an author’s point of view.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Differentiate between facts and opinion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Provide your own definition for “education”.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Recognize the steps of the scientific method.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Understand the role of vitamin C for the body's immune system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 3:

How Should Essay Questions Be Constructed?

After they have read an essay item, students should have a clear idea of how they should tailor their responses. Below are specific guidelines that can help to improve existing essay questions and create new ones.

1. Clearly define the intended learning outcome to be assessed by the item.

Decide which of the following intended learning outcomes lends itself better to be assessed by an essay question.

Example A

Students will appreciate the process of cell division.

Example B

Given a chart illustrating the process of cell division, students will compare and contrast each major step in the process.

Example B is more useful for guiding the development of an essay question. *Specific* intended learning outcomes are crucial to designing effective essay questions. If the expected outcome to be assessed lacks clarity and specificity, the essay question meant to assess students' achievement of the outcome will likely assess something other than what is intended. Example A is too general to provide clear guidance in writing an essay question. The directive verb, "appreciate" is vague and difficult to assess. It is especially difficult to judge or assign a grade to students' "appreciation".

In specifying the intended learning outcome, teachers should clarify the performance that students should be able to demonstrate as a result of what they have learned. Intended learning outcomes meant to guide the development of test items will typically begin with a specific directive verb. The outcome statement will describe the observable behavior, action or outcome that students should demonstrate. The focus is on what students should be able to do rather than on the learning or teaching process. Reviewing a list of directive verbs to determine which verbs most closely match the ability

students should demonstrate is helpful. Appendix B contains a sample list of directive verbs and their definitions.

Again, intended learning outcomes meant to guide assessment of student learning should be as specific as possible. Objectives written broadly or generally are adequate for guiding an entire course or for describing the goals of an entire program, but are not as useful for determining which type of assessment item should be used.

2. Avoid using essay questions for intended learning outcomes that are better assessed with other kinds of assessment.

Some types of learning outcomes can be more efficiently and more reliably assessed with selected-response questions than with essay questions. In addition, some complex learning outcomes can be more directly assessed with other types of assessment (e.g., performance assessment, simulations, internships) than with essay questions. Since essay questions typically sample a limited range of content, are time consuming to score, and involve greater subjectivity in scoring than objectively scored items, the use of essay questions should be reserved for learning outcomes that cannot be better assessed by some other means.

3. Clearly define and situate the task within a problem situation.

With some essay questions, students can feel like they have an infinite supply of lead to write a response on an indefinite number of pages about whatever they feel happy to write about. This can happen when the essay question is vague or open to numerous interpretations. Remember that effective essay questions:

provide students with an indication of the types of thinking and content to use in responding to the essay question.



Thus, effective essay questions provide a well-defined task for students. That task should provide students with an indication of the types of thinking they will use to respond to the essay question and the content they should reason with.

In essence, an effective essay question produces valid evidence of the degree to which students have achieved the intended learning outcome. The process of writing effective essay questions requires educators to carefully select one or more verbs that elicit the desired thought processes in the minds of the students. The following example

demonstrates the importance of carefully choosing directive verbs to align the essay question with the intended learning outcome.

Example C

Intended learning outcome:	Analyze the impact of America at war on the American economy.
Less effective essay question:	Describe the impact of America at war on the American economy.
More effective essay question:	Analyze the impact of America at war on the American economy by describing how different effects of the war work together to influence the economy .

According to the definition provided in Appendix B, “analyze” means to break material into its constituent parts and to determine how the parts relate to one another and to an overall structure or purpose. In the less effective example, students are asked to describe the impact. To describe requires students to give an account of the impact of America at war on the American economy, but it does not require students to make an analysis based on the different effects of the war and how they work together to affect the economy. The more effective question does make this distinction for students, thereby providing guidance concerning the task of analyzing. Thus, directive verbs must be carefully selected to clearly reflect the task required of students and to be aligned to intended outcomes.

Similarly, the object of the directive verb must be carefully written. Just as it is important to select the right verb, it is important to delimit the scope of the object of that verb. Delimiting the scope of the task helps to avoid student responses containing ideas unrelated to the essay question and extreme subjectivity when scoring responses.

A clearly defined task will specify the performance students should exhibit when responding to the essay question. A clearly defined task is composed of a directive verb and the object of that verb. For example, consider the following tasks:

5. More focused essay question:	Evaluate the impact of the Industrial Revolution on the role of fathers in poor communities of England based on whether or not the Industrial Revolution improved fathers' abilities to provide the material necessities of life and education and training for their children. <u>Explain how the role of a father as provider changed with the Industrial Revolution and whether or not the changes were an improvement for fathers striving to provide for their children.</u>
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In the examples above, five essay questions are provided. Example 1 has little structure. The directive verb is “evaluate” and the object of the verb is “the impact of the Industrial Revolution on England.” Very little guidance is given to students about the task of evaluating and the scope of the task. A student reading Example 1 may ask the following:

- a. The impact on what in England? The economy? Foreign trade? A particular group of people?
- b. Evaluate? Based on what criteria? The significance of the Revolution? The quality of life in England? Progress in technological advancements?
- c. What exactly do you want me to do in my evaluation?

Example 2 delimits the task for students by specifying a particular unit of society in England affected by the Industrial Revolution (family). Example 3 is even more focused than Example 2 because students are asked to focus on a subunit of the family (fathers) and a specific community of families in England (poor communities).

With Example 4, the task is further delimited by giving students a criterion for evaluating the impact of the Industrial Revolution (whether or not fathers' abilities to provide for their children in two different ways improved because of the Industrial Revolution).

The last example provides more structure for students than all the other examples. In Example 5, the task is focused and delimited by clarifying for students what must be done to “evaluate.” Students must explain how the role of fathers as providers changed and judge whether or not the changes were an improvement for fathers and their children.

Although the examples differ in the degree of structure and focus provided for students, it is not necessarily true that more structure and more focus are better than less

structure and less focus. As mentioned previously, when using more structure in essay questions, teachers are trying to avoid at least two problems: bluffing and grading difficulty. More structure helps to avoid student responses containing ideas unrelated to the essay question and extreme subjectivity when scoring responses. Of the five examples, the one that would be best to use, depends on the intended learning outcome that is to be assessed by the essay question and the purpose for which the essay question is to be used.

Failure to establish adequate and effective limits for the student response to the essay question allows students to set their own boundaries for their response, meaning that students might provide responses that are outside of the intended task, that are too long, or that only address a part of the intended task. If students' failure to answer within the



intended limits of the essay question can be ascribed to poor or ineffective wording of the task, the teacher is left with unreliable and invalid information about the students' achievement of the intended learning outcome and has little or no basis for grading the student responses. Therefore, teachers are responsible for writing essay questions in such a way that they provide students with clear boundaries for responses. In short, educators should avoid indeterminate questions.

A question is indeterminate if it is so unstructured that students can redefine the problem and focus on some aspect of it with which they are thoroughly familiar, or if experts in the subject matter cannot agree that one answer is better than another. One way to avoid indeterminate questions is to stay away from vocabulary that is ambiguous. For example, teachers should avoid using the verb “discuss” in an essay question. This verb is simply too broad and vague and therefore fails to provide adequate guidance for students as to how to respond to the essay question. Moreover, teachers should also avoid including vocabulary that is too advanced for students.

Once the task of the essay question is clearly defined and the content that students are to use in accomplishing the task has been delimited, the essay question is ready to be situated in a problem. The ability to situate well-written tasks within problems is what makes educators effective at writing essay questions. Both the tasks and the problems are key elements of essay questions.

We have defined the task, now we want to define the problem. The problem in essay questions includes the unsettled matter or undesirable state of affairs that needs to be resolved. The purpose of the problem is to provide the students with a context within which they can demonstrate the performance to be assessed. Ideally, students would not have previously encountered the specific problem.

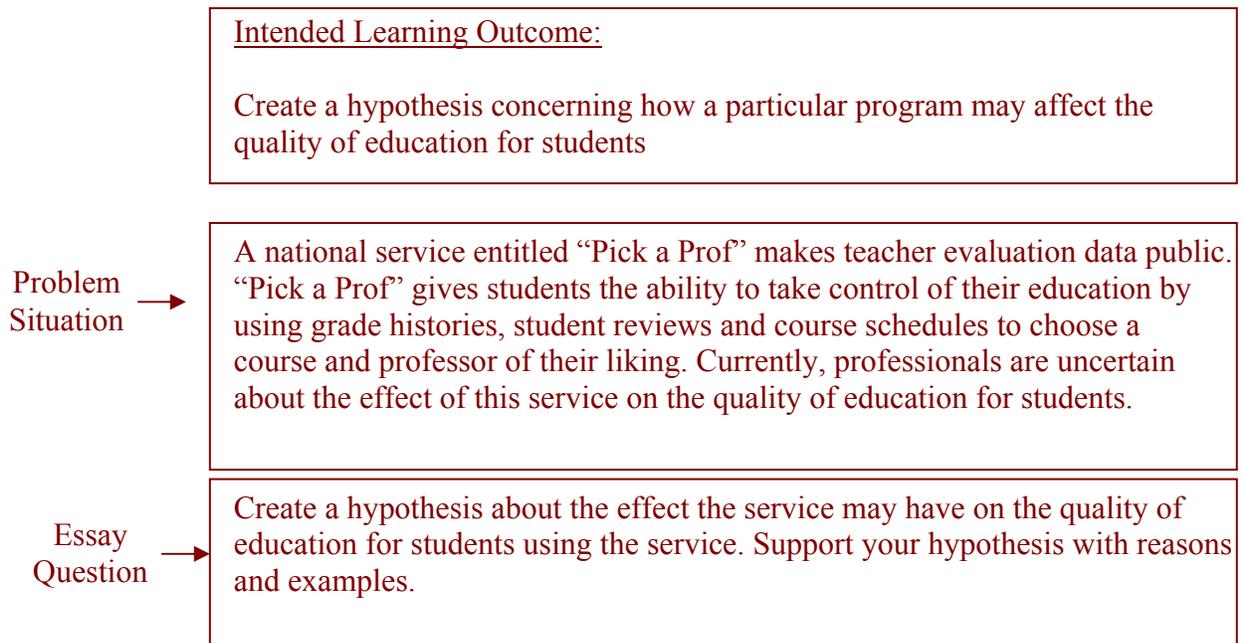
Depending on the intended learning outcome to be assessed, teachers may take different approaches to develop the problem in which the task will be situated. In cases where the intended outcome to be assessed requires complex or critical thinking, often a unique or novel problem situation is developed. In this case, the problem situation consists of a context that students have not previously encountered and that presents some unresolved matter or uncertain situation. The purpose of making a novel problem situation part of the essay question is to confront students with a new context requiring them to assess the situation and derive an acceptable solution by using knowledge of the relevant subject matter, and reasoning skills.

Writing novel problem situations requires creativity. Essentially, teachers should try to embed the problem in new and particular circumstances. The circumstances should be strikingly different from those previously encountered in class or in teaching materials. At the same time, the novel problem situation should not be completely foreign to the students' experience. Novelty is a matter of degree. Hence, the test maker must be cautious to avoid creating too large of a gap between what students should have learned directly with the teachers help and what they should be able to conclude by reasoning.

A developed problem situation in an essay question should assess the same intended learning outcome that guided the instruction, but should be embedded in a new context that requires students to transfer to this new setting the knowledge, understanding, and cognitive abilities they previously learned. In other words, the task of the essay question requires students to *reason with their knowledge* based on a novel context.

When using a novel problem situation, it is often described before the actual essay question is given. For example, consider the following essay question meant to assess complex levels of thinking. In the example, the novel problem situation is given first, followed by the essay question.

Example:



Presenting the students with a situation they have not previously encountered so they must reason with their knowledge provides an authentic assessment of complex thinking. If a problem that has been previously discussed and solved in class is used on an exam, the essay question merely assesses students’ recall or memory of the class discussion.

In summary, the task and problem are the key elements of essay questions. The complexity of the task and problem depends on the intended learning outcome to be assessed. Accurately developing the task and problem of an essay question requires practice and training. In addition, there are other considerations that are important when developing the task and problem of the essay question.

4. Present a reasonable task to students.

When defining the task for the essay question, teachers need to make sure that they present a reasonable task to their students. One of the challenges that teachers face in composing essay questions is that because of their extensive experience with the subject matter they may be tempted to demand unreasonable content expertise from the students. Hence, teachers need to make sure that their students can “be expected to have adequate

material with which to answer the question” (Stalnaker, 1952, p.520). In addition, teachers should ask themselves if students can be reasonably expected to adequately perform the thought processes which are required of them in the task. For assessment to be fair, teachers need to provide their students with sufficient instruction and practice in the subject matter and thought processes to be assessed.

Identifying an audience for students to write their essay responses to may also be helpful. This would make the task more authentic. A key element in writing communication is to clearly identify and write to a specific audience. Often, this key element is removed from the task given to students in essay questions.

5. The task can be written as a statement or question.

In essay questions, the task can be presented either in the form of a direct question or an imperative statement. If written as a question, then it must be readily translatable into the form of an imperative statement. For example, the following illustrates the same essay item twice, once as a question and once as an imperative statement.

Question: How are the processes of increasing production and improving quality in a manufacturing plant similar or different based on cost?

Imperative statement: Compare and contrast the processes of increasing production and improving quality in a manufacturing plant based on cost.

In the example above, both essay items elicit the same performance from the student (compare and contrast processes based on cost). Whether essay questions are written as imperative statements or questions, they should be written to align with the intended outcome and in such a way that the task is clear to the students.

6. Specify the relative point value and the approximate time limit in clear directions.

Specifying the relative point value and the approximate time limit helps students allocate their time in answering several essay questions because the directions clarify the relative merit of each essay question. Without such guidelines students may feel at a loss as to how much time to spend on a question. When deciding how much time should be spent on a question, keep the slower students and students with certain disabilities in mind. Also make sure that students can be realistically expected to provide an adequate answer in the given and/or the suggested time.

7. State the criteria for grading

Students should know what criteria will be applied to grade their responses. As long as the criteria are the same for the grading of the different essay questions they don't have to be repeated for each essay question but can rather be stated once for all essay questions. Consider the following example.

Example

The content of all of your responses to essay questions will be graded in terms of the accuracy, completeness, and relevance of the ideas expressed. The form of your answer will be evaluated in terms of clarity, organization, correct mechanics (spelling, punctuation, grammar, capitalization), and legibility.

If teachers intend to grade the content and the form of student responses to the essay question, they should specify the relative point value for the content and the relative point value for the form.

8. Use several relatively short essay questions rather than one long one.

Only a very limited number of essay questions can be included on a test because of the time required for students to respond to them and the time required for teachers to grade the responses. This creates a challenge with regards to designing valid essay questions. Focused essay questions are better suited to assess the depth of student learning within a subject whereas less-focused essay questions are better suited to assess the breadth of student learning within a subject. Hence, there is a trade-off when choosing between several short essay questions or one long one.

9. Avoid the use of optional questions

Students should not be permitted to choose one essay question to answer from two or more optional questions. The use of optional questions should be avoided for the following reasons:

- Students may waste time deciding on an option.
- Some questions are likely to be harder to answer than others. This could make the comparative assessment of students' abilities unfair.
- The use of optional questions makes it difficult to evaluate if all students are equally knowledgeable about topics covered in the test.

10. Improve the essay question through preview and review.

The following steps can help you improve an essay item before and after you hand it out to your students making the essay question much more effective for both you and the student.



Preview (before handing out the essay question to the students)

a. Predict student responses.

Try to respond to the question from the perspective of a typical student. Evaluate whether students have the content knowledge and the skills necessary to adequately respond to the question. Repair any possible weaknesses of the essay question before handing out the exam.

b. Write a model answer.

Before using a question, write model answer(s) or at least an outline of major points that should be included in an answer. Writing the model answer allows reflection on the clarity of the essay question. Furthermore, the model answer(s) serve as a basis for grading students' responses. Once the model answer has been written compare its alignment with the essay question and the intended learning outcome and make changes as needed to assure that the intended learning outcome, the essay question, and the model answer are aligned with each other.

c. Ask a knowledgeable colleague to critically review the essay question, the model answer, and the intended learning outcome for alignment.

Before using the essay question on a test, ask a person knowledgeable in the subject (colleague, teaching assistant, etc.) to critically review the essay question, the model answer, and the intended learning outcome to determine how well they are aligned with each other. Based on the intended learning outcome, revise the question as needed. By having someone else look at the test the likelihood of creating effective test items is increased. Try asking a colleague or TA to evaluate the essay questions based on the guidelines for constructing essay questions contained in this booklet.

Review (after receiving the student responses)

d. Review student responses to the essay question.

After students complete the essay questions, carefully review the range of answers given and the manner in which students seem to have interpreted the question. Make revisions based on the findings. Writing good essay questions is a process that requires time and practice. Carefully studying the student responses can help evaluate students' understanding of the question as well as the effectiveness of the question in assessing the intended learning outcomes.

Practice Activity

The following exercises provide an opportunity to practice writing more effective essay questions. For reasons of practicality, the exercises only focus on some of the previously discussed guidelines for constructing essay questions.

Answer each question (circle Y or N) and when prompted to do so provide a short explanation for your answer (1-2 sentences). If needed, improve the essay question. For example, the first question focuses on the alignment of the essay question with the intended learning outcome. If there is a misalignment, only improve the question to the point that it is aligned with the intended learning outcome and then move on to the next question. Use Appendix B and Appendix C as reference points for this activity. Compare your answers with the answers in Appendix A (p. 42).

Practice Exercise 1

Intended learning outcome: Analyze Shakespeare's plays with regard to his view of women.

Essay question: Determine Shakespeare's view of women in his plays.

Is the essay question aligned with the intended learning outcome? Y or N

Explanation:

Improved essay question:

Is the task defined specific and clear enough? Y or N

Explanation:

Improved essay question:

Have the relative point value and the suggested time been provided? Y or N

Practice Exercise 2

Intended learning outcome: Evaluate the appropriateness of the response of the United States to the terrorist attacks on September 11, 2001.

Essay question: In your opinion was the response of the United States to the terrorist attacks on September 11, 2001 an appropriate solution to the problem?
(Suggested time: 25 min Maximum points: 12)

Is the essay question aligned with the intended learning outcome? Y or N
Explanation:

Improved essay question:

Is the task defined specific and clear enough? Y or N
Explanation:

Improved essay question:

Have the relative point value and the suggested time been provided? Y or N

Following is a review of Section 3: How Should Essay Questions Be Constructed. This review contains more practice exercises to enhance understanding of the principles contained in this section.



Review: How to Construct Essay Questions

1. Clearly define the intended learning outcome to be assessed by the item.
2. Avoid using essay questions for intended learning outcomes that are better assessed with other kinds of assessment.
3. Clearly define the task and situate the task in a problem situation.
 - a. Clearly define the task.
 - b. Delimit the scope of the task.
 - c. Clearly develop the problem or problem situation.
4. Present a reasonable task to students.
5. The tasks can be written as a statement or question.
6. Specify the relative point value and the approximate time limit in clear directions.
7. State the criteria for grading.
8. Use several relatively short essay questions rather than one long one.
9. Avoid the use of optional questions.
10. Improve the essay question through preview and review.
 - Preview (before)
 - a. Predict student responses.
 - b. Write a model answer.
 - c. Ask a knowledgeable colleague to critically review the essay question, the model answer, and the intended learning outcome for alignment.
 - Review (after)
 - d. Review student responses to the essay question.



Review Exercise: How to construct Essay Questions

Exercise 1

For exercise 1, develop an effective essay question for the given intended learning outcome. Make sure that the essay question meets the following criteria:

- The essay question matches the intended learning outcome.
- The task is specifically and clearly defined.
- The relative point value and the approximate time limit are specified.

Compare your answers with the answers in Appendix A (p. 42).

Intended learning outcome:

Trace the development of computers in school instruction.

Essay question:



Review Exercise: How to construct Essay Questions

Exercise 2

Choose an intended learning outcome from a course you are currently teaching and create an effective essay question to assess students' achievement of the outcome. Follow each of the guidelines provided for this exercise. Check off each step on the provided checklist once you have finished it. The checklist is only a partial list of the guidelines previously given.

Intended learning outcome:

Checklist

1	Clearly define the intended learning outcome to be assessed by the item.
2	Avoid using essay questions for objectives that are better assessed with objectively-scored items.
3	Clearly define the task and situate the task in a problem situation. <ul style="list-style-type: none"> • Clearly define the task. • Delimit the scope of the task. • Clearly develop the problem or problem situation.
4	Present a reasonable task to students. Consider identifying an audience for the response.
5	Specify the relative point value and the approximate time limit.
6	State the criteria for grading.
7	Predict student responses.
8	Write a model answer.
9	Have colleague critically review the essay question.

Write the essay question after you have finished step 3:

Write the new essay question after you have finished step 6:

Write the new essay question after you have finished step 9:

Checklist for Writing Essay Questions

- Could the item be better assessed with a different kind of assessment?
- Is the essay question aligned with the intended learning outcome?
- Is the essay question too long and should it rather be split up into several relatively short essay questions?
- Does the essay question contain a clear and delimited task and a specific problem situation (if necessary)?
- Is the question worded and structured in such a way that it will be clear to the students what they are expected to do?
- Is the task presented to students reasonable?
- If there is a problem situation included in the essay question, is it a novel situation?
- Do the students know the recommended time for completing their answer?
- Do the students know how many points the essay is worth?
- Have you avoided the use of optional questions?
- Have you written a model answer or an outline of major points that should be included in the answer? Is the model answer aligned with the intended learning outcome and the essay question?
- Did you have a person knowledgeable in the subject critically review the essay item for clarity and for alignment with the intended learning outcome and the model answer?

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Appendix A

What is an Essay Question?

When looking at the suggested improved essay questions, please keep in mind that there is more than one way for improving the essay questions. These examples are meant to give you an idea of how the essay questions could be improved.

 Review Exercise: What is an Essay Question?					
Yes	No				Essay question
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.			Restate the definition for “Opportunity Cost” that was provided in class.
				Improved essay question:	In your own words, explain what “Opportunity Cost” is, and provide one example that fits the definition.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2.			Should the Olympic games ever be cancelled because of the threat of terrorist attacks?
				Improved essay question:	Decide whether the Olympic games should ever be cancelled because of the threats of terrorist attacks, and explain the reasons for your decision.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3.			What are the 3 basic steps of photosynthesis?
				Improved essay question:	Name the 3 basic steps of photosynthesis, and explain in your own words what happens in each step.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.			Compare and contrast descriptive research and empirical research. What are the differences, and what are the similarities?

When Should Essay Questions Be Used?



Review Exercise: When Should Essay Questions Be Used?

Intended Learning Outcome	Objective Items	Objective or Essay	Essay Questions
1. Abstract the major ideas of the movie “Forrest Gump”.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Apply Heisenberg's Principle of Uncertainty to an unfamiliar task.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Critique the usefulness of a solution for solving a given problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Determine an author’s point of view.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Differentiate between facts and opinion.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Provide your own definition for “education”.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7. Recognize the steps of the scientific method.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Understand the role of vitamin C for the body's immune system.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

9. Your colleague just found out that you are learning how to design and grade essay questions. She wants to assess her students’ ability to analyze a political speech. When talking to her you find out that she has 40 students in her class. She has relatively little time, but it is important for her to make the test as close as possible to “real life”. She has the help of two teaching assistants and both she and her assistants feel fairly comfortable with writing and grading essay questions. The assistants also feel fairly comfortable with designing multiple-choice questions. Your colleague is not sure whether to use multiple-choice items or an essay question to assess the intended learning outcome. What will you recommend to her and why? Write your response in the space provided below.

Although students’ ability to analyze a political speech could be either assessed through essay questions or through objective items, it is better to advise your colleague to use essay questions because she wants her test to be as close as possible to “real life”. She may worry about grading the responses because she has a fairly high number of students. However, this should not be a problem because she has the help of two teaching assistants who feel fairly comfortable with grading student responses to essay questions. Thus, deciding to use essay questions is a good choice.

As an alternative, your colleague could even consider using both essay questions and multiple-choice questions to assess her students’ ability to analyze a political speech because she and her teaching assistants feel comfortable with designing multiple-choice questions.

How Should Essay Questions Be Constructed?

Practice Exercise 1

Intended learning outcome: Analyze Shakespeare’s plays with regard to his view of women.

Essay question: Determine Shakespeare’s view of women in his plays.

Is the essay question aligned with the intended learning outcome? Y or N

Explanation: According to Bloom’s taxonomy in Appendix C, analyzing involves attributing which means to determine an author’s point of view (see Appendix B). However, more explanation is needed to help students understand what they have to do as part of determining Shakespeare’s view.

Improved essay question:

Is the task defined specific and clear enough? Y or N

Explanation: More explanation is needed to help students understand what they have to do as part of determining Shakespeare’s view. Do they just need to state his view or do they also need to provide evidence? One of the advantages of essay questions is that they allow students to explain their reasoning, hence a teacher should specify how they need to explain their reasoning. It is more appropriate to limit the subject matter to one or two of Shakespeare’s plays and to specify more clearly what is meant by “Shakespeare’s view of women”—does it mean his view of them as mothers, wives, his view of their social status, etc.?

Improved essay question:

Analyze Shakespeare’s “*Romeo and Juliet*” by determining his view of women’s role in the family as portrayed in this play. Give your opinion on what Shakespeare’s view of women’s role in family is according to this play and provide specific evidence from the play.

Have the relative point value and the suggested time been provided? Y or N

Practice Exercise 2

<p>Intended learning outcome: Evaluate the appropriateness of the response of the United States to the terrorist attacks on September 11, 2001.</p> <p>Essay question: In your opinion, was the response of the United States to the terrorist attacks on September 11, 2001 an appropriate solution to the problem? (Suggested time: 25 min Maximum points: 12)</p> <p>Is the essay question aligned with the intended learning outcome? <input checked="" type="radio"/> Y or N</p> <p>Explanation: According to the definition provided in Appendix B, evaluating involves making a judgment based on criteria and standards. Therefore, the essay question matches the intended learning outcome because the students need to judge if the response of the United States was an appropriate solution to the problem of the terrorist attacks.</p> <p>Improved essay question:</p> <p>Is the task defined specific and clear enough? Y or <input checked="" type="radio"/> N</p> <p>Explanation: The essay question is not specific enough. Students could answer it with yes or no and satisfy the demands of the question. The United States responded in more than one way to the terrorist attacks (war, economic measures, investigation etc.). Hence, there is a need to specify which of the responses the essay question is referring to.</p> <p>Improved essay question: In your opinion, was the war that the United States fought in Afghanistan in response to the terrorist attacks on September 11, 2001 an appropriate solution to the problem? State the major problems that the terrorist attacks on September 11 presented to the United States. Explain why the United States chose the war in Afghanistan as a means to solve these problems. Judge the appropriateness of the war in Afghanistan by deciding whether or whether not the United States accomplished its purposes against terrorism through this war. Provide specific examples that show whether or whether not the United States was successful in accomplishing its purposes against terrorism through the war in Afghanistan.</p> <p>Have the relative point value and the suggested time been provided? <input checked="" type="radio"/> Y or N</p>
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Review Exercise: How to construct Essay Questions

Exercise 1

Intended learning outcome: Trace the development of computers in school instruction.

Essay Question: Describe how the use of computers in school instruction has developed over the last 40 years (from 1960 to 2000). Name the major stages of development and describe how each stage differed from the previous one. Explain how each stage improved upon the weaknesses of the previous one.
(Suggested time: 15 min Maximum points: 12)

Explanation: The essay question limits the content by specifying a time period (1960 - 2000) and by focusing on the major steps of development only. The essay question also clarifies what the students have to do to trace the development (name the major stages of development, describe how successive stages differed from each other, and explain how each successive stage improves upon the previous one).

Appendix B

This appendix contains a list of some verbs that describe mental tasks to be performed. The definitions specify thought processes a person must perform to complete the mental task.

<u>Verbs</u>	<u>Definitions & Examples</u>
analyze	Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose. <i>Analyze the meaning of a verse for the whole poem.</i>
apply	Decide which abstractions (concepts, principles, rules, laws, theories, generalizations) are relevant in a problem situation. Use the selected abstraction to solve the problem. <i>Apply the Nursing Process to determine a patient's immediate need for help</i>
attribute	Determine a point of view, bias, value, or intent underlying presented material. <i>Determine the point of view of the author of an essay in terms of his or her political perspective.</i>
classify	Determine which category belongs to something. <i>Classify observed or described cases of mental disorders.</i>
compare	Identify and describe points of similarity. <i>Compare the legislative branches of the state government and the national government.</i>
compose	Make or form by combining things, parts, or elements. <i>Compose an effective essay question based on a given intended learning outcome.</i>
contrast	Bring out the points of difference. <i>Contrast the novels of Jane Austen and William Makepeace Thackeray.</i>
create	Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure. <i>Create a solution for an existing problem.</i>
criticize	Make judgments as to the correctness, faults, or merits of an item or issue; criticism may approve or disapprove. <i>Criticize the increasing use of alcohol.</i>
critique	Detect consistencies and inconsistencies between a product and relevant external criteria; detect the appropriateness of a procedure for a given problem. <i>Judge which of two methods is the best way for solving a problem.</i>

APPENDIX B – DIRECTIVE VERBS AND DEFINITIONS

defend	Develop and present an argument to support a recommendation, to maintain or revise a policy, program, or propose a course of action. <i>Defend the application of surgery for healing a given injury.</i>
define	Give the meaning of a word or concept; place it in the class to which it belongs and distinguish it from other items in the same class. <i>Define the term "archetype".</i>
describe	Give an account of; tell or depict in words; represent or delineate by a word picture. <i>Describe Gorbatschov's contribution to the reunification of Germany.</i>
design	Devise a procedure for accomplishing some task. <i>Design a plan for the efficient study of a textbook.</i>
develop	Bring to a more advanced , effective, or usable state; produce. <i>Develop an essay question by improving upon a less effective essay question.</i>
differentiate	Distinguish relevant from irrelevant parts or important from unimportant parts of presented material. <i>Distinguish between relevant and irrelevant parts of a speech.</i>
explain	Make clear the cause or reason of something; construct a cause-and-effect model of a system ; tell "how" to do; tell the meaning of. <i>Explain the causes of important 18th Century events in France..</i>
evaluate	Make judgments based on criteria and standards; determine the significance, value, quality, or relevance of; give the good points and the bad ones; identify and describe advantages and limitations. <i>Evaluate the contributions of teaching machines.</i>
generate	Come up with alternative hypotheses, examples, solutions, proposals, etc. based on criteria. <i>Generate hypotheses to account for an observed phenomenon.</i>
identify	Recognize as being a particular person or thing. <i>Identify the characteristics of Gothic architecture.</i>
illustrate	Use a word picture, a diagram, a chart, or a concrete example to clarify a point. <i>Illustrate the use of catapults in the amphibious warfare of Alexander.</i>
infer	Draw a logical conclusion from presented information. <i>Infer grammatical principles from examples.</i>

APPENDIX B – DIRECTIVE VERBS AND DEFINITIONS

interpret	Give the meaning of; change from one form of representation (e.g. numerical) to another (e.g. verbal). <i>Interpret the poetic line, "The sound of a cobweb snapping is the noise of my life."</i>
justify	Show good reasons for; give your evidence; present facts to support your position. <i>Justify the American entry into World War II.</i>
list	Create a series of names or other items. <i>List the major functions of the human heart.</i>
predict	Know or tell beforehand with precision of calculation, knowledge, or shrewd inference from facts or experience what will happen. <i>Predict the outcome of a chemical reaction.</i>
propose	Offer for consideration, acceptance, or action; suggest. <i>Propose a solution for a given problem.</i>
recognize	Locate knowledge in long term memory that is consistent with presented material. <i>Recognize the dates of important events in U.S. history.</i>
recall	Retrieve relevant knowledge from long-term memory. <i>Recall the dates of important events in human history.</i>
summarize	Sum up; give the main points briefly. <i>Summarize the ways in which man preserves food.</i>
trace	Follow the course of; follow the trail of; give a description of progress. <i>Trace the development of television in school instruction.</i>

(Moss & Holder, 1988; Anderson & Krathwohl, 2001; Webster's College Dictionary, 1996)

Appendix C

Bloom’s Cognitive Process Dimension

Categories & Cognitive Processes	Alternative names
1. Remember	
1.1 Recognizing	Identifying
1.2 Recalling	Retrieving
2. Understand	
2.1 Interpreting	Clarifying, paraphrasing, representing, translating
2.2 Exemplifying	Illustrating, instantiating
2.3 Classifying	Categorizing, subsuming
2.4 Summarizing	Abstracting, generalizing
2.5 Inferring	Concluding, extrapolating, interpolating, predicting
2.6 Comparing	Contrasting, mapping, matching
2.7 Explaining	Constructing models
3. Apply	
3.1 Executing	Carrying out
3.2 Implementing	Using
4. Analyze	
4.1 Differentiating	Discriminating, distinguishing, focusing, selecting
4.2 Organizing	Finding coherence, integrating, outlining, parsing, structuring
4.3 Attributing	Deconstructing
5. Evaluate	
5.1 Checking	Coordinating, detecting, monitoring, testing
5.2 Critiquing	Judging
6. Create	
6.1 Generating	Hypothesizing
5.2 Planning	Designing
6.3 Producing	Constructing

(Anderson & Krathwohl, 2001)