

TOOLS FOR COGNITIVE ASSESSMENT

a) Essay type test

Essay test is a form of written examination. Essay test is a test containing questions that requires the examinee to write several paragraphs in their own words. Generally, essay tests are designed to measure the different abilities of examinees such as factual knowledge, language proficiency with legible handwriting, organizing answer and time management. But specially, such tests are designed to measures the higher mental processes which involve the process of synthesis, analysis, evaluation, organization and criticism of the events of the past. Essay test are thus suitable for measuring traits like critical thinking, originality and the ability to integrate or synthesize or analyze different events. In this way, the examinees are free to present their ideas in their own words. It is also known as traditional test and subjective test.

Essay tests pose only few questions based on particular content area. It covers limited content samples in a single test, while many portions of content left untouched. Thus, the content validity of such test may be low. In addition, the reliability of essay tests is compromised by subjectivity or inconsistencies in scoring. However, such tests are still popular and widely used even today.

John M. Stalnaker (1951), *“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”.*

Essay type questions are asked in several types such as descriptive, explanatory, discussion, comparison, illustrative and criticism etc. Further, essay test may be subdivided into two broad types i.e. restricted and extended response question.

i. Restricted response question (Closed-ended question)

Restricted response question usually limits both content and response by restricting the scope of the topic to be discussed. Similarly, we can say that restricted response imposes the word's limitation for answering a question. Such limitations are clearly mentioned in the question. For example, describe the important characteristics of developed countries (the answer should not be exceeded more than 100 words). However, by restricting the students' response, we are unable to measure the students' ability to synthesize ideas and expressing them in logical and coherent fashion. The restricted response questions are generally asked

in such ways, write a brief description, draw a map, make a list, perform a calculation, translate a sentence and write down definition, and so on.

ii. Extended response question (Open-ended question)

Extended response question allows examinees to organize the answer in accordance with their knowledge and best judgment. It requires examinees not only to give answer but explain in detail as possible. In this way, the extended response test allows full freedom to examinees for answering a question. This freedom enables examinees to demonstrate their ability to analyze the problems, organizing ideas and further describing in their own words. On the other side, this freedom of creative expression and other higher-order skills makes extended response question inefficient for measuring specific learning outcomes of the examinees. Similarly, evaluator faces difficulty in scoring of items.

Difference between restricted and extended response	
<i>Restricted response</i>	<i>Extended response</i>
<i>It restricts the freedom of expressing thoughts and ideas.</i>	<i>It provides full freedom of expressing thoughts and ideas.</i>
<i>It is quick and easy to write.</i>	<i>Writing is difficult task.</i>
<i>It takes limited time in responding questions.</i>	<i>It takes more time in responding questions.</i>
<i>Restricted response questions are more useful in measuring specific learning outcomes.</i>	<i>Extended response questions are more useful in measuring complex behaviors.</i>
<i>Scoring is easy in restricted response question.</i>	<i>Scoring is difficult in extended response questions.</i>
<i>Restricted response measure the factual knowledge only.</i>	<i>Extended response measure the ability to synthesize ideas.</i>

Advantages of essay test

In order to use essay questions effectively, it is important to understand the following advantages of essay questions.

- Essay test allows freedom of response to examinees.
- Essay test requires the examinees to compose answer rather than select correct answer. Therefore, the use of essay question eliminates the problem of guessing.
- Essay test offers the examinees an opportunity to develop higher-order or critical thinking, critical reasoning and systematic presentation in variety of ways.

- Essay tests encourage students to prepare more thoroughly, because it requires the written communication skills and expression of thoughts.
- Essay tests measure the complex learning outcomes which cannot be measured by other tests. This test is ideal for assessing how well students can summarize, hypothesizes, find relations and apply known procedures to new situations.
- Essay tests allow examinees to show their originality of thought as they permitted freedom of response.
- Essay test more useful in developing writing skills and linguistic ability among examinees.
- Essay tests stress integration and application of thinking and problem solving skills.
- It is relatively easy in construction and administration. This factor leads to widespread use of such questions for assessing classroom performance of students by the teacher.
- Essay tests set better standards of professional ethics for teachers because they require more time in assessing and scoring.
- Essay tests provide less scope for the use of unfair means.

Disadvantages of essay test

- In practice, essay tests stress the lengthy enumeration of memorized facts.
- Essay question covers limited sample of content (subject matter). Such test includes few questions from some specific areas and are measured thoroughly, while many others areas are neglected. Hence, such test has poor content validity.
- Essay tests are time consuming for both examinees and examiners. Examinees spend more time in answering the questions. Similarly, examiners are also required extensive time for reading and scoring of answers.
- Essay tests are difficult to score objectively because of permitted wide freedom of expression.
- The evaluation of essay test depends on the viewpoint of the evaluator. Consequently, it encourages the use of subjective criteria in assessment. Therefore, essay test is unreliable test on scoring point of view.
- Sometime marking is influenced by the mood of examiner. If personal and professional life of examiners is satisfied that motivate them to be more generous in marking.

- Essay responses are subject to bluffing. Poorly prepared students desperately attempt to get a passing grade by answering something even if the responses are not related to the asked questions.
- Essay tests are good for testing small numbers of students. However, as the number of student increases, the advantage of such test decreases.

a) Short-answer test

Short-answer test is a practical alternative to the essay test. It is also a type of written examination, where examinees are required to supply the answer rather than choose from given responses. Simply, we can say that a short-answer test is a test between essay and objective type test.

Short-answer question is used in examinations to assess the basic knowledge and understanding of an examinee related to a topic or content area. In other word, we can say that short-answer questions tend to test the lower levels of the cognitive domain. In-fact the scoring of short-answer question is more objective than the essay type test. In this test, the questions may be asked in the form of complete the sentence, supply the missing word, short descriptive and diagrams with explanations etc.

J. Nitku (1983), *“Short-answer items require the examinee to respond to the item with a word, short phrase, number or a symbol”.*

Advantages of short-answer test

- Short-answer test is easy to construct and administer.
- Short-answer test is basically direct question based on lower levels of cognitive abilities i.e. knowledge and understanding. Hence, the scoring of such test is relatively fast and easy.
- The examinees have to supply the answer rather than choosing correct response from given options as required in objective test. So there is no chance of guessing at all.
- Short-answer test can cover large content areas with inclusion of more questions in a test/examination.
- Short-answer test minimizes the effect of handwriting and spelling errors etc. in the scoring.
- Short-answer test can be used as part of formative and summative assessment both. Short questions are generally used in traditional examination of school and college. So the students are more familiar with this practice and feel less anxious.

Disadvantages of short-answer test

- Short-answer tests are not suitable for measuring the complex learning outcomes of examinees.
- Short-answer tests are not suitable for judging the power of analyzing and reasoning of the examinees.
- Short-answer tests are typically used to measure the basic knowledge. Thus, it promotes rote learning of the examinees. If the evaluator wishes to use short-answer questions to assess deeper learning, an appropriate question is required.
- There can be time management issues when answering short answer questions.
- Short-answer test can lead to difficulties in scoring. If the question is not designed properly, then it leads to many different answers of same question.
- Sometime evaluation may be influenced by handwriting and mechanics (correctness of grammar and spelling) of the examinees.
- Evaluator is not very clear about the expected answer because the short-answer test is mainly an open-ended test where examinees are free to answer on their own way.

b) Objective test

An objective test is one where there is only one fixed correct answer. The examinee either writes the response or chooses the response from among given options. In other words, objective tests are those tests whose items are scored by the examiner in a way, where there is no scope for subjective judgment. The answer of objective test item is either right or wrong and requires no interpretation or judgment on the part of the scorer as required in subjective tests like essay. It is also known as new-type test or limited-answer test.

L. M. Carey (1988), *“Objective test items require students to work or select a correct or best answer. These items are called objective because they can be scored more objectively than any other type of item used to measure student’s performance. Selected response items include alternative response, matching, keyed and multiple choice items”.*

W. Wiersma & S. G. Jurs (1989), *“Objective items are items that can be objectively scored, items on which persons select a response from a list of options”.*

All the objective items can be divided into two broad categories i.e. construct and selection type items.

1. Construct type items (Recall type items)

In this format, examinee is required to write answer in the form of one-word or completing a statement. The construct type items can be formulated in two ways, in the form of direct question or incomplete sentence. Both formats are almost similar but differ in terms of presentation.

a. Very-short answer item

A very-short answer item is given in question form, where the examinee supplies the correct answer in terms of one-word, number or phrase. *For example*, who was the first president of the Indian Republic? (Dr. Rajendar Prasad)

b. Completion item

The completion item is one where the examinee is required to insert the answer (in one or two words) in order to complete a statement. It is also known as fill in the blank type item.

An incomplete statement contains a blank space at the end or between the statements, in which the examinee writes a short response to complete the statement. It is good if the blank space should be placed at the end of the statement. For example, Chandigarh is the capital of Punjab and _____.

c. Correction item

In this form, the examinee is required to correct the item by providing the right answer. Usually, the wrong part of the item is underlined or written in colour or in italics, where the examinee is required to substitute the indicated part by a correct answer. *For example*, 26th January is celebrated as Independence Day in India. (15th August)

2. Selection type item (Recognition type item)

Another important category of objective items is the selection type of item where the examinee is required to select the correct response from among a few given options or alternatives. It includes the alternative-response, multiple choice and matching items.

a. Alternative-response items

Alternative-response items are those where the examinee is required to select the response that he thinks to be correct. In more simply, alternative-response items provide two answers for single item and the examinee have to choose between these two. Here, the item is presented

in the form of a statement or question. The two-alternative item is also known as dichotomous format item.

Alternative-response items can be used to measure the examinee's learning outcomes pertaining to facts, definitions, concepts, etc. These items are also suitable for covering a large content area within a limited time span. Apart from this, it can be written quickly and scored objectively. The possibility of guessing is quite high, may be 50 percent if equal number of true and false items are given in the test.

A. J. Nikto (1983), *"A true-false item consists of a statement or proposition which the examinee must judge and mark as either true or false".*

N. E. Gronlund (1985), *"The alternative response test item consists of a declarative statement that the pupil is asked to mark true or false, right or wrong, correct or incorrect, yes or no, fact or opinion, agree or disagree and the like. In each case there are only two possible answers. Because the true-false option is the most common, this item type is most frequently referred to as the true-false item".*

Alternative-response item is divided into many subcategories i.e. true-false, yes-no, right-wrong, and so on.

True-False

This form of objective item is expressed in terms of declarative statement, which is either completely true or completely false. *For example*, Essay test measures the high order cognitive abilities of students. (True/False)

Yes-No

This is form of objective item is expressed in terms of question. *For example*, are you getting education for acquire a good Job? (Yes/No)

Right-Wrong

This form of objective item is expressed in terms of simple sentences, which are to be marked as right or wrong depending upon the correctness or incorrectness of the sentence. *For example*, the sun revolves round the earth. (Right/Wrong)

How to write good alternative response items

An item writer must keep in view the following suggestions and guidelines while constructing good alternative-response items:

- The statement must be written in simple and straightforward. Avoid the use of complex and indirect ways of presenting statement.
- The statement must be either entirely true or entirely false so that only one interpretation is possible.
- Double negative must be avoided because they tend to confuse the examinees.
- Express a single idea in one statement. Do not test two or more stimuli to elicit one response.
- Don't have a disproportionate number of either true or false statements.

b. Multiple choice item

Multiple choice items are the most popular, common, flexible and effective among all objective items. In multiple-choice items where examinee read a question or an incomplete statement and selects the best answer from a set of possible choices. Simply we can say that multiple-choice item presents the problem along with suggested solutions. Multiple-choice item consists of two basic parts i.e. problem (*stem*) and options or alternative responses (suggested solutions). The stem may be presented in the form of either a question or an incomplete statement. Though, the options or alternative responses contain one correct answer (best alternative) and remaining as incorrect or inferior, which is known as distractors. A distractor is not actually the correct answer but very much close to correct one. Although there is no set rule for the exact number of responses to be included in the list of options, usually four to five alternatives are preferred. *For example,*

Q1. Which of the following Article of Indian Constitution lays down that education of children aged 6-14 years is a Fundamental Right? (Stem)

- (i) Article 21 (A) (Answer) (ii) Article 45 (Distractor)
 (iii) Article 51 (K) (Distractor) (iv) Article 42 (Distractor)

Q2. Summative evaluation implies _____

- (i) Judging the performance during teaching learning interactions. (Distractor)
 (ii) Finding out the level of achievement initially. (Distractor)
 (iii) Judging the learning outcome for motivational purposes. (Distractor)
 (iv) Ascertaining the performance level after the academic session comes to an end. (Answer)

Multiple choice items can be used to test factual recall, levels of understanding, ability to use judgment in analyzing and evaluating. Such items cover many topics in single test. Further, examinees can quickly answer many items within limited time. In addition, it can be

scored rapidly, accurately and objectively. Though, the construction of such item is more difficult as compared to other objective items. This means that multiple-choice items can be constructed only by trained persons. The important merit of this test items is that can be used for any class or grade. But it is completely fail in measuring the ability of expression of examinees.

N. E. Gronlund (1985), *“A multiple choice item consists of a problem and a list of suggested solutions. The problem may be stated as a direct question or an incomplete statement and is called the stem of the item. The text of suggested solutions may include words, numbers, symbols, or phrase and are called alternatives (also called choices or options). The pupil is typically requested to read the stem and the list of alternatives and to select the one correct or best alternative”.*

How to write good Multiple-Choice Items?

An item writer must keep in view the following suggestions and guidelines while constructing good multiple-choice items:

- o The stem must be written in a clear language and presented in the form of direct question.
- o Do not use the blank space in the beginning or between the statements in completion type multiple choice items.
- o Eliminate excessive irrelevant information from the stem.
- o Include all those word(s) in stem that might otherwise be repeated in each alternative.
- o Use a negatively stated stem only when significant learning outcomes are expected.
- o Make all distractors plausible and equally attractive.
- o Make all the alternatives approximately equal in length. The relative length of the options should not provide a clue to the answer.
- o Ensure that there should be only one correct or best response for each multiple-choice item unless you are using partial credit scoring.
- o Remove clues from the answer such as word associations, grammatical inconsistencies or any connection between the stem and answer. Make all options grammatically parallel in construction and do not repeat words that appear in the stem.
- o Minimize the use of ‘All of the above’ and ‘None of these’ as an option.

c. Matching items

Another category of the selection type item is the matching item. The matching item can be considered as a modified form of multiple-choice item. Instead of writing each item separately, a series of items are listed in one column (*left-column A*) and their responses are listed in the other column (*right-column B*). For matching test items, examinee must find the relationship and pair together information given in two columns (A & B).

Items on the column A constitute a set of stems called premises and items on the column B constitute responses (alternatives). Though, the constructions of such items are relatively easy. If the items are properly constructed and extra items may be placed in the response column, then, it reduces the probability of guessing through the process of elimination. Thus, the simple way to reduce the possibility of guessing is to list a larger number of responses than premises. *For example*, column A contains a list of Article of constitution of Indian (premises) and column B (alternatives) description of these Articles. Match the column A with column B.

Column A	Column B
Article 21:	Right to free meals.
Article 21A:	Right to Education (up to 6 years' age).
Article 45:	Duty of parents/guardians to education of children.
Article 51K:	Right to Education between 6 to 14 years age.

The matching format is effectively used to measure examinee's ability of recognizing the relationships between incomplete statements, descriptive phrase, definitions, events and dates, vocabulary, and examples, and so on. Thus, matching items are effective in measuring achievement where associative learning is involved.

Matching item is objective and can be scored quickly by the examiner. However, matching items have some inherent weaknesses such as it measures only factual association rather than organizational ability of the examinee, and also require more time to answer as compared to alternative and multiple-choice items.

A. N. Nitko (1983), "A matching exercise presents the pupil with a list of premises, a list of responses and a set of directions for matching the elements of these two tests".

N. E. Gronlund (1985), "The matching exercise consists of two parallel columns with each word, number or symbol in one column being matched to a word, a sentence or phrase in the other column. The items in the column for which a match is sought are called premises and the items in the column for which the selection is made are called response".

L. M. Corey (1988), "Matching items are another popular selected response format. These items require students to match information in two columns.

Items in the left hand column are called premises and those in the right hand column are called response. Students are required to locate the correct response for each premise”.

How to write good matching items?

An item writer must keep in view the following suggestions and guidelines while constructing good matching items:

- The number of alternative responses should be greater than the number of stem in each matching exercise. This is done in order to reduce the probability of guessing through the process of elimination.
- The basis on which matching is to be done should be clearly indicated or directed. *For example*, here the List-I shows the name of some authors and list-II the titles of book. Match the author name with his/her titled book.
- All the items of a single matching exercise should be on the same page otherwise matching becomes difficult.
- Only homogeneous or related materials should be used in any one exercise.
- The nature of the stems and the number of response options must be neither too short nor too long.
- Diagrams may also be used for matching.
- Avoid grammatical clues or other clues in correct responses.

Advantage of objective test

- The scoring of objective type items is more objective than essay type test. The scoring will not vary from time to time or examiner to examiner. Such items are free from personal biasness and similarly the mood of the examiner in no way affects scoring.
- Objective test provides highly reliable test scores. Moreover, it is quick and easy to score.
- Objective test scoring is done using the answer key. The scoring of objective type test is possible with the help of electronic machine and manually by any persons.
- Objective test is more comprehensive. It can cover large amounts of content. Therefore, teachers can cover large number of course material in a single test.
- Objective test eliminates extraneous (irrelevant) factors such as speed of writing, fluency of expression, literary style, good handwriting and neatness, etc.

- Objective test can be standardized by applying the beforehand to a large number of students of the same age group before the actual examination. On the basis of the results of this standardized test, the achievement of students can be compared with other students of same age and grade.

Disadvantage of objective test

- Objective test takes time in construction (especially good questions). Construction of the objective test items is difficult while answering them is quite easy. In case of multiple-choice item, it is difficult to prepare good choices or options. However, matching item takes more time in answering as compared to other objective type items.
- There is a chance of guessing in all objective type test items. In case of alternative-response item, the scope of guessing may increase to 50 percent.
- Cheating is somehow possible in all objective tests if the invigilators are lenient. The examinee can easily correct many questions through the means of cheating.
- Objective test restricts the examinees. In which an examiner has to select a response from the list of option. The examinee does not have an opportunity to show his/her ability in expressing ideas or thought.
- It is commonly said that objective type test fails to check cramming. The examinee focuses more on memory work even without understanding.
- Sometime the result of objective type test may be misleading in the absence of proper standardization of items. It may be possible that many respondents scored equally.