Evaluation of theory and practical test, kirkpatrick evaluation model

Objectives: At the end of this lesson you shall be able to
• **distinguish between test, assessment evaluation and validation**
• **state the importance of analysing the test result**
• **explain the evaluation of theory and practical test**
• **describe Kirkpatrick evaluation model.**

Test, and evaluation assessment

Test

A test is used to examine learners knowledge of something to determine what he /she knows or has learned. Testing is a tool which is used to measure the level of skill (or) is a tool of knowledge that has been learned.

Assessment

It is the process of documenting knowledge, skills, attributes and beliefs, which is in measurable terms.

The goal of assessment is to make improvements, in an educational content. Assessment is the process of describing, collecting, recording, scoring and interpretive and information about learning.

Evaluation

It is defined as the process of making judgements based on criteria and evidence.

Validation

The term 'validation' and evaluation are important when designing training. Validation is an essential feature, and it will be your responsibility to include appropriate validation measures, but it is often done by management. Validation is further classified as 'Internal' and "external" validation.

Internal validation

A series of tests and assessments designed to ascertain whether a training programme has achieved the behavioural objectives specified.

External validation

A series of tests and assessments designed to ascertain whether the behavioural objectives of an internally valid training programme were realistically based on accurate initial identification of training needs in relation to the criteria of effectiveness adopted by the organisation.

The relationship between these three terms (Evaluation, Internal and external validations) is illustrated in Fig 1.

Fig 1
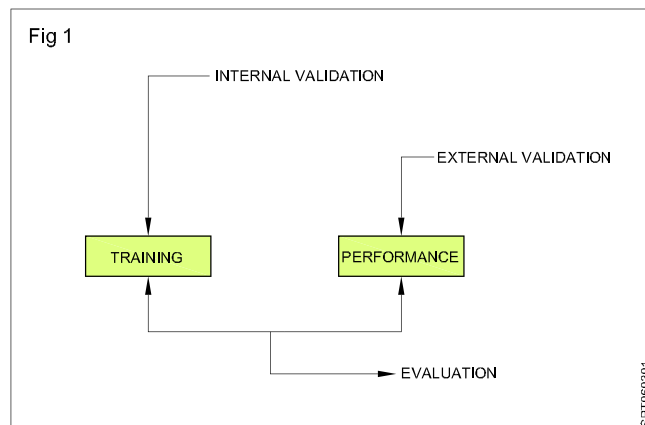
Note the essential part, that any system is developed for evaluating training needs to incorporate the procedure obtained by information about the validity.

The importants of analysis of tests results

• The importance of systematic evaluation of a test.

• It is an acceptable fact that no training programme is completed without evaluation .

• It is not just enough if the teacher conducts a test by designing a question paper well and does not evaluate it.

• After completion of the test it is very much necessary and important to evaluate the test systematically.

• Through evaluation, the achievement of the students can be measured and at the same time the success and failure of the training programme is also measured.

• It shows as a feedback for both the trainer and the trainees.

• Both of them can make improvements if it is necessary.

• After evaluating the test paper it is very much necessary and important to analyse the results of the tests. This analysis will help the teacher to inform the students about their progress and improvement.

• It also helps them to decide what course of action is to be taken, in order to bring all the students of class for the required standard. For the students it helps them to know their drawbacks, so that they can take required measures.

Following information can be obtained by analyzing the test result

- The difficult value of question asked in a particular test can be found out.

- If students scores good marks in all subjects we can assume that the questions where very easy.

- If most of the students did not attended a particular question, it can be concluded that the particular question would have been out of syllabus or has not been understood by the students.

- After evaluating the test result, classification of the students will be possible.

- It is easy for giving ranks for students.

Types of evaluation

Evaluation is normally divided into two types.

Formative evaluation

This evaluation (internal evaluations) is a method for judging the worth of a programme while the program activities are forming (progress). They can be conducted during any phase ADDIE process.

The formative evaluation are basically done on the fly. Its main purpose is to catch deficiencies ASAP, so that the proper learning interventions can take place and allows the learners to master the required skills and knowledge. It is useful in analysing learning materials and achievement of students, and teacher effectiveness.

Summative evaluation

This evaluation (external) is a method of judging the worth of a program. At the end of the program activities (summative) it focus on outcomes. All assessments can be summative functions (ie) have the potential to serve a summative function that only some additional capability of serving formative function.

The most important feature is the guidance given for the completion. All instruction should be clearly stated.

It concludes formative evaluation which is conducted during the development (or) improvement of performance Summative which involves making judgments about the efficiency of a program at its conclusion.

Theory based evaluation

It is an approach of evaluation (completed analytical model) and not a specific method or technique. It is a way of structuring and undertaking analyses of an evaluation.

Principle of evaluation

It is a systematic process of determining to what extend the instructional objective has been achieved.

Therefore evaluation process must be carried out with effective techniques.

Evaluation method of theory test

A test (or) assignment used for theoretical subjects may consist of a number of objective test items with a few subjective items.

The instructor will allot full marks to the correct answers of objective items and no marks to the incorrect answers.

In the case of subjective items, the instructor has to necessarily make a subjective judgement and consider the range of performance and allot marks accordingly.

Approach of evaluation of practical test (Performance test)

While evaluating trainees performance abilities, the instructors have to take into account not only the final product, but also the method of performance and other attributes which will contribute towards the development of correct work habits.

It means, the instructors have to make both objective and subjective assessment while evaluating training jobs.

The practical (performance skill test) tests consists of different features, which are similar to the theory test items. For features which stipulates certain specific standards performance are given below:

The performance test features are:

- Abilities to handle tools and equipment

- Selection and economical use of materials

- Ability to read drawings

- Observing safety and good work habits

- Speed of work

- Accuracy

- Quality of workmanship

- Attitude towards work

- Correct sequence in performance

- Neatness in workmanship

- House keeping

In the case of the above features and other attributes, the range of performance 'has to be' judged and recorded as they involve subjective measurement.

Method of evaluating practical test as per NSQF syllabus

The method adopted for assessing the trainees performance in exercises is different when compared with practical test.

Keeping in view the requirements of performance skills independently on the job, the following criteria are to be taken into account for evaluation of practical tests.

a   Organisational ability   -   20
    (Attitude features)

b   Method of doing work (Performance)
    (Objective feature)   -   30

c   Quality product making   -   50
    (Subjective feature)

d   Time

Method of evaluating each criteria

a   Organisational ability (Attitude features)

This is the ability of planning performance in order to accomplish the job as required.

The ability to organise can be tested by asking the trainee to write the procedure for accomplishing a work, name the tools, equipment and materials required for the same, calculation involved, interpretation of symbols and drawing the required result automatic diagram.

b   Method of doing work (Performance) (Objective feature)

The method of doing a skill work would include the following aspects.

* Interpreting the schematic to actual connection.

* Selection of tools for specific application.

* Correct use of tools

* Economic use of materials.

* Following the essential steps in skill performance.

* House keeping

* Observation of safety

Evaluation of this factor is made by the instructors for doing this.

c   Quality of product (Subjective feature)

The evaluation of the quality of a product is based on it's functional requirements.

The aspects assessed are:

* Dimensional features

* Functionality (correct connection, movement, manipulation)

* Other features of the job which need subjective judgement.

Weightage for each aspects is to be given according to the complexity of the performance, and the critically of the features in respect of the functional aspects of the job.

d   Time

The time taken by the trainees during the test has to be taken into account, as speed is an important aspect. The factor to be considered is whether the trainee has taken less or more than the allotted time and it should be expressed as a % of the time allotted for doing the exercise. Weightage or deduction of the marks should be made accordingly.

Awarding marks for time

All exercises included in the programme has time estimation and it is indicated in the drawing. These timings are based on the judgement of the media developers and the information supplied, after completing prototypes of the exercises and the feed-back after conducting the trials.

No separate marks are allotted for the time factor. Extra time up to 30% may be given for enabling the trainees to complete the exercise, if necessary. Due weightage should be given by allotting marks for in time saving and deduction of marks should be given extra time taken.

It should be noted that no weightage in marks should be allowed unless the trainee has secured 70% of marks for the other aspects of the exercise.

Suggested scale

Extra time taken (+)	Time saved (-)	Marks (for a total of 100)
+10%		-3
	-10%	+3
+20%		-6
	-20%	+6
+30%		-9
	-30%	+9

The marks awarded including the weightage of time should not exceed the total marks allotted. The following scale is suggested for awarding marks for time.

Distribution of marks for practical tests

For example, In Electrician trade the practical tests result in some products. The capability of learners in performing the skills can be of greater extent, who is evaluated by the quality of the product and this aspect should be taken into account while determining the weightage of marks for different criteria.

The weightage of marks is suggested - by the following test paper which consists of 3 questions.

Organisational ability - Writing the procedure, requirement of tools, equipment and material	20 marks X 3
Method of doing the work - As marked using performance observation criteria	30 marks X 3
Quality - Product making	50 marks X 3
Total	**100 marks X 3**
	300 Marks

Model Practical Examination Question Paper

Total marks : 300

Time : 8 hrs

1   Write the tools and material required with specification and also write the procedure steps in sequence to make a 'T' (Tee) joint in a 7/20.

2

   a   Draw the circuit diagram to verify the relation between line with phase voltages and line with phase currents in 3 phase star and delta connection using ISI symbols.

   b   Write the required tools and instruments with specification and also write the procedure steps.

   c   Make the connection measure with voltage and current in the above and verify their relations.

3   Verify the characteristics of Series and Parallel Circuit.

   a   Draw the circuit diagram for the Series and Parallel Circuit.

   b   Write the required tools, instruments and materials with specification.

   c   Verify the characteristics of both circuits.

Model practical examination evaluation scheme

1   **(100 Marks)**

S.No	Objective Features	Marks 30	Score of marks for roll no.
1	Tools and material requirement	10	
2	Drawing the object	10	
3	Procedure	10	

S.No	Subjective Features	Marks 50	Score of marks for roll no
1	Dimension	10	
2	Skinning	10	
3	Making joints	10	
4	Uniformity and closeness of furns	10	
5	Finishing and workmanship	10	

S.No	Attitude Features	Marks 20	Score of marks for roll no.
1	Safety	5	
2	House keeping	5	
3	Initiative	5	
4	Co-operation/(Viva)	5	

2   **(100 Marks)**

S.No	Objective Features	Marks 30	Score of marks for roll no.
1	Tools, instruments and material requirements with specification	10	
2	Proper usage of materials	10	
3	Circuit diagram and procedure	10	

S.No	Subjective Features	Marks 50	Score of marks for roll no.
1	Handling of tools	10	
2	Correct connection with harnessing	20	
3	Measure the reading	10	
4	Verification of relationship	10	

S.No	Attitude Features	Marks 20	Score of marks for roll no.
1	Safety	5	
2	House keeping	5	
3	Initiative	5	
4	Co-operation/(Viva)	5	

3   **(100 Marks)**

S.No	Objective Features	Marks 30	Score of marks for roll no.
1	Tools, instruments and material requirements with specification	10	
2	Economic usage of materials	10	
3	Circuit diagram and procedure	10	

S.No	Subjective Features	Marks 50	Score of marks for roll no.
1	Preparation of drawing layout	10	
2	Fixing of accessories	10	
3	Making connection	10	
4	Reading and recording the measured value	10	
5	Observing the characteristics	10	

S.No	Attitude Features	Marks 20	Score of marks for roll no.
1	Safety	5	
2	House keeping	5	
3	Initiative	5	
4	Co-operation/(Viva)	5	

Kirkpatrick evaluation model

Kirkpatrick model

It is probably the best known model for analysing and evaluating the result of training and educational programme.

It takes into account of any style of training both informal (or) formal to determine aptitude based on four levels of criteria.

Kirkpatrick four levels model:

The Kirkpatrick four level training evaluation model helps trainers to measure the effectiveness of their training in objective way.

This model was originally created by **Donald Kirkpatrick** in 1959, and has gone through several updates and revisions. This model was then updated in 1975, and again in 1993.

The four levels are:

*   Reaction
*   Learning
*   Behaviour
*   Results (Impact)

Level 1 - Reaction

This level measures how your trainees reacted to the training. Its important to measure the reactions because, it helps you understand how well the training was received by your trainees and how it has improved.

Furthe training for trainees, include identifying important areas or topics that are missing from training.

Obtaining feedback from trainees about the quality of training which they have received is very important. Their opinions about the content, place, methodology, tutorial support, learning material and the facilities available are essential components in monitoring and improving the 'quality' of training. The basis for obtaining this information is by using 'Immediate Reaction Questionnaires'.

Level 2 - Learning

You should access our trainees by knowing how much has their knowledge they have increased as a result of the training.

It is important to access, what your trainees are learning and what they are not knowing and it will help you to improve future training.

The purpose of training is to organise learning on the behalf of a person, so that they can achieve specified objectives. The outcome of this process is to assess the person's acquisition of knowledge, skills and attitudes relevant to their needs. This can be done using formal tests (or) with a less intrusive form of assessment. Examples of assessment techniques include:

*   Objective tests
*   Checklists
*   Simulations
*   Interviews
*   Performance tests
*   Observation
*   Assignments and projects

Level 3 : Behaviour

In this level, you evaluate how far your trainees have changed their behaviour based on the training they received, (i.e.) how trainees apply the information. They are:

*   Current job description
*   Specific tasks or competences
*   Standards of performance
*   Performance targets
*   Categories of knowledge - principles, concepts, facts, procedures, etc.
*   Categories of skills - manual, interpersonal, keyboard, problem solving, etc.
*   Indicators of attitudes

Level 4 : Results (Impact)

At this level, you analyze the final result of your training. This includes outcomes that you (or) your organization have determined to be good for the employees (or) good for the employers (or) good for bottom line.

Fig 2 shows the Kirkpatrick model of 4 steps of evaluation steps of learning (earlier approach)
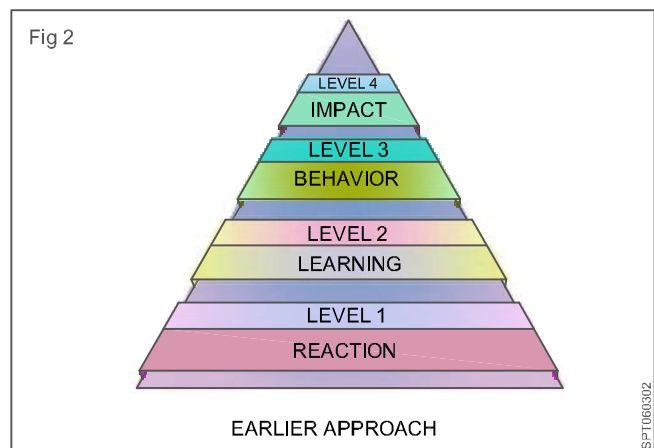

Fig 2

LEVEL 4
IMPACT

LEVEL 3
BEHAVIOR

LEVEL 2
LEARNING

LEVEL 1
REACTION

EARLIER APPROACH

Fig 3 shows the Kirkpatrick revised current apporach of Kirkpatrick 4 steps evaluation steps of learning with chain links.

Fig 3

CURRENT APPROACH: CHAIN OF EVIDENCE

LEVEL 1   LEVEL 2   LEVEL 3   LEVEL 4
REACTION   LEARNING   BEHAVIOR   IMPACT

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Use of the Kirkpatrick model for training evaluation

Level 1 : Reaction

Objective : At this level, the focus is to determine the learner's reaction to the training. Today, we have wide-rang of options through Learner Analytics to identify if the learners liked the training whether they found it useful and whether they would be able to apply the learning.

From an evaluation perspective, this feedback enables L & D (Learners and Development) teams to assess if they are on track or if any further changes are required.

Level 2: Learning

Objective : At this level, the focus is to determine what was learned (or) gained (this should be attributable directly to the training). It includes

• Knowledge gain

• Acquisition of a new skill

• Further proficiency gain on an existing skill

• Behavioural change

The pointers from this stage of evaluation would point to:

• The need for further training

• The need to supplement formal training with other measures that could include performance support intervention or mentoring/coaching.

Level 3 : Behavior

Objective : At this level, the focus is to determine if the learner behaviour changed (again, this should be attributable directly to the training).

From an evaluation perspective, this feedback enables L & D teams to assess if there was a demonstrable change in the learner's behaviour.

Often, this is can be tricky. Although, learners had successfully cleared the assessment, yet there is no demonstrable change.

This may need re-assessment to determine why this is not happening.

Sometimes, it could be because learners have no opportunity to demonstrate what they have learned, and often, it may point to the need for reinforcement.

There may be a need to have refresher programs to be offered over an extended period of time till the required gain is observed.

Level 4 : Impact (Result)

Objective: At this level, the focus is to determine whether the business has attained some gain and whether the required impact was created on account of the training.

From an evaluation perspective, this feedback enables L & D teams to review if the expected impact identified during the TNA phase indeed happened.

Model Questions

Theory 6.3

9   Which term is defined as the process of documenting knowledge and skills?

   A   Evaluation   B   Assessment

   C   External validation   D   Internal validation

10 What is evaluation?

   A   The process of making judgement with evidence

   B   Series of test and assessment to ascertain the achievements

   C   Examine learners knowledge of something

   D   The process of describing collecting information about learning

11 What is principle of evaluation?

   A   Systematic analysis of test results

   B   Systematic process of determining to the instructional objectives achivements

   C   Way of structuring and undertaking analysis

   D   Process of analysing learning objectives