

Guideline of the Evaluating effectiveness of Training and Development Programs

Oil Industry Management Development Center

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Change Registration and Control

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1.0	December 25, 2020	Initial document by Yalda Daneshmandi	Yalda Daneshmandi

1. Introduction

In accordance with the directive numbered dated from the Oil Industry Management Development Center is tasked with developing guidelines for the Evaluation of training and development programs. This initiative aims to create suitable conditions for the implementation of training and development activities within the Ministry of Petroleum and its affiliated and subsidiary companies.

2. Purpose

The primary purpose of these guidelines is to establish a framework for evaluating the effectiveness of training and development programs. The evaluation aims to enhance the quality of training activities, ensure alignment with organizational goals, and facilitate continuous improvement in the field of training and development.

3. Scope

These guidelines apply to all training and development activities conducted within the Ministry of Petroleum and its affiliated and subsidiary companies. The evaluation process encompasses various aspects, including program design, content delivery, participant engagement, and the overall impact on organizational performance.

4. Executive Steps of Training and Development Evaluation

The basis of the evaluation method for training courses and developmental programs at the Oil Industry Management Development Center is based on the Kirkpatrick evaluation model (reaction, learning, behavior change, results) and Phillips (return on investment).

Out of the five levels of the mentioned model, two or three of the first levels are used for some courses and programs, considering that the implementation of the fourth and fifth levels, which requires identifying organizational productivity indicators and identifying and comparing the benefits and costs of training and development, and establishing a connection between them and the relevant training courses and programs, is currently not anticipated and its implementation is postponed to the realization of the necessary prerequisites in the future. In general, the objectives of training and development evaluation include:

- Enhancing the quality and effectiveness of training courses and developmental programs and achieving related organizational goals.
- Evaluating the level of participant satisfaction with the implemented training.
- Assessing the content of training courses and developmental programs and their impact on improving job competence.
- Comparing elements and factors influencing the implementation of training courses and developmental programs (comparing instructors, training facilities, and other aspects) for future planning.
- Measuring management satisfaction with the performance of participants after completing training courses and developmental programs.
- Examining the extent to which behavioral objectives of training courses and developmental programs are achieved.
- Assessing the alignment of participants' behavior with expectations arising from the completion of training courses and developmental programs.

Note 1: The evaluation process for each developmental programs (such as mentoring, coaching, backseat, job rotation and others) are comprehensively explained in the relevant guidelines for that program. Therefore, this section exclusively elaborates on the assessment process for training courses.

To conduct the evaluation process of training courses, four levels of evaluation—reaction, learning, behavior change, and results—are performed as follows:

4.1 Reaction Evaluation (Level 1):

This level assesses learners' reactions, including their responses and engagement in the course. It measures the satisfaction of learners with the course execution in relation to factors affecting program quality, such as the instructor, content, and organization. To assess learner reactions, a Reaction Assessment Questionnaire is used, incorporating the above indicators.

For this purpose, assessment personnel provide the evaluation form to learners after completing the training course and before leaving the learning environment. After completion and collection, they proceed to summarize the results obtained from the forms. Based on the relevant form, the column coefficients are Excellent (5), Above Expectation (4), As Expected (3), Below Expectation (2), and Unacceptable (1). Considering the results from all received forms, the score for each question is calculated, and then the evaluation score for content, instructor, and organization aspects is calculated as a percentage. Finally, considering the coefficients mentioned in the formula below, the evaluation score for the reaction level of the training course is determined.

Table 1: Level 1 Questionnaire (Reaction) Indicators and Their Weights

Indicators	Weighting Coefficient	Minimum Acceptable Criteria
Instructor	60%	70%
Content	20%	
Quality of Delivery (Organization)	20%	

The Reaction Evaluation Score is calculated using the formula:

Reaction Evaluation Score=

$$(\text{Instructor Evaluation Score} \times 60\%) + (\text{Content Evaluation Score} \times 20\%) + (\text{Organization Evaluation Score} \times 20\%)$$

Note 2: The minimum acceptable criterion for the instructor's evaluation is 70%.

The acceptable threshold for instructor satisfaction is a minimum of 80% of the achievable scores. The acceptance criterion for training evaluation at this level is a minimum average score of 70. After evaluating this level, if the program's average falls below expectations, factors leading to the score reduction must be investigated, and corrective actions should be planned.

Note 3: If a course has a knowledge-based nature and lasts less than 8 hours, only the effectiveness of the first level (reaction) will be assessed.

In addition to using the standard Level 1 (Reaction) questionnaire at this level, the Training and Development Management Deputy of the Oil Industry employs three additional forms to enhance planning, design, and supervision for better effectiveness. These three forms are as follows:

- **Instructor Reaction Evaluation Form:** Completed by the instructor, this form captures the instructor's feedback on the conducted course based on predefined indicators in the respective form.
- **Observer Evaluation Form:** This form, completed by an observer (who may be the course instructor or another designated individual), aims to evaluate learner activities during the course based on behavioral indicators.
- **Instructor Evaluation Form from the Perspective of the Training Specialist:** The training specialist initiates an evaluation of the instructor based on the relevant form, considering three main evaluation points—before, during, and after course completion.

4.2. Learning Evaluation (Level 2)

The purpose of Level 2 learning evaluation is to measure the level of skills and knowledge acquired by learners during the training course. The learning level of participants is assessed in three areas: knowledge, skills, and attitude, based on the course syllabus and content. Knowledge, skills, and attitude should be evaluated according to the training/behavioral objectives of the program. The assessment of learning in training programs is carried out through pre-tests and post-tests as follows:

To assess the learning of participants in training courses, an "exam" (standard exam/teacher-made exam/practical exam as needed) is used. Assessment unit officials, in collaboration with the instructor or subject matter experts, prepare pre-test and post-test questions and provide the relevant score recording form to the course instructor.

- At the beginning of the course or before it, if necessary, a pre-test is administered to participants.
- At the end of the training course or one week after its completion, if necessary, a post-test is administered to participants.

To calculate and analyze the results, the average post-test scores are calculated according to the following table:

Table 2: Formula for Calculating Pre-test and Post-test Scores

Number of Participants	Average	Learning	Minimum Acceptable Criteria
N	$\bar{X} = \sum_{i=1}^n \frac{x_i}{n}$	Before Training	If a pre-test is conducted ≥ 40 If a pre-test is not conducted ≥ 60
N	$\bar{Y} = \sum_{i=1}^n \frac{y_i}{n}$	After Training	

The acceptance criterion for the learning level evaluation for both pre-test and post-test is a score of 40, and if no pre-test is conducted, the acceptance criterion is a score of 60. If the average post-test scores are lower than expected, the evaluation unit officials will investigate the effectiveness of the conducted training course to identify the reasons for the reduced effectiveness. If necessary, corrective actions will be defined.

The learning level evaluation is calculated using the formula:

Learning Level Evaluation=

(Maximum Course Score (Average Post–Test Score–Average Pre–Test Score)) ×100

Note 4: If the course has a knowledge-based nature and lasts between 8 to 16 hours, only the effectiveness of Level 1 (Reaction) and Level 2 (Learning) will be assessed.

The principles and assumptions of the Oil Industry Management Development Center 's exams are as follows:

- Attendance in all training courses is mandatory for participants. In the case of virtual and online courses, participants can only miss up to 20 or a maximum of 30 percent (this amount may vary in different plans) of the course. If absent, they can catch up offline by watching the recorded video and studying the course content on their own.
- In case of absence in any of the virtual training courses, participants must, in addition to watching the recorded video, take the initiative to record an audio file of at least 20 to 30 minutes summarizing the taught topics of the respective course and send it to the training implementation unit specialists. If the recorded audio file is sent, their absence will be considered justified.
- Some training courses may have pre-tests, post-tests, and comprehensive exams (final exams). In this case, the criterion for the participants' acceptance is the score of the comprehensive exam (final exam).
- The pre-test, post-test, or final exam questions should be designed by the course instructors or other qualified individuals approved by the training and development deputy, based on the course syllabus.
- Comprehensive exam questions should be practical and, if possible, based on case studies (Case Based Exam), while pre-test and post-test questions can be either objective or descriptive.
- Some training courses may include work assignments. These work assignments should be designed by the course instructor.
- If a course has a work assignment, it will be considered as part of the final evaluation of the participant, constituting a minimum of 20 percent of the final score (although this amount may vary depending on the nature of the work assignment and the instructor's opinion).
- Exam papers and work assignments of participants will be corrected by the course instructor, and therefore, the final score, including the work assignment score, will be calculated and determined by the course instructor.
- Participants, in case of unauthorized absence and failure to send the recorded course file, non-completion of the course evaluation form, failure to send work assignments,

and other relevant documents, will be deprived of participating in the exam or reviewing the score or receiving a certificate until they fulfill their commitments and send the required documents.

- The passing score threshold in the final exam is 12, in other words, obtaining a minimum of 60 percent of the exam score is mandatory for participants (for some plans, this amount may be variable up to a maximum of 70 percent).

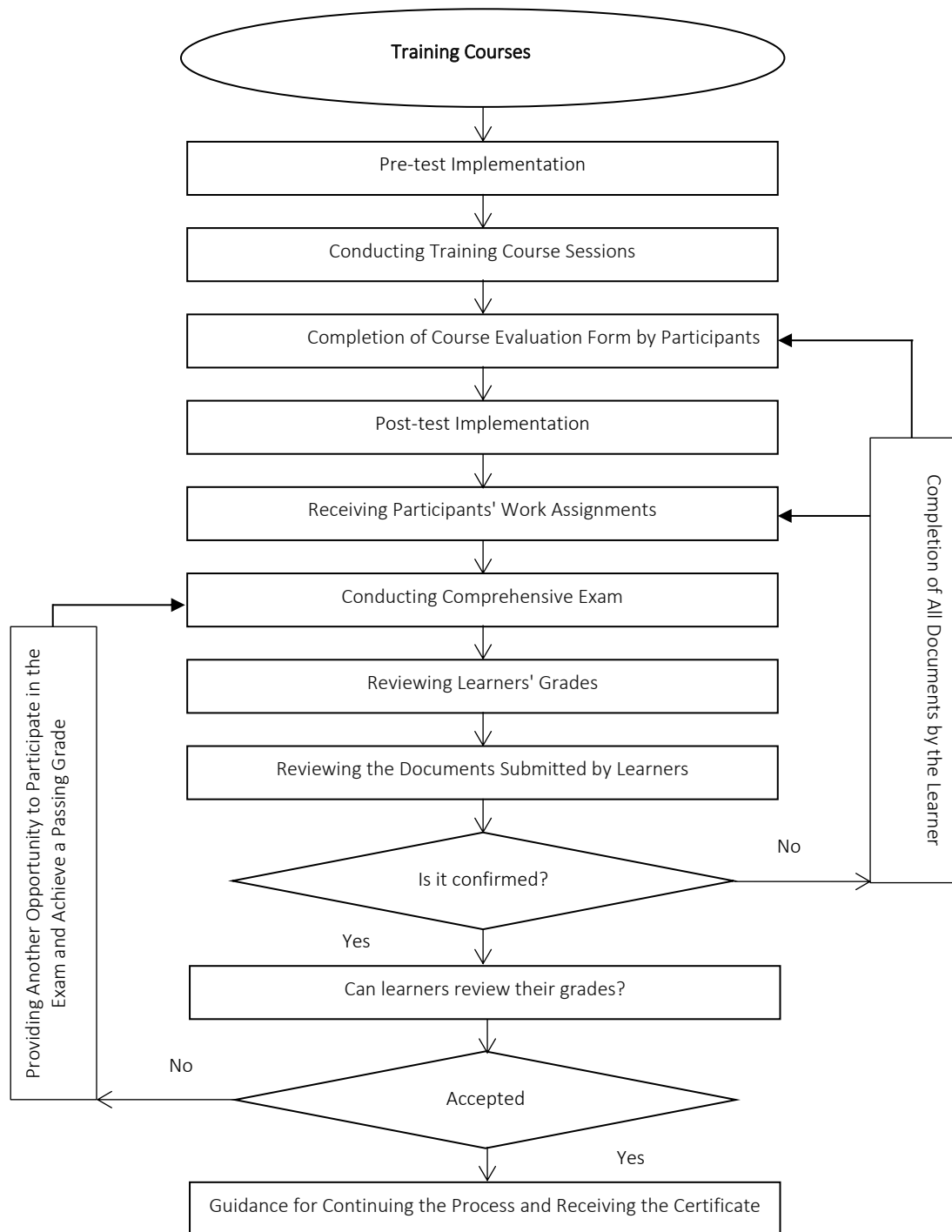


Figure 1: Implementation Process of Exam Administration

4.3. Behavior Change Evaluation (Level Three)

The purpose of this evaluation is to measure the development of skills in applying knowledge and information in the workplace after completing the training course. In other words, it assesses the individual, organizational, or job-related behaviors that learners are expected to demonstrate in the organizational environment after completing the training course. To assess learners' behavior in the workplace, an evaluation form for behavior change is used.

The questions in these forms are prepared based on behavioral objectives, course content, and direct supervisor expectations. The forms are completed 3 to 6 months after completing the course/program by both the learner (40% weight) and the direct supervisor (60% weight).

Calculation and Analysis of Questions:

Each column in the form is assigned an option (Unacceptable, Below Expectations, Meets Expectations, Exceeds Expectations, Excellent) corresponding to scores 1 through 5. After learners and their direct supervisors complete the relevant forms, these forms are returned to training and development officials. The evaluation forms of this level are then analyzed and assessed by training and development officials.

Calculation of Average Scores:

The average scores for both the learner and the direct supervisor are calculated using the following formula:

Table 2: Formula for Behavior Change Level Evaluation

Number of Questions	Average	Evaluator	Weighted Average of Supervisor and Learner Scores
N	$\bar{X} = \sum_{i=1}^n \frac{x_i}{n}$	Supervisor	$\frac{\bar{X} + \bar{Y}}{2}$
N	$\bar{Y} = \sum_{i=1}^n \frac{y_i}{n}$	Learner	

The minimum threshold for training evaluation at this level is an average score of 50. If the obtained average is below expectations, an examination of factors causing the reduction should take place, and corrective actions should be defined if necessary.

Note 5: In courses with a skill-oriented and attitudinal nature lasting more than 16 hours, the effectiveness of levels one (reaction), two (learning), and three (behavior change) will be evaluated.

Note 6: If a training course is of special importance, leading to specific behavioral changes in employees and is less than 16 hours, the effectiveness of level three will still be calculated for it.

4.4. Results Evaluation (Level Four)

At this stage, the impact of training on key performance indicators, results, and fundamental organization metrics is examined. Some of these indicators include increased productivity, reduced downtime, decreased failures, reduced accidents, problem-solving in functional performance, cost reduction, increased employee satisfaction, energy consumption, and other relevant aspects. Naturally, in this case, it is necessary to first identify and define the rate of the specific indicator based on the objectives and nature of the training course. Then, this indicator or indicators are analyzed and evaluated within a specified time frame before and after the training course under the same conditions. This type of evaluation generally requires a minimum of 1 to 2 years after the training course has been conducted. Given the particular complexities of organizational analysis, this level of evaluation is not routinely applied unless it is in specific and sensitive situations.

4.4. Return on Investment Evaluation (Level Five)

Return on Investment (ROI) refers to comparing the financial benefits of training with the costs associated. Training costs can be either direct or indirect. Direct costs include salaries and benefits for everyone involved in training and development, such as learners, instructors, consultants, and individuals responsible for designing and planning training activities. Additionally, direct costs encompass course materials, equipment, and various facilities. Indirect costs, on the other hand, are not directly related to the design, development, or provision of training and development services. These costs include general the Oil Industry Management Development Center equipment, travel expenses, and other external expenses not accounted for directly in the training and development activities, such as salaries for training and development management, and employees involved in design, execution, and support.

Given the particular complexities of its analysis, this level of evaluation is not routinely applied unless in specific and sensitive situations. Nonetheless, to measure it, the cost-benefit ratio and the calculation of ROI are employed. The cost-benefit analysis formula is as follows:

$$\text{Cost of Training} \div \text{Benefits of Training} = \text{Cost-Benefit Ratio}$$

$$\text{Training Costs} \div (\text{Training Costs} \div \text{Benefits of Training}) = \text{Return on Investment (ROI)}$$

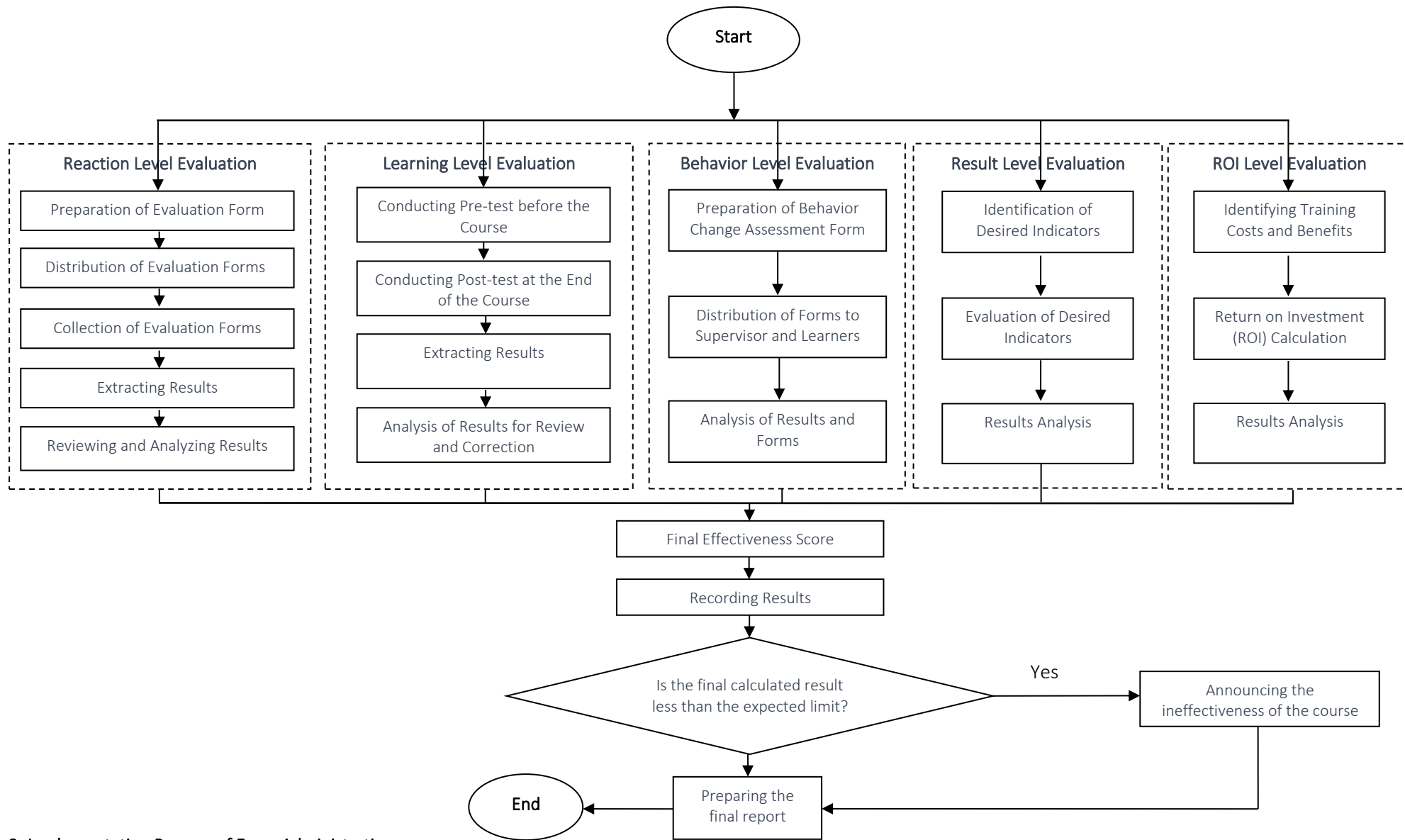


Figure 2: Implementation Process of Exam Administration