

EVALUATING THE EFFECTIVENESS OF IN-SERVICE TRAINING COURSES IN KHUZESTAN PETROCHEMICAL COMPANY ACCORDING TO KIRKPATRICK MODEL

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ABSTRACT

The research has been done in Khuzestan Petrochemical Company in Mahshahr Special Economic Zone, entitled "Evaluating effectiveness of in-service training courses in Khuzestan Petrochemical Company based on Kirkpatrick model". The research population included all participants of in-service training in Khuzestan Petrochemical Company in the first six months of 2013 that consisted 731 individuals and sample size was 250 people. Quantitative and qualitative tools (questionnaires with open and close questions and post-test scores) of interviews with experts and employees in relevant posts are used for data collection and the investigation has used Kirkpatrick model as a conceptual model. Effectiveness of petrochemical trainings studies the Kirkpatrick model in four levels of response, learning, behavior and results. SPSS version 21 software was used for this purpose. After data analysis, it was found that courses are effective at learning, response, and behavior and results level. The purpose of above-mentioned study is to explain and describe the categories of training and show the results of research in Khuzestan Petrochemical Company in order to evaluate the effect of these four levels of response, learning, behavior and results. In addition, this study is the result of collaboration between all staff of Khuzestan Petrochemical Company and based on data received from staff.

Keywords: *Training, In- service Training, Kirkpatrick and Training Effectiveness*

INTRODUCTION

According to daily changes and advancements in science and technology, technology as well as number of jobs and trades, staff training is of special importance in order to avoid wasting resources, and its execution requires planning and detailed study based on training needs of staff. Training for staff development is expensive (LeBoeuf, 2006).

Training activities of each country can be considered an investment of a generation for another generation (Kaufman and Herman, 1995). The main objective of this investment is human development, in other words, it includes training activities, consciousness growth and human potential abilities (Bazarqan, 2009), so one way to gain a sustainable competitive advantage is emphasize on continuous learning of employees in order to achieve organizational goals with the most effectiveness (Abel *et al.*, 2009).

Studies have shown that presenting real-time results and effects of training courses have become a obsession for training units, so that organization managers and policy makers demand practical and objective reports on effectiveness of training courses regarding spent costs and resources (Fathi *et al.*, 2005).

However, despite many years of accepting the need for training, organizational training planners and managers in their organization that Khuzestan petrochemical company is one of these organizations face a challenge or question the must provide precise and scientific answer to it " To what extent is organizational learning effective on using human allocated resources, financial, material and ultimately on realization of predetermined objectives?"

The above problem can also be designed such that if we consider the development of training in organizations as three stages of creating an enterprise, quantity growth and development and emphasis on quality, it will be seen that most of units in charge of training staff are today in the third stage or transition

Research Article

from second to third stage. On the other hand, the characteristic of emphasis on quality is to consider the qualitative assessments of training through determining the effectiveness of these activities (Bzaz, 2005). Therefore, the answer for these questions must be fined in order to determine and evaluate the effectiveness of in-service training of Khuzestan Petrochemical Company; "How well is the function of training unit?",

"How much should be better the performance of training unit?" and we can judge the utility an promotion of training programs through determining the effectiveness of training processes?

Literature

In- service Training

"J.F. May" defining in-service training says that: In-service training is the systematic and continuous improvement of staff in terms of knowledge, skills and behaviors that help to their and organization welfare.

Thus, the aim of in-service training is to create additional production capacity, increase the efficiency of current job and to obtain better conditions for higher posts (Fathi, 2008).

In-service training includes activities that are designed to train job related skills and specialized knowledge and are used to increase the effectiveness of employees during their years of service now and in future (Farjad, 2009).

Types of in-service training service in terms of time

In-service training is divided into three categories due to time:

1. Short-term specialized training: short-term specialized training includes those in-service trainings that is limited in terms of time and varies from a few weeks to several months. The major issue of in- service training is based on designing such trainings.

2. Long-term trainings: it refers to those trainings that firstly, are broad in terms of time and secondly, are led to obtain a higher academic degree.

3. Combination training: it includes those in-service trainings in terms of time that are provided in special short-terms and limited intervals, however they have certain structures in terms of aim and ultimately they lead to higher academic degree (Fathi, 2008).

Types of In-service Training Based on Objectives

In-service training courses can be divided depending on aim of training types to justification, compensatory retraining and knowledge increase.

1. Justification training: it refers to those in-service trainings that are presented for coordination and notification of new employees so that adaption is obtained between individual practices of employees and organizational expectations.

2. Retraining: it refers to trainings that are organized and carried out for repetition and remind of training content that have already been learned.

3. Training of knowledge increase: This type of training is usually intended to compensate and complete staff training.

4. Training of knowledge increase includes those types of in- service trainings that follow two main aims:

1) Providing new scientific development and information to staff in terms of tenure profession.

2) Helping employees to achieve higher academic degrees and qualifications (Fathi, 2008).

Types of in-service trainings in terms of nature

Trainings are divided into two professional (in particular) and general training in terms of nature.

1. Professional training (special): in these trainings those subject matters are discussed that are not considered sufficiently in pre-service training and these trainings are designed to carried out since the needs of organization requires person to have special skills and abilities.

2. General training: This training is provided to create a unified vision, attitudes among staff as well as to create or develop generic skills to employees (Vajargah, 2008).

In- service Training Process

Staff training is a 5-step process that includes following 5 stages:

1. Need assessment of training: At this stage, training needs are prioritize dafter identification.

Research Article

2. At this stage, designing and planning are done based on organization possibilities in order to hold training courses and consider priority of courses, courses administrative arrangements such as budget, location of holding, professors of courses, etc.

3. Execution of training courses: Courses are held in accordance with planning materials.

4. Monitor execution of courses: Training officials and experts monitor execution of training courses, thereby course will be held according to anticipated objectives and outlines.

5. Evaluation: In this stage, the results of courses will be evaluated and attainment of objectives will be measured. The evaluation results are used to improve future training courses (Zeydabadi, 2009).

Donald Kirkpatrick Model

Patrick's model evaluates a training program from a surface layer to deep layers of organization (Qahramani, 2009):

Level one: response

Since the initial effect of phenomenon including a training course is crucial in transferring message and doing tasks and predicted goals, understanding the views of participants and other factors relevant to courses will be studied and reviewed at this stage.

Level Two: Learning

At the second level, attainment of training goals is separable through assessment of students' mastery of learning objectives in three areas of cognitive, emotional and skill and each of these areas have their own characteristics. Assessment of learning in each of them requires the use of specific methods and tools. Evaluation plans are used in order to perform these evaluations in proportion to importance and necessity of evaluation. End of course tests can be used in the simplest form as a criterion for judgment on staff learning. Evaluation designs before and after training can be used at higher level.

Level Three: Behavior

At this level, rate of knowledge, attitudes and learned skills transfer into workplace and operational processes are measured. Types of assessment, pretest and posttest and control groups are used in order to assess the level of training.

Level Four: Results

The last level of evaluation is to assess the effect of training and relatively long-term evaluation of its effect on organization performance. The consequences can be generally classified into two groups. The results are in first group that enhance the organization's strengths and identify and exploit the potentially active opportunities. The second group indicates cases that reduce or eliminate organizational threats or weaknesses.

Research Hypotheses

The main Hypothesis

Khuzestan Petrochemical Company training courses are effective.

The Sub-hypotheses

1. According to Kirkpatrick model, in-service training courses are effective at reaction level.
2. According to Kirkpatrick model, in-service training courses are effective at learning level.
3. According to Kirkpatrick model, in-service training courses are effective at behavior level.
4. According to Kirkpatrick model, in-service training courses are effective at results level.

MATERIALS AND METHODS

The research method is descriptive. The evaluation method is Kirkpatrick training effectiveness based on theoretical model of research. Four levels of response, learning, behavior and results evaluation are considered in order to evaluate each training course.

The statistical population included 731 patients among all Khuzestan Petrochemical Company staff and sample size was obtained 250 people using Cochran formula.

For measuring and evaluating data, poll form of courses is used to evaluate the first level of pattern (response level), tests for teachers that will be held after the completion of each course by instructor and the scores for each participant will be determined between zero to one hundred, evaluation form for

Research Article

effectiveness of courses which is designed for courses and each form consists of 10 items that 5 items are used to measure the fourth level of model.

Cronbach's alpha and split-half are used to determine the reliability of three questionnaires.

Table 1: Reliability coefficients of questionnaires (Cronbach's alpha and split-half)

Questionnaires	Level	Number of items	Cronbach's alpha	Split-half
Evaluation	Reaction	19	0.929	0.756
Evaluation	Achievement of objectives micro level	4	0.844	0.809
Evaluation	Professors' training activities micro level	7	0.923	0.847
Evaluation	Course content and training materials micro level	4	0.759	0.654
Evaluation	Executive management micro level	4	0.874	0.864
Effectiveness of knowledge	Behavior level	5	0.996	0.957
Effectiveness of knowledge	Results level	5	0.997	0.959

Inferential statistics, including simple one sample t-test (t-student) and split-half and Cronbach's alpha were used for data analysis.

Data Analysis

The Main Hypothesis

In- service training courses of Khuzestan Petrochemical Company are effective. $H_1: \mu \neq 0$

In-service training courses of Khuzestan Petrochemical Company are not effective $H_0: \mu = 0$

Table 2: Mean and standard deviation of effectiveness of in-service training courses compared to test value

Test value =10						
Sig	t	DF	The mean difference	Standard deviation	Mean	Variable
0.0001	24.146	248	4.14	2.70	14.14	Effectiveness score

According to Table 2 results, mean total score of effectiveness is equal to 14.14 from respondents perspective. According to scoring method of this dimension of effectiveness variable that has been conducted on 20 degrees scale we can say that the mean shows high effectiveness and mean scores difference and test value is 4.14. Given the calculated significant level (significance level = 0.0001) is smaller than 5% error level, we can say that it has been effective more than mean according to views of in-service training courses respondents in Khuzestan Petrochemical Company.

The First Sub-hypothesis

According to Kirkpatrick model, in-service training courses are effective at reaction level. $H_1: \mu \neq 0$

According to Kirkpatrick model, in-service training courses are not effective at reaction level. $H_0: \mu=0$

Table 3: Mean and standard deviation of effectiveness of response level compared to test value

Test value =10						
Sig	t	Df	The mean difference	Standard deviation	Mean	Variable
0.0001	12.64	249	0.50	0.63	3.50	Response level

One-sample t-test with test value of 3 or Likert scale mean score and Confidence Interval of 95% (5% error) is used to explain and interpret the response level variable of in-service training courses in Khuzestan Petrochemical Company. According to Table 3, mean score of response level is equal to 3.5

Research Article

from respondents' perspective. This amount is different from test value as 0.5 score and is significant at level 0.0001. We can say that it has been effective more than mean at response level according to views of in-service training courses respondents in Khuzestan Petrochemical Company. Research hypothesis is confirmed.

The Second Sub-hypothesis

According to Kirkpatrick model, in-service training courses are effective at learning level. H1: $\mu \neq 0$
 According to Kirkpatrick model, in-service training courses are not effective at learning level. H0: $\mu=0$

Table 4: Mean and standard deviation of effectiveness of learning level compared to test value

Test value =60							
Sig	t	Df	The difference	mean	Standard deviation	Mean	Variable
0.0001	4.29	249	10.26		37.80	70.26	Learning level

According to Table 4 results, mean total score of effectiveness is equal to 70.26 from respondents perspective. According to scoring method of this dimension of effectiveness variable that has been conducted on 100 degrees scale we can say that the mean shows high effectiveness and mean score difference between learning level and test value is 10.26. Given the calculated significant level (significance level = 0.0001) is smaller than 5% error level, we can say that it has been effective more than mean at learning level according to views of in-service training courses respondents in Khuzestan Petrochemical Company. Research hypothesis is confirmed.

The Third Sub-hypothesis

According to Kirkpatrick model, in-service training courses are effective at behavior level. H1: $\mu \neq 0$
 According to Kirkpatrick model, in-service training courses are not effective at behavior level. H0: $\mu=0$

Table 5: Mean and standard deviation of effectiveness of behavior level compared to test value

Test value =14							
Sig	t	DF	The mean difference	Standard deviation	Mean	Variable	
0.0001	6.02	249	0.97	2.56	14.96	Behavior level	

According to Table 5, mean total score of effectiveness is equal to 14.96 from respondents' perspective. According to scoring method of this variable that has been conducted on 20 degrees scale we can say that the mean shows high effectiveness and mean score difference between behavior level and test value is 0.97. Given the calculated significant level (significance level = 0.0001) is smaller than 5% error level, we can say that it has been effective more than mean at behavior level according to views of in-service training courses respondents in Khuzestan Petrochemical Company. Research hypothesis is confirmed.

The Fourth Sub-hypothesis

According to Kirkpatrick model, in-service training courses are effective at results level. H1: $\mu \neq 0$
 According to Kirkpatrick model, in-service training courses are not effective at results level. H0: $\mu=0$

Table 6: Mean and standard deviation of effectiveness of results level compared to test value

Test value =14							
Sig	t	DF	The mean difference	Standard deviation	Mean	Variable	
0.0001	4.72	249	0.89	2.98	14.89	Results level	

According to Table 6 results, mean total score at results level is equal to 14.89 from respondents' perspective. According to scoring method of this variable that has been conducted on 20 degrees scale we can say that the mean shows high effectiveness and mean score difference between effectiveness and test value is 0.89. Given the calculated significant level (significance level = 0.0001) is smaller than 5% error

Research Article

level, we can say that it has been effective more than mean at results level according to views of in-service training courses respondents in Khuzestan Petrochemical Company. Research hypothesis is confirmed.

RESULTS AND DISCUSSION

According to Table 2, mean total score related to four levels of Kirkpatrick model is equal to 14.14 from respondents' perspective. Total score of effectiveness according to respondents' views due to method of scoring for this dimension of effectiveness variable on 20 degrees scale shows high mean effectiveness. Given the significant difference of 14.4, mean score difference between effectiveness score and test value for significance level is smaller than 5% error level (calculated = 0.0001), therefore, main hypothesis of in-service training courses in Khuzestan Petrochemical Company is effective based on Kirkpatrick model. According to above, we can claim that in-service training courses respondents in Khuzestan Petrochemical Company based on Kirkpatrick model is effective according to table 2 and research hypothesis is confirmed.

First Sub Hypothesis

As shown in Table 3 mean score assigned to response level of learners is 3.50 that is among 60% of highest achieved score of number 3 and this difference is statistically significant, thus, it shows that mean response score (3.5) differs from test value (3) to the amount of (0.5) using one sample t-test with test value of 3 or average Likert score and confidence interval of 95% that is calculated with 5% error, and the difference is significant at (0.0001) level therefore, it can be claimed that in-service training courses of Khuzestan Petrochemical Company based on Kirkpatrick model is effective at response level. So we can say that it has been effective more than mean at response level according to views of in-service training courses respondents in Khuzestan Petrochemical Company and research hypothesis is confirmed.

Therefore, according to first sub- hypothesis confirmation and mean scores given to micro level of achieving to training objectives at response level, 89.6% effectiveness is achieved and at micro level of training activities of teachers at response level of 95.7%, participants in in-service courses of Khuzestan Petrochemical Company with respect to mean determined scores, effectiveness is achieved and at micro level of course contents at response level of 78.4%, participants in in-service courses of Khuzestan Petrochemical Company, effectiveness is achieved. At micro level of executive management activities, mean scores are among 60% of highest achieved score and 72.7% of participants at response level of Kirkpatrick model, effectiveness is achieved.

Considering the above cases, it can be claimed at response level that response of participants in training courses is effective on in- service training of Khuzestan Petrochemical Company staff and hypothesis is confirmed.

Second Sub- hypothesis

Table 4 shows that mean score assigned to learning level of learners is 70.26 from respondents' point of view and according to scoring method of this dimension of learning level that has been conducted on 100 degrees scale and referring to mean learning scores difference and test value that is 410.26 and given the calculated significant level (significance level = 0.0001) is smaller than 5% error level, therefore we can claim that in- service training courses of Khuzestan Petrochemical Company at learning level of Kirkpatrick model of 75.4 has been effective and hypothesis is confirmed.

Third Sub Hypothesis

As shown in Table 5 mean score assigned to behavior level of learners by their supervisors (14.96) is among 60% of highest achieved score and according to scoring method of this variable that has been conducted on 20 degrees scale it shows that mean behavior scores difference and test value is 0.97, therefore, the calculated significant level (significance level = 0.0001) is smaller than 5% error level, and this mean shows effectiveness of 94.5% therefore we can claim that in- service training courses of Khuzestan Petrochemical Company based on Kirkpatrick model has been effective on learners' behavior and hypothesis is confirmed.

Research Article

Fourth Sub Hypothesis

As shown in Table 6, mean score assigned to results level of learners by their supervisors is 14.89 and according to scoring method of this variable that has been conducted on 20 degrees scale it shows that mean behavior scores difference and test value is 0.89, therefore, the calculated significant level (significance level = 0.0001) is smaller than 5% error level, and we can say that in- service training courses of Khuzestan Petrochemical Company based on Kirkpatrick model has been effective 92.1% on learners' results and hypothesis is confirmed.

Suggestions

- 1) Due to the widespread replication of learners at response level it is proposed that training courses are held at least according to geographical region of Khuzestan Petrochemical Company, in order to create diversity in staff morale in good weather areas (and preferably in big cities like Tehran and Shiraz) and in the morning.
2. It is proposed that course evaluation questionnaires are sent to individuals using automation information system of offices in Khuzestan Petrochemical Company so that cost, time and manpower are saved as well as an automated system of measuring the effectiveness of training courses is designed in order to collect and analyze the raw data of this system and its output is as an index that indicates the effectiveness. It is worth noting that the system is running in some organizations within the country.
3. According to repeated advices, training section (training coerces location) must be disconnected from and outside of work environment in order to motivate and promoting learners' morale.
4. It is recommended that all learners discharge from their organizational unit and be under control of learning management in order to promote learning level of participants during implementation period because generally "it has been observed that people are not separated from work place and due to closeness of learning location to workplace, they are present in classes even with wireless communication equipment so that when it is necessary they are announces and class is disrupted.
5. It is recommended that written sources are presented in electronic resources and available to everyone in system in order to promote effectively learning information.
6. It is recommended that results of training courses are provided for learners and teachers after analysis in order to increase incentives to achieve the objectives of course because as previously mentioned the original basis for work in companies is adoption of purpose and having sense of cooperation.
7. Content and training material are important factors influencing the effectiveness of training. This is important for both new training courses and for courses that are continually held and considering that in response level questionnaires the lowest mean scores after executive management is assigned to micro level of course content and training materials, it is recommended that scientific content of courses are examined prior to implementation. The content of training courses that are held regularly must be periodically reviewed and improved and if new content and instructional materials are necessary, they are provided for learners at the beginning of course.
8. Although, teacher and instructors' role is key in any training program, but this is very important especially "in short-term, specialized training courses. Therefore, based on discussions and negotiations of learners, it is offered that in selecting instructors of training courses and executives of training centers, three criteria of expertise are considered including communication with adult learners, pass courses of coaching and familiarity with activities of petrochemical industry (especially Khuzestan petroleum).
9. Since effectiveness of training is not only result of teaching and learning activities it is recommended to prepare the work place, and support aspects, infrastructure, facilities and systems of management for training course participants (particularly those go outside the complex for training mission), so that facilitate optimal use of knowledge learned in course and institution in the case of problems associated with working environment and personally, I suggest it is implemented in company as an cyclic retraining system so that Knowledge transfer is done for everyone and they prevent from loss of time and training costs as well as withdrawal of knowledge learned when individuals go to another company.

Research Article

10. It is recommended that indicators are defined based on corporate jobs through formation of specialized committees as well as the training indices are considered as part of annual performance evaluation of staff and these factors are considered in effectiveness of proposed mechanism.

11. Since there is relationship between staff training system and human resources system of oil ministry, in order to ensure the realization of training system objective in promoting individual and organizational rankings, it is recommended that these objectives are measured by external units.

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