Chapter IV

Research Procedure
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RESEARCH PROCEDURE

This Chapter describes the research design and procedures adopted for conducting the present study. Specifically, this chapter delineates the instrument development, sampling, data collection, and data analysis procedures. It also looks into reliability and validity of the measurement scales.

4.1 Scope

The study is conducted in Govt. training institutions i.e., Defence Headquarters Training Institute under Ministry of Defence. The focus of research is on horizontal evaluation of a training programme for middle level executives working in various HQs under ministry of defence. The study is done at three levels (a) pre training (b) during training (c) post training.

The study is conducted in Defence Headquarters Training Institute, Ministry of Defence, on trainees of junior management level. For the purpose of this study, 80 participants in 2 batches were requested from different Headquarters to participate in 15 days duration training programme i.e. “Executive Development Programme”. The focus of evaluation study was on the process of evaluating training before, during training and Transfer of training on the job after 6 months. The evaluation model [Figure 4 (i)] used in the present study is a modified version of model developed by Virmani & Seth (1985) in their evaluation study of training programmes in Administrative Staff College of India (ASCI), Hyderabad. Evaluation of the Executive Development Programme was done in three major phases.

(a) Pre-training evaluation: During this phase a questionnaire was sent to trainee and his boss to know about their perception about the objectives of the training and whether the training objectives meet the individual and organizational needs. It also drew attention on the process of selection of training and reason for attending the training programme. The trainees from
experimental and control group were asked to appear in a test before the training to ascertain the level of knowledge they possess. During the pre-training stage, job satisfaction & organisational learning diagnostic questionnaire was also administered to the participants.

(b) Context & Input evaluation: Pre-training evaluation would not only help the management and the trainee in identifying training needs but also help trainers to become acquainted with the diverse training needs of the participants of a particular training programme. But unless the inputs are in conformity with the objectives of the programme the effect of training on the participants cannot be evaluated. In this phase, trainer got the input about the objective of trainees and their organisations. It also gave them opportunity to mend design of training as per the requirement of trainees and their organisations.

(c) Post-training evaluation: During this phase of research, the reaction, learning and transfer of learning after 6 months on the job were studied.

(i) Reaction evaluation: Soon after the training participants’ reactions to the course was obtained through an evaluation proforma which elicits information about the course inputs and the impression about the course in general.

(ii) Learning evaluation: The test questionnaire was prepared for assessing participants’ knowledge and skills and administered before training was administered again at the end of the course. It then measures the degree of learning acquired through the programme by arriving at the change score i.e. the post-training score minus pre-training score. The test questionnaire was re-administered on the trainees to obtain the addition in learning of individual participants. The same test was also conducted on officers of control group. After the end of similar duration as of training, the test was re-administered to find the learning of individual officers of the control group.
(iii) Follow up after six months: The ultimate aim of the training course was to transfer the learning from training to the job. Self-reported measures of transfer criteria at one time are widely used in transfer studies. Such a measure raises the question of its validity. For more rigorous testing of actual behaviour, in addition to self-reported data, data from other sources (e.g. trainees' supervisors, peers, etc.) should be collected (Facteau et al, 1995). Data gathered shortly after the completion of the training programme may not reflect trainees' actual behaviour change. Generally speaking, three months after training is likely to be a good performance checking point since this will let the trainees go through an "orientation" period to induce new behaviour.

However, if the research is about maintenance issues (e.g. test of long-term retention or relapse prevention), a longer period of performance evaluation and several checking points within the period are needed. Hesketh (1997) also stressed that long-term evaluation is necessary when organisations and researchers want to determine which training methods best develop generic skills. In consequence, behaviour changes reported by trainees and other informants at more than one point in time are needed to capture the dynamics of behaviour. In the present study, follow up of training was done after six months. The transfer of training on the job was assessed by finding the perception of the trainee and his supervisor on his transfer of training on the job. The transfer of training questionnaire was administered on experimental as well as control group.

The present study is experimental research, looking at the relationships between various organisational and individual factor and training effectiveness. The study is longitudinal in nature as it is spread over six month. The study has been selected to experiment because author has control over the variables under study and there is deliberate effort to study their effect on training outcomes. Evidence gathered through experiments is very powerful support possible for various hypotheses.
4.2 Problem

Huge amount is spent on training activities in an organization, but the results are not up to the mark. There are many factors responsible for lack of effectiveness of training. It may be due to lack of organisational culture of learning or non-trainability of the participant. It may be due to irrelevant course content or inability of trainers. Therefore there is a requirement of understanding the individual and organizational need for training before drawing the objectives of the training. In the field of training design a long-standing principle (McGehee & Thayer, 1961) is that trainers must first assess the cause of a performance situation to ensure an appropriate intervention is employed. Content of course should be in accordance of the nature of the job and the entry behaviour of the trainees.

In some cases it is found that although trainees are learning from the training, but are not able transfer the learning on the job. Here, support of organization and its culture plays a crucial role. Organisational support in terms of effective HR practices, learning culture, experimentation and shared learning helps the transfer of training on the job. There is a need to find relationship between organizational parameters and training effectiveness. Apart from the organisational support, and support of supervisor; peer group, subordinates and trainer are very important for transfer of training on the job. The individual factors like job satisfaction, locus of control also have a bearing on the learning of a trainee. Following question needs to be addressed for conceptualization of training effectiveness.

(i) Does training impact the performance of an individual?

(ii) What is the impact of organisational learning, design of training and trainer’s effectiveness on effectiveness of training?

(iii) Do the individual factors viz. locus of control, job satisfaction play any role in learning of trainees in a training programme?

4.3 Justification

There is a need for research to identify if the factors outlined in the model Fig 1(i) are indeed determinants of whether or not learning, behaviour change or
performance improvement occur as a result of training program participation. Effect of organizational learning, training design, trainer's effectiveness, locus of control, job satisfaction on learning/transfer on the job will be investigated empirically. Studies in this area will have important practical implication for training practitioners and managers. For example, if organizational learning is found to be strongly related to learning and its transfer, this would indicate that the organization as a whole has to enhance its learning capabilities for increasing the training effectiveness. Similar such findings would suggest that greater emphasis should be placed on design aspects and choosing the right kind of trainer for the training program.

Every individual have different level of understanding in a training programme. Training funds may be wasted by forcing those employees who have low job involvement and external locus of controls. Therefore, there is a need to assess the trainability of individuals called for attending training programme. Validation of this model may have implications regarding the selection and development of trainees in order to improve training effectiveness. Ultimately it will have a bearing on the performance of the organization.

The research findings will help Training institutions in governments in streamlining their training programmes by evolving more meaningful criteria of evaluating management training and development programmes. The organisations may find this useful by being able to utilise the training more effectively for organisational improvement. The executives, in turn, will benefit by developing, before undergoing training, a frame of reference which is conducive to learning.

Study will be useful to draw lessons for:

(a) Developing organisational culture which encourages learning and supports transfer of learning on the job.

(b) Analyzing the individual's traits of trainees for effectiveness of training.

(c) Making the design of training more purposeful.

(d) Trainers to be effective for helping trainees to learn from the programme and its transfer on the job.
4.4 Pilot Testing

Pilot study of the measurement instrument on effectiveness of design of training, trainer effectiveness and transfer of training on the job was necessary to validate the items and the whole scale. This is because some of the measurement items were developed or modified for the purposes of this research and because the questions in the instrument were newly compiled to form a new questionnaire. The pilot testing was conducted in a series of steps.

Before the final survey instrument was set up, a preliminary questionnaire was developed and tested to validate the scale items to be used in the study. The development of the measurement scales for this research followed the procedures recommended by Churchill (1979) and DeVellis (1991) for developing a standardized survey instrument. The initial task in developing the scale was to devise the item pool from previous studies.

A structured questionnaire on effectiveness of design, trainer’s effectiveness and transfer of training on the job was developed to conduct the study. Some questions in the questionnaire were adopted and compiled from previous studies of transfer of training, effectiveness of trainer & design of training. Then, the preliminary survey questionnaire was distributed to six faculty members at Institute of Secretarial Training & Management, New Delhi, a nodal training institution for Government of India, to gain their feedback regarding the content, layout, wording and ease of understanding the measurement items.

They were also asked to offer suggestions for improving the proposed scale and to edit the items to enhance clarity, readability, and content adequacy. The feedback was taken into account in revising the questionnaire. Twenty trainees from different courses were interviewed about the revised questionnaire. The trainees were mainly asked about clarity of questionnaire. Changes were made based on the verbal feedback received. Then, the newly revised questionnaire was pilot tested using a convenience sample of 80 trainees. In pilot test, respondents were trainees of another course in the Institute with similar job profile and designation. They were asked to rate the quality of design of training and effectiveness of trainer on the 5 point Likert scale.
(a) Reliability and validity of the instrument:

In this research, the multi-item scales measuring design of training, trainer effectiveness and transfer of training were checked for reliability by determining Cronbach's alpha and alpha value of 0.60 or greater was considered acceptable. According to Schuessler (1971), a scale is considered to have good reliability if it has an alpha value greater than 0.60. Hair, Anderson, Tatham, & Black, (1998) suggest that reliability estimates between 0.6 and 0.7 represent the lower limit of acceptability for reliability estimates.

The content validity of the instrument was assessed by asking experts to examine it and provide feedback for revision. The expert panel included six faculty members of ISTM. After they reviewed the questionnaire, changes were made to clarify and eliminate ambiguous statements in instructions and questions according to their recommendations. Each question was examined for its clarity and relevance for the purpose of the research, which resulted in some modifications in the questions.

After the data collection with final questionnaire, the content validity of design of training, trainer's effectiveness, transfer of training was assessed by factor analysis. Such analysis provides an empirical assessment of the interrelationships among items in a variable in forming the conceptual and empirical foundation of a summated scale (Hair, Anderson, Tatham, & Black, 1998). Internal construct validity was also assessed by factor analysis. Factor analysis provides evidence of the dimensionality of a measure, factor analysis with a varimax rotation was used to determine the number of factors contained in Transfer of training, Design of training and Effectiveness of trainer scales. An eigenvalue greater than 1 is considered to indicate the presence of an interpretable factor so that factors with eigenvalues greater than 1 were taken into account for interpretation. Factor loading values indicated the strength of relationship between each item and each factor.

Values greater than 0.3 are considered practically significant (Hair, Anderson, Tatham, & Black 1998). Thus a factor loading value of 0.50 was used for the cut-off point.
(b) Instruments used:

(i) Design of training: No scale could be found for assessing the effectiveness of design of training. The scale was developed for finding the same. The most important aspect on design of training programme is deciding about the objective of the training. The objectives should be stated clearly in terms of knowledge and skill. The objectives should be as per the need of trainees and their organisations. Content of the training should be decided as per the objectives of the course. It should be as per the level of the trainees and related to the concerned job.

The contents should progress from known to unknown. Once the content is decided as per entry behaviour of the participants, appropriate methodology should be adopted. The methodology should make the learning easy and avoid monotony. Learning should become a two way communication process. Appropriate training aid, handouts and duration should be adopted to make learning process effective. Keeping in view of the above, facets of design of training, 08 factors of design of training are taken in the Questionnaires i.e. Objective, Content, Methodology, Entry-behaviour, Need base training, Duration, Training Aids, Handouts. Total No. of questions are 30. The reliability and validity is given below:-

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Cronbach Alpha Coefficient was found to be 0.86.</th>
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<tr>
<td>Validity</td>
<td>The scale was checked for both face and content validity by factor analysis.</td>
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(ii) Trainer effectiveness: No scale could be found for assessing the effectiveness of trainer. Factors affecting the effectiveness of trainer are extracted from the literature review of training effectiveness. Knowledge, experience of the trainer is highly solicited for effective transfer of learning to the trainees. Trainers should be highly skilled so that he can involve participants through discussion. He should have good communication, listening and analytical skills. Good trainer have an orientation of problem solving. He helps out trainees by making their action plans after the end of the
training. Trainer should show high level of enthusiasm so that he can stimulate participants in discussion making and problem solving. Keeping in view the factors of effectiveness of trainer, the scale was developed for finding the trainer’s effectiveness. The scale contain 04 factors in the Questionnaires i.e. knowledge, skill, enthusiasm, problem orientation. Total No. of questions are 12. The reliability and validity is given below:-

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Cronbach Alpha Coefficient was found to be 0.81.</th>
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<td>Validity</td>
<td>The scale was checked for both face and content validity by factor analysis.</td>
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(iii) **Transfer of training**: No scale could be found for assessing the transfer of training. The scale was developed for finding the same. Performance enhancement is the foremost factor of effective transfer of training. Effective transfer of training can be determined by observing improved efficiency and skill to overcome crisis like situation peacefully. Effective transfer of training also means that the trainee is able to make better decisions after attending the training programme. His analytical abilities improve after the training.

The confidence of individual is also an indicator of positive outcome of training. His status improves in his organisation, he feels satisfied with his improved performance and is able to become aware of his strong and weak points. Positive outcome of training ensures that the individual is then more aware of his personal goals and level of his aspirations. He is more aware of his personal goals in relation to organisational objectives. Effective transfer of training also ensure that the trainee is able to make effective team and adopts Synerogogy, a tool of learning in his place of work. Individual becomes more open minded which helps him to meet people to solve his own and others problems.

Transfer of Training was assessed from the view point of trainee as well as trainee’s Boss. Therefore two questionnaires were developed. Each questionnaire was having 06 factors i.e. self confidence, open mindedness, performance enhancement, goal aspiration, decision making, team building. Total No. of questions are 24. The reliability and validity is given below:-
Trainee's response on transfer of training

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Cronbach Alpha Coefficient was found to be 0.78.</th>
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<tr>
<td>Validity</td>
<td>The scale was checked for both face and content validity by factor analysis.</td>
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Boss's response on transfer of training

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<tr>
<th>Reliability</th>
<th>Cronbach Alpha Coefficient was found to be 0.75.</th>
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<tbody>
<tr>
<td>Validity</td>
<td>The scale was checked for both face and content validity by factor analysis.</td>
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(iv) **Learning index**: For purposes of evaluation of training programme a test questionnaire was prepared by the researcher. While preparing it, the researcher had to initially spend a lot of time discussing with each of the faculty members regarding following issues:

- The opportunities provided to the participants to learn from each faculty member’s inputs.
- Whether the faculty member expected his inputs to result in enduring learning.
- Whether they thought that this learning would influence the way in which the executive subsequently worked and if so, now?
- If they expected their inputs to result in changed work behaviour, did they expect to have a demonstrable benefit to the organization?
- How they felt their inputs contributed to the achievement of training objectives set for a particular course.

Based on these discussions held separately with each of the concerned faculty, it was possible to establish a direct link between objectives of the programme and the inputs which would help achieve the set objectives. It also helped the training faculty evaluate inputs in terms of relevance and quality. Subsequent to this discussion, simple objective types of questions items were prepared which were as far as possible, clear, concise and straightforward. The item statements were as brief as possible so as not to fatigue the respondent. Question items prepared for different sessions/inputs were then put into parts and compilation of all the parts formed the total test questionnaire.
Reliability: Cronbach Alpha Coefficient was found to be 0.81.

Since the purpose of preparing this test questionnaire was not to construct a standardized scale in the usual sense but to evolve an instrument which would meet the criterion of discriminating between respondents holding contrary opinions about management concepts and skills that are to be covered through the course, the researcher relied mainly on face validity and construct validity. Construct validity was ensured through discussions with the concerned faculty about their inputs achieving the set objectives for a particular course.

Construct validity was also ensured by revising the question items based on the interpretation of the executives as received through feedback from the pilot study and from the results of each course. Since it was found to be satisfactory, it serves the intended purpose of this research, the researcher did not do the exercise of determining the validation score.

Pre training and post training scores of individuals were taken with the help of these questionnaire. Thereafter, learning index was determined by using the formula used by Virmani & Seth (1986) in their study in ASCI Hyderabad. The test questionnaire includes 74 questions on records mgt, conduct rule, computer application, values, change mgt, emotional intelligence, RTI, team building, and presentation skill & business etiquettes.

\[
\text{Learning index} = \frac{\text{Post Training Score} \% - \text{Pre Training Score} \%}{\left(100 - \text{Pre Training Score} \%\right)} \times 100
\]

(v) Organisational learning: Organisational learning diagnostic scale was developed and standardised by Pareek (1997). This psychometric tool has Guttman split-half reliability coefficient of 0.98. The scale has content validity. It has 23 statements to be rated by the respondents on a five-point Likert type scale. Organisational learning diagnostics (OLD) has 23 items. Respondents are required to rate each item on a 5-point scale, for the value and frequency of its practice in the respondent’s organisation. The more frequently these mechanisms are used, the stronger is the organisational learning. These mechanisms are grouped into three subsystems: acquiring and
examining (the innovation phase), retaining and integrating (the implementation phase), and using and adapting (the stabilisation phase). Furthermore, all 23 items are grouped into five categories of OL mechanisms: experimentation and flexibility, mutuality and teamwork, contingency and incremental planning, temporary systems, and competency building.

(vi) Locus of control: Scale developed by Pareek (1997) was used for measuring Locus of Control. It has 29 items with 5 points rating scale. It measures internality (others) and externality (luck).

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Split-half reliability coefficient for the instrument were 0.43, 0.45 for I, E-O sub-scales, and even-odd reliability coefficients were 0.41, 0.48 respectively.</th>
</tr>
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<tbody>
<tr>
<td>Validity</td>
<td>High correlation (0.89) between Levenson's instrument and Loco Inventory, in a sample of twenty-six bankers, indicates the validity of the inventory.</td>
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</table>

(vii) Job satisfaction: Scale developed by Dubey, Uppal and Verma (1989) was used for measuring Job Satisfaction. It has 25 items with 5 points rating scale. It measures job satisfaction of Employees.

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Split-half reliability coefficient for the instrument were 0.72 Test-retest = 0.64.</th>
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<tbody>
<tr>
<td>Validity</td>
<td>Independent of age, education and salary, moderately and negatively correlated with instability (-0.50) and extraversion (-0.42) but not with other personality variable like psychotism, social desirability, quality of life, depression</td>
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4.5 Sample:

The trainees for the course were called from Headquarters in Defence Headquarters Training Institute under Ministry of Defence for attending Executive Development Programme. The schedule of EDP is placed at Annexure IV. The participants were of the age from 48 to 53 selected through random sampling. The participants called for attending training Constitutes the Experimental Group. Another set of 80 officials of the similar age and status were selected through random sampling from same HQrs for the purpose of Study which constitute the Control Group. There are 446 officers of the level of the trainees in the organisation. That makes the universe equal to 446. Two EDP courses were held simultaneously consisting of 40 participants per course. Therefore, total strength = 80

<table>
<thead>
<tr>
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<th>Experimental Group</th>
<th>Control Group</th>
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<tbody>
<tr>
<td>Trainee</td>
<td>80</td>
<td>77</td>
</tr>
<tr>
<td>Boss</td>
<td>75</td>
<td>75</td>
</tr>
</tbody>
</table>

Total Sample = 307

Total 160 trainees and their respective supervisors, before training were distributed questionnaire to ascertain the matching of training objectives with Individual & Organisational objectives. Out of these 87.5% trainees & 70% supervisors responded and sent back the questionnaires. On joining the course, 80 trainees were requested to fill the questionnaire on Organisation Learning, locus of control, job satisfaction. All the trainees gave their opinion through filling the questionnaire. 160 participants (experimental group & control group) appeared in pre test and post test to assess the learning from the training.
After six months, all the participant and their supervisors from experimental and control group were sent the questionnaire for transfer of training on the job. 97% trainees & 94% supervisor responded to the request. The total sample of 307 respondents composed of 81% male and 19% females. The mean age of trainees of Experimental Group is 51.03 years and of Control Group is 50.93 years. In terms of educational qualifications, 70% were graduate and 30% of them were post graduate. With respect to work experience, the trainees had work experience of around 18-21 years.

4.6 Data analysis:

The data gathered from questionnaires were recorded and analyzed using the Statistical Package for the Social Sciences (SPSS). The data analysis consisted of factor analysis, step wise Regression, Correlation, t-tests, and descriptive statistics including means, frequencies and percentiles.

The t-test (or student's t-test) gives an indication of the separateness of two sets of measurements, and is thus used to check whether two sets of measures are essentially different (and usually that an experimental effect has been demonstrated). The typical way of doing this is with the null hypothesis that means of the two sets of measures are equal.

Descriptive statistics describe the basic features of the data in the study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data. Descriptive statistics simply describe what is or what the data shows. Descriptive Statistics present quantitative descriptions in a manageable form. For checking the reliability of the multi-item scales measuring effectiveness of design of training, trainer's effectiveness, transfer of training (trainee's & Supervisor's perception), Cronbach's alpha values were. An exploratory factor analysis (EFA) with principal components was also conducted to determine the validity of the design of training, trainer's effectiveness, transfer of training (trainee's & Supervisor's perception) measures. This analysis includes preliminary tests to determine the appropriateness of factor analysis: the anti-image correlation matrix, Bartlett's test of sphericity, and the Kaiser-Meyer-Olkin measure of sampling adequacy (MSA).
4.7 The objectives are:

(i) To assess the reaction of the trainees after the training programme.

(ii) To evaluate the impact of training on learning of trainees.

(iii) To assess the difference in learning of experimental group and control group.

(iv) To study relationship between learning of individual in a training programme and his perception about design of training

(v) To study relationship between learning of individual in a training programme and his perception about trainer's effectiveness.

(vi) To study the relationship between the job satisfaction and the learning of the trainees.

(vii) To evaluate the impact of level of organisational learning on trainee's learning in a training programme.

(viii) To assess the impact of locus of control of individual on his learning from a training programme.

(ix) To assess the relationship between organizational learning and transfer of training on the job.

(x) To compare transfer of training on the job in experimental and control group.

4.8 Hypotheses:

Following Hypotheses were tested in the study:

H1: Training will lead to significant increase in the knowledge of trainees.

H2: Organisational learning increases the learning of individual from a training programme.
H3: Learning of trainees in the training programme is directly proportional to design of training.

H4: Learning of trainees in the training programme is directly proportional to trainer’s effectiveness.

H5: Job satisfaction enhances the learning of trainees in the training programme.

H6: Trainees with higher internal locus of control will learn more in the training programme.

H7: Trainees with higher external locus of control will learn more in the training programme.

H8: Transfer of training by experimental group is significantly higher than that of control group.

H9: Organisational learning enhances the transfer of training on the job.

For assessing the relationship between dependent and independent variables, correlation and regression was conducted with respect to the hypotheses H2, H3, H4, H5, H6, H7 & H9. For testing Hypotheses H1 and H8, T Test was conducted.