DEVELOPMENT OF
IN-SERVICE TRAINING MODEL
Chapter-IV

Development of In-service Training Model

A need was felt to construct a new model of In-service training due to changing needs of the society, students, contents and due to new innovations in the field of pedagogy. The use of educational technology is being emphasised and almost all policies and recommendations of commissions and committees and even National Policy of Education (1986) has emphasised the need of applications of teaching and technology for the modification of teaching learning process. The existing teaching learning programmes has certain short comings at the stage of planning implementation and evaluation.

The investigator being a teacher has attended many refresher courses, seminars, symposia and has direct experience about the type of in-service training programmes. Need of constructing a need based training programme was felt by the investigator and the procedure for the development of in-service training model has been discussed below.

4.01 Objectives of the Model

J.S. Jawanda (1976) has brought to light several objectives of in-service education such as :

1) To equip the teachers with the latest content or subject matter in their specialised fields so that they may catch up with progress and new developments.

2) To help the teachers learn modern cost effective methods of teaching.

3) To initiate the teachers in the habit of self-study with the ultimate aim of keeping them abreast of the latest developments in their own and allied fields. Also they have to be conscious of the growing interrelations between various branches of knowledge.

4) To develop suitable and varied programmes to meet individual needs, school needs
and needs of the State.

4.02 Analysis of Existing Models

Many existing models of In-service Teachers Training were analysed. Many were content based, pedagogy based, orientation type etc. In these models there exists, lack of teachers involvement. The present investigator tried to remove the existing drawbacks. A new model was developed mainly to remove defects.

4.03 Focus

The educational objective of the new model are

i) To improve teacher's competency

ii) To have positive attitudes of teachers towards profession.

iii) To have better academic achievements of students.

4.04 PLAN OF NEW PROGRAMME FOR IN-SERVICE TRAINING

An In-service Teacher Training programme was developed by the investigator in consultation with his learned supervisor, a team of reputed teachers, experts and Heads of the various Institutions. The related available literature was also studied. The investigator met teachers who are teaches in various In-service Training Centres and Training college in the State and had vast experiences a'nd are nowstill servicing in-service or retired from their services. The Investigator also visited the training Institutions where B.Ed. training is imparted these days, like Govt., college of Education Patiala where the Investigator studied up to B.Ed. level and also visited college of Education Abohar where he served as Lecturer in education. He also visited college of education Gurusar sadhar (Ludhiana) to acquaint himself the latest modes of training & techniques.

A programme thus was developed with the sole aim of improving the In-service
Education and also to explore the further study for research purposes. The programme was made for ten days with the scope of extension for fifteen days to a month according to the need & according to the finances available for the purpose. As the investigator had the limited sources and the entire programme was his individual effort, he made a programme for ten days duration. There were four periods daily. Two periods were kept entirely for the preparation of Charts and teaching aids. Emphasis was given that teaching should be theoretical, innovative and demonstrative coupled with practical aspect. This was done to make the lesson interesting and suited to the local conditions of the Institution. Free time to handle the various equipment and apparatus was also provided in the programme. The programme was for ten days with the stay at the station with only few relaxations.

### 4.05 Daily schedule scheme

<table>
<thead>
<tr>
<th>Time</th>
<th>Proposed work</th>
<th>Incharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 9 A.M. to 10 A.M.</td>
<td>Inauguration</td>
<td>Principal of In-service centre</td>
</tr>
<tr>
<td>2. 10 A.M. to 11.25 A.M.</td>
<td>Lecture, demonstration &amp; discussion</td>
<td>First resource person</td>
</tr>
<tr>
<td>3. 11.25 to 11.35 A.M.</td>
<td>Tea break</td>
<td></td>
</tr>
<tr>
<td>4. 11.35 to 1.05 P.M.</td>
<td>Lecture, Demonstration &amp; discussion</td>
<td>Second resource person</td>
</tr>
<tr>
<td>5. 1.05 to 2.00 P.M.</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>6. 2.00 to 3.25 P.M.</td>
<td>Lecture, demonstration &amp; discussion</td>
<td>Third resource person</td>
</tr>
<tr>
<td>7. 3.25 to 3.35 P.M.</td>
<td>Tea break</td>
<td></td>
</tr>
<tr>
<td>8. 3.35 to 5.00 P.M.</td>
<td>Lecture, demonstration &amp; discussion</td>
<td>Fourth resource person</td>
</tr>
</tbody>
</table>
9. 5.00 to 7.00 P.M. Rest.
10. 7.00 to 8.30 P.M. Dinner
11. 8.30 to 9.30 P.M. Self study of science books by teachers & discussion with fellow teachers.

4.06 SYNTAX OF THE MODEL

The division of the programme was as follows:—

First day: 9 AM. to 10 AM.

Inauguration of the programme. The purpose and objectives of the programme were made clear to all the seminarians.

1st period: 10 A.M. to 11.25 A.M.

During the period, Half hour theory was taken by the expert. For Half hour the demonstration was organised as per Theory and another half hour was kept for discussion between expert and seminarians. Thus, theory, demonstration & teacher's involvement was the main aim of this period.

Tea Break

Ten minutes break from 11.25 A.M. to 11.35 A.M.

2nd period: 11.35 A.M. to 1.05 P.M.

Here again the period was divided into half hour theory, half hour demonstration and half hour discussion.

Lunch Break: 1.05 P.M. to 2.00 P.M.

3rd period 2.00 P.M. to 3.25 PM.

Theory, demonstration & discussion through teacher's involvement.

Tea break: 3.25 P.M. to 3.35 P.M.

4th period: 3.25 P.M. to 5.00 P.M.
Here again theory, Demonstration & discussion through the involvement of the seminarians. Next day the same procedure was adopted. From 9 A.M. to 10 A.M. previous days work was discussed with the Investigator along with experts. The rest time was utilized in the same way.

Next day 1st period starts at 10 A.M.

4.07 Programme of action during the training model

1) The investigator kept in to account all the local conditions and requirements in the topics to be taught to the teachers who participates in the In-service programme. For this +1 chemistry syllabus was thoroughly analysed and topics were selected.

2) To impart this programme he selected the experts who were innovative in the working. The period was nearly one and half hour duration. It was decided to give 20 to 25 minutes theory information followed by 40 to 45 minutes demonstration cum practical side of the lesson. The remaining 25 minutes were kept for discussion among seminarians & the expert. The investigator was also involved himself in the discussion.

3) After three days programme one day was given to consult library Magazines on teaching of science subjects & other such literature to find out the solutions of the problems arising day to day in teaching of chemistry at senior secondary level.

4) Next half day was devoted to discuss the solutions found by the seminarians and also to obtain suggestions. In this discussion some experts were also invited. The best solutions were accepted & recorded. Remaining half day was used as Educational recreational activity time. Again three days Lectures, demonstrations cum Practical programme was done on the similar lines as earlier done during the course.

5) Experts in preparing models charts and use of Modern Techniques in teaching of science were invited & then programme was organised.

6) Ninth day was kept for visit of a reputed Educational Sr. Sec. School.
7) Last day the total programme was discussed in terms of its strengths and weaknesses. The discussion was among seminarians, experts & some Educationists. The views of the seminarians were collected regarding the effectiveness of the programme.

4.08 FOLLOW UP

Scheme for the follow up programme was also prepared in such a way that it would be practical. The seminarians were informed that the investigator would visit their place of posting for getting the data on the pattern they were given training. It was also decided if need be the investigator would deliver a lecture in the actual situation.

4.09 Reaction of the teachers training after the programme.

Teachers were of the view that duration of the course was sufficient & useful to teachers. They were of the opinion that many of them have attended various training courses but this course was altogether different where the involvement of the teachers was more. A few significant points attributed by the seminarians were as under :

1) There were opportunities for them to observe and try out teaching methods & it was not just a theoretical orientation course.
2) Demonstration by resource person along with practical aspects was a new feature in the programme.
3) The opportunity for the feedback was provided in the course.
4) It was encouraging for teachers to express their eagerness to try out other models they have been supplied during the course.
5) It was expressed by seminarians that they had enjoyed the useful programme and would use in actual situation in their class rooms.
4.10 SOCIAL SYSTEM

There is good interaction between the teachers & the resource personals. There is full involvement of the teachers in the learning. There was a free atmosphere for discussion, demonstration & asking about the questions that may arise to understand the subject.

4.11 THE SUPPORT SYSTEM

Scientific equipment, charts, science reference books etc. were provided. The material needed for the lesson under discussion was first checked & provided to the teachers.

4.12 Evaluation:

Evaluation will be done by the various tools:

i) Teachers competency will be evaluated by B.G.T.C. scale.

ii) Teachers Attitude towards profession will be evaluated by Ahluwalias inventory scale.

iii) Self prepared achievement tests would be prepared for evaluating students achievements.

4.13 Development of achievement Tools

To measure student's achievement, a relevant and effective tool was needed. So, the present investigator constructed the achievement tests. The following procedure to prepare the tests was used. The pre-test was prepared on the basis of tenth class syllabus and post-test on the basis of “Plus One” syllabus covered before the test is used. The syllabus was fixed in consultation with 10 teachers-attached with the class according to the local environment and needs of the population.

(i) The investigator discussed the importance of different parts of the tenth class syllabus with the concerned teachers. According to their suggestions and opinions the total syllabus was divided into four parts and arranged in order of their importance and
utility.

(ii) In consultation with two teachers dealing with the class, investigator prepared a list of questions to test knowledge, comprehension and application preliminary draft consists of 210 items. The five experts were given these item to judge the content validity of the items keeping in view the format and language. In the light of suggestions made by the experts, some items were deleted and some were modified. Now the number of items retained for further analysis were 150. The unit wise break up of items for second draft of the test noted in table 4.13.

**Table 4.13**

<table>
<thead>
<tr>
<th>Unit</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>25</td>
<td>18</td>
<td>20</td>
<td>63</td>
</tr>
<tr>
<td>Unit 2</td>
<td>18</td>
<td>16</td>
<td>22</td>
<td>56</td>
</tr>
<tr>
<td>Unit 3</td>
<td>10</td>
<td>10</td>
<td>11</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>44</td>
<td>53</td>
<td>150</td>
</tr>
</tbody>
</table>

Expert's judgement

Before individual try out it was thought essential to have some content and technical experts examine and judge the content validity (suitability of the items) and also to check language of the test. The experts were requested to give +1 to suitable item, zero uncertain needed to be modified and -1 to quite unsuitable item or not related to the content. Now ten experts examined the test items and the index of suitability of each item (IOC) was worked out. The formula applied was

\[ \text{IOC} = \frac{\text{ER}}{N} \]

ER stands for sum of the experts judgement (scores) and N stands for number of experts. The IOC of the test items were ranged from .47 to 1. The analysis of the IOC is in the table 4.14.
From the table items having 0.50 or less IOC were rejected from the test and others were retained. Then at this stage 90 items were left in the test as per table No. 4.15.

### Items and IOC's of each item Table 4.14

<table>
<thead>
<tr>
<th>Unit</th>
<th>IOC of knowledge items</th>
<th>IOC Comprehensive Items</th>
<th>IOC of application items</th>
</tr>
</thead>
</table>

### Items those IOC greater than 0.50 and retained for further analysis Table 4.15

<table>
<thead>
<tr>
<th>Unit</th>
<th>Knowledge items</th>
<th>Comprehensive Items</th>
<th>Application Items</th>
<th>Total retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>3, 4, 5, 47, 49, 50, 94, 95, 130, 131, 132</td>
<td>17, 18, 19, 20, 6, 63, 64, 65, 134, 136, 137, 138, 140</td>
<td>31, 33, 34, 35, 80, 144, 145, 146, 147, 148, 149, 150</td>
<td>36</td>
</tr>
<tr>
<td>II</td>
<td>8, 10, 53, 54, 55, 96, 97, 98, 99, 100, 102, 103/104</td>
<td>21, 22, 23, 25, 67, 69, 70, 109, 110</td>
<td>36, 37, 39, 40, 83, 85, 112, 114, 115, 120, 121, 122</td>
<td>34</td>
</tr>
<tr>
<td>III</td>
<td>12, 15, 56, 57, 58, 59/80</td>
<td>28, 29, 30, 71, 72, 73, 74, 75</td>
<td>45, 86, 87, 88/101</td>
<td>20</td>
</tr>
</tbody>
</table>

- **Total retained**
  - 36
  - 34
  - 20
  - 90
Pilot Survey and Try-out Testing of Third draft of the test.

To make sure that the test was relevant to the experiment it was administered for a pre-try-out. It was done with 20 students of plus one of Nabha Senior Secondary school. All students understand and were able to do the maximum test items. Then 50 copies of the test items and 100 response sheets were photostated.

Try Out

The test items now was ready for trial in actual use. Try out step is necessary in the construction of the test in its final form because in its absence it will be impossible to know how good the test is. Try out test was administered twice to a sample of 100 students of “Plus One” belonging to Amargarh and Nabha senior secondary schools. The gap of two week was given between the two administrations.

Scoring of the Response Sheets

After the administration of the test to 100 students of the above mentioned schools, the response sheets were scored with the help of scoring-key prepared by the investigator.

Item analysis

After scoring item analysis was carried out Two kinds of information, namely item difficulty value and discriminating power of items were computed. Item difficulty is the mean item score which stands for empirical probability that the target population will pass the item.

For this test, item analysis was carried out in accordance with Kelly 's (1939) method. He demonstrated that when extreme groups, each consisting of 27% of the total group were used the ratio of the difference in abilities of the groups to the standard error of their difference, that is the degree of uncertainty about the size of the real difference, was found to be maximum. Kelly (1939) showed that by taking upper and lower achievement groups of 27% of the total group, one could say with greater confidence that those in the upper group were superior in measured by the test to those in the lower group.
For calculating the difficulty value (D.V.) discriminating power (D.P.): the following formulae, were used:

\[ D.P. = \frac{(RU-RL)}{N} \]
\[ D.V. = \frac{(RU+RL)}{N} \]

Where RU = Number of right responses in the upper group.
RL = Number of right responses in the lower group.
N = Total number of students in both the groups.

The D.P. and D.V. for each item were computed and recorded in table 4.14 & 4.15. The results in table showing the discriminating power of the items of the achievement test, it may be seen that discriminating power ranged from 0.23 to 0.91 and the difficulty values ranged from 0.80 to 1.0.

It was decided that those items whose difficulty value was either below 0.25 or above .75 were rejected and those item whose D.V. ranged between .25 to .75 were selected.

Ebel's (1966) criterion was followed for selecting items on the bases of D.P. Those items whose D.P. was .40 or above were retained as such, and others were rejected.

The table 4.16 given below shows the distribution of discriminating power of the items of the draft of the achievement test.
Table 4.16
The distribution of discriminating power of the draft of the student's achievement test on academic and its application

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>D.P.</th>
<th>Frequency</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Above 0.40</td>
<td>67</td>
<td>3,4,5,8,10,12,15,19,20,21,23,25,29,30,33,34,35,40,45,47,49,50,54,57,59,60,61,64,65,67,70,74,75,80,83,85,87,88,95,96,97,98,99,101,102,103,104,110,112,114,115,120,131,132,136,137,138,140,144,145,146,147,148,149,150.</td>
</tr>
<tr>
<td>2</td>
<td>Less than 0.40</td>
<td>13</td>
<td>17,18,22,28,31,36,37,39,53,55,56,63,69,71,72,73,86,94,109,121,123,130,134</td>
</tr>
</tbody>
</table>

Table 4.16 shows that out of 90 items 67 were accepted as such 23 items having D.P. values less than 0.40 were deleted.

Table 4.17
D.V. of items of the draft of the Achievement test.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>D.V.</th>
<th>Frequency</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25 to 0.75</td>
<td>61</td>
<td>3,4,5,8,10,12,15,20,21,23,25,30,33,34,35,40,45,47,49,50,58,59,60,61,64,65,67,70,74,75,80,83,85,88,95,96,97,98,100,101,102,103,104,110,112,114,115,120,132,136,137,138,140,144,145,146,147,148,149,150.</td>
</tr>
<tr>
<td>2</td>
<td>Below 0.25 and above 0.75</td>
<td>6</td>
<td>19,29,54,57,87,131</td>
</tr>
</tbody>
</table>

From table 4.17 show that out of 67 items 61 were accepted as such. Six items were deleted because they were above .75 and below .25.
4.18 Reliability and Validity

Reliability: Tuckman (1975) reliability can be defined as the degree of consistency between two measures of the same thing. The reliability of a particular test gives a consistent and accurate representation of the property being measured by that test is a function of the test's reliability. States by Tuckman (1975).

Guilford (1956) says, By a perfectly reliable test, we mean one that is free from errors of measurement, so that successive measurement of the same individual or phenomenon would yield exactly the same value: “Ballard (1949) defined reliability of the test.” A reliable test is one that yield the same results again and again.”

There are various procedures for finding reliability of a test. The five important and widely used procedures are (i) Kuder Richardson formula, (ii) Parallel item reliability, (iii) Split-half Reliability, (iv) Alternate forms Reliability (v) Test-Retest Reliability.

In this study, the most relevant reliability procedure used was Test-retest method, because of its multiple format. The test-retest reliability is determined by giving the pupils the same test twice. The gap of three weeks was given between the two administration of the test. It was based on the extent to which students' scores on each two administration of the test correspond. The Pearson-product moment, correlation co-efficient formula was used to find the reliability of unit tests.

Test-retest method was employed to find the reliability of the achievement test. The gap of two weeks was kept between the, two administrations of the test to 100 plus one students. The pearson product moment correlation co-efficient formula was used as follow:

\[
r_{xy} = \frac{N E_{xy} - E_xE_y}{\sqrt{(N E_x^2 - (E_x)^2) (N E_y^2 - (E_y)^2)}}
\]

The reliability of the test as calculated above is 0.78 which very high.
Validity: Validity means truthfulness. The validity of a test or any measuring instrument depends upon the fidelity with which it measures what it purports to measure. Tuckman (1975) states that "Test validity refers to whether a test measures what we intend it to measure."

The objective of many tests is to measure the effect of certain experiences that have occurred prior to the test. Teacher-built achievement tests and stand achievement tests share this point of reference. Their purpose is to find out the extent to which the objectives of the prior experience have been met. As such, they are used to monitor or assess an experience that has already occurred or to determine student learning based on that experience.

Other tests have their point of reference in the future. They aim to detect the presence of a quality that will predict a person's future behaviour.

Finally, some tests have their principal point of reference in the present, focusing on the concurrence of other presumably related qualities to the one being measured.

The different respects in which a test may be valid are summarized in the following table.

Table 4.19
Testing for validity: How we can whether the outcomes of a test reflect the purposes for which it is used (Tuckman: 1975)

<table>
<thead>
<tr>
<th>Time Reference of Test outcome</th>
<th>Validity question</th>
<th>Type of validity</th>
<th>Kind of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past</td>
<td>(i) Does the test reflect what was</td>
<td>Appropriateness Content validity</td>
<td>Achievement Test</td>
</tr>
</tbody>
</table>
intended to be taught

(ii) Do the persons who Criterion Achievement have been taught do better on the test than persons not taught.

(i) Do persons who Concurrent Intelligence Tests already show after Validity evidence of the quality do better on the test than person who do not?

<table>
<thead>
<tr>
<th>Present</th>
<th>(ii) Do scores on the Construct Personality Tests test relate to other qualities with which they are expected to be related?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future</td>
<td>(i) Do scores on the Predictive Attitude Test test predict success in a subsequent, related area</td>
</tr>
</tbody>
</table>
4.20 Criterion Validity

Tuckman (1975) states that “Criterion Validity indicates the extent to which student who have training on the objectives being measured scores higher on a test than students who have not had training.”

Criterion validity also applies more directly to the classroom teacher. Before students have been given instruction on a particular set of objectives, they represent an untrained group. After such instruction has been completed, they constitute a trained group. If the test of proficiency on the given objectives has criterion validity, students should score lower on it when untrained (i.e., before instruction when it is given as a pre-test) than when trained (i.e., after instruction when given as a post-test).

Criterion validity can also be applied with respect to its objectives or content. After a test has been developed, it can be submitted to a panel of experts for inquiry to content specialists whose opinions serve as the criterion and validate the content coverage of the test. This concurrence with the content of the test will provide support for the acceptance of its content validity or appropriateness.

In this study, content validity and criterion validity were found. The group of 15 experts judged that this achievement test as highly valid from considering the test content with the objectives of the programme.

The test was judged by the group of ten content and technical experts. The content validity of the test were ranged from 0.65 to 0.87.