CHAPTER 5 VALIDATION OF THE MULTI-MEDIA PACKAGE PAGE

CHAPTER 5

VALIDATION OF THE MULTI-MEDIA PACKAGE

5.1 INTRODUCTION

Chapter 3 described the salient features of a model developed for individual skill learning, integrating knowledge, and skill and Chapter 4 dealt with the details of the course design using the multi-media package. Conceptualisation of a model for skill learning integrating knowledge and skill was considered important, as considerable practical exercises numbering fiftyone were introduced in modules 2 to 5. Chapter 5 described the procedure for design of instruction, the multi-media package with self evaluation quiz for each learning element, criterion test for each of the objectives at the end of each module and the whole course. In the present chapter, validation of the multi-media package has been dealt under three sections.

Section 1, deals with the validation of the multi-media package in terms of achievement of the learners on criterion tests. Section 2, deals with the investigation on the effectiveness of the multi-media package in terms of the attitude of the learners toward the developed multi-media package and the relationship between the instructor trainees' achievement in the criterion tests and the English language abilities. The last section of this Chapter describes the study on the feasibility of the package developed in terms of cost and time.

SECTION - 1

VALIDATION OF THE MULTI-MEDIA PACKAGE

5.2 The Objective

In any instructional development, irrespective of the modes and media, evaluation forms an important part of the system. It offers empirical evidence on the effectiveness of the strategy in achieving the set of objectives. The attempt is to test how well the strategy attains the objective it is intended to attain. The following is a detailed account of the validation of the developed course materials.

Effectiveness of the multi-media package is judged by the performance of the learners on the (a) course test; (b) module tests for each module and (c) attitude of the learners toward the package. In this section it is proposed to discuss items (a) and (b) and item (c) will be discussed under Section 2. The objective in connection with (a) and (b) stated in Chapter 1, is stated as under:

> " To find the effectiveness of the multi-media package in terms of the achievement of the instructor trainees. "

5.3 Effectiveness of Instructional strategies

In the past quite a number of experimental studies have been conducted at CASE, M.S. University and elsewhere in India and abroad on the development of multi-media packages. The 1960's and early 1970's many studies attempted

to establish the effectiveness of programmed learning as an instructional technique. These studies compared programmed learning with what is referred to as 'conventional' or 'traditional' method of teaching. Under chapter two, review of such works have been done. Govinda (1976) has reported a number of studies, in which the effectiveness of programmed learning has been established over the conventional instruction in almost all cases. Similarly Ravindranath (1982) has reviewed few cases of studies comparing the effectiveness of multi-media strategy with other forms of instruction and has concluded that the multi-media strategy is more effective. His own work and the work of Vardhini (1982) also concludes that for teaching a course on science at the secondary school level as per the syllabus of the Gujarat Board to the students of standard VIII, multi-media strategy was effective. Menon (1983) in a study for teaching a course on Educational Technology to M.Ed. students at the M.S. University, Baroda evolved a multi-media approach and concluded that the approach was feasible as well as effective. This was not a comparative study as it was felt that comparisons have been done in the past and the present need is development of instructional materials for a complete course and validate the same. As the requirement was to provide better teaching materials, the investigator in this study evolved specifc tested and reproducible multi-media instructional package for self-instruction at the skill learning level.

For many, the term evaluation is simply student assessment, and some others it implies something wider. Evaluation here is specified to mean what one observes and the effects and the effectiveness, of the teaching and learning. Effectiveness implies concern with the extent to which a course has been successful in achieving certain prescribed objectives of ends. One can be concerned with course effects or outcomes that were

not anticipated. If the evaluation of a course is to be worthwhile, one can not overlook the unexpected. For example, the evaluation of a course can show that the majority of the students had improved satisfactorily in relation to the objectives in the criterion tests, but could hardly apply the results in real situations later on in life. By and large, evaluation in developmental research studies of this kind is done to be able to prove that materials developed attain the objectives for which they are meant, and it will be possible to make decisions to adopt the course materials for future. But evaluation is a continuous process and it is always necessary to continue the process of finding results, and revising the contents and update the same.

5.4 Experimental validation of the multi-media package

5.4.1 Sample

Sample for the experimental study consisted of 127 instructor trainees enrolled for the instructor training programme at the Central Training Institute for Instructors, Madras during the academic year 1981-82. There were some drop outs, and some were irregular in attendance. Hence, leaving those subjects, the remaining 111 instructor trainees were taken in natural classroom grouping, in the actual class set-up as the subjects for the investigation. As there was only one category of learners, all receiving instruction through the multi-media package, there was no difficulty in controlling part of the subjects and preventing any intermixing of information from one strategy group to other.

5.4.2 Instruments

The instruments used for measuring different aspects in the experiment were:

* English language ability test
* Attitude questionnaire, on the attitude of the learners toward the multi-media package.
* Comprehensive achievement test for the whole course.
* Criterion tests for each module.

English Language ability test

The experimental group consisted of 111 instructor trainees from different disciplines, and different background with respect to their general education and language ability, as they come from different states, the majority of them from four southern states - Andhra, Karnataka, Kerala and Tamil Nadu. It was thought that as they have undergone their general education in their mother tongue, which varied, and the medium of instruction was mostly their mother tongue and the medium of instruction followed in the Central Training Institute for Instructors, Madras and the medium for the proposed self-study materials was also English, an initial test on their language ability, at the level of the minimum general education qualification was necessary. Apart from the fact that the instruction was through the medium of English , most of the instruction was having a stress on the visual than aural medium. It was thought, that by providing an initial language ability test, it will be possible to find out whether there is any relation between their language ability and the achievement in the final comprehensive test.

The English language ability test was prepared in consultation with Professors from the State Council of Education and Research, Tamil Nadu and questions were picked up from the Secondary School Public Examination held in the past four years. The test was tried on selected trainees undergoing training in 1979-1980 at Central Training Institute, Madras and then discussed with the faculty members and experts in the field before adoption. The final form of the test consisted of ten questions, carrying a maximum of hundred marks. The details are furnished below:

Table 5.1 Showing types of test items for the English Language Ability Test

	Types of test items	Number of items
1.	Translation	1
2.	Short answer	1
3.	Completion items	1
4.	Multiple Choice items	2
5.	Discrimination	2
6.	Others	3

Attitude Questionnaire on the attitude of the learners toward the multi-media package

One of the objectives of the study was to find the effectiveness of the multi-media package in terms of attitude of the instructor trainees toward the package. A questionnaire was developed to measure the instructors' attitude toward the multi-media package as an instructional tool, validated, and selected items used to determine the instructor trainee's attitude toward the multi-media package. Details of the test construction is given under Section II, in this chapter.

Comprehensive achievement test for the whole course:

Comprehensive achievement test was developed to measure achievement of the participants at the end of instruction in Audio Visual Education. For developing this test, the steps suggested by Gronlund (1976) were followed. The steps are:

1 Listing topics of the subject matter content,

2 Preparing instructional objectives according to Gronlund (1978),

3 Classifying objectives under the categories of knowledge, comprehension, higher mental abilities, and skill using classifying system adopted by Hopper (1982),

4 Weighing different topics in terms of their relative importance on the basis of opinions expressed by the subject matter experts and methodology experts,

5 Preparing a table of specifications from the weighted list of subject matter topics and expected behavioural outcomes, and

6 Constructing achievement tests according to the basis of table of specifications.

Briggs (1977) has suggested that the test items should reflect the different types of learning for which the objectives are prepared.

Several authors have developed different classifications of the levels of learning involved. The simplest offers just two categories:

(a) Knowledge and (b) intellectual abilities and skills.

Bloom and his associates (1956) distinguish five categories of cognitive levels. They are :

(a) Knowledge (b) comprehension (c) application
(d) Analysis (e) synthesis and (f) evaluation.

A table of specifications is a valuable planning aid to assure that the relationships among various elements are seen clearly. The performance objectives have therefore been categorised as knowledge, comprehension, higher mental abilities and skills using classification system adopted by Hopper (1982).

Test items have been developed for the final post test to assess learners' growth over five modules. A systematic plan was followed for constructing the final test. The final form of the course test consisted of the following type of test items. There were in all 134 test items covering all the modules. Types of test items are given in table 5.2.

Table 5.2 Showing types of test items for the course test

Types of test items	Number of items
1. Discussion	1
2. Short answer	15
3. Multiple-choice items	60
4. Matching items	6
5. Completion items	19
6. Selection type	8
7. Discrimination	11
8. Practicals [Skill]	8
9. Others	6

The type of tests items were selected on the basis of their suitability for different types of subject matter content. The test was divided into three parts, the first part for multiple choice items, the second for short answer or completion type items and the third for the practical exercises. The first draft of the test was critically reviewed by the faculty leader of the training methodology section and the training officer handling the

subject audio visual education for a group of students during 1979-80. This was followed by discussion between the investigator and these two experts, and finally based on the review, thirty test items were re-written. The second form of the test items was checked for its content validity by two different faculty members of the training methodology section of CTI, Madras, and reviewed by the faculty leader. This involved the checking the list of topics, the instructional objectives, weighing of topics and table of specifications. The test items were discussed with an expert on classification from NCERT, and content expert from SCERT, and the final version adopted for the try-out.

Criterion test foreach of the five modules

The course was designed incorporating the modular concept, consisting of five modules, as already explained, and each module was divided into convenient units (could also be called capsules). In all, there were 35 units in 5 modules, as given in Chapter 4 - Flow Chart 4.1. Criterion tests were developed for each module in the same way as the course test. Whereas the comprehensive achievement tests were representing only sample objectives, the module test was representing every objective. Stated differently, every single objective had a test item. As in the case of comprehensive achievement test, the module tests were also divided into three sections, for module II, III, IV and V and two sections for Module I. Section A consisted of only multiple-choice test items, Section B mainly consisted of short answer, completion or supply type items and Section C practical exercises, detailed account of which was provided in table 5.1. The details of these tests together with the keys and marking instructions are provided in Volume VII.

TABLE 5-3 SHOWING SPECIFICATIONS FOLLOWED FOR THE MODULE TESTS AND COURSE TESTS

ABILITIES / MODULES	K	C	H	S	TOTAL
MODULE I	40	40	20	—	100
MODULE II	30	10	30	30	100
MODULE III	25	30	15	30	100
MODULE IV	15	40	5	40	100
MODULE V	15	35	5	45	100
COURSE TEST	21	43	14	22	100

TABLE 5-4 SHOWING THE ALLOCATION OF MARKS FOR EACH OF THE FIVE MODULES AND THE COURSE TEST UNDER EACH CATEGORY K C H S AND ALL PAT TOGETHER

MODULES / CATEGORY	ALLOCATION OF MARKS					
	M I	M II	M III	M IV	M V	C T
K	30	79	73.5	21.5	24.5	54.0
C	30	25	88.5	56.0	60.0	108.0
H	15	79	42.5	6.5	8.5	35.5
S	—	79	89.0	56.0	76.0	56.5
T	75	262	293.5	140.0	169.0	254.0
NUMBER OF OBJECTIVES	41	71	127	24	40	303

TABLE 5-5 SHOWING THE ALLOCATION OF MARKS OF COURSE TEST MODULE WISE UNDER K, C, H AND S.

CATEGORY / MODULE	K	C	H	S	TOTAL
MODULE I	19.5	23.5	5.5	—	48.5
MODULE II	20.5	9.0	17.5	5.5	52.5
MODULE III	7.0	35.5	9.5	27.0	79.0
MODULE IV	4.5	29.0		100	43.5
MODULE V	2.5	11.0	3.0	14.0	30.5
TOTAL	54.0	108.0	35.5	56.5	254.0

REFERENCE :

K – KNOWLEDGE. C – COMPREHENSION.
H – HIGHER MENTAL ABILITIES. S – SKILL.
T – TOTAL OF K, C, H AND S.

For developing the criterion tests for every module all the steps suggested by Gronlund (1976) and (1978) were followed. The procedure explained for preparing the comprehensive achievement test for the whole course was followed for the preparation of the module tests also. The table of specifications for the module tests and course test, as adopted for the final experimentation is presented in table 5.3.

Table 5.4 provides the number of objectives in each module and actual marks provided for knowledge, comprehension, higher abilities, and skills for the test items provided in each of the five modules and the course test.

Table 5.5 shows the allocation of marks classification wise, that is for knowledge, comprehension, higher mental abilities, and skill for each of the five modules of the comprehensive course test.

5.4.3 Commencement of the Experiment

The following procedure in a sequential manner was adopted before the actual experimental try-out for validation of the multi-media package was taken up.

a English language ability test was administered to all the learners, based on the test devised for the purpose and scored to find the language ability of the learners.

b An attitude scale developed by the investigator was used to measure the attitude of the instructor-trainees. Details of this scale are discussed under section II, in this Chapter.

c The comprehensive achievement test for the whole course, was administered as a pre-test to measure the prior knowledge of the learners on the content, as some of them were working for a number of years as instructors and they could possess some knowledge or skill. In the case of practicals, they were asked to say whther they can do the practicals, and after obtaining their initial statement, about their knowledge, they were asked to do the practical exercises. This was done to avoid the equipment from being damaged, if the learners cannot operate them, and also to avoid the saving of time, if they cannot operate any of the equipment. The scores as per the marking scheme was done and tabulated.

d The criterion test for Module I was then administered to all the students. Here the practical tests were not there, and so there were no problems on the same. Before starting each module the criterion test was administered, that is, before commencement of each module.

All these tests were conducted for all the candidates together, with the exception of the practical exercises where equipment operation was involved. In the CTI, Madras there is an examination hall, and all the candidates could be accommodated together. All test question papers were collected back from the examinees, so that they could be used again. Because the tests were conducted together at the same time, there was no problem of package of questions to other students. The dates for the teaching classes were fixed as per the normal time schedule and the learners were issued the learning materials in advance.

5.4.4 Implementing the programme and administering the multi-media self-study package

There were no problems either with the physical facilities including

accommodation, with instructional staff or doing practical exercises. The instructional staff were briefed one month in advance about the course work and how to implement the strategy. All the staff members were also involved as subject experts and methodology experts, for reviewing the content, method of instruction, and preparation of the course and module tests. The practical exercises were all carried out in the visual aid workshop where facility was available and the learners who had facility to do practicals at their hostel (all instructor trainees were inmates of the C.T.I.Hostel) were permitted to do the same. Those who did not have facility were given necessary facility at C.T.I. visual aid workshop during the regular class-hours,or whenever the instructor trainees had spare time with them, by fixing prior appointments with the faculty member.

5.4.5 Highlight of the programme

Details of the time scheduling has been discussed in Section III where the effectiveness of the package with respect to the time and cost, for regular use has been discussed. However there were no problems for the schedule, and out of the second phase (second semester) of six months, four hours per week, will provide 104 hours for the administration of the course. In all there were 36 teaching units and 51 practical exercises for the five modules. Against the 104 hours allotted for the subject, 36 hours were utilised as instructional hours for theory and 40 hours for practical exercises. Six hours were utilised for the discussion sessions. The remaining time was used for the various tests, and inidividual instruction. When practical exercises were to be done, under Module II, there were 34 exercises and the instructor trainees had no problem, as in each group there were less than 30 candidates. There were in all five groups. Wherever it was possible, when some one

had completed one exercise, he was allowed to proceed to the next exercise. This gave a little leeway with respect to scheduling the tools and equipment required for doing the practical exercises from Module II through Module V. In certain cases, it was possible to allot a few learners to one exercise, few to another exercise and another group to still a different exercise. This rotation was practicable, and paved the way for effective machine utilisation and completing the exercises in time. For most of the exercises the students were allowed time to practice atleast three times wherever demanded by them, as having not learned. It should be remembered that the course was based on self-study, and self-evaluation at each stage - unit - and their ability was measured by criterion tests for each module. A pre-test of the criterion test was administered before commencement of each module.

Another point worth mentioning here is the special nature of the two of the modules, module I and module III, which had sound slide presentations. Under module I, the slide projector and synchronised sound slide projector was used for three of the five units. For module III, three slide projectors with synchronised sound slide projector and dissolve control unit was used, in a multi-imagery presentation. The reason for using this multi-imagery was that during the initial try-out, it was found out, certain visuals lacked clarity, and they required either elaborate verbal explanation, or more visuals with extreme close-ups. When the different visuals with different points are used together, it was easy for the instructor trainees comprehend better and in a lesser time, more learning could be given. In both the modules, I and III, workbooks were introduced. The learners were expected to interact with the work book often, by stopping the presentation.

After their recording of the responses to the stimuli presented, there is built in confirmation of the answers, which the learner can verify with what he had done before, and correct if necessary. These answers will function as knowledge of results. Often this has provided ample opportunity for them to keep constant watch of the presentation, and the confirmation of correct answers clear doubts and misgivings if any. In the end, the learners were expected to discuss with the instructor, problems if any, and they were asked to respond to criterion unit test, after the discussions. The learners were encouraged to self-evaluate these tests, and they were provided with the key to the criterion tests after they had answered these tests. This second opportunity provided a further possibility to provide effective instruction. A post test was given at the end of every module, and a pre-test before the next module was started. The post tests and pre tests were evaluated and the scores tabulated. These were converted into percentages as the tests were all having different maximum marks. The difference between these were worked out to gain scores in all cases. The gain in scores gives the amount of learning that has taken place on account of the multi-media instruction. The learners were supplied with correct answers and scores after the post test on every module, along with test results. The pre-tests and post-tests were given for modules I through V and course test.

A different approach with self instruction and textual material was provided with numerous pictures, laying more stress on the visuals to explain the concepts presented for Module II. Moreover these written instructions provided a basis for them to understand the principles in doing the practical exercises. There were no scheduled class-room teaching. The learners were encouraged to attempt learner activities provided in each unit and

attend the discussion sessions. No other unit tests were provided. Practical exercises 1-34 were given and the learners were enthusiastic about these practical exercises and there was a spirit of competition more than in other classes.

The modus operandi with respect to the Module III has already been discussed in the previous paras. Module IV, had a slightly different approach than Module I, Module II, and Module III. While Module I was a sound slide instructional system, Module II was self-instructional textual material with discussions and learner activities, Module III was similar to Module I, with the difference that the visual presentation was through the multi-imagery. In Module IV, the presentation was through textual self-instructional units, but for the practical exercises, they were provided with demonstrations, in addition to textual materials provided. They had to do practical exercises, and take unit tests, as in Module I and III. This was not provided in Module II. These tests were evaluated by the learners and they were provided with correct response sheets.

Module V, was similar to module IV, with the difference that no demonstration was provided, but audio casettes were provided for the practical exercises. Facility was given to do the exercises with the instructions on the audio cassettes. They were given the self-instructional textual material in advance, and this helped them, to read, and then listen to the tape, while doing the practical exercises. In Module II, III, IV and V, practical tests were also included in the criterion referenced module tests. The quizzing, immediate feedback, discussions all provided a situation which improved the learning skill of the instructor trainees. A post test was given at the end, covering sample objectives from all the modules. All pre-tests and

post tests were the same and had a relation with the objectives. Most of the objectives had one test item, while some of the objectives were provided with more test items.

5.4.6 Winding up of the experimental study

After the completion of the administration of the modules 1 through 5 and the criterion tests for each module given at the end of each module, the comprehensive achievement test for the entire course was given as explained above, to check the attainment on sample objectives. Following test was administered once again.

The attitude questionnaire developed for measuring the attitude of instructor trainees toward the multi-media package was administered four weeks after the completion of the course, as a post test to find out whether there is any change in attitude and to find out the effectiveness of the multi-media package.

5.5 Results and Discussions on the Experiment

Effectiveness of the multi-media package was studied module wise and for the whole course in terms of individual categories of objectives, namely knowledge, comprehension, higher mental abilities and skill separately, and also all combined together based on

a percentage of scores obtained on the post test;

b comparison of the scores with those obtained for the same course but not adopting the multi-media package developed, in the past sessions;

c standard deviations and mean of the scores obtained on the post tests in the five modules separately and the whole course; and

d the gain in the post tests over the pre test scores in the five modules separately and the whole course.

5.5.1 Effectiveness of the multi-media package based on percentage of scores obtained on the criterion test - post test only

The different tests at the end of each module and the whole course differed with reference to maximum marks in terms of each category of objectives and the complete test. All the raw scores on the tests - category-wise and combined- were converted into percentages. These percentages were tabulated for each of the module and the whole course, under the five categories; knowledge (K), comprehension (C), higher mental abilities (H), skill (S) and all put together (T), combining percentages into seven categories; 90-100, 80-89, 70-79, 60-69, 50-59, 40-49 and less than 40. From table 5.6 it can be seen that 98% of the learners obtained more than 80% of the marks in the total of the course test; that 67.5% obtained over 90% marks and 30.5% over 80% marks. Of the two candidates who secured less than 80%, one secured 79% and the other 78% marks. The mean of the entire post test scores combining K, C, H, and S i.e., total T is 90.459 (table 5.7 and 5.8) and the mean gain of post test over pre test is 84.045 (table 5.9). This is a very satisfactory figure, as the pass prcentage is only 60. Even the module wise break up is quite encouraging from the following figures of the percentage of scroes of the instructor trainees, who secured more than 80%. Refer table 5.6.

	Module I	Module II	Module III	Module IV	Module V	Course Test
% of trainees who scored more than 80%.	66	69	78	96	92	98

From the same table it can also be seen that those who obtained less than 60% - the pass mark - are 'nil' for the whole course and insignificant in the module tests, as indicated hereunder.

	Module I	Module II	Module III	Module IV	Module V	Course Test
% of trainees who scored less than 60%.	2.5	1.0	1.0	--	2.0	-

Thus it can be said that the performance of the learners are excellent on the course test where 98% of them secured distinction (above 80%) and no one failed. Similarly the performance on Module tests are equally good on Modules IV and V, very good on Module III and quite satisfactory on Modules I and II. The course has served a major purpose for which it was developed, namely to increase the performance standards of the instructor trainees.

5.5.2 Effectiveness of the Multi-media package based on performance on course test comparing with performance on previous sessions

Validation is attempted in terms of achievement of the learners on the (a) Course test (b) Module test for each one of the modules (c) attitude

Table 5.6 Showing the Post-test Scores on Criterion Tests for each Module and Whole Course on K, C, H, S and T.

TEST	CATEGORY	PERCENTAGE SCORES						
		90-100	80-89	70-79	60-69	50-59	40-49	40
MODULE I	K	50.5	20.0	12.5	9.0	6.0	1.0	1.0
	C	41.0	16.0	11.0	15.0	9.0	6.0	2.0
	H	70.0	16.0	10.0	3.0	-	-	1.0
	S	-	-	-	-	-	-	-
	T	37.0	29.0	18.0	12.5	2.5	-	1.0
MODULE II	K	8.0	61.0	24.0	5.0	2.0	-	-
	C	1.0	57.5	39.0	2.5	-	-	-
	H	7.0	63.0	25.0	4.0	1.0	-	-
	S	6.0	67.0	24.0	2.0	1.0	-	-
	T	4.0	65.0	27.0	3.0	1.0	-	-
MODULE III	K	34.0	44.0	14.0	3.0	5.0	-	-
	C	37.0	23.0	6.0	22.0	11.0	-	1.0
	H	14.0	48.0	31.5	4.5	1.0	1.0	-
	S	85.5	13.5	1.0	-	-	-	-
	T	24.0	54.0	16.0	5.0	1.0	-	-
MODULE IV	K	3.0	67.5	29.5	-	-	-	-
	C	12.0	86.0	2.0	-	-	-	-
	H	94.0	1.0	3.0	1.0	-	1.0	-
	S	3.0	45.0	50.0	1.0	1.0	-	-
	T	2.0	94.0	2.0	2.0	-	-	-
MODULE V	K	34.0	55.0	4.0	3.0	2.0	-	2.0
	C	12.0	82.0	2.0	-	2.0	1.0	1.0
	H	88.0	-	4.0	-	-	-	8.0
	S	-	78.0	18.0	2.0	1.0	-	1.0
	T	3.5	88.0	4.5	1.0	2.0	1.0	-
COURSE TEST	K	77.0	18.0	4.0	1.0	-	-	-
	C	73.0	25.0	2.0	-	-	-	-
	H	90.0	6.5	3.5	-	-	-	-
	S	31.5	58.5	9.0	1.0	-	-	-
	T	67.5	30.5	2.0	-	-	-	-

K = KNOWLEDGE; C = COMPREHENSION; H = HIGHER MENTAL ABILITIES;

S = SKILL; T = TOTAL OF K, C, H AND S.

TABLE 5-7 SHOWING THE PERFORMANCE OF THE INSTRUCTOR TRAINEES IN THE PAST THREE YEARS AND THE PERFORMANCE IN THE EXPERIMENT

(a) COMPARISON OF SD AND MEAN

ITEMS \ YEAR	1978-1979	1979-1980	1980-1981	1981-1982
NUMBER OF SUBJECTS	62.000	113.000	92.000	111.000
S D	6.180	9.668	10.598	3.289
MEAN	68 689	69 283	69 304	90 459

(b) COMPARISON OF PERCENTAGE OF LEARNERS WHO OBTAINED DIFFERENT SCORES

% \ YEARS	1978-1979	1979-1980	1980-1981	1981-1982
90 100	—	3.0	—	67.5
80 89	12.0	18.0	17.5	30.5
70 79	34.0	18.0	42.0	2.0
60 69	54.0	55.0	27.0	—
50 59	—	6.0	10.0	—
40 49	—	—	2.5	—
LESS THAN 40	—	—	1.0	—

of the learners towards the package and (d) cost and time. The discussion of these are given in paras 5.5.1; 5.5.2 to 5.5.8; and 5.12 to 5.19. External validation is one of the accepted forms of approaches of evaluation adopted in evaluating instructional packages. This could be against attainment of external criteria. In the past no planned systematic instruction similar to present study was ever attempted in this area of instruction at the CTIs. Hence it was felt that a comparison of the present performance of the instructor trainees with the past three years would indicate how far the multi-media package is effective. This could be the external criteria.

It can be seen from the table 5.7(a) that while the mean performance of the learners stood uniformly at about 69% in the past three years the performance in 81-82 shows about 90%. The higher performance of the subjects indicate the effectiveness of the multi-media package and its superiority over other methods used in the previous three years. It is note-worthy to point out the low standard devisation is an added evidence of this achievement.

The number of subjects who obtained different percentages in all the four sessions, i.e., 78-79, 79-80, 80-81, and 81-82 are shown at Table 5.7(b). It very clearly shows that the instructor trainees could achieve better than those who are not exposed to the strategy. This is another evidence to show that the experimental multi-media package is effective as an instructional strategy, for the population for whom they have been developed.

Table 5.8 Showing the Standard Deviation and the Mean of the Post-test Scores on Criterion Tests for each Module and Whole Course on K, C, H, S and T.

	MODULE I		MODULE II		MODULE III		MODULE IV		MODULE V		COURSE TEST	
	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN
K	16.431	84.218	7.483	82.072	8.913	84.232	8.167	79.784	11.067	85.649	6.389	92.986
C	19.967	79.277	4.773	78.902	13.726	78.464	9.022	86.153	8.132	85.748	4.667	92.153
H	14.553	89.493	9.999	80.900	8.551	81.396	6.999	98.423	12.426	85.126	4.473	93.909
S	-	-	5.949	81.838	3.429	92.286	5.712	79.928	6.916	80.378	3.560	82.819
T	12.109	84.161	5.691	81.414	10.511	83.631	2.859	83.478	7.158	83.928	3.289	90.459

K = KNOWLEDGE; C = COMPREHENSION; H = HIGHER MENTAL ABILITIES;

S = SKILL; T = TOTAL OF K, C, H AND S.

5.5.3 Effectiveness of the Multi-media package based on performance on the post test scores in the five modules separately and for the whole course

Observing from table 5.8, where the mean and standard deviation with respect to the scores obtained on the criterion tests (post-tests) at the end of each module and the course are tabulated, one can note that under the total scores (column T) all are having a mean of more than 80% on every module, and more than 90% on the course test. Similarly the means of the scores on the knowledge, comprehension, higher mental abilities and skill are high, with more than 80% on almost all, with high figure of more than 78 on two items and 79 on two items. The means of scores on knowledge , comprehension and higher mental abilities are all 90% and above. Thus the performance of the instructor trainees on the post test module-wise and for the whole course justifies the effectiveness of the multi-media package comparing the mean perofrmance between the modules, under the categories higher mental abilities and comprehension performance was better in module IV, knowledge was better in Module V and skill in Module II. Standard Deviation is also comparatively small in the Module III for the skill objectives.

It may be remembered that the central theme of the present investigation has been systematised instruction in the subject Audio Visual Education at the instructor training course and this was attempted through the development of multi-media packages for the whole course which could be used under existing situations without causing undue disturbance in the functioning of the present physical facilities. Evidently the performance of the instructor trainees was quite appreciable and the study could testify that the components of the strategy were effective. It can however, be noticed

that the Standard deviations for all categories of objectives considered separately and taken together for Module I are comparatively larger than other modules and the course test, indicating greater dispersion of scores on these tests. The standard deviations are comparatively low for all the categories under the course test with high mean scores, which shows that the instructor trainees have tended towards attaining the mastery level, and effective in attaining the stated objectives, under all categories uniformly. Thus the combinations of the modes and media used are appropriate.

5.5.4 Effectiveness of the multi-media package based on gain in knowledge, comprehension, higher mental abilities, skill and all put together on criterion tests - Pre tests and post tests

The mean achievement of the gain of post over pre-tests were tested for significance by using the 't' test. Mean gain of achievement scores, that is difference between post and pre-tests for the module and course tests are presented in table 5.9.

It may be observed that the 't' value is significant at 0.01 level for the criterion tests for Module I, II, III, IV and V and also for the comprehensive course test. The instructor trainees have done well in the comprehensive course test, as seen from the high mean in gain score and its low standard deviation, showing that the multi-media package was effective.

5.5.5 Effectiveness of the multi-media package for attainment of gain in knowledge objectives in the five modules separately and for the whole course

It should be pointed out that the multi-media package was developed

TABLE 5.9 SHOWING MEAN GAIN, SD, AND T VALUES ON THE DIFFERENCE BETWEEN THE PRE-TEST AND POST-TEST ON THE CRITERION TESTS IN EACH OF THE FIVE MODULES AND THE WHOLE COURSE FOR K, C, H AND S, COMBINED TOGETHER

ITEMS / TEST	MEAN GAIN	SD	T VALUE	REMARKS
MODULE I	66.153	16.044	43.44	X
MODULE II	65.649	7.348	94 13	X
MODULE III	77 176	8 594	94 61	X
MODULE IV	79 71	4 569	183 00	X
MODULE V	77 036	8 390	96 73	X
COURSE TEST	84 045	4 001	221 00	X
X SIGNIFICANT AT 0 01 LEVEL				

TABLE 5-10 SHOWING MEAN GAIN, SD, AND T VALUES ON THE DIFFERENCE BETWEEN THE PRE TEST AND THE POST TEST ON THE CRITERION TESTS IN EACH OF THE FIVE MODULES AND THE WHOLE COURSE IN KNOWLEDGE OBJECTIVES

ITEMS / TESTS	MEAN GAIN	SD	T VALUE	REMARKS
MODULE I	61.099	19.800	32 510	X
MODULE II	65.390	12 229	56.340	X
MODULE III	70.856	13.433	55 570	X
MODULE IV	69 090	7.663	94.990	X
MODULE V	72.712	10.132	75.620	X
COURSL TEST	75.856	9.530	85 660	X
X SIGNIFICANT AT 0.01 LEVEL				

as instructional system for self or individual learning small group as well as large group learning. The data obtained and discussed so far has indicated that the multi-media package was effective in terms of the gain in achievement in the criterion tests for each module, and also for the whole course. It is now proposed to examine in a little more detail about the performance in each of the areas namely knowledge, comprehension, higher mental abilities and skill. The data presented in table 5-10 shows the mean, S.D., and 't' values for the gain scores of post tests over pre-tests.

In the table 5.10 the mean, S.D., and 't' values of gain scores of post over pre-tests are given. It can be seen that knowledge objectives could be learned in an effective manner through multi-media package either through independent study or through small group presentation. In Module V, the skill learning was effected through aural source, and in Module IV the skill learning was through demonstration after the learners were given an opportunity to have a study of the self learning material. In Module II and III, no other help than what was given through the multi-imagery and the self learning textual material were given. It can be seen that the multi-media package of instruction is equally effective irrespective of the medium adopted for the delivery of the content stimuli. From the observed data of the course test, one cannot say definitely, that a particular medium was responsible for higher scores and it is the combined totality of the approach and strategy which is responsible for the success of the package.

5.5.6 Effectiveness of the multi-media package for attainment of gain in comprehension objective in the five Modules separately and for the whole course

TABLE 5-11 SHOWING MEAN GAIN, SD, AND T VALUES ON THE DIFFERENCE BETWEEN THE PRE-TEST AND THE POST-TEST ON THE CRITERION TESTS IN EACH OF THE FIVE MODULES AND THE WHOLE COURSE IN COMPREHENSION OBJECTIVES

ITEMS / TESTS	MEAN GAIN	SD	T VALUE	REMARKS
MODULE I	65.973	20.654	33.65	X
MODULE II	56.790	10.889	54 45	X
MODULE III	67.198	15.372	46.06	X
MODULE IV	82.153	5.662	152.00	X
MODULE V	76.171	10858	73.91	X
COURSE TEST	87. 712	5.627	164.00	X
X SIGNIFICANT AT 0.01 LEVEL				

TABLE 5-12 SHOWING MEAN GAIN SD AND T VALUES ON THE DIFFERENCE BETWEEN THE PRE TEST AND THE POST TEST ON THE CRITERION TESTS IN EACH OF THE FIVE MODULES AND THE WHOLE COURSE IN HIGHER MENTAL ABILITIES OBJECTIVES

ITEMS / TESTS	MEAN GAIN	SD	T VALUE	REMARKS
MODULE I	75.530	14.698	54.140	X
MODULE II	67.070	7.803	90.560	X
MODULE III	79.171	9.329	89 410	X
MODULE IV	97.559	6.540	157.000	X
MODULE V	82.991	22.388	39.060	X
COURSE TEST	86.946	6 342	144 000	X
X SIGNIFICANT AT 0 01 LEVEL				

The details of the gain scores the post over pre-tests of the instructor trainees in comprehension objectives in the five modules and the course taken as a whole are presented in table 5.11 wherein mean gain, SD, 't' value and the significant level are given. It can be seen from the table that the mean of gain score for the course test, is 87.7% and for the Module IV is 82.15. Though one can say that Module IV can be best taught by the self instructional multi-media package, it is noteworthy to say that novelty of multi-imagery or multi-media on tape slide presentation, was not a criterion for the achievement of the instructor trainees in the achievement tests. From the course test results, it can be safely argued that the total approach is as effective for comprehension objectives, as in the knowledge objectives.

5.5.7 Effectiveness of the Multi-media package for attainment of gain in higher mental abilities in the five modules separately and for the whole course

The details of the main scores of post-pre-tests of the instructor trainees in higher mental abilities, computed for the whole course and each of the five modules are given in the table 5.12 and the results are discussed hereunder.

The mean gain is higher in Module IV and the total course test. The multi-media approach followed is very effective for the objectives under higher mental abilities. Comparing this with the comprehension, there is slight difference but definitely, both comprehension and higher mental abilities objectives can best be attained through the "Multi-media Package" strategy adopted in the course.

TABLE 5-13 SHOWING MEAN GAIN SD A T VALUES ON THE DIFFERENCE BETWEEN PRE TEST AND THE POST TEST ON THE CRITERION TESTS IN EACH OF THE FIVE MODULES AND THE WHOLE COURSE IN SKILL OBJECTIVES

TEST ITEM	MEAN GAIN	S D	T VALUE	REMARKS
MODULE I	00.000	00.000	00.000	#
MODULE II	69.765	7.188	102.000	X
MODULE III	91.946	3.199	302.000	X
MODULE IV	78.649	7.930	104.000	X
MODULE V	78.180	7.670	107.000	X
COURSE TEST	82.613	3.760	31.000	X

\# NO SKILL OBJECTIVES

X SIGNIFICANT AT 0 01 LEVEL

5.5.8 Effectiveness of the Multi-media package for attainment of gain in skill abilities in the five modules separately for the whole course

The details of the mean gain scores of the post over pre-tests of the instructor trainees in skill abilities, computed for the different modules and the whole course are given in the Table 5.13 and the results are discussed thereafter.

The highest difference in gain in achievement and low standard deviation is in Module III and among other modules, the learners have scored equally well in Modules IV and V. On the whole the achievement is also good with high mean gain and low SD in the course test and it can be said with confidence that the multi-media package is very effective for skill learning, irrespective of the fact that learning has taken place through self-learning kits, or with instructor demonstrations.

5.6 Effectiveness of the Multi-media Package in the Affective Domain

In the affective domain taxonomy, emphasis has been laid on three processes of compliance, identification and internalisation by which an individual accepted influence or conforms (Krathwohl, et al. 1964). When an individual accepted the influence of a satisfying relationship to a particular mode of learning or group or person, identification could be said to occur. In identification, satisfaction in response has been given the taxonomic code of 0.3 which would be an essential step to move on further in the hierarchy to order the process of internalisation of the accepted value. One of the most important and noteworthy feature of the result of the course was, the use by the instructor trainees, the method followed in this course, for

the practice teaching classes while they were practising, and in the final examination. It was observed that out of 127 candidates admitted, 111 attended the course fully, and among these candidates, 104 or 82% of the examinees in the final test used a number of aids andused altogether different approach. Those who did not attend the course regularly, and those who appeared for a second time as failed candidates did not show this difference from the traditional or conventional method of teaching normally followed. Apart from their issuing the type of tests, and objectives, and advance information sheets, 104 of the instructor trainees used simple visual aids such as models, charts and transparencies. None of the instructional staff used any visual aids, or a similar approach, in their classes during the session in which these instructor trainees attended, and by and large the method used by them are, "take a lecture class, ask the instructor to write notes, correct and issue them back." The tests and examination never used to be regorous nor there used to be any feedback sessions. On the whole none of the classes were objective oriented, and followed any scientific procedures. The instructor trainees not only emulated the methodology followed in the multi-media package or atleast certain characteristics - and this itself was a reward for the instructional developer - and the administration ofthis course could produce a metamorphosis in their practice sessions. The investigator himself, took a round of the practice session classes during the final examination and discussed with the examiners then, and at the end, while they submitted the marks, for a feedback on the performance.

Other reasons for coming to the conclusion that the change in affective domain is due to the multi-media package are:

* that in as much as 95% of the instructors who were attending the

course, were regular and did not miss discussion classes and the tests;

* instructor trainees willingly co-operated with the instructional staff and the investigator in completing the course as per design of the course;
* instructor trainees patiently waited for their turn to do practical exercises, equipment operation and submitted the asignments well before due dates;
* they did not hesitate to do repeat performances, when they could not attain mastery over the equipment operation, especially in Modules III, IV and V.

They had an eagerness to learn. A further report on attitude is provided in the following section.

5.7 Summary

This section has thus described the results of the study and discussion of the results of the experiment, with respect to the validation of the multi-media package, by finding out its effectiveness in terms of achievement of the instructor trainees on criterion tests. It was established that the multi.media package, as a whole developed for teaching a course on Audio Visual Education, is effective, based on the achievement of the instructor trainees on the criterion tests for each of the five module and for the whole course based on the comprehensive course test. It was also established that the strategy was better compared to performance on previous three years when no multi-media approach was used. The next section describes the details of the experimental study with respect to two other objectives of the investigation, namely, to find the effectiveness of the multi-media package in terms of attitude of the instructor trainees toward the multi-media package, and relationship between the instructor trainees' achievement in the criterion tests and the English language abilities.

SECTION - 2

LEARNER CHARACTERISTICS AND MULTI-MEDIA PACKAGE

5.8 The Objectives

In the previous section the effectiveness of the developed multi-media package as a whole and of its individual modules has been established with reference to the achievement of the instructor trainees on criterion tests given at the begining and end of the course and also at the end of each module. The prime objective of this study was development of a multi-media package for teaching a course on Audio Visual Education for instructor trainees and validating the same. Two more objectives taken for the study are discussed in this section. The objectives given in Chapter 1 are restated below:

1 To find the effectiveness of the multi-media package in terms of the attitude of the instructor trainees toward the multi-media package.

2 To study the relationship between the instructor trainee's 'achievement' and his 'English language ability' through which the course was administered.

5.9 Effectiveness of multi-media package in terms of attitude of the instructor trainees toward the multi-media package

The word attitude is defined in the concise Oxford dictionary as settled behaviour indicating opinion; settled mode of thinking etc. Psycho-

logical conceptions of attitudes have been constructed and operationally defined in numerous ways in an attempt to account for peoples' feelings or affective responses. Thurstone (1931) defined attitudes as, "the amount of affect for or against a psychological object." Recent authors of Psychology conceptualise attitude as multi-dimensional, often a three part construct consisting of cognitive, affective and behavioural components. (Mouly, 1968). Gagne (1977) defines attitude as an "acquired internal state that influences the choice of personal action towards some class of things, persons or events." According to him, attitudes are affected by (a) an individual getting a success in a particular action, (b) reinforcement an individual receives from successful completion of a task and (c) human modelling.

Continuance or discontinuance of a new practice in any situation depends upon the attitude ofo people concerned. When it comes to the question of adopting a new method of instruction at any level, three categories of people are involved directly. They are the learners, the instructors and the administrators. However, in the present context, the learners, are the prospective instructors and are adults. Their attitude is an important factor to be reckoned, for the success of the validation of the instructional material depend to a larger extent on their attitude toward the material and the manner in which they are taught. It is essential that we check up the acceptability of a new system, as the learners are all grown up adults of age ranging from twenty to fifty. It is academically not desirable to force something on a community, if there is no liking for it. Therefore, one of the objectives of the present study was to investigate how acceptable is the multi-media package to the instructor trainees. This is an attempt tried for the first time at the Central Training Institute for Instructors and an attempt has been made to measure the attitude of the instructor trainees.

No standardised tool was available for measuring the attitude of the learners toward the multi-media package at the level of vocational training, and therefore it was considered necessary to develop first an attitude questionnaire. No study at the vocational educational or training level could be located on attitude of trainees or instructor trainees toward multi-media package as an instructional strategy.

Govinda (1976) has reported number of studies on programmed learning conducted by Feldhusen (1962), Hartley (1965), Frey et al. (1967), Brinkmann (1966), Neidt and Meredith (1966), Noble (1968), Noble and Gray (1968), Krishnamoorthy (1968), Mullick (1968) and Desai (1968) in which the overall reaction of students were favourable toward the programmed learning as a method of teaching. In a study Ravindranath (1982) has reported the effectiveness of the developed multi-media instructional strategy for teaching science (biology) at secondary level. Student's reactions were collected through interviews and a reaction questionnaire. Students are reported to have liked the novel approach of learning, and favoured learning through the new strategy in their next standard. In general more than seventy percent of students had reported to have shown positive reactions, and the investigator had said that, the strategy worked to a satisfactory level.

5.10 Construction of a scale to measure the attitude of instructor trainees toward multi-media package as a method of instruction

In view of the observation made in the preceeding paragraphs, an attempt has been made by the investigator in the present study to construct a questionnaire to measure the attitude of the instructor trainees toward the multi-media package as a method of instruction and validate the same

before administration to the concerned subjects, at the start and end of the course. The post-test was administered only after a lapse of four weeks of the completion of the course, so that the influence of novelty effect if any on the response of the learners is sufficiently controlled.

Generally there are two methods usually adopted in constructing attitude scales. They are the methods of summated ratings evolved by Likert and the method of equal interval evolved by Thurstone. The former method requires administration of a pool of positive and negative attitude statement to a large group of subjects say hundred and statements are selected from the responses. In the other method, the prior administration of the statements to the subjects during standardisation of the scale is not required. Only ratings of each item is obtained from a panel of judges. These ratings are taken as the basis for evaluating the individual statements as to their suitability for inclusion in the final form of the scale.

5.10.1 Step - 1

The first step in the construction of an attitude scale is to develop a fairly large number of statements about the programme with statements which might be ranging from one end of a continuum of strongly agree to the other end strongly disagree. Forty such statements were made, and a person who would agree fully would indicate a specific degree of attitude possessed by him towards the particular subject or idea presented. Similarly a person who is not at all in agreement with the statement would agree to the negative statement, or disagree to the positive statements. The statements, thus prepared, totalling about 50 was discussed with the faculty members of the training methodology section, and then with experts in the

Table 5.14 Statement Showing Mean and Standard Deviation of Attitude Questionnaire for Validation (Ref. Appendix - B)

Item Nos. in original attitude Scale	Mean	Standard Deviation	Selected items with Numbers
1	4.482	0.735	
2	4.223	0.813	
3	3.875	1.049	
4	3.661	1.036	12
5	3.205	1.067	13
6	4.054	0.909	
7	3.116	1.257	
8	3.991	1.009	
9	2.938	1.180	14
10	3.313	1.207	15
11	3.982	1.022	
12	3.741	0.993	16
13	3.813	1.053	17
14	2.946	1.161	18
15	4.384	0.872	
16	3.982	0.939	
17	3.009	1.095	19
18	2.688	1.193	20
19	3.054	1.236	21
20	4.045	1.077	
21	3.152	1.330	
22	3.563	1.153	22
23	3.741	1.002	23
24	3.839	1.009	24
25	3.946	0.976	
26	3.036	0.890	1
27	3.259	1.257	
28	3.714	1.158	2
29	3.241	1.059	3
30	3.741	0.918	4
31	3.179	1.109	11
32	3.214	1.211	10
33	3.768	1.074	5
34	4.045	1.052	
35	3.813	0.991	6
36	3.196	1.097	9
37	3.795	0.761	7
38	3.795	0.902	8
39	3.830	1.073	
40	4.500	0.710	

field from the University of Madras and also State Council of Educational Research and Training (SCERT). After thorough examination, forty of these statements were finally selected as the primary pool of statement. In the final selection efforts were made to ensure that these statements included items reflecting all shades of feelings toward the object of covering the whole attitude continuum. The copy of this primary pool of forty statements is given in Appendix-A.

5.10.2 S t e p - 2

The next step in the process is the validation of these items. Co-operation of instructional staff who were exposed to multi-media programmes were required at the level of vocational training. The statement was then distributed to 150 such instructional staff who attended seminar-workshop conducted by the investigator on multi-media programmes at the Central Training Institute, Madras. These persons had a fair knowledge of the multi-media approach, and are acquainted with the method of rating on the five point Likerts Scale. Only 112 statements were received fully answered. Some did not respond, and about twenty of the statements were incomplete. The mean, and standard deviation in respect of these items, are given in table 5.14. From the forty items of the primary pool of statements, twenty four items having a mean not more than 3.875 and standard deviation less than 1.25, were chosen for administration to the subjects chosen for the validation study. Both the primary pool and the final selected items are given in Appendix - A and B.

5.11 Sample

The sample for the study, are the instructor trainees belonging to different disciplines (trades) undergoing training at the Central Training Institute for Instructors, Madras during the academic year 1981-1982. The validation study was conducted under natural set up, without disturbing the grouping for this course or the class schedules. This enabled the investigator to obtain reliable results.

5.12 Measurement of attitude and results

The attitude scale was first administered after completing Module I and a part of Module II and the last test, that is, the post test was administered about four weeks after the completion of the last module. By the time, the pre test was given the learners had experience of completion of one module with multi-media package of one variety, take various tests, and also part of another module with a different strategy. The different module tests formed part of the progressive assessment of the course and included in the validation process, explained in the previous chapter. This would have enabled the instructor trainees to have given enough time and experience to have formed an attitude toward the psychological objective. The delayed administration of the post test would enable novelty influence to fade away, and there is more likelihood of getting a more valid and reliable rating.

The mean, standard deviation obtained due to change of attitude of the instructor trainees is given in table 5.15.

Table 5.15 showing the mean of pre and post test, mean gain in attitude, observed 't' value and tabulated 't' values.

Mean pretest	Mean post-test	Mean gain	Standard deviation, of the gain scores	't' observed
80.172	87.514	7.342	8.890	8.70

From the above tabulation it can be observed that the mean gain on the change in attitude of the instructor trainees is significant at 0.01 level. It can be said that there is significant improvement in the attitude of the learners toward the multi-media package from the mean gain (7.342) and the observed 't' value (8.70) for the difference in the means of pre-test and post-test.

Findings of the present study regarding the change of attitude of students favourably towards multi-media package agree with the study reported by Ravindranath (1982) regarding the reaction of students toward the multi-media strategy. In a study conducted by Govinda (1976) regarding the attitude of students towards programmed learning for a course, 'Educational testing and techniques of evaluation,' at B.Ed. lelvel, he reported that the attitude of students towards programmed learning is favourable, but he cites reports of Hartley (1975), Frey et al. (1967), Noble (1968), Noble and Gray (1968), Neidt and Sjorgren (1968) who have uniformly reported that they observed a decrease in the favourability in the attitude, when measurement was done more than once over a long period of instruction.

5.13 Achievemnet and English Language ability

As the levels of the instructor trainees were different with difference in backgrounds from various states, it was thought necessary to study the relationship between the instructor's achievement and his English language ability through which the course was administered. By and large, the basic general education of the instructor trainees were a pass in the high school, with technical certificate or dimploma in vocational subjects. The medium of instruction at the Central Training Institute, Madras is in English and therefore, the course materials were prepared in that medium. One of the purpose of designing the multi-media package was to help learners to learn through self-instruction, and here adequate knowledge of English language was considered to be significant. Hence, an English language ability test was prepared in consultation with Professors from State Council of Education and Training out of questions from the Secondary School Public Examinations held in the past four years. The English language test constructed was first given to a selected group of 12 students, one from each of the trade areas undergoing training at the Central Training Institute for Instructors, Madras in the year 1979-1980. It was found that all students secured more than 45% on the test. The test together with the results were again discussed with the expert from SCERT and no changes adopted for the English language ability testing to the batch of instructor trainees undergoing training in the year 1981-1982 on whom the multi-media package was administered. The English language test thus given is given in Appendix-C. The results are tabulated in table 5.16.

Table 5.16 Showing the correlation between English Language and the scores on the post-test, i.e., course test for the whole course.

Correlation Coefficient	't' observed	't' tabulated 5%	't' tabulated 1%
0.3201	4.91	1.96	2.45

From the above data, t value is significant at 0.01 level.

Language has not played a crucial role in the learning task through the strategy as more visuals have been used and they have helped the learners considerably.

5.14 Summary

This secion has thus described the results of the study pertaining to the objectives (a) effectiveness of the multi-media package in terms of the attitude of the instructor trainees toward the multi-media package, (b) relationship between the instructor trainee's achievement and his English language ability through which the course was administered. It was established that the multi-media package developed for teaching a course on audio visual education is effective in terms of the change in attitude of the instructor trainees. It was also found out that there is positive change in motivation to learn in the instructor trainees through the use of multi-media package. It was also noticed that there is low correlation between English language ability and achievement of instructor trainees learning through multi-media

package visuals and not words have played a key role in the process of learning. Stated differently low language ability or difficulty in understanding English has not stood in the way of achievement of the learners. This leaves us to a position of acceptability of the multi-media package of instruction by the learners from whom this package was developed, and we can use the package with confidence as an instructional strategy and give instruction for the course Audio Visual Education, for future batches of instructor trainees.

The third section of this chapter describes the feasibility of the multi-media package.

SECTION - 3

FEASIBILITY OF THE MULTI-MEDIA PACKAGE

5.15 The Objective

Currently the educational and training systems are under heavy pressures to provide more effective and efficient education and training, pressures that have given rise to such concepts as accountability and performance contracting. One of the most popular notions raised by the financial wizards involves 'cost-effectiveness,' which is used to measure the efficiency of particular educational or training strategy. Although many instructional developers are repelled by the idea of quantifying the efficiency of the educational and training process, which is extremely complex and subtle, it is nevertheless true that such numbers are extremely powerful and often overshadow other valuable outcomes of a particular educational and training enterprises.

It has been stated in Chapter 1, that an aspect which gains importance is studies dealing with instructional development, is the feasibility of the developed package in terms of cost and time. This has added significance when the materials developed are of a nature not normally found in our school system. It is the opinion of this investigator, that cost-effectiveness analysis is to be taken as an aid to decision making, for adopting the new instructional strategy, but not as a substitute for decision making. In any decision making situation, one has to consider the availability of financial

resources, and the effectiveness in terms of performacne. In Section-1 it has been reported that the developed multi-media package is effective in terms of achievement of the instructor trainees. It is now proposed to discuss the feasibility of the developed multi-media package in terms of cost and time. The objective in respect of this development aspect as stated in the first chapter is:

> "To study the feasibility of the multi-media package in terms of (a) cost, and (b) time, for the instructor training programme."

By and large instruction in the CTI, Madras is generally around lectures, books demonstration and notes. These are the focus of learning in schools and colleges also and instructional tools adopted by most of the instructors. When any change is made, no matter how best the changes are, one has not only to satisfy the criterion of acceptability in terms of instructional effectiveness, but how the instructional tools can be adopted in a regular situation. Therefore present discussion will be limited to the following two aspects in this section:

1 whether the cost to be incurred for the regular use of the developed multi-media package is manageable, i.e., feasibility of reproducibility and

2 whether the multi-media package developed can be used within the normal time schedule in the training system, for the instructor training programme, i.e., reusability.

5.16 Design

For studying the feasibility in terms of cost, details of cost related

to the expenses incurred on initial development and for duplicating the materials for repeat use have been collected and worked out. For the second aspect namely, time, a detailed account of time taken for implementation of the scheme kept. In fact, the course was implemented in a natural set up, within the regular time schedule, and it was easy to find out the number of periods utilised for the implementation of the multi-media package in terms of study periods, testing periods, workshop periods and discussion sessions. For studying the cost effectiveness, finally the cost is compared to the training grant permissible to be incurred by the Government of India, and for the time, the time allowed in the time-table for the instructor training programme.

5.17 Data Collection

In all there were five modules, consisting of 36 units of instruction, and the data in respect of cost required to develop the learning material for the whole course was collected in terms of initial preparation and for further duplication. Similarly the data in respect of time required to administer the course with the multi-media package developed was also kept in terms of the number of hours utilised. Though the multi-media package was conceived to be utilised as a self-instructional package, and the learners can learn the course mostly outside class hours, except perhaps for the sound slide presentation and for some of the practicals, where equipment will be required; the time normally required had the classes been conducted in the conventional way has been considered for the purpose of reckoning the time element. Regarding the cost, non-recurring cost of production of visuals and stencils for duplication and the recurring cost of duplication

Table 5.17 Showing the Non-Recurring Expenditure

Sl.No.	Details of items		Total Rs.
A.	**Visuals**		
1	Bond paper for making drawings for scanning.	140 sheets @ 0.08/e	11.20
2	Tracing sheets A4 size for making drawings	48 sheets @ 0.25/e	12.00
3	Lith film A4 size for making O.H. transparencies i/c developing.	30 Sheets @ 12.00/e	360.00
4	Colour slides including one set of master negatives. Cost includes exposing, developing and mounting.	1676 Nos. @10.50/e	17,598.00
	Total of visuals		17,981.00
B.	**Artwork and draughting**		
1	Artwork for making slides	600 Nos. @ 25.00/e	15,000.00
2	Drawings and captions	700 Nos. @ 5.00/e	3,500.00
3	Location shootings	400 Nos. @ 3.00/e	1,200.00
4	Sketches for practical exercises	45 Nos. @ 5.00/e	225.00
			19,925.00
C.	**Audio**		
1	Cassettes for audio including master for copying.	20 Nos. @ 30.00/e	600.00
2	Recording and making copy	10 Nos. @ 15.00/e	150.00
			750.00
D.	**Stencils**		
1	Wax stencils	1000 Nos. @ 1.50/e	1,500.00
2	Scanning stencils (Faxil)	140 Nos. @ 3.75/e	525.00
3	Cost of cutting and scanning stencils.	1140 Nos.@1.50/e	1,710.00
			3,735.00

of written instructional materials for the self-study has been considered. The costs for this purpose are as to what they stood in the year 1982 at the time of experimentation, at Madras.

5.18 Feasibility of the multi-media package in terms of cost

As pointed out, the financial implication for the non-recurring and recurring aspects have been calculated based on the try-out done during 1982 at Madras. While considering the recurring cost, the number of learners have been taken as 120, which was the admitted strength during 1981-1982 session for the experimental study: The details are worked out in Table 5.17.

The non-recurring cost to be considered are cost of making the visuals for both the written instructional materials and the cost of components. The former includes various tests and practical exercises, while the latter slides, tapes and transparencies. The recurring cost will include cost of duplicating the textual material including tests. For the purpose of arriving cost per learner, it is assumed that the slides, transparencies and audio cassettes will last for ten years, and the stencils can be reused five times. If proper care is taken the life time could be increased. This estimate for time is based on past experience on similar jobs. The recurring cost will be on year to year basis, that is per use. This assumption, may not hold good, if in case, the modular courses are introduced, and the use will be more depending on the number of times, the course is conducted, thus reducing the cost per use. It is also conceived that learners will not be capable of procuring projection materials for use at their own places. The basis of

the work is that the learners, either individually, or in small groups can check out the package in module from the library or visual aid workshop, and use the projection equipment in the audio visual workshop.

Table 5.18 Showing Recurring Expenditure

Sl.No	Details of items	Quantity	Rate	Total Rs.
1	Duplicating paper A4 size (1140 x 120 : 68.4 reams)	69 reams	@ 30.00/e	2,070.00
2	Duplicating ink (1 for 50 stencils)	3 tubes	@ 20.00/e	460.00
3	Duplicating charges (120 copies)	1140 sheets	@ 0.75/e	855.00
				3,385.00
			or say Rs. 3,500.00	

It can be seen from the foregoing tables 5.17 and 5.18 that the total cost of production appears to be on the high side, but it is only an illussion. We have taken the actual situation prevailing at the CTI, Madras, where admission position was 120, and the course was offered on an year to year basis. This cost works out to Rs. 5.60 per instructor trainees per month, and can be seen at table 5.19.

Table 5.19 Showing Expenditure per Instructor trainee per year

No	Details		Cost - Rs.
A.	Non-Recurring cost for 120 learners		
1	Visuals	17,981.00	
2	Artwork	19,925.00	
3	Audio	750.00	
		38,656.00	
	Cost for 120 trainee per annum, fixing ten year life		3,865.60
4	Stencils	3,735.00	
	Cost for 120 trainees per annum, fixing five year life		747.00
B.	Recurring cost for 120 learners		
1	Duplicating	Cost per annum	3,500.00
	Cost for 120 trainees per annum		8,112.60
	Cost for one trainee per annum		67.60
	Cost for one trainee per month		5.60

The training cost on materials and supplies is Rs.40/- per trainee per month at present. This figure is likely to be increased, due to escalation in prices. The cost of Rs.5.60 worked out for for one subject out of six subjects is well within permissible limits. In case, this material will be used in other Central Training Institutes for Instructors, in all about 1000 trainees will receive instruction per annum, and the cost per learner will considerably be reduced, as the non recurring expenditure will get distributed

over to the 1000 learners as against 120 learners per annum. A slight staggering of scheduling of the classes will permit the visuals and audio to be used by all on rotation basis. However,even if separate supply has to be made, the cost per learner will come down. The feasibility of the multi-media package for reproducibility is thus established, and there is no difficulty to use the materials for instructional purposes on a regular basis. The second aspect of the study, is the time factor.

5.19 Feasibility of the multi-media package in terms of time

The course is offered in the second phase of a full academic year. At the Central Training Institute for Instructors, Madras, two sessions each of two hours during the second phase is allotted thus making a total of 104 hours of study per academic year. In all for the administration of the multi-media packages, a total of 103 hours was utilised. This time does not include the time taken for the administration of pre-tests and post-tests on English language ability, and attitude toward the multi-media package. Details of time utilised for implementing the instructional strategy are given in table 5.20. The analysis shows that 36 hours were utilised for the textual material, 40 hours for practical exercises, 6 hours for discussion, and 21 hours for the module and course tests. It is worth mentioning here that normally in the process of instruction such rigorous scheduling is never adopted at the Central Training Institute for Instructors, Madras. Moreover, tests of such elaborate nature for every objective, including practical exercises, are not conducted every month. It is a practice to give a test of only one hour duration every month, and give home assignments for practical exercises. Tests are also mostly essay type. An extra fourteen hours have been devoted for tests.

Table 5.20 Showing the number of class hours utilised for administering the multi-media package and the tests

Sl.No.	Modules	Units	Number of hours utilised for				Total
			Instruction	Practical	Disscussion	Tests	
1	I	1-5	5	-	1	11/4	71/4
2	II	1-9	10	34	11/2	83/4	541/4
3	III	1-10	10	31/2	11/2	31/2	181/2
4	IV	1-5	5	11/2	1	2	91/2
5	V	1-6	6	1	1	2	10
6	Course test	all	-	-	-	31/2	31/2
Total :		--	36	40	6	21	103

One important feature of the strategy is that except in the case of module 1 and 3, for which projection equipment is required, for the multi-media and multi-imagery instruction, no equipment is contemplated for the learning, and the learner can use them at a convenient place, at his own rate of learning, outside the class hours. Similarly most of the practicals for module 2, could be done outside the class hours. In fact, because of the self-learning concept and facility, class hours can be saved, which was utilised during 81-82 session for individual attention, and repeat skill learning for those

who needed. Thus a total of 21 hours could be saved for modules 2,4 and 5. A considerable number of hours out of 34 hours provided for module 2 could also be saved during practical exercises. This saving of time is a saving of teaching work for the instructor, unless there is some one who comes for individual discussion. Thus one could safely say that the implementation of the strategy, as per the time schedule allotted is feasible. By adopting the strategy, structured learning sequence, periodical and continued evaluation of the learner and obtaining feedback data for further improvement of the instructional materials on a scientific basic are the additional advantages, available to the total instructional system.

In the present study, in addition to achievement tests at the end of each module and the whole course; the English language ability test administered before the commencement of the course, an attitude questionnaire of instructor trainees toward the multi-media package was also administered. Time required for these tests are tabulated below:

Table 5.21 Showing time required for tests conducted other than achievement tests for each module and the course

No	Details of the tests	When administered	Time:Hrs
1	English language ability test	Biginning of course	2.00
2	Attitude questionnaire toward the multi-media package	Beginning and end of course	1.00
3	Pre-test for the whole course	Beginning of course	3.50
4	Pre-test for each module (5 tests)	Biginning of each module	17.00
	Total time taken		23.50

None of the above tests are required for normal courses and in fact used in the regular programmes. As such they are not taken into consideration for time accountability. These tests are arranged during experimental study by arranging extra classes, of course only during the regular working hours, by reallocating schedules for other classes. However, this time if distributed during the six months under phase II, it will be only four hours per month, which can be easily met from weekly library periods and from periods set apart for the monthly test for the subject, as no separate periods will be required for monthly tests. Thus, even including the additional tests, one can easily conclude, that the strategy is feasible for regular implementation. Even the discussion sessions, which is not regular feature during the usual instruction (non-multi-media strategy) could be accommodated within the allotted time. For implementing the multi-media programme, additional resource required are discussed hereunder.

5.20 Resource

Certain resource are necessary to implement the scheme. Among these are personnel, physical facilities, equipment and material. No additional instructional staff was found necessary and only existing personnel were used. Organising new method of instruction was certainly effecting changes in the existing systems and procedures, and hence required considerable amount of discussions and briefing with the faculty members and the faculty leader. Faculty members were happy to try a novel approach. Further, they save time for preparation of notes, correction of notes, preparation of tests, correction of tests and sequencing the instruction. The tests now provided are easy to evaluate, and the faculty was provided with complete

scheme for evaluation. The time saved by the faculty was utilised for individual discussions and repeat performance as and when required by the learners. All the staff who were involved were happy to use the strategy, as they were previously exposed to multi-media seminars during the previous two years, and this provided them a good opportunity to immediately implement the multi-approach which was the theme of the seminars.

The next aspect to be considered is the physical facility. The institution is provided with all classroom facilities and there was no necessity to make any new arrangements. The third aspect to be considered is the requirement of equipment. The entire course was drafted as per the syllabus and equipment required were already available and therefore there was no difficulty. All materials used in the course, are indigenously produced and are available at Madras. The instructor trainees could also procure materials for development of visuals from local market.

5.21 Summary

The multi-media package is thus a strategy that can be adopted as a regular instructional resource material in terms of time, cost and also resource such as personnel, physical facilities, equipment, consumable materials and other resource required to implement instruction. In the next chapter, a summary of the report is presented. This summary would include significant aspects of the study, objectives of the study, outcome of the study and suggestions for further studies in this area.

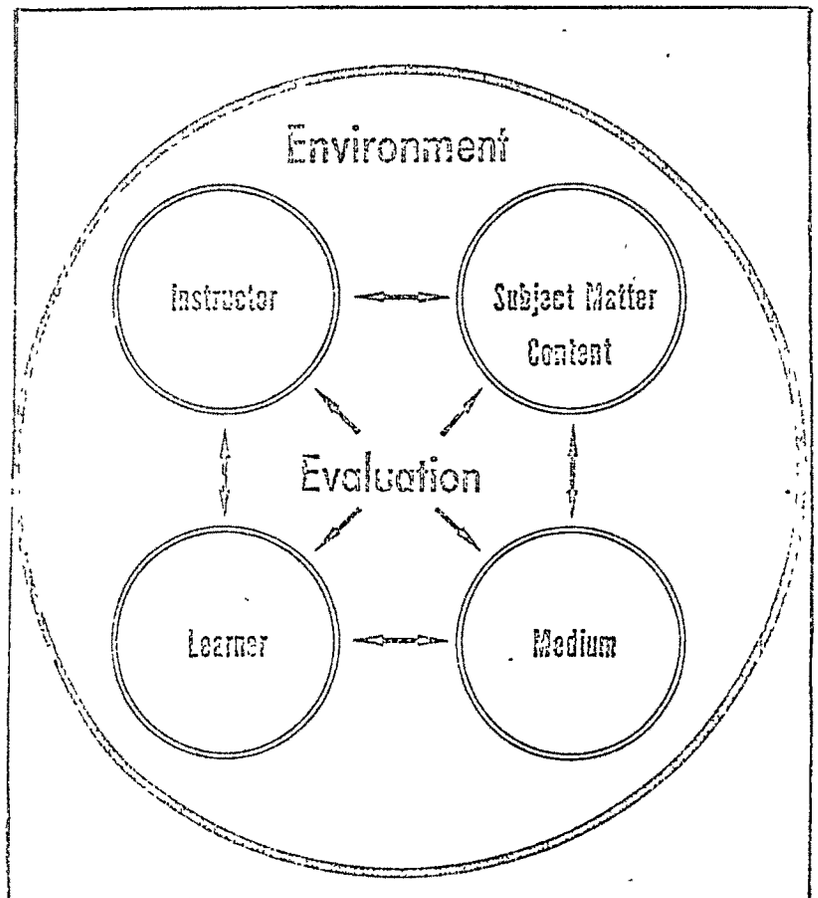

FIG-6-1 THE INSTRUCTONAL SYSTEM
(KOZMA-1978)