CHAPTER – IV

METHODOLOGY...
## CHAPTER IV  METHODOLOGY

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CHAPTER IV
METHODOLOGY

INTRODUCTION

Research is a systematic attempt to provide answers to questions. Such answers may be abstract and general as is often the case in basic research, or they may be highly concrete and specific as is often the case in demonstration or applied research. Research is simply a systematic and refined technique of thinking, employing specialized tools, instruments and procedures in order to obtain a more adequate solution of a problem than would be possible under ordinary means. It starts with a problem, collect data or facts, analyzes these critically and reaches decisions based on the actual evidence. It involves original work instead of mere exercise of personal opinion. It evolves from a genuine desire to know rather than a desire to prove something. It is quantitative, seeking to know only what but how much, and measurement is therefore a central feature of it.

In this chapter, an attempt is made to describe the video programmes availed in the study and their validation, the development of the interview schedule which was used to collect individual information from the sample, the development of Criterion Referenced Tests Form-A and Form-B used as Pre and Post-tests, Flanders Interaction Analysis Categories System used as a tool in the interaction analysis of the instructional process in the Control and Experimental Groups, procedure adopted in conducting the experiment, and the establishment of the reliability and validity of the different tools used for data collection in the study.

VIDEO PROGRAMMES AVAILED AND THEIR VALIDATION

A Brief Resume of Video Programmes Availed in the Study

As this study mainly aimed at establishing the effectiveness of the video assisted instruction in agriculture, video programmes on agricultural subjects were inevitable in
carrying out the study. It is popularly known that the Directorate of Extension Education, 
Tamil Nadu Agricultural University, Coimbatore has produced more than 75 video 
programmes on different agricultural subjects ranging from kitchen gardening to waste 
land development. A list of video programmes which are relevant to the Kanyakumari 
District of Tamil Nadu, it being the locale of the study was prepared and circulated among 
the farmers of the experimental villages requesting them to select those programmes 
which they felt most needed. They were also requested to give their priority to the 
different programmes to the degree of their needs, prior knowledge etc. Accordingly 15 
programmes were finally selected for instruction, the details of which are given in the 
Table 1.

From the Table 1, it is known that three programmes were related to coconut 
cultivation and relative byproducts, five programmes were to groundnut cultivation, two 
programmes were on paddy cultivation, one programme each on banana cultivation and 
mushroom cultivation and the remaining three programmes were related to cultivation of 
general crops. Seven of these programmes were Documentary in format while the 
remaining eight programmes were in Straight Talk. The duration of the programmes 
range from 7 minutes to 30 minutes. The average duration was found to be 16 minutes. 
An attempt was made to analyse the content of the said video programmes, the details of 
which are given in the Appendix : 1.

All the above said video programmes were evaluated by experts using a specially 
developed evaluation proforma, the details of which are given in the following pages.

**Development of Evaluation Proforma**

Evaluation is the application of research skills to determine the worth of an 
instructional practice. Evaluation research aids in decision making at a given site (s) and 
adds the research-based knowledge about a specific practice which may or may not be
TABLE 1. DISCISSION OF THE VIDEO PROGRAMMES AVAILED IN THE STUDY

<table>
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<th>CONTENTS</th>
<th>FARMAT</th>
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<td>Tanjore Wilt in Coconut</td>
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<td>Paddy Cultivation</td>
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<td>Enriched Farmyard Manure</td>
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Doc - Documentary  
ST - Straight talk
relevant to more general audiences. Decisions are those which plan and improve a practice or which justify or do not justify widespread adoption of a practice. Evaluation skills include abilities to analyze the practice to be evaluated, acquire a knowledge of the site content and the values operating in the site, work cooperatively with diverse evaluation audiences and communicate technical data in nontechnical language.

Evaluation activities have always been an integral part of education. Frequently, professional judgements have been made about the placement of learners in special programmes the extent of learners' learning, the selection of materials and the modification of programmes. Evaluation studies are used to determine the allocation of scarce resources and the effectiveness of alternative educational programmes and to make and justify value decisions in many aspects of education.

Evaluation as defined from a research point of view requires a formal evaluation design and procedures in order to collect and analyze data systematically for determining the value of a specific educational practice or anticipated practice. As Lincoln and Guba (1980) stated at the root of the term evaluate suggests that the function of evaluation is to place a value on the thing being appraised.

Video is an effective tool in the teaching-learning process. In the field of agriculture, video has a positive impact in achieving the objectives of extension education. So to develop more and more qualitative video programmes, evaluation is an important aspect. The researcher evaluated the video programmes before they were used for the study. It ensured the quality of the video programme. The researcher evaluated the video programmes with reference to the following aspects:

- Content (Subject matter)
- Audio
- Video
- Graphics
- Language
All the above said aspects of the video programmes are equally important and their level should be judged to be at least satisfactory.

**Content (Subject matter)**

The video programmes in agriculture were developed by agricultural experts and hence despite presenting up-to-date information are free from errors. If the content is complex, then it should be explained and remain totally comprehensible. Content should not, due to ideological or dogmatic stand points, transmit distorted or incomplete knowledge or information. Objectivity can sometimes consist in presenting several interpretations of the same fact or event or several possible explanations of the phenomenon.

The video programme should have activities which the learner can carry out, either under the guidance of the instructor or his own, which should be presented in the form of practical applications, either of knowledge or theoretical concepts, or of rules to be learned or even in the form of problems to be solved, information to be sought or experimentations.

**Content-interest of Learners**

Learning is facilitated if the learner's interest is enhanced by the content of the video programme—not only personal interests, but also as a member of the group. A clear and precise presentation of text and evocative attractive examples can play an important part in stimulating the interest of the learners. The presentation of content to the learner should be able to find situations which are familiar to him or examples drawn from the environment of the learner.
Organization

A progression should appear in the content of the software, starting from the basic abilities considered as elementary, in order to attain the most complex ones, thus enabling the fulfillment of the objectives of intellectual development fixed by the subject. Each concept should be explained in the developed software in one hand and on the other progression of content and learning activities should lead the learner towards knowing how to use simple concepts, and then more complex ones, in order to master application to a variety of situations or facts.

Presentation

A relative uniformity of presentation is useful in facilitating assimilation of content in sequence, and how they inter-relate. Diversity in presentation would confuse the reader and oblige him to readapt to a different presentation to the detriment of learning. Uniformity simplifies the work of the developer by providing him with a model upon which to build each section.

The problem consists in presenting the required minimum of contents for the acquisition phase and establishing liaison with the integration of new content, without lengthening the programme too much. A compromise has to be reached between contribution of information and graphics which is sufficient to permit learning of new content and length of programme which, if excessive, might discourage the learner. Learners who have already known more than others might lose interest and motivation if information is repeated to excess.

Clarity and Accuracy of Content

Illustrations should faithfully depict and explain what is shown visually. They should be clear and accurate and not give rise to ambiguities. The introduction of fantasy can hamper comprehension, as can an excessive search for aesthetic quality which might
direct the attention of the reader from the real aim of the illustration. Decorative illustrations are justified to stimulate and develop a learner's artistic sensibility. Any artistic aspect inserted into the software, should have a pedagogical function also.

Suitability to the Target Population

Choice of contents and elaboration should take into account the fact that the interests of learners are varied and, like abilities differ according to age, environment, psycho-affective traits. The video programme should be related with regard to the learner's needs, previous knowledge and comprehensibility.

Familiar, short and simply constructed phrases are generally better and memorized and understood than long, intricate phrases with complex structure. Visualization is also another important factor for reinforcing the main points because if words and new concepts are related to mental images they will be easier for the learners to understand.

Audio

Spoken aspects: Avoid making phrases too long or complex and adopt the length to the age and cultural level of the learners.

Short, oversimplified phrases are not, however, understood as well as phrases which are little and better articulated.

Sufficient pause and stress should be given in the appropriate place and the speed of delivery should also be at optimum level.

Video

Visualization is an important factor, because if words and new concepts are related to mental images they will be easier for the learners to understand and memorize. Visuals should be relevant to the instructional content. They should support the instructional points. The visuals should be presented in a sequential order. Still pictures, simulation
and live activity may adopt to the suitability of the presentation option. The
synchronization of audio and video is also an important aspect in video programme.

Graphics

Text density and the speed at which the text is displayed should be at optimum
level. Grouping of similar concepts together is an important aspect in graphic
presentation. Mix of colours and consistency in the use of colours should be taken into
account very carefully. Suitable graphics should be selected for presentation at suitable
place. The graphics should be in supporting and illustrating the instructional points due to
its clarity and accuracy.

Language

Language used in the programmes should be suitable to the target population.
Words used in the video programmes should be those commonly used, recognized and
accepted by the system, and usually familiar to learners. Learners' basic vocabulary varies
with age, socio-cultural environment and in some cases the ethnic milieu. The producer of
the video programme must bear in mind the fact that a learner's vocabulary also contains
long, abstract, infrequently used words the meaning of which must be reinforced and fixed
in his mind. This is a problem of measuring the degrees of facility of reading texts, by
choosing and adopting vocabulary according to the subject matter and topic under
consideration. The producer of the programme should take into account the use of
continuous links in order to arouse and sustain the interest of the participants.

Keeping all the above said principles in mind, the researcher developed the
Evaluation Proforma so as to assess the quality as well as the suitability of the video
programmes in agriculture to the target population. A copy of the evluation proforma is
given in the Appendix : 2.
Validation of Agricultural Video Programmes

All the fifteen said video programmes were evaluated by 25 experts comprising the Director of Extension Education, Professor and Head and Assistant Director, Audio-Video Studio, Tamil Nadu Agricultural University, Coimbatore, subject specialists, extension workers, technical experts, educational technologist, research scholars and farmers using the developed evaluation proforma. The said video programmes were played to the evaluers one by one. They responded to each of the different aspects of the video programmes based on their overall impression, the details of which are given in the Appendix : 3.

The findings emerged are described as follows:

Content

So far as the content of the video programmes is concerned, the evaluers responded as described below:

1. So far as the content's reflection of learner's interest is concerned, 64, 32 and 4 per cent of the evaluers stated as 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively.

2. So far as the organization, presentation and clarify of communication of the content are concerned, 60, 32 and 8 per cent of the evaluers stated as 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively.

3. With regard to the suitability of the contents to the target population in terms of their, previous knowledge and comprehensibility, the evaluers' response is as follows:

   (i) Thirty six per cent, fifty two per cent and twelve per cent of the evaluers expressed as 'highly acceptable', 'acceptable' and 'moderately acceptable' towards the need of the learners respectively.
(ii) Twenty eight per cent, sixty four per cent and four per cent of the evaluers expressed as 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively towards previous knowledge of the learners.

(iii) Forty per cent, thirty two per cent and twenty eight per cent of the evaluers expressed 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively towards comprehensibility of the learners.

4. When responding to the length of the contents, 4, 28 and 60 per cent and the remaining 8 per cent of the evaluers expressed as 'too lengthy', 'lengthy', 'reasonably timed' and 'short' respectively.

5. With regard to the strategy adopted in the programmes to reinforce the main points, 40, 44 and 16 per cent of the evaluers expressed as 'highly appreciable' 'appreciable' and 'moderately acceptable' respectively.

6. When responding to how the subject matter is reviewed before closure, 32, 48, 16 and 4 per cent of the evaluers expressed as 'well adequate', 'adequate', 'moderately adequate' and 'inadequate' respectively.

7. With regard to the coverage of the subject matter, 48, 44 and 8 per cent of the evalueres expressed as 'well adequate', 'adequate' and 'moderately adequate' respectively.

Audio

The quality of the audio of the video programmes is evaluated by the experts in different aspects are as follows:
1. With regard to the quality of the audio recording of the video programmes 64 and 36 per cent of the evaluers expressed as 'very good' and 'good' respectively.

2. With regard to the suitability of the background music, 40, 48, 8 and 4 per cent of the evaluers expressed as 'highly appreciable', 'appreciable', 'moderately appreciable' and 'poor' respectively.

3. With regard to the quality of the spoken aspects of the presenter in terms of pronunciation, phrasing, pause, stress and speed of delivery, the evaluator's response is as follows:

   (i) Forty per cent, forty eight per cent and twelve per cent of the evaluator expressed as 'very good', 'good' and 'moderately good' respectively towards pronunciation and phrasing of the presenter.

   (ii) Twenty four per cent, fifty six per cent and twenty per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' respectively towards pause of the spoken aspect.

   (iii) Twelve per cent, fifty six per cent and twenty per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' towards the stress given in the spoken aspect of the video programmes.

   (iv) Forty per cent, thirty six per cent and twenty four per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' towards the speed of delivery of the presenter.

**VIDEO**

The quality of the video programmes evaluated by the experts to different aspects are as follows:

1. With regard to the quality of the video programmes 64 and 36 per cent of the evaluers expressed as 'very good', and 'good' respectively.
2. With regard to the visuals' relevance to the instructional content 56 and 44 per cent of the evaluers expressed as 'highly appropriate' and 'appropriate' respectively.

3. With regard to the visuals' calibre to support the instructional points 32, 44 and 24 per cent of the evaluers expressed as 'very high', 'high' and 'moderate' respectively.

4. With regard to the sequence of visuals presented, 56, 32 and 12 per cent of the evaluers expressed 'highly impressive', 'impressive' and 'moderately impressive' respectively.

5. With regard to the suitability of the presentation options viz. live activity, simulation and still pictures, the evaluers' response is as follows:
   
   (i) Seventy two per cent and twenty eight per cent of the evaluers expressed as 'highly impressive' and 'impressive' respectively in terms of the live activity.

   (ii) Forty four per cent, forty eight per cent and eight per cent of the evaluers expressed as 'highly impressive' and 'impressive' respectively towards simulation in the video programmes.

   (iii) Twenty eight per cent, fifty six per cent and sixteen per cent of the evaluers expressed as 'highly impressive', 'impressive' and 'moderately impressive' respectively towards still pictures.

6. With regard to the coverage of specific events, 68, 24 and 8 per cent of the evaluers expressed as 'highly impressive', 'impressive' and 'moderately impressive' respectively.

7. With regard to the synchronization of the audio with visuals 76, 20 and 4 per cent of the evaluers expressed as 'highly impressive', 'impressive' and 'moderately impressive' respectively.
Graphics

The responses made by the evaluers to the quality with regard to different aspects of the graphics used in the video programmes are as follows:

1. With regard to the text (written words) density 24, 72 and 4 per cent of the evaluers expressed as 'highly reasonable', 'reasonable' and 'moderately reasonable' respectively.

2. With regard to the speed at which the text is displayed 44, 48 and 8 per cent of the evaluers expressed as 'highly impressive', 'impressive' and 'moderately impressive' respectively.

3. With regard to the grouping of similar concepts together 56, 40 and 4 per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' respectively.

4. With regard to the appropriateness of the colour used for graphics, 56, 40 and 4 per cent of the evaluers expressed as 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively.

5. With regard towards mix and consistency in use of colours in the video programmes 44, 48 and 8 per cent of the evaluers expressed as 'highly acceptable', 'acceptable' and 'moderately acceptable' respectively.

6. With regard to the quality of the graphics, 52, 36 and 12 per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' respectively.

7. With regard to the suitability of the graphic selection, 48, 44 and 8 per cent of the evaluers expressed as 'suitable', 'suitable' and 'moderately suitable' respectively.

8. With regard to the efficiency of the graphics in supporting and illustrating the instructional points 48 and 52 per cent of the evaluers expressed as 'highly commendable', 'commendable' and 'moderately commendable' respectively.
9. With regard to clarity and accuracy of the graphics 40, 44 and 16 per cent of the evaluers expressed as 'very good', 'good' and 'moderately good' respectively.

10. With regard to the appropriateness of the place at which the graphics used, 60 and 40 per cent of the evaluers expressed as 'highly appropriate' and 'appropriate' respectively.

11. With regard to the accuracy of the titles and captions which accompany the graphics 36 and 64 per cent of the evaluers expressed as 'quite accurate', and 'accurate' respectively.

Language

The opinion of the evaluators regarding the usage of language in the video programmes as follows.

1. With regard to the suitability of the language used in the programmes to the target population 36, 60 and 4 per cent of the evaluers expressed 'quite suitable', 'suitable' and 'moderately suitable' respectively.

2. With regard to the vocabulary used to the assumed level of the target population 32, 56 and 12 per cent of the evaluers expressed as 'quite appropriate', 'appropriate' and 'moderately appropriate' respectively.

3. With regard to the use of subject specific vocabularies 16, 24 and 60 per cent of the evaluers expressed as 'too much', 'much' and 'reasonable' respectively.

4. With regard to the structure of the sentences so far as to the comprehension level of the participants is concerned 44 and 56 per cent of the evaluers expressed as 'quite appropriate' and 'appropriate' respectively.

5. With regard to the use of continuous links in order to arouse and sustain the interest of the participation 40 and 60 per cent of the evaluers expressed as 'highly appreciable' and 'appreciable' respectively.
DEVELOPMENT OF THE INTERVIEW SCHEDULE

Unless the learning style of the participants, physical facilities available in the centre, cultural issues related to the video media and physical and emotional needs of the learners are known, it is not possible to generalize from the findings of the study. Hence it was decided to develop an interview schedule.

Interviews are essentially vocal questionnaires. The major steps in constructing an interview are justification, defining objectives, writing questions, deciding general and item format and pretesting. The interview involves direct interaction between individuals and this interaction has both advantages and disadvantages. The interview technique is flexible and adaptable. It can be used with many different problems and types of persons, such as those who are illiterate or too young to read and write, and responses can be probed, followed up, clarified and elaborated to achieve specific, accurate responses. Nonverbal as well as verbal behaviour can be noted in face-to-face interviews, and the interviewer has an opportunity to motivate the respondent. Interviews result in a much higher response rate than questionnaires especially for topics that concern personal qualities or negative feelings.

The disadvantages of the interview are its potential for subjectivity and bias and its higher cost and time consuming nature. Depending on the training and expertise of the interviewer, the respondent may be uncomfortable in the interview and unwilling to report true feeling. The interviewer may ask leading questions to support a particular point of view; or the interviewer's perceptions of what was said may be inaccurate.

To mitigate the disadvantages of interviewing, the interviewer should be thought of as a neutral medium through which information is exchanged. If this goal is attained, then the interviewer's presence will have no effect on the perceptions or answers of the respondent. If the interview is done correctly any number of different interviewers would
obtain the same results. This aspect of interviewing is essentially an estimate of reliability. If two or more interviewers agree on the way most of the responses to the questions should be classified, then the process is reliable.

Once the researcher makes the decision to use an interview to collect data, he constructs an interview schedule. The schedule lists all the questions that will be asked, giving room for the interviewer to write answers. The questions are related directly to the objectives of the study and follow a given sequence that is adhered to in each interview. In most cases, the written questions are exactly what will be asked orally, with appropriate probing questions. The questions are usually in one of three forms: structured or semistructured or unstructured. Structured questions are followed by a set of choices and the respondents select one of the choices as the answer. Semistructured questions have no choices from which the respondent selects an answer. Rather, the question is phrased to allow for individual responses. It is an open-ended question but it is fairly specific in its intent. Unstructured questions allow the interviewer great latitude in asking broad questions in whatever order seems appropriate. In quantitative educational studies most interviews use a combination of structured and semistructured questions. This provides a high degree of objectivity and uniformity, yet allows for probing and clarification.

After the questions have been written they must be pretested. The pretest is necessary as a check for bias in the procedures, the interviewer, or the questions. The procedures adopted during pre-test should be identical to those that will be implemented in the final study. The interviewer should take special note of any one suggesting that the respondent is uncomfortable or does not fully understand the questions. After the interview, the respondent can evaluate the questions for intent, clarity and so on. The pretest provides a means of assessing the length of the interview and will give the researcher some idea of the ease with which the data can be summarized.
One potential problem that must be addressed before the actual study is conducted is the removal or rephrasing of leading questions. A leading question is so worded that the respondent is more aware of one answer than another, or contains information that may bias the response.

All the above said principles were strictly observed while developing the interview schedule used in the study to collect the required data from the samples of the control and experimental groups. The interview schedule includes questions with regard to the samples' demographical variables, socio-economic status, participation in agricultural extension programmes, linkage with agricultural extension personnel and mass media exposure particularly with reference to agricultural programmes. The draft interview schedule was discussed with experts for improvement of the same. Once the draft was ready, it was pretested with 25 farmers living in the experimental villages. The pre-test helped the investigator to understand to what extent a question influenced the respondents themselves in a good light and to attempt, to anticipate what the researcher want to hear are findout. It also helped the investigator to what extent a question asked for information about respondents that they might not know about themselves. A copy of the interview schedule (Tamil and English versions) is given in the Appendix: 4.

DEVELOPMENT OF CRITERION REFERENCED TESTS (CRT's)

In order to assess the entry and terminal behaviour of the participants before and after the experimentation, it was decided to develop Criterion Referenced Test Form-A and Form-B in the said content areas of the video programmes.

Development of Criterion-Referenced Tests involves quite a few difficulties specially due to wide variation in the concept of criterion referenced test itself. As such it is well high impossible to suggest a tailor-made procedure for construction of such test. We can identify the cognitive learning outcomes with regard to the segment of content and
a similar hierarchy can be established ranging from the simple knowledge of specifics to
the higher mental process as shown below.

Knowledge of facts > Understand of concepts > Application of knowledge.

We may choose the cognitive level at which a particular domain may be tested. All
domains cannot and need not be tested at all the three cognitive levels.

Popham (1970) refers to two attributes of a domain description, namely, the
brevity, and sufficiency. According to him a domain should be brief enough so as to be
usable by the educator and the item writer.

However, it should circumscribe sufficiently the class of behaviours under
consideration so that independent judges agree on items relating to a particular class of
behaviours. How large or small chunks of behaviours should be for inclusion in the list of
behaviours?. Though it is impossible to provide straight answer to this, yet we can
consider the following factors on which it would depend:

(a) Learning time required to display a behaviour
(b) Limiting the number of domains for evaluation
(c) Stimulus homogeneity of test items
(d) Response homogeneity of test items
(e) Transfer capability of an item.

Strategy of Test Construction

Once the basis or the framework is ready in the form of the grid mentioned above,
two strategies are possible for test construction. One may select number of domains and
test for elements of knowledge, understanding and application together. Alternatively we
may test only the key idea presenting the core intending learning outcomes. In the latter
case if the core key intended learning outcome is found to have been attained by learners,
then it is assumed that the learners will be able to apply his knowledge of the concepts. Such an approach may help to reduce the length of the test as the lower level concepts need not be included in this approach. Never the less, the smaller the scale of the domain one samples, the more accurate will be diagnosis although more time consuming it would be as there will be more number of such domains to be tested.

**Selection of Specific Objectives**

General objectives which are supposed to have been identified earlier, on the basis of importance, ease of production and scorability of the content, skills etc. do not enable us to develop tests which can be interpreted in terms of predetermined criteria unless we formulate specific objectives for each domain. Need for stating learner's behaviours in the form of amplified objectives cannot, therefore, be over-emphasised. Specific objectives, however may be formulated using the following criteria:

(a) They should be widely accepted by those who teach that subject area.

(b) They should be transferable within the domain i.e. generally viable in the content general domain.

(c) They should represent the terminal behaviours and not the enroute learning behaviours, requiring reasonable instructional or learning time.

(d) These should be testable with ease of scoring.

(e) They should be transferable outside the domain i.e. the behaviour or skill mastered in one course is transferable to other courses also like the transfer skills and intellectual constructs.

(f) They should be amenable to instruction and not be idealistic. Each objective should be amplified so that it could provide the need basis for item generation. In a typical measurable objective there is a big latitude which is provided to the item writer and as such it is difficult to control learner's response. Therefore each objective may be expanded or amplified to delimit the scope regarding the
nature of measurement procedure to help the item writers to produce homogeneous items.

**Development of Achievement Continuum**

The domain description envisages identification of not only the content hierarchy or sequence but also the hierarchy of learning outcomes. It is therefore, necessary that the tester should think of the type of judgements he is likely to make. Since the criterion-referenced tests demand judgements in terms of expected or intended performance as implied in a behaviourally stated specific objectives of the domain, such judgements are related to the various levels of achievement representing the achievement continuum. Such a continuum may vary from 'No Proficiency' to 'Perfect Proficiency'. The continuum of achievement represents different levels of proficiency varying from zero to 100 per cent. An individual's achievement lies somewhere between the two extremes as displayed during testing.

When a learner is tested he shows some level proficiency depending upon his performance. Accordingly, the learner can be placed on this continuum which would indicate his mastery or non-mastery. Therefore, for proper placement of an individual there is need for:

(a) indicating the ultimate outcome of learning
(b) listing behaviours associated with proficiency
(c) phrasing each behaviour in observable terms
(d) arranging behaviours in a meaningful manner.

Arrangement of behaviours would differ from subject to subject and even from one domain to the other, depending upon the nature of content. In certain domains the behaviours can be arranged sequentially. Behaviours can also be arranged taxonomically which involves ordering of content or skills in terms of increasing complexity, thereby
establishing a hierarchy of concepts, still another way is to arrange behaviour developmentally. According to this approach, the behaviours are arranged in an increasing order of improvement level of skills.

Steps Involved in Construction

There are varieties of Criterion-Referenced Tests and due to confusion in the nature and scope of such tests, it is quite difficult to provide clearcut guidelines for construction of such tests. However, keeping in view the basic tenetes of Criterion-Referenced Tests the following steps can be suggested. Some of these steps may be combined while others can be split up into two or more steps.

(a) Identification of Subject Area: The first step in development of Criterion-Referenced Test is the decision about the subject matter area to be worked out. For example, one may take up mathematics, english, environmental studies etc., depending upon the need of the area and the resources one can utilize for one or more subject areas.

(b) Selection of Unit/Topic: After the decision is taken about area, the next step is to select the unit on which test is to be developed. This unit may have more than one modules/sections/domains which comprise the total unit. Depending upon the need one or more than one sections or chunks of content may be taken up for test construction.

(c) Delineation and Description of Domain of Testing: Since domain refers to a particular segment of the content one may examine the topic and delineate it into various segments which can be developed into a well defined separate domains. Each domain can then be analysed in terms of facts, concepts, principles, process etc., that may be arranged in order of their increasing complexity. Description of domain is very important as it provides the basis for item writing. It should reflect clearly the nature and scope of the content specification in sequential, hierarchal or developmental order.
(d) **Specification of Domain Objectives**: Having decided about content elements of a domain selected, the next task is to formulate the instructional objectives or expected learning outcomes which may be categorized in terms of knowledge, understanding, application, skills, attitudes etc. These objectives should be stated so precisely that the performance of students could be clearly interpretable in terms of adequacies or inadequacies in terms of intended learning outcomes.

(e) **External Review of Steps(c&d)**: The tasks identified in steps (b&c) should be reviewed by those who are not involved in identifying the domain and its descriptions in terms of content elements and the specific objectives. However, a teacher who teaches that particular subject may also be involved in this task so that he may be able to clarify doubts, if any, raised by the external reviewers. Major purpose of this review is to sharpen domain description and the specific objectives in order to make them more realistic and functional. For this sample items accompanying the specific objectives are checked for their congruence with each objective and content elements.

(f) **Internal Review**: After step 'e' the internal reviewer i.e. the constructor himself will examine all specific objectives along with one or more sample items which accompany each specific objective. The focus of this review is one sharpening further the specific objectives if necessary.

(g) **Construction of Test Forms A&B**: It is desirable to develop two forms of the test i.e. A&B so that one of the two could be used after post instructional remedial measures. Moreover, it would be easier to compute reliability on the two forms. A copy of the key or the correct answers should accompany the test and may be retained by the developer. As far as the construction of items is concerned, these items are to be developed in accordance with the domain description.
(h) **Internal Review of Step (g):** An internal review by the teacher is essential after the two forms of the test are ready i.e. after step `g`. The purpose of this review is to seed whether all questions in the two forms of the test are congruent with the specific objectives besides having cursory check for any glaring deficiencies in the test.

(i) **External Review of the Test Forms A&B:** Prior to the field trial the test may be re-examined. The main purpose is to detect some content flaws, if any, and check for congruence of items with the domain description.

(j) **Field Trial of the Test Forms A&B:** At this stage Forms A&B of the test may be tried out on a limited number of learners, say five to ten to get a fix on the elements in the instruction which might be proved drastically wrong. It is better that the subject experts other than those involved in the development of the test, administer these tests. However, one team member of the developers may accompany them in order to meet queries if any, relating to the content or procedure that might arise during try out of the test.

(k) **Internal Review:** After step (j), internal review would provide a last look at the test which would depend on the changes, if any, that have been made as a result of the review or the field try out. The purpose of this review is to certify the final format of the test and pass it for use.

(l) **Final Form of the Test A&B:** Now the final form of the test A&B is ready for use and may be administered after having it cyclostyled. A sign off sheet may be used to accompany the various tests as they move from step `a` to `l`. Each test may be kept in a folder to which the signed sheet may be attached. This enables the developer to keep track of the given test. To monitor the progress of the test as it goes through the various stages of development, a master progress sheet can be used.
Using the Test in the Field: Test copies can now be used in the field. The test can be administered to test the domains which are covered by the test. The domains being tested can be arranged according to the needs of the teacher and administered one after the other in sequential order. Where time is stipulated to complete the task, the test may be administered accordingly. Learners' responses may be recorded and tabulated in accordance with the scheme of analysis which has to be mostly in terms of specified domain objective.

Finding Validity and Reliability of the Test: Since the data are now available on the test we may find out the reliability and validity of the test using various techniques.

With this one cycle of developing a criterion-referenced test is completed and new cycle of developing another test begins. All the steps discussed in the last few pages for construction and finalization of Criterion-Referenced Tests are depicted in the Figure I given in the next page.

Almost all the above said principles were strictly observed while developing the CRTs in the selected content areas in agriculture as detailed in a previous section of this chapter. It was decided to develop two parallel forms of CRTs in the same content areas in order to use one form as pre-test and another one as post-test. The blue-prints of the CRTs Form-A and Form-B are given the Tables 2 & 3 respectively.
FIGURE 1

STEPS IN THE DEVELOPMENT OF CRITERION REFERENCED TEST

(a) Identification of subject area

(b) Selection of Unit or Topic

(c) Delineation of Domain and its description

(d) Specification of Domain Objectives

(e) External review of step (c) and (d)

(f) Internal review of step (e)

(g) Framing test items for Form A and B

(h) Internal review of step (g)

(i) External review of step (g)

(j) Field try out of Test Form A and B

(k) Internal review of step (j)

(l) Final Test Form A and B

(m) Using test in the classroom

Finding reliability and validity

New cycle
### TABLE 2. BLUE-PRINT OF THE CRITERION REFERENCED TEST - FORM-A

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>CONTENTS</th>
<th>Knowledge</th>
<th>Understanding</th>
<th>Application</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tanjore Wilt in Coconut</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Coconut Cultivation and Intercropping in Coconut</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>3.</td>
<td>Composed Coirpith</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>4.</td>
<td>Seed Hardening in Groundut</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>5.</td>
<td>Groundnut Grading</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>6.</td>
<td>Groundnut Cultivation</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>7.</td>
<td>Agronomy Practices and Weed Control in Groundnut</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>8.</td>
<td>Control of Red Hairy Catterpillar and Leaf Rollar in Groundnut</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>9.</td>
<td>Paddy Cultivation</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>10.</td>
<td>Green Manure for Paddy</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>11.</td>
<td>Banana Cultivation</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>12.</td>
<td>Enriched Farmyard Manure</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>13.</td>
<td>Activated Clay for Pulses and Dry Farming</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>14.</td>
<td>Rhizobium for Tree Crops</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>15.</td>
<td>Mushroom Cultivation</td>
<td>12</td>
<td>3</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>75</strong></td>
<td><strong>35</strong></td>
<td><strong>40</strong></td>
<td><strong>150</strong></td>
<td></td>
</tr>
</tbody>
</table>

Each item is given one score.
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>CONTENTS</th>
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<th>Understanding</th>
<th>Application</th>
<th>Total</th>
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<td>3</td>
<td>16</td>
</tr>
<tr>
<td>3.</td>
<td>Composed Coirpith</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>4.</td>
<td>Seed Hardening in Groundnut</td>
<td>5</td>
<td>-</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>5.</td>
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<td>6</td>
<td>2</td>
<td>4</td>
<td>12</td>
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<tr>
<td>6.</td>
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<td>4</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
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<td>5</td>
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<td>1</td>
<td>9</td>
</tr>
<tr>
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<td></td>
<td>75</td>
<td>35</td>
<td>40</td>
<td>150</td>
</tr>
</tbody>
</table>

Each item is given one score.
The test is comprised of 150 items with a break of 75 items at knowledge level, 35 items at understanding level and the remaining 40 items at application level for both the forms. Each item is given a score of '1'.

Both forms of the test were tried out on ten farmers living in the experimental villages. The field trial of the test helped the investigator to meet queries from them relating to content and procedures. Accordingly modifications were brought into the items and thus the final form of the test was confirmed. A copy of the CRT-Form-A and Form-B is given in the Appendix : 5. The English version of the same is also given in the Appendix : 6. The answer keys for both the form of the test are given in the Appendix : 7.

FLANDER'S INTERACTION ANALYSIS CATEGORIES SYSTEM (FIACS)

Since one of the objectives of the study deals with the interaction patterns that occur during interaction among the instructor, the learners and the media, observation technique is the best suited method of data collection so far as this objective is concerned. "Systematic observation is an accepted method of organizing observed teaching acts in a manner which allows any trained person who follows sorted procedures to observe, record and analyse interactions assuring that others viewing the same way through viewing a wide variety of classroom interaction settings. As an accepted frame of reference, systematic observation is like the rules in the sport where a foul is a foul, a score is a score".

"An observational system usually includes some type of carefully defined items or categories so that observers can become skilled in identifying and recording brief ideas to represent behaviours occurring in classroom".

Interaction Analysis technique developed by Flanders was followed in the present investigation. The most important element in this system is that of the type of influence
the instructor has on the learners. The influences are two types. One is 'Direct Influence', another is 'Indirect Influence'. The behaviour patterns of the instructor which are characterized by giving more freedom of action for the learners through accepting their feelings, facilitating their participation by praising and encouraging, accepting their ideas and stimulating them to talk by raising questions are the 'Indirect Influence Patterns'. The behaviour patterns of the instructor which are characterized by giving little or no freedom of action to the learners by way of continuous lecturing, giving definite directions, criticizing and justifying his authority are the 'Direct Influence Patterns'. The different categories of FIACS are briefly described as follows:

Description of FIACS Categories

(A) Teacher Behaviour

I. Indirect Influence

   (i) Accepts feelings: Accepts or clarifies the feelings of the learners in non-threatening manner. Feelings may be positive or negative, predicting and recalling feelings are included.

   (ii) Praises or Encourages: Praises or encourages learners action or behaviours, jokes that release tension not at the expense of another individual, noding head or saying "UM", "hm" are included.

   (iii) Accepts or Uses Ideas of Pupils: Clarifying or building or developing ideas suggested by a learner. If the instructor brings more of his own ideas into play shift to category five.

   (iv) Asks Questions: Asking question about content or procedure with the intent that a learner may answer.
II. Direct Influence

(v) **Gives Lecture**: Giving facts or opinions about content or procedure, expressing his own ideas, asking rhetorical questions.

(vi) **Gives Directions**: Directions or orders to which a student is expected to comply.

(vii) **Criticizes or Justifies Authority**: Statements intended to change learner's behaviour from non acceptable to acceptable pattern, hawling some one out, stating why the instructor is doing what he is doing, extreme self-reference.

(B). **Student Behaviour**

(viii) **Student Talk-Response**: This category is used when the teacher has initiated the contact or has solicited learner statement, when the student answers a question asked by the instructor.

(ix) **Student Talk Initiation**: Talk by learners which they initiate, unpredictable statements in response to instructor.

(x) **Silence or Confusion**: Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

Flander's Interaction Analysis Categories can be written in a short form so as to be easy for the observer to apply them during observation. The shortened form of the categories are as shown below:-

1. Accepts feelings
2. Praises or encourages
3. Accepts or uses ideas of pupils
4. Asks questions
5. Lecturing
6. Giving Direction
Some Modifications

The Flander's system as described concentrates only on verbal interaction between the instructor and learners. So only verbal behaviours can be analysed. It is fact that non-verbal behaviour is also equally important, so that more data may be collected and thus more insight can be gained into the instructional behaviour. Moreover FIACS being adopted to analyse the instructional process in the agricultural extension needed some modifications in order to make it suitable to the problem in hand. So additional categories were also added to Flander's categories as shown below:

1. Viewing the video programme
2. Instructor uses teaching aids
3. Discussion among the learners
4. Individual clarification by the instructor
5. Learners work silently
6. Mass answering by the learners.

The modified version of the FIACS suiting to analyse the interaction patterns that occurred among the instructor, the learners and the media during instruction in agricultural programmes is given as follows:

1. Accepts feelings
2. Praises or encourages
3. Accepts or uses ideas of learners
4. Asks questions
5. Lecturing
6. The learners view the video programme
7. The instructor gives directions
8. The instructor criticizes the learners or justifies his authority
9. Learner talk-response
10. Learner talk-initiation
11. Instructor uses teaching aids
12. Discussion among the learners
13. Individual clarification by the instructor
14. Learners work silently
15. Mass answering by the learners
16. Silence/confusion

Ground Rules

The ground rules would help the observer to record the observations as accurate as possible, a list of which is given as follows:

(a) When not certain to which of two or more categories a statement belongs, choose the category that is numerically farthest from category five with the exception of category 16.

(b) If more than one category occur during three second interval, then all the categories used in that interval are recorded. If no change occurs within three seconds, repeat that category number.

(c) Directions are statements and result in observable behaviour on the part of the learners.

(d) If there is a discernable period of silence, record one 16 for every five seconds of silence.
(e) When the instructor repeats learner's answer and the answer is a correct answer, this is recorded as a `2'. This reveals that the learner has the right answer and therefore functions as praise.

(f) When the instructor repeats a learner's idea and communicates only that idea which is considered or accepted as something to be discussed, five is used.

(g) If a learner begins talking after another learner a `16' is inserted between the nine's or ten's to indicate the change of learner.

(h) Statements such as `uh', `huh', `Yes', `all right', `okay' which occur between 10's are recorded as `2'.

Method of Observation

The observer who is specially engaged in taking record of the interaction occuring during teaching-learning process has memorize all the above said categories. In order to write down the categories in every three seconds he puts five dots. After many rehearsals he can equip himself for handling the tool. He has to sit at the last in the learning centre and observe how interaction results among the instructor, the learners and the media at an interval of every three seconds. He writes down the category number which best represent the communication event just completed. For instance, when the instructor is lecturing, the observer puts `5'. When he asks questions, he put `4'. When the learners work silently, he puts 14. This procedure of recording the events may go on at a rate of 20 to 25 observation per minute. In the end a long series of numbers will be obtained and entered in 16x16 matrix. When the matrix is prepared, two numbers will be taken at a time. The first number stands for row and the second number for column. Thus each number in the series is used once as the row number and once as the column number.
As an example, the following sequence of numbers can be classified as illustrated.

\[
\begin{array}{ccc}
  & II & IV \\
 I & 5 & 5 & 4 & 4 & 9 \\
 III & 5 & & 4 & & \\
 V & & & 9 & & \\
\end{array}
\]

They represent pair of numbers. The first pair is (5,5). The second pair is (5,5). The third pair is (5,4). The fourth pair is (4,4) and the fifth pair is (4,9) and so on. Each pair overlaps with the next. The first number in each pair denotes the row number while the second number in the same pair denotes the column number. Accordingly we have to make tallies taking one pair at a time. Hence the number which denotes the row number will now denote the column number. In such a way each number in the series will once denote as row number and next as column number. The total number of observations \(N\) will always be tabulated by \((N-1)\) tallies in the matrix. Observation may continue for the whole programme. From the tabulated matrix, a number of ratios representing different communication patterns may be computed.

**PROCEDURE**

**Experimental Research**

An experiment involves the comparison of the effects of a particular treatment with that of a different treatment or of no treatment. Experimenters manipulate certain stimuli, treatments, or environmental conditions and observe how the condition or behaviour of the subject is affected or changed. Their manipulation is deliberate and systematic. They must be aware of other factors that could influence the outcome and remove or control them so that they can establish a logical association between manipulated factors and observed effects.
Experimentation provides a method of hypothesis testing. After experimenters define a problem, they propose a tentative answer, or hypothesis. They test the hypothesis and confirm and deconfirm it in the light of the controlled variable relationship that they have observed. It is important to note that the confirmation or rejection of the hypothesis is stated in terms of probability rather than certainty.

Experimentation is the classic method of the science laboratory, where elements manipulated and effects observed can be controlled. It is the most sophisticated, exacting and powerful method for discovering and developing an organized body of knowledge.

Although the experimental method finds its greatest utility in the laboratory, it has been effectively applied within non-laboratory settings such as the classroom, where significant factors or variables can be controlled to some degree. The immediate purpose of experimentation is to predict events in the experimental setting. The ultimate purpose is to generalize the variable relationships so that they may be applied outside the laboratory to a wider population of interest of all the experimental designs, pre-test, post-test, non-equivalent groups design was found to be the most appropriate design for testing the formulated hypothesis in this study.

**Pre-test Post-test Non-equivalent Group Design**

True experimental designs provide the strongest, most convincing arguments of causal effect of the independent variable because they control for most sources of internal invalidity. There are, however, many circumstances in educational research for which, while causal inference is desired, it is unfeasible to design true experiments, or in which the need for strong external validity is greater. The most common reasons that experimental designs cannot be employed are that randomization of subjects to experimental and control groups is impossible and that a control or comparison group is unavailable, inconvenient, or too expensive. Fortunately, there are a number of good
designs that can be used under either of these circumstances. These designs are termed quasi-experimental because, while not true experiments, they provide reasonable control over most sources of invalidity and they are usually stronger than the pre-experimental designs.

Suppose a researcher is interested in studying the effect of three different methods of changing the cognitive behaviour in school subject. The researcher has three classes of students to work with, and it is impossible to assign students randomly within each class to each of the three methods. The researcher therefore uses each class intact and gives each class a different treatment. The design would be as follows:

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<thead>
<tr>
<th>Groups</th>
<th>Pre-test</th>
<th>Method</th>
<th>Post-test</th>
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<tr>
<td>A</td>
<td>&gt; 0</td>
<td>(X_1)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 0</td>
<td>(X_2)</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 0</td>
<td>(X_3)</td>
<td>&gt; 0</td>
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</tbody>
</table>

The interpretation of the results will depend largely on whether the groups differed on some characteristic that might reasonably be related to the independent variable. This decision is made by comparing the three groups on such characteristics as gender, time the groups meet, size of groups, achievement, aptitude, socio-economic status, major and pretest scores. If, for instance, group A comprises all elementary majors and groups B and C secondary majors, and the results showed that group A gained more than B and C, the gain may be attributable to the values and backgrounds of elementary majors as compared to those of secondary majors. On the other hand, if the groups are about the same in most characteristics, then it would be reasonable to assume that selection differences probably would not account for the results. Consequently, if the researcher knows in advance that randomization is impossible, the groups should be selected to be as similar as possible. The pretest scores and other measures on the groups are then used to
adjust the groups statistically on the factor that is measured. Another approach to controlling selection when intact groups, such as classrooms, must be used is to use a large number of groups and then randomly assign entire groups to either control or treatment conditions. This procedure then changes the study to a true experimental design. This is, in fact, the preferred approach when diffusion of treatment or local history threats are viable.

Experimentation

Fifty farmers in each of three villages viz. Mukilankudiyeruppu, Achankulum and Puviyoor in Kanyakumari district of Tamil Nadu were formed as the subjects for Control, Experimental Group I and Experimental Group II, respectively. An interview schedule was administered to all the participants of the control and experimental groups before experimentation in order to study their demographical, socio-economic status, then field experience in agriculture, contact with extension personnel and mass media exposure. The distribution of the samples is given in Table 4.

TABLE 4. DISTRIBUTION OF SAMPLES FOR THE CONTROL AND EXPERIMENTAL GROUPS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Group</th>
<th>Name of the Village</th>
<th>Distribution of samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Control group</td>
<td>Mukilamkudiyeruppu</td>
<td>37          13  50</td>
</tr>
<tr>
<td>2.</td>
<td>Experimental Group I</td>
<td>Achankulam</td>
<td>42          8   50</td>
</tr>
<tr>
<td>3.</td>
<td>Experimental Group II</td>
<td>Puviyoor</td>
<td>43          7   50</td>
</tr>
</tbody>
</table>

A pre-test in the said content areas (Criterion Referenced Test Form A) was also administered to all the three groups before experimentation. The homogeneity of the three groups with respect to their cognition in the said content areas alone was established by
finding out the significance of difference between the means of these groups on the scores as measured by the pre-test. Lecture Method (LM) was adopted in the Control Group while Conventional Non-Interactive Video (CNIV) and Instructor Controlled Interactive Video (ICIV) were adopted as experimental intervention is the Experimental Group I and Experimental Group II respectively.

A knowledge with regard to the demographical variables of the sample, their socio-economic status, field experience in agriculture, contact with agricultural extension personnel and mass media exposure would help to generalize from the findings of the study. Hence, an attempt was made to present the profile of the participants of the Control and Experimental Groups as responded by them to the interview schedule, the details of which are given as follows:

**Profile of the Control Group**

The sample of the control group comprised of different age groups viz. 20-25 (20%), 26-30 (40%), 31-35 (20%), 36-40(8%) and 41.45(12%). Seventy four per cent of the sample was represented by male population while 26 per cent of them are female. Six per cent of the sample are educated at primary level, 72 per cent of them at secondary and higher section level and the remaining 22 per cent of them are educated at collegiate level. 96 per cent of the sample are found to be from Backward Community while the remaining four per cent of them are form Most Backward Community. 80 per cent of the sample practise agriculture as their main profession while the remaining 20 per cent of the take up business in addition to agriculture.

Twenty four per cent of the sample were married and the remaining 76 per cent were found to be unmarried. 22 per cent of them lived in nuclear families while the remaining 78 per cent of them lived in joint families. It was found that the annual income of 78 per cent of the sample is less than Rs. 5000 while that of the remaining 24 per cent
of them is between Rs. 5001 to 10,000. Ninety four per cent of the sample are found to possess up to 2.5 acres of agriculture land while the remaining six per cent of them possess 2.5 to 5 acres of the same.

Sixty eight per cent of the sample reported that they had less than five years of experience in agriculture, 24 per cent of them reported that they had six to ten years of experience and the remaining eight per cent of them, 11 to 15 years of experience in agriculture. Fourteen per cent of the sample were found to be coolies, eight per cent of them work in private organizations and the remaining 78 per cent of them work in agricultural fields. It is also found that 62 per cent of the sample lived in tiled houses and the remaining 38 per cent of them lived in concrete houses.

It was found that six per cent of the sample contact the agricultural extension agencies; 10 per cent of them rarely contact the agencies while the remaining 84 per cent of them never contact the extension agencies at all. Again it was found that 90 per cent of the subjects rarely contacted the agricultural extension personnel viz. Agricultural Officers, Asst. Director of Agriculture, Scientists and Junior Scientists while less than 10 per cent of them never contacted such personnel. It was also found that less than 10 per cent of the sample had participated in agricultural programmes while more than 90 per cent of them had never participated in such programmes.

Fifty per cent of the sample reported to have TV in their homes while the remaining fifty per cent of them have no TV at all. Sixteen per cent of the sample were found to have VCR at their homes while the remaining 84 per cent of them had no VCR at all. It was also found that 64 per cent of the sample possess radio at home while the remaining 36 per cent of them have no radio at all. Again it was found that 50 per cent of the sample possess tape recorder at home while the remaining 50 per cent of them have no tape recorder at all.
It was found that only less than 10 per cent of the sample reported to be interested in Agricultural Exhibition, Special Agricultural Camps, Stall of Agricultural Department in Government Exhibitions, KVK and Agricultural demonstrations while more than 90 per cent of them had no interest in these agricultural programmes.

It was found that 32 per cent of the sample watch general programmes on TV daily, 36 per cent of them watch frequently, 20 per cent of them watch rarely and the remaining 12 per cent of them never watch general programmes on TV. But at the same time 4 per cent of the sample watch agricultural programmes on TV daily, 26 per cent of them watch frequently, 28 per cent of them watch rarely and the remaining 42 per cent never watch agricultural programmes on TV.

It was also found 28 per cent of the sample listen to radio general programmes daily, 34 per cent of them listen frequently, 30 per cent of them listen rarely and the remaining eight per cent of them never listen to general radio programmes.

Again it was found that 44 per cent of the sample read general writings in the newspapers daily, 38 per cent of them read frequently, 16 per cent of them read rarely and the remaining four per cent of them never read general writings in the newspaper. But at the same time 12 per cent of them read agricultural writings daily, 22 per cent of them read frequently, 18 per cent of them read rarely and the remaining 48 per cent of them never read agricultural writings in newspapers.

It was also found that ten per cent of the sample read journals of general nature daily, 34 per cent of them read frequently, 20 per cent of them read rarely and the remaining 36 per cent of them never read journals of general nature. Again it was found that 2 per cent of the sample read agricultural journals daily, 16 per cent of them read
frequently, eight per cent of them read rarely and the remaining 64 per cent never read agricultural journals.

**Profile of the Experimental Group I**

The subjects of the experimental group I comprised of different age groups viz. 20-25 (68%), 26-30 (12%), 31-35 (10%), 36-40 (2%) and 41-45 (4%). Eighty four per cent of the sample was represented by male population, while 16 per cent of them are female. Eight per cent of the sample were educated at primary level, 68 per cent of them were at secondary and higher secondary level and the remaining 24 per cent of them were educated at collegiate level. Ninety two per cent of the subjects were belonging to Backward Community and the remaining eight per cent of them are from Scheduled Cast. Seventy two per cent of the sample practise agriculture as their main profession and the remaining 28 per cent of them have business in addition to agriculture.

Twenty four per cent of the sample were married while the remaining 76 per cent of them were unmarried. Seventy-two per cent of them lived in nuclear families while the remaining 28 per cent of them lived in joint families. Sixty eight per cent of the sample was belonging to below Rs. 5,000/- annual income category, 22 per cent of them were in Rs. 5,001 - 10,000 category and the remaining 10 per cent of them were belonging to above Rs. 10,001 category. It was found that 80 per cent of the sample possess upto 2.5 acres of agriculture land, 12 per cent of them posses 2.51 to 5 acres and the remaining eight per cent of them possess above ten acres of agricultural land.

Sixty eight per cent of the sample have less than five years of experience in agriculture, 24 per cent of them have six to ten years experience and eight per cent of them have 16 to 20 years experience in agriculture. Twenty two per cent of the sample were found to be coolies, 12 per cent of them were government employees and the remaining 66 per cent of them were working in agricultural field. Sixteen per cent of the
sample lived in thatched houses, 54 per cent in tiled houses and the remaining 30 per cent in concrete houses.

It was found that 85 per cent of the sample rarely contact with agricultural extension personnel viz. Agricultural Officers, Assistant Directors of Agriculture, Scientists and Junior Scientists and less than 15 per cent of them never contact such personnel. It was also found that 80 per cent of the sample never participate in agricultural programmes such as training camp, exhibition and demonstration and 20 per cent of them rarely participate in such programmes.

Thirty eight per cent of the sample have TV at their houses and the remaining 62 per cent of them have no TV in their home. Twelve per cent of the sample have VCR at their home and the remaining 94 per cent have no VCR at all. Eighty four per cent of the sample have radio at home and the remaining 16 per cent of the sample have no radio at all. Seventy eight per cent of the sample possess tape-recorder at their home and the remaining 22 per cent of the sample have no tape-recorder at all.

It was found that 60 per cent of the sample listen to general radio programmes daily, 20 per cent listen rarely and 14 per cent of them never listen to general radio programmes. It was also found that 36 per cent of the sample listen agricultural radio programmes daily, 30 per cent of them frequently, 20 per cent of them rarely and 14 per cent of them never listen to agricultural radio programmes.

Again it was found that 32 per cent of the sample watch general programmes in TV daily, 28 per cent of them watch frequently, 22 per cent of them watch rarely and 18 per cent of the remaining sample never watch general programmes in TV. It is also found that 12 per cent of the sample watch agricultural programmes in TV daily, 38 per cent of them watch frequently, 30 per cent watch rarely and the remaining 20 per cent of the sample never watch agricultural programmes TV.
It was found that 88 per cent of the sample read general matters in the newspapers daily, four per cent of them read frequently, four per cent of them read rarely and the remaining four per cent never read newspapers. Again it is found that 28 per cent of the sample read agricultural writings daily, 56 per cent of them read frequently, 10 per cent of them read rarely and the remaining six per cent never read agricultural writings in newspapers.

It was found that 32 per cent of the sample read journals of general nature, daily, 18 per cent read frequently, 24 per cent read rarely and the remaining 26 per cent never read journals of general nature. Again it was found that 24 per cent of the sample read agricultural journals daily, 24 per cent of them read frequently, 20 per cent of them read rarely and the remaining 32 per cent of them never read agricultural journals.

Profile of the Experimental Group II

The sample of the Experimental Group II comprised of different age groups viz. 20-25 (60%), 26-30 (24%), 31-35 (24%), 36-40 (12%) and 41-45 (10%). Eighty six per cent of the sample was represented by male population while 14 per cent of them are female. Twenty four per cent of the sample are educated at primary level, 64 per cent of them are at secondary and higher secondary level and the remaining 12 per cent of them are educated at collegiate level. Two per cent of the sample is belonging to forward community. Ninety four per cent of them form backward community and the remaining four per cent of them were found to be belonging to most backward community. Eighty six per cent of the sample practise agriculture as their main profession and the remaining 14 per cent of them have business in addition to agriculture.

Sixteen per cent of the sample were married while the remaining 84 per cent of them were unmarried. Fifty four per cent of them lived in nuclear families while the
remaining 46 per cent of them lived in joint families. Seventy eight per cent of the sample was belonging to less than Rs. 5,000/- annual income category, 14 per cent of them were in Rs. 5,001 to 1000 category and the remaining 10 per cent of them were belonging to above Rs. 10,000 category. It was also found that 88 per cent of the sample possessed upto 2.5 acres of agriculture land, 6 per cent of them possessed 2.51 to 5 acres and the remaining 6 per cent of the sample possessed above ten acres of agriculture land.

Seventy two per cent of the sample had less than five years of experience in farm, 24 per cent of them had six to ten years of experience and 4 per cent of them had 11 to 15 years of farm experience. It was also found that 90 per cent of the sample were working in agricultural field and the remaining 10 per cent of the sample were agricultural coolies. Eight per cent of sample lived in thatched houses, 70 per cent lived in tiled houses and 22 per cent lived in concrete houses.

Again it was observed that 90 per cent of the sample rarely contact with agricultural extension personnel viz. Agricultural Officers, Assistant Director of Agriculture, Agricultural Scientists and Junior Scientists and less than 10 per cent of the remaining sample never contacted such personnel. It was found that 20 per cent of the sample were participating in agricultural extension programmes such as agricultural extension training, exhibition, tour and the remaining 80 per cent of them never participated in such programmes. Fifty two per cent of them possess TV at their home and the remaining 48 per cent of the sample did not possess it. Ninety eight per cent of the sample have VCR and only two per cent of the sample possess VCR. Ninety four per cent of the sample possess radio and the remaining six per cent of them have no radio
at all. Eighty two per cent of the sample possess tape-recorder and the 18 per cent of the remaining sample have no tape-recorder at all.

It was noticed that 62 per cent of the sample listen general radio programmes daily, 26 per cent of the sample listen frequently, eight per cent of the sample listen rarely and the remaining four per cent of the sample never listen general radio programmes. Again it was found that twelve per cent of the sample listen to agricultural radio programmes daily, 54 per cent of them frequently, 22 per cent of them rarely and the remaining 12 per cent of the sample never listen to agricultural radio programmes.

It was also found that 42 per cent of sample watch general TV programmes daily, 20 per cent of them watch frequently, 24 per cent of them watch rarely and the remaining 14 per cent of the sample never watch general TV programmes. Again it was found that 8 per cent of the samples watch agricultural TV programmes daily, 24 per cent of them watch frequently, 28 per cent of them watch rarely and the remaining 40 per cent of the sample never watch agricultural TV programmes.

It was found that 84 per cent of the sample read general matters in the newspapers daily, 10 per cent of them read frequently and the remaining 6 per cent of the sample never read newspaper. Again it was found that 14 per cent of the sample read agricultural writings daily, 52 per cent of them read frequently, 24 per cent of them read rarely and the remaining 10 per cent of the sample never read agricultural writings in newspapers.

Again it was found that 24 per cent of the sample read journals of general nature, 24 per cent of them read frequently, 20 per cent of them read rarely and the remaining 32 per cent of the remaining sample never read journals of general nature. It was found that eight per cent of the sample read agricultural journals daily, 18 per cent of them read
frequently, 30 per cent of them read rarely and the remaining 44 per cent of them never read agricultural journals.

A comparative study of the profiles of the Control and Experimental Groups highlights that the samples of all the three groups are almost identical so far as their demographical variables, socio-economic status, experience in agricultural practices, contact with extension personnel and mass media exposure are concerned. Hence it is evident that all the three groups are almost homogeneous not only in terms of the entry behaviour of the farmers in the selected content areas of agriculture but also in terms of the above stated variables.

**Instructional Process Carried out in Control and Experimental Groups**

How the different instructional strategies viz. LM, CNIV and ICIV were introduced as experimental intervention in the Control and Experimental Groups is described as follows:

**Control Group**

Lecture method was adopted in the control group. The investigator himself engaged in this instructional process using charts and specimens. The classes were conducted in the community hall of the village. Interaction emerged between the instructor and the participants during instructional process, instructor's usage of apt language, mannerism, wit and humour, skill of drawing the attention of the participants, vivid expression, presentation of the concepts in coherent manner etc kept the learners as active participants throughout the lecture. While lecturing, the instructor adopted himself to the subject matter, achievement level of the learners, time limit, etc. He also got reinforcement from the learners in terms of their attention. The participants were also asked questions to know whether they comprehended the instruction. The participants felt
not only entertained by the instructor's wit and humour, non-verbal communications, logical presentation of concepts and enthusiasm but also group feelings, social reinforcement and emotional security.

Each of the fifteen said content areas were introduced to the participants one by one in fifteen consecutive days. Though the length of the said content areas slightly differ from each other, they were introduced to the participants on an average of 30 minutes each. Post tests in the respective content areas were administered to the participants immediately after the instruction was over.

The interaction that emerged between the instructor and the learners during instruction was observed and recorded by a trained person using the modified version of FIACS for all the fifteen classes.

**Experimental Group I**

Conventional non-interactive video was introduced to this group as an experimental intervention. The TV was placed in the hall in such a way that all the participants could see the screen without any difficulty. The video programmes on the said content areas were played to the participants using a VCR one by one for 15 consecutive days. On an average each programme was played for about 15 minutes. Being closest to reality, the video with a combination of sound and picture, provides motivation and realistic feel to the participants. Due to the absence of interactivity, the participants merely watched the video programmes passively.

As there was no provision for the learners to control the pace of information both visual and verbal, they were sometimes found not attentive to the programmes. However, the presence of the investigator among the participants made them attentive to the
programmes. Test in the respective content areas were administered to the participants immediately after the video presentation was over.

**Experimental Group II**

This group received instruction through ICIV as another experimental intervention. The participants of this group were seated comfortably in the hall. The television was placed in the hall in such a way that all the participants could observe the video demonstration without any difficulty. Taking a convenient place in the hall the instructor (investigator) explained the principles, concepts, procedures etc., to the participants as a supplement to the video presentation and thus made the learner group watch and respond to the questions asked by him intermittently. The participants got clarified of their doubts then and there by the instructor, keeping the VCR 'On' and 'Off' intermittently. The instructor maintained better interaction between himself and the participants through out the teaching-learning process by keeping low information density, planning the programmes in small sequences providing pauses wherever necessary and humourizing the content at every stage of presentation. He had already mentally prepared the audience before viewing the video programme.

Each of the fifteen video programmes on the said content areas were introduced to the participants one by one for fifteen consecutive days. On an average of 30 to 40 minutes were taken for each of the programme. Post tests in the respective content areas were administered to the participants immediately after the instruction was over.

The interaction that emerged among the instructor, the learners and the media during instruction was observed and recorded by a trained person using the modified version of FIACS for all the fifteen programmes.
The Criterion Referenced Test Form B used as post-test was administered to the participants of all the three groups as Retention Test one month after the experimentation was over.

The answer scripts of the participants of all the three groups in all the three tests viz. Pre-Test, Post-Test and Retention Test were scored and the scores are given in the Appendix : 8.

The mean and SD of the scores of the participant of all three groups as measured by the Pre, Post and Retention Tests were also computed. 16x16 matrix was prepared for each of the observations made in the Control Group and the Experimental Group II. Different ratios representing different communication pattern were also computed based on the tallies marked in the different cells in the 16x16 matrix for each of the instructional programmes of the Control Group and the Experimental Group II.

The formulated hypothesis were tested using appropriate statistical techniques.

RELIABILITY AND VALIDITY ESTIMATES OF THE TOOLS USED IN THE STUDY

Reliability refers to the consistency of measurement, the extent to which the results are similar over different forms of the same instrument or occasions of data collecting. The goal of developing reliable measures is to minimize the influence of chance or other variables unrelated to the intent of the measure. If an instrument is unreliable, the information obtained is ambiguous, inconsistent and useless. It is therefore important for researchers to select and develop data gathering procedure that will be highly reliable.

Validity is the extent to which inferences made on the basis of numerical scores are appropriate, meaningful and useful. Validity is a judgement of the appropriateness of a measure for specific inferences or decisions that result from the scores generated. Validity is a situation-specific concept: validity is assessed depending upon the purpose, population
and environmental characteristics in which measurement takes place. A test can therefore be valid in one situation and invalid in another. Consequently in order to assure others that the procedures have validity in relation to the research problems, subjects and setting of the study, it is incumbent on the investigator to describe the validity of the instruments used to collect data.

**Interview Schedule**

**Reliability**

The interview schedule uses a combination of structured and semi-structured questions. This provides a high degree of objectivity and uniformity, yet allows for probing and clarification.

The investigator himself conducted the interview with the participants using the specially developed interview schedule. Being well trained and having expertise in conducting interviews with rural mass, he felt comfortable in conducting the same in the Control and Experimental Groups. By asking leading questions to support a particular point of view, he was able to extract the exact perception of the respondent.

He administered the interview schedule to 10 per cent of the participants to each of Control and Experimental Groups twice with 10 days of interval. An attempt was made to compare the responses made by these participants to the first and second administration of the interview schedule. It was found that more than 90 per cent of the responses made by these participants to both administration of the interview schedule were identical. Hence it is concluded that the tool has high reliability.

**Validity**

As stated by Nunnally (1978) the researcher may ensure the validity of the tool through systematic plan and procedure of the construction of the tool rather than testing
the validity of measures after they are constructed. According to him to ensure the content validity of any tool, two important standards are necessary viz. a representative collection of items and a sensible method of tool construction.

In the present study the items for the interview schedule were decided first by extensive analysis of the objectives of the study followed by consultation with experts in the area of agricultural extension. After the items were pooled a pilot study was conducted in the study area. The results of the pilot study gave an insight into the investigator to change the structure as well as the content of some of the items. Accordingly the modified and improved version was used in the final study. Hence it is obvious that the interview schedule possesses high level content validity also.

**Criterion Referenced Test Form A and Form B**

**Reliability**

Criterion Referenced Test Form A and Form B were developed and utilized for collecting the required data in this study. 'Split-Half' method was adopted to ensure the reliability of the CRT-Form A and B. The scale is divided randomly into two halves. This may be done in any way which is practical and yet assures randomization. The procedure is to separate the scale into two, using the odd-numbered items for one and the even-numbered for the other. This can be done only when the numbering itself has not involved in a systematic principle. It is safer than comparing the first half against the second half since differential informant fatigue or cumulative item effect may lower or raise the true correlation.

Each of the two sets of items is treated as a separate scale and scored accordingly. The two subscales are then correlated and this is taken as a measure of reliability. A further step is to correct the correlation coefficient secured between the two halves by applying the Spearman-Brown Prophecy formula $r_{m} = r_{1}/[1+(n-1)r_{1}]$. This correction
assumes that a scale 2n items long will be more reliable than a scale 'n' items long and since the length of the scale has been halved by dividing it into odds and evens, the full scale will have a higher reliability than would either half.

This technique assumes that the scale as a whole hangs together, so that either half may be taken as adequately representative of the whole. This can be true only when two conditions are met.

1. There must be an empirical demonstration that the scale is a unity.

2. Each half scale must contain sufficient items to be reliable itself. A minimum number for this is probably eight to ten, so the entire scale should not be shorter than 16 to 20 items.

The investigator adopted the same procedure taking 10 per cent of the total sample of 150 participants, 50 in each of control and experimental groups. The answer scripts (Form A, used as pre-test) of five participants from each of Control and Experimental Groups were taken out at random. The test was split into two equivalent halves by pooling the odd numbered items for one score and the even numbered items for another score. This makes the two scores obtained from a single test reasonably equivalent. In this way the scores of each participants were obtained, one on odd numbered items and the second on even numbered items. The correlation between the results of the two halves is determined and from these the reliability of the whole test is computed by applying the Spearmen-Brown Profecy formula. The reliability of the whole test is found to be 0.825 and significant at 0.01 level.

In the same manner, the reliability of the CRT Form B was also established which is found to be 0.802 and significant at 0.01 level.

Hence, it is evident that both the CRT Form A and Form B have high reliability.
Validity

According to Nunnally (1978) the researcher may ensure the validity of the tool through systematic planning and procedures in constructing the said tool which needs two important standards viz. representative collection of the items and sensible method of test construction.

In developing the Criterion Referenced Test Form A and B, the items were collected after exhaustive analysis of the contents meant for instruction through different instructional strategies, followed by consultation with experts in the area of agricultural extension as well as the producers of the said video programmes. As suggested by the experts and the video producers, revisions were made with regard to the structure and content of the test items. A pilot study was also done taking a few samples in the study area. Thus a systematic methodology was undertaken in developing both the forms of Criterion Referenced Test. Hence it is evident that these tests have high content validity also.

Modified version of FIACS

The problem of observer training and reliability

Individuals differ in their ability to become reliable observers. Both accuracy of judgement in classifying verbal interactions and consistency in judging the behaviours correctly are necessary qualities of a good observer. Unless recorded behaviours are actual observed behaviours, a system's usefulness is limited. The greater the disparity between observed and recorded behaviours, the less useful is the system. To provide an estimation of an observer validity or reliability, the collected data is compared to that collected from the same setting by an expert. Sets of data should be collected under similar conditions if not identical for the exact accepted time sample.
Consistent observation by a team requires group training, discussions of common ground rules and regular meetings to discuss unusual categorization problems. This ideal observer team is a group of like minded individuals who will respond consistently with same category number when presented with the same communicative events.

In order to establish the reliability of the observations made during instructions through Lecture Method and ICIV, Inter-Observer Reliability Coefficient Technique was adopted. A trained observer was asked to observe the instructional activities in the Control Group for one programme as a sample along with the regular observer who had been observing the instructional activities both in the Control and Experimental Group II from the beginning. Based on the observations recorded 16x16 matrices were prepared. The percentage of the total tallies that lie in a given column to the grand total of tallies in the matrix was computed for all the 16 columns for both the observers, the details of which are given in the Table 5.

The investigator applied the Scott's formula for finding out the reliability correlation of his tool. According to Scott's formula, reliability is equal to the total agreement between the two observers minus the agreement that occurs by chance divided by the greatest possible agreement minus the agreement that occurs by chance.
<table>
<thead>
<tr>
<th>Category No.</th>
<th>Investigator percentage</th>
<th>Observer percentage</th>
<th>Difference</th>
</tr>
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<td></td>
<td></td>
<td></td>
<td>+</td>
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<tr>
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<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>4.20</strong></td>
</tr>
</tbody>
</table>
This reliability is a comparison of the agreement between the observers not resulting by chance and the greatest agreement possible that does not result from pure chance.

\[
\text{Reliability} = \frac{\text{Total agreement between observation} - \text{chance agreement}}{\text{Greatest possible agreement} - \text{chance agreement}}
\]

According to Scott's formula,

\[
r = \frac{\text{Po} - \text{Pe}}{1 - \text{Pe}}
\]

Where,

\[
\text{Po} = \text{Greatest possible agreement} - \text{disagreement}
\]

\[
\text{Po} = 1 - \text{disagreement}
\]

\[
= 1 - 0.0832 \text{ (percentage value is converted into decimal values)}
\]

\[
= 0.9168
\]

\[
= 0.92
\]

\[
\text{Pe} = \text{Agreement due to change}
\]

\[
= (0.391)^2 + (0.255)^2
\]

\[
= 0.22
\]

\[
r = 0.90
\]

This shows that the reliability of agreement between the two observers is quite high and significant.

**Validity**

As the interactions emerged during instructional process in Control and Experimental Group II were recorded with the standard category system of observation, it is sure that the modified version of FIACS has a good and high content validity also.

The analysis and interpretation of data along with hypotheses testing are given in the next chapter.
GRAPH: 7 COMPARISON OF EFFECTIVENESS BETWEEN DOCUMENTARY AND STRAIGHT TALK AS PROGRAMME FORMATS IN AGRICULTURE AS REVEALED BY THE RETENTION TEST FOR DIFFERENT INSTRUCTIONAL STRATEGIES.
GRAPH 8 COMPARISON OF EFFECTIVENESS BETWEEN ICIV AND CNIV IN ENHANCING RETENTION AMONG FARMERS IN AGRICULTURE AS REVEALED BY THE RETENTION TEST FOR DIFFERENT FORMATS OF VIDEO PROGRAMMES.
TABLE 14. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF CNIV AND ICIV AS DIFFERENT INSTRUCTIONAL STRATEGIES IN TERMS OF RETENTION AS REVEALED BY THE PARTICIPANTS' PERFORMANCES IN HE RETENTION TEST FOR DIFFERENT FORMATS

<table>
<thead>
<tr>
<th>GROUPS COMPARED</th>
<th>Sl.No</th>
<th>FORMAT</th>
<th>M$_1$</th>
<th>$\sigma_1$</th>
<th>M$_2$</th>
<th>$\sigma_2$</th>
<th>D</th>
<th>$\sigma_D$</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNIV Vs ICIV</td>
<td>1</td>
<td>DOC</td>
<td>23.66</td>
<td>3.45</td>
<td>35.62</td>
<td>10.39</td>
<td>11.96</td>
<td>1.55</td>
<td>7.72*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>ST</td>
<td>40.12</td>
<td>8.49</td>
<td>58.16</td>
<td>17.99</td>
<td>18.04</td>
<td>2.81</td>
<td>6.42*</td>
</tr>
</tbody>
</table>

N1 = N2 = N3 = 50  D.F. = 98  * - Significant at 0.01 level.

CNIV - Conventional Non-Interactive Video
ICIV - Instructor Controlled Interactive Video
Doc - Documentary
ST - Straight Talk

Null Hypothesis No.8

There is no significant difference between the means of Post and Retention Test scores of the participants of the different instructional strategies viz. LM, CNIV and ICIV at all levels of cognition in agriculture.

To test this null hypothesis, 't' tests were attempted between the mean scores of Post-Test and Retention-Test at all levels of cognition for Control and Experimental Groups. The results are given in the Table 15.

From the Table 15, it is found that there is significant difference at 0.01 level between the means of Post Test and Retention Test scores at all levels of cognition for the Control Group and the Experimental Group II. It is also found that there is significant difference at 0.01 level between the means of Post-Test and Retention Test scores at total and application levels for the Experimental Group I. There is no significant difference...
TABLE 15. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF POST AND RETENTION TESTS ADMINISTERED TO CONTROL AND EXPERIMENTAL GROUPS

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Group</th>
<th>Variables</th>
<th>Post-test</th>
<th>Retention-test</th>
<th>D</th>
<th>σ_D</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M_1</td>
<td>σ_1</td>
<td>M_2</td>
<td>σ_2</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Control Group (LM)</td>
<td>K</td>
<td>49.98</td>
<td>9.43</td>
<td>35.36</td>
<td>7.45</td>
<td>14.62</td>
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<tr>
<td></td>
<td></td>
<td>U</td>
<td>26.20</td>
<td>4.47</td>
<td>20.66</td>
<td>5.75</td>
<td>5.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>27.38</td>
<td>5.60</td>
<td>18.92</td>
<td>4.52</td>
<td>8.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>103.56</td>
<td>18.38</td>
<td>74.94</td>
<td>16.33</td>
<td>28.62</td>
</tr>
<tr>
<td>2.</td>
<td>Experimental Group I (CNIV)</td>
<td>K</td>
<td>32.48</td>
<td>5.07</td>
<td>32.24</td>
<td>4.96</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U</td>
<td>20.04</td>
<td>3.81</td>
<td>18.78</td>
<td>5.33</td>
<td>1.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>21.62</td>
<td>5.65</td>
<td>13.38</td>
<td>4.24</td>
<td>8.24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>74.14</td>
<td>11.96</td>
<td>64.40</td>
<td>10.98</td>
<td>9.74</td>
</tr>
<tr>
<td>3.</td>
<td>Experimental Group II (ICIV)</td>
<td>K</td>
<td>57.02</td>
<td>7.92</td>
<td>44.16</td>
<td>16.22</td>
<td>12.86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U</td>
<td>27.80</td>
<td>3.93</td>
<td>22.92</td>
<td>5.97</td>
<td>4.88</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>31.14</td>
<td>4.57</td>
<td>27.72</td>
<td>7.27</td>
<td>3.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>115.96</td>
<td>15.23</td>
<td>94.80</td>
<td>27.58</td>
<td>21.16</td>
</tr>
</tbody>
</table>

N1 = N2 = N3 = 50
* - Significant at 0.01 level.  # - Not significant
K - Knowledge  U - Understanding  A - Application  T - Total

between the means of Post-test and Retention test scores at knowledge and understanding levels for this group. Again it is found that the mean value of the Post Test scores are greater than that of the Retention Test scores for all the three groups.

Hence the null hypothesis is rejected and the hypothesis is accepted. It is concluded that irrespective of the instructional strategy adopted for instruction in agriculture, farmers tend to forget what they have learnt in lapse of time. This is clearly seen in Graph 9.

The highlights of the testing of hypotheses 1 to 8 convince that ICIV is relatively more effective when compared to LM and CNIV in not only modifying the cognitive
GRAPH: COMPARISON BETWEEN THE MEANS OF POST AND RETENTION TEST SCORES OF THE PARTICIPANTS OF DIFFERENT INSTRUCTIONAL STRATEGIES.
behaviour among farmers but also in enhancing retention so far as instruction in agriculture is concerned. Again it is convinced that LM is more effective when compared to CNIV which is least effective of all the three instructional strategies is not only modifying the cognitive behaviour among farmers but also in enhancing retention in agriculture. ICIV being closest to reality with its combination of sound and picture, motivation and realistic feel to the participants is found to be most effective of all the three strategies. In addition to maintain better interaction between the instructor and the participants throughout the instructional process by keeping low information density, pauses wherever necessary, and humourising the content at every stage of presentation, ICIV is found to be relatively more effective when compared to LM and CNIV.

The presence of instructor's wit and humour, non-verbal communications, logical presentation of concepts and enthusiasm besides group feeling, social reinforcement and emotional security among the participants make the LM more effective when compared to CNIV which lacks these interesting features. However, the CNIV can also influence the learners by the way of moving images, music sound effects and graphics which makes CNIV also as an effective medium in education. The absence of interaction with the participants due to its one way communication makes CNIV relatively inferior to LM as well as ICIV in realizing the envisaged instructional objective in agricultural extension education. Straight Talk as programme format is found to be more effective when compared to Documentary as another format in modifying the cognition among farmers in agriculture. It seems the indirect interaction emerged between the participants and the human face along with appropriate visuals seen in the video influences better learning among the farmers in the case of Straight Talk as programme format when compared to Documentary as another programme format.
Null Hypothesis No. 9

There is no significant difference between LM and ICIV as different instructional strategies with regard to different interaction patterns occurring as a result of interaction among the instructor, participants and the media.

To test this null hypothesis, 't' tests were attempted between the means of Control Group and Experimental Group II on the scores of different ratios representing different communication patterns of the instructor. Definitions and method of computation of different ratios representing different communication patterns of the instructor are described in the next section of this chapter. The mean and SD on the scores of the ratios representing different communication patterns for both the groups had already been computed. The results of the 't' tests are given in the Table 16.

From the Table 16, it is found that there is significant difference at 0.01 level between the means of Control Group and Experimental Group II on the scores of the ratios representing certain communication patterns viz. CCR, I/P, ITR and IQR. It is also found that the mean value of the Control Group is greater than that of the Experimental Group II with regard to the ratios viz. I/P, I/D, ITR and IQR. But at the same time the mean value of the Experimental Group II is greater than that of the Control Group with regard to the ratio CCR. Again it is found there is no significant difference between the means of these two groups with regard to the ratios viz. IRR, PTR and PIR.

Hence the null hypothesis is partially accepted. It is concluded that the interaction patterns occurring as a result of interaction among the instructor, participants and the media so far as the Control Group is concerned, are characterized by the instructor's tendency to dominate the participants in the instructional process, express views through
lecture, give directions and criticize the participants with the expectation of compliance in addition to asking more number of questions during content related discussions. Again it

**TABLE 16. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF CONTROL GROUP AND EXPERIMENTAL GROUP II ON THE SCORES OF DIFFERENT COMMUNICATION PATTERNS OF THE INSTRUCTOR**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Ratio</th>
<th>M1</th>
<th>M2</th>
<th>σ₁</th>
<th>σ₂</th>
<th>D</th>
<th>σD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CCR</td>
<td>39.82</td>
<td>64.26</td>
<td>3.40</td>
<td>7.82</td>
<td>24.44</td>
<td>2.20</td>
<td>11.11*</td>
</tr>
<tr>
<td>2</td>
<td>SSR</td>
<td>73.03</td>
<td>70.00</td>
<td>6.05</td>
<td>3.43</td>
<td>3.03</td>
<td>1.79</td>
<td>1.69#</td>
</tr>
<tr>
<td>3</td>
<td>I/P</td>
<td>5.31</td>
<td>2.47</td>
<td>1.22</td>
<td>0.86</td>
<td>2.84</td>
<td>0.38</td>
<td>7.47*</td>
</tr>
<tr>
<td>4</td>
<td>I/D</td>
<td>0.31</td>
<td>0.20</td>
<td>0.05</td>
<td>0.05</td>
<td>0.11</td>
<td>0.02</td>
<td>5.50*</td>
</tr>
<tr>
<td>5</td>
<td>ITR</td>
<td>82.68</td>
<td>38.01</td>
<td>2.56</td>
<td>5.64</td>
<td>44.79</td>
<td>1.59</td>
<td>28.17*</td>
</tr>
<tr>
<td>6</td>
<td>IQR</td>
<td>17.30</td>
<td>8.10</td>
<td>4.67</td>
<td>2.33</td>
<td>9.20</td>
<td>1.35</td>
<td>6.81*</td>
</tr>
<tr>
<td>7</td>
<td>IRR</td>
<td>65.68</td>
<td>62.26</td>
<td>6.22</td>
<td>8.16</td>
<td>3.42</td>
<td>2.65</td>
<td>1.29#</td>
</tr>
<tr>
<td>8</td>
<td>PTR</td>
<td>16.20</td>
<td>18.27</td>
<td>2.64</td>
<td>10.36</td>
<td>2.07</td>
<td>2.76</td>
<td>0.75#</td>
</tr>
<tr>
<td>9</td>
<td>PIR</td>
<td>40.18</td>
<td>45.03</td>
<td>12.87</td>
<td>8.37</td>
<td>4.85</td>
<td>3.96</td>
<td>1.22#</td>
</tr>
<tr>
<td>10</td>
<td>Silence ratio</td>
<td>1.38</td>
<td>1.04</td>
<td>0.83</td>
<td>0.47</td>
<td>0.34</td>
<td>0.25</td>
<td>1.36#</td>
</tr>
</tbody>
</table>

N₁ = N₂ = 50  D.F. = 98
* - Significant at 0.01 level.  # - Not significant

is concluded that so far as the Experimental Group II is concerned, the interaction patterns occurred as a result of interaction among the instructor, the participants and the media are characterized by the instructors tendency to talk more and more with regard to discussing the content as well as asking questions. Again it is concluded both the Control and Experimental Group II are almost identically characterized with regard to instructor's tendency to react to the ideas and feelings expressed by the participants, the participants'
tendency to talk either by responding to the instructor's question or by initiating the talk by themselves. (Graph. 10)

ANALYSIS OF INTERACTION IN CONTROL GROUP AND EXPERIMENTAL GROUP II

As one of the objectives of the study deals with the interaction patterns that occur during the instructional process among the instructor, the participants and the media, an attempt was made to analyse the same which occurred in the Control and Experimental Group II, the details of which are given as follows:

Definitions and Method of Computation of Different Ratios Representing Different Communication Patterns of Instructor

Knowledge of how much the instructor or the learners talked becomes much more useful when it is combined with some index of quality. Simple ratios can be calculated which provide such informations in terms of instructor initiative, instructor response and learner initiation. We normally expect reciprocal relationship between instructor's statements and learners' statements. The more the instructor takes the initiative, the more likely learners are to respond. The more an instructor responds, the more likely it is that learners will make statements which show initiative.

The ratios are proposed for making quick comparisons of balance between initiative and response.

(1) Content Cross Ratio (CCR)

This represents the percentage of instructor statements consisting primarily lecture, statements of opinion and instructor question about information etc. This can be computed by the per cent of all tallies that lie within the columns and rows of categories 4, 5 and 6.

\[
\text{CCR} = \frac{4 + 5 + 6}{\text{Total tallies}} \times 100
\]
COMPARISON BETWEEN THE MEANS OF CONTROL GROUP AND EXPERIMENTAL GROUP II ON THE SCORES OF DIFFERENT COMMUNICATION PATTERNS OF THE INSTRUCTOR.

MEANS OF SCORES

CONT.Gr.  EXPT.Gr.II
(2) Steady State Ratio (SSR)

The diagonal area of the matrix is known as 'Steady State Cells'. Only when the behaviour remains in a single category longer than three seconds, there will be tallies in these cells. The percentage of those tallies to the total tallies in the matrix is known as Steady State Ratio. This can be computed by the following formula.

\[
SSR = \frac{\text{Total number of tallies that lie within the steady state cells}}{\text{Total number of tallies in the matrix}} \times 100
\]

The Steady State Ratio reflects the tendency of instructor and learner talk to remain in the same category for periods longer than three seconds. The higher this ratio, the less rapid is the interchange between the instructor and the learners on the average.

(3) Instructor Learner Ratio [I/P]

It indicates the amount of instructor participation as compared to the amount of participants' participation. If the ratio is greater than one, it will show that the instructor is dominating in the instructional process. If it is less than one, it will show that the learners are dominating in the instructional process. It can be computed by the following formula.

\[
I/P = \frac{\text{Total tallies that lie in the columns of } 1 + 2 + 3 + 4 + 5 + 7 + 8 + 11 + 13}{\text{Total tallies that lie in the columns of } 9 + 10 + 12 + 14 + 15}
\]

(4) Indirect Influence to Direct Influence Ratio [I/D]

Indirect influence is defined as actions taken by the instructor which encourage and support learners' participation. Accepting, clarifying, praising and developing the ideas and feelings expressed by the learners will support learners' participation. Indirect behaviour can operationally be defined by noting the per cent of instructor statements falling into categories 1, 2, 3 and 4.
Direct influence refers to the actions taken by the instructor which restrict learners' participation. Direct influence can be operationally defined by noting the per cent of instructor statements falling with categories 5, 6, 7, 8, 11 and 13. This ratio can be computed from the following formula:

\[
I/D = \frac{\text{The sum of tallies that lie in the columns of } 1, 2, 3, \text{ and } 4}{\text{The sum of tallies that lie in the columns of } 5, 6, 7, 8, 11 \text{ and } 13}
\]

(5) Instructor Talk Ratio (ITR)

It is defined as an index representing the tendency of the instructor to talk during instruction. It can be computed from the following formula:

\[
ITR = \frac{\text{The sum of tallies in the columns of } 1, 2, 3, 4, 5, 7, 8, 11 \text{ and } 13}{\text{Total tallies in the matrix}} \times 100
\]

(6) Instructor Question Ratio (IQR)

It is defined as an index representing the tendency of the instructor to ask questions when guiding the more content part of discussion during instruction. This can be computed from the following formula:

\[
IQR = \frac{\text{Tallies in column no 4}}{\text{The sum of tallies in the column Nos. 4, 5 and 6}} \times 100
\]

(7) Instructor Response Ratio (IRR)

It is defined as an index which corresponds to the instructor's tendency to react to the ideas and feelings of the learners. The formula is so designed that the index will be a per cent figure never higher than 100 and never less than zero. It can be computed from the following formula:
The sum of tallies that lie in the
columns of 1, 2 and 3

\[
\text{IRR} = \frac{\text{The sum of tallies that lie in the}}{\text{columns of 1, 2, 3, 7 and 8}} x 100
\]

(8) Participants' Talk Ratio (PTR)

It is defined as an index representing the tendency of learners to talk either by responding to the instructor's questions or by initiating the talk by themselves. Mass answering by the learners is also taken as learners' talk. It can be computed from the following formula:

\[
\text{PTR} = \frac{\text{All the tallies in the rows of}}{9, 10, 12 and 15} x 100
\]

(9) Participants' Initiation Ratio (PIR)

It is proposed to indicate what portion of learners' talk is judged by the observer to be an act of initiation. It can be computed from the following formula:

\[
\text{PIR} = \frac{\text{Tallies that lie in column no. 10}}{\text{Sum of the tallies that lie in column}} x 100
\]
\[9, 10 and 15\]

(10) Silence Ratio

It is defined as an index representing the amount of silence and confusion prevailing in the learning centre during discussion. This can be computed from the following formula:

\[
\text{Silence Ratio} = \frac{\text{Tallies that lie in column no. 16}}{\text{Total tallies in the matrix}} x 100
\]
Graph 1: Homogeneity of the control and experimental groups in terms of the scores of the participants as measured by the pre-test.
TESTING OF HYPOTHESES

In order to test the formulated hypotheses, the same are stated in the null form. The testing of the hypotheses are described as follows.

Null Hypothesis No.1

There is no significant difference between the means of pre and post test scores of the participants of the different instructional strategies viz. LM, CNIV and ICIV at all levels of cognition in agriculture.

To test the null hypothesis, 't' tests were attempted between the means of pre and post test scores of the participants of Control and Experimental Groups at all levels of cognition. The 'mean' and 'SD' of the scores of the participants for all the three groups for both pre and post tests at all levels of cognition had already been computed. The results of the 't' tests are given in the Table 7.

From the Table 7, it is found that there is significant difference at 0.01 level between the means of pre and post test scores of the Control and Experimental Groups at all levels of cognition in the selected content areas of agriculture. It is also found that the mean value of the post test scores is greater than that of the pre-test scores at all levels of cognition for all the three groups. Hence the null hypothesis is rejected and the hypothesis is accepted. It is concluded that all the three instructional strategies viz. LM, CNIV and ICIV are effective in achieving the instructional objectives at all levels of cognition so far as agricultural programmes are concerned. This clearly seen in the Graph 2.
GRAPH: 2 EFFECTIVENESS OF DIFFERENT INSTRUCTIONAL STRATEGIES AS REVEALED BY THE MEANS OF PRE AND POST TEST SCORES OF THE PARTICIPANTS IN AGRICULTURE
TABLE 7. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF PRE AND POST TEST SCORES OF THE CONTROL AND EXPERIMENTAL GROUPS IN AGRICULTURE

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Group</th>
<th>Variables</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>D</th>
<th>σD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M₁</td>
<td>σ₁</td>
<td>M₂</td>
<td>σ₂</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
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<td>K</td>
<td>23.70</td>
<td>4.46</td>
<td>49.98</td>
<td>9.43</td>
<td>26.28</td>
</tr>
<tr>
<td></td>
<td>(LM)</td>
<td>U</td>
<td>14.10</td>
<td>3.87</td>
<td>26.20</td>
<td>4.47</td>
<td>12.10</td>
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<td></td>
<td></td>
<td>A</td>
<td>15.54</td>
<td>3.49</td>
<td>27.38</td>
<td>5.60</td>
<td>11.84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>53.34</td>
<td>10.14</td>
<td>103.56</td>
<td>18.38</td>
<td>50.22</td>
</tr>
<tr>
<td>2.</td>
<td>Experimental</td>
<td>K</td>
<td>22.74</td>
<td>6.12</td>
<td>32.48</td>
<td>5.07</td>
<td>9.74</td>
</tr>
<tr>
<td>Group I</td>
<td>(CNIV)</td>
<td>U</td>
<td>12.82</td>
<td>4.43</td>
<td>20.04</td>
<td>3.81</td>
<td>7.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>15.72</td>
<td>6.06</td>
<td>21.62</td>
<td>5.65</td>
<td>5.90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>51.28</td>
<td>14.92</td>
<td>74.14</td>
<td>11.96</td>
<td>22.86</td>
</tr>
<tr>
<td>3.</td>
<td>Experimental</td>
<td>K</td>
<td>24.80</td>
<td>8.10</td>
<td>57.02</td>
<td>7.92</td>
<td>32.22</td>
</tr>
<tr>
<td>Group II</td>
<td>(ICIV)</td>
<td>U</td>
<td>15.00</td>
<td>5.66</td>
<td>27.80</td>
<td>3.93</td>
<td>12.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>15.74</td>
<td>5.46</td>
<td>31.14</td>
<td>4.57</td>
<td>15.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>55.62</td>
<td>16.14</td>
<td>115.96</td>
<td>15.23</td>
<td>60.34</td>
</tr>
</tbody>
</table>

N₁ = N₂ = N₃ = 50  D.F. = 98  * - Significant at 0.01 level.

K - Knowledge  U - Understanding  A - Application  T - Total

Null Hypothesis No.2

There is no significant difference among different instructional strategies viz. LM, CNIV and ICIV in their effectiveness in modifying the cognitive behaviour at all levels among farmers in agriculture.

To test the null hypothesis, 't' tests were attempted between the means of Control and Experimental Groups on the scores of the participants as measured by the post test at all levels of cognition. The mean and SD of the scores of the participants as measured by the post test at all levels of cognition have already been computed. The results of the 't' tests are given in the Table 8.
### TABLE 8. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF CONTROL AND EXPERIMENTAL GROUPS AS MEASURED BY THE POST TEST AT KNOWLEDGE, UNDERSTANDING, APPLICATION AND TOTAL LEVELS

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Groups compared</th>
<th>Variables</th>
<th>M₁</th>
<th>σ₁</th>
<th>M₂</th>
<th>σ₂</th>
<th>D</th>
<th>σ₁₀</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Control Group K</td>
<td>Vs. Experimental U</td>
<td>49.98</td>
<td>9.43</td>
<td>32.48</td>
<td>5.07</td>
<td>17.50</td>
<td>1.51</td>
<td>11.59*</td>
</tr>
<tr>
<td></td>
<td>Group I A</td>
<td></td>
<td>27.38</td>
<td>5.54</td>
<td>21.62</td>
<td>5.65</td>
<td>5.76</td>
<td>1.12</td>
<td>5.14*</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td></td>
<td>103.56</td>
<td>18.38</td>
<td>74.14</td>
<td>11.96</td>
<td>29.42</td>
<td>3.10</td>
<td>9.49*</td>
</tr>
<tr>
<td>2.</td>
<td>Control Group K</td>
<td>Vs. Experimental U</td>
<td>49.98</td>
<td>9.43</td>
<td>57.02</td>
<td>7.92</td>
<td>7.04</td>
<td>1.74</td>
<td>4.04*</td>
</tr>
<tr>
<td></td>
<td>Group II A</td>
<td></td>
<td>27.38</td>
<td>5.54</td>
<td>31.14</td>
<td>4.57</td>
<td>3.76</td>
<td>1.02</td>
<td>3.68*</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td></td>
<td>103.56</td>
<td>18.38</td>
<td>115.96</td>
<td>15.23</td>
<td>12.40</td>
<td>3.38</td>
<td>3.67*</td>
</tr>
<tr>
<td>3.</td>
<td>Experimental K</td>
<td>Vs. Experimental U</td>
<td>32.48</td>
<td>5.07</td>
<td>57.02</td>
<td>7.92</td>
<td>24.54</td>
<td>1.32</td>
<td>18.59*</td>
</tr>
<tr>
<td></td>
<td>Group I A</td>
<td></td>
<td>21.62</td>
<td>5.65</td>
<td>31.14</td>
<td>4.57</td>
<td>9.52</td>
<td>1.03</td>
<td>9.24*</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td></td>
<td>74.14</td>
<td>11.96</td>
<td>115.96</td>
<td>15.23</td>
<td>41.82</td>
<td>2.74</td>
<td>15.26*</td>
</tr>
</tbody>
</table>

N₁ = N₂ = N₃ = 50  D.F. = 98

* - Significant at 0.01 level  # - Not significant.

K - Knowledge  U - Understanding  A - Application  T - Total

From the Table 8, it is found that there is significant difference at 0.01 level between the means of Control Group and the Experimental Groups and between Experimental Group I and Experimental Group II on the scores of the participants as measured by the post test. It is also found that there is significant difference at 0.01 level between the means of Control Group and Experimental Group II at all levels of cognition except at understanding level. It is also found that the mean value of the Control Group is greater than that of the Experimental Group I but less than that of the Experimental Group II at all levels of cognition. Again it is found that the mean value of the Experimental Group I is found to be less than that of the Control Group and Experimental Group II.
Hence the null hypothesis is rejected and the hypothesis is accepted. Therefore it is concluded that ICIV is more effective when compared to LM in modifying the cognitive behaviour among farmers at all levels except at understanding level in agriculture. It is also concluded that ICIV is more effective when compared to CNIV in modifying the cognitive behaviour among farmers at all levels in agriculture. Again it is concluded that LM is more effective when compared to CNIV in modifying the cognitive behaviour among farmers at all levels. This is vividly seen in the Graph 3.

Null Hypothesis No.3

There is no significant difference among different instructional strategies viz. LM, CNIV and ICIV in terms of their effectiveness in modifying the cognitive behaviour among farmers in the context of varying difficulty levels of the content in agriculture.

In order to find out the difficulty level of the different content areas in agriculture, a rating scale was administered to the participants of the Experimental Group I immediately after the respective video programme was over requesting them to rate the difficulty level of the content at five levels viz. too simple, simple, moderate, difficult and too difficult. The difficulty scores assigned to the scale range from 1-5 from too easy to too difficult respectively. The difficulty scores assigned by the participants for each programme were computed. The mean and SD of the difficulty scores of the programmes were also computed, the distribution of which is given in the Table 9 along with ranking.
GRAPH: 3 RELATIVE EFFECTIVENESS AMONG DIFFERENT INSTRUCTIONAL STRATEGIES IN MODIFYING COGNITIVE BEHAVIOUR AMONG FARMERS AS REVEALED BY THE MEANS OF THEIR SCORES MEASURED BY THE POST TEST IN AGRICULTURE.
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>CONTENTS</th>
<th>Mean</th>
<th>σ</th>
<th>Rank in Difficulty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tanjore Wilt in Coconut</td>
<td>2.48</td>
<td>0.67</td>
<td>9</td>
</tr>
<tr>
<td>2.</td>
<td>Coconut Cultivation and Intercropping in Coconut</td>
<td>3.10</td>
<td>0.75</td>
<td>7</td>
</tr>
<tr>
<td>3.</td>
<td>Composed Coirpith</td>
<td>1.52</td>
<td>0.64</td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td>Seed Hardening in Groundnut</td>
<td>3.90</td>
<td>0.92</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Groundnut Grading</td>
<td>3.18</td>
<td>0.91</td>
<td>5</td>
</tr>
<tr>
<td>6.</td>
<td>Groundnut Cultivation</td>
<td>3.34</td>
<td>0.73</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>Agronomy Practices and Weed Control in Groundnut</td>
<td>2.16</td>
<td>0.67</td>
<td>11</td>
</tr>
<tr>
<td>8.</td>
<td>Control of Red Hairy Catterpiller and Leaf Rollar in Groundnut</td>
<td>1.90</td>
<td>0.72</td>
<td>12</td>
</tr>
<tr>
<td>9.</td>
<td>Paddy Cultivation</td>
<td>2.50</td>
<td>0.64</td>
<td>8</td>
</tr>
<tr>
<td>10.</td>
<td>Green Manure for Paddy</td>
<td>3.14</td>
<td>0.80</td>
<td>6</td>
</tr>
<tr>
<td>11.</td>
<td>Banana Cultivation</td>
<td>1.44</td>
<td>0.49</td>
<td>15</td>
</tr>
<tr>
<td>12.</td>
<td>Enriched Farmyard Manure</td>
<td>1.64</td>
<td>0.66</td>
<td>13</td>
</tr>
<tr>
<td>13.</td>
<td>Activated Clay for Pulses and Dry Farming</td>
<td>4.34</td>
<td>0.65</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Rhizobium for Tree Crops</td>
<td>3.28</td>
<td>0.87</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>Mushroom Cultivation</td>
<td>2.26</td>
<td>0.77</td>
<td>10</td>
</tr>
</tbody>
</table>

Low difficulty level - Programme No. 3, 7, 8, 11 and 12
Medium difficulty level - Programme No. 1, 2, 9, 10 and 15
High difficulty level - Programme No. 4, 5, 6, 13 and 14
From the Table 9, it is found that programmes no. 4, 5, 6, 13 & 14 were rated by the participants as high difficulty level programmes, the programmes no. 1, 2, 9, 10 & 15 were rated by them as medium difficulty level and the programmes no. 3, 7, 8, 11 & 12 were rated to be low difficulty level programmes.

To test the null hypothesis, 't' tests were attempted between the means of Control and Experimental Groups on the scores as measured by the post test with regard to the programmes with varying difficulty levels of the content. The mean and SD of the scores as measured by the post test with regard to the programmes with varying difficulty levels of the contents for all the three groups had already been computed. The results of the 't' tests are given in the Table 10.

**TABLE 10. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF CONTROL AND EXPERIMENTAL GROUPS IN AGRICULTURE AT KNOWLEDGE, UNDERSTANDING, APPLICATION AND TOTAL LEVELS IN THE CONTEXT OF THE CONTENTS WITH VARYING DIFFICULTY LEVELS**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Groups compared</th>
<th>Difficulty level</th>
<th>M₁</th>
<th>σ₁</th>
<th>M₂</th>
<th>σ₂</th>
<th>D</th>
<th>σ_D</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control Group Vs.</td>
<td>L</td>
<td>70.92</td>
<td>13.94</td>
<td>45.46</td>
<td>9.76</td>
<td>25.46</td>
<td>1.97</td>
<td>12.92*</td>
</tr>
<tr>
<td></td>
<td>Experimental Group I</td>
<td>M</td>
<td>66.70</td>
<td>11.67</td>
<td>45.94</td>
<td>9.94</td>
<td>20.76</td>
<td>2.17</td>
<td>9.57*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>69.12</td>
<td>15.38</td>
<td>59.56</td>
<td>11.92</td>
<td>9.56</td>
<td>2.75</td>
<td>3.48*</td>
</tr>
<tr>
<td>2</td>
<td>Control Group Vs.</td>
<td>L</td>
<td>70.92</td>
<td>13.94</td>
<td>77.66</td>
<td>10.24</td>
<td>6.74</td>
<td>2.45</td>
<td>2.75*</td>
</tr>
<tr>
<td></td>
<td>Experimental Group II</td>
<td>M</td>
<td>66.70</td>
<td>11.67</td>
<td>80.02</td>
<td>9.99</td>
<td>13.94</td>
<td>2.17</td>
<td>6.42*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>69.12</td>
<td>15.38</td>
<td>73.26</td>
<td>16.52</td>
<td>4.14</td>
<td>3.19</td>
<td>1.30*</td>
</tr>
<tr>
<td>3</td>
<td>Experimental Group I Vs.</td>
<td>L</td>
<td>45.46</td>
<td>9.76</td>
<td>77.66</td>
<td>10.24</td>
<td>32.20</td>
<td>2.00</td>
<td>16.10*</td>
</tr>
<tr>
<td></td>
<td>Experimental Group II</td>
<td>M</td>
<td>45.94</td>
<td>9.94</td>
<td>80.02</td>
<td>9.99</td>
<td>34.08</td>
<td>1.99</td>
<td>17.13*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>59.56</td>
<td>11.92</td>
<td>73.26</td>
<td>16.52</td>
<td>13.70</td>
<td>2.88</td>
<td>4.76*</td>
</tr>
</tbody>
</table>

N₁ = N₂ = N₃ = 50   D.F. = 98   * - Significant at 0.01 level.

L - Low   M - Medium   H - High
From the Table 10, it is found that there is significant difference at 0.01 level between the means of Control Group and Experimental Group I and between Experimental Group I and Experimental Group II for all the three difficulty levels of the content areas. It is also found that there is significant difference at 0.01 level between the means of Control Group and Experimental Group II, when the difficulty levels of the content areas are at low and medium. But at the same time there is no significant difference between the means of these two groups when the difficulty level of the content is high.

The mean value of the Experimental Group II is found to be greater than that of the Control Group and Experimental Group I for all the three difficulty levels of the content areas. It is also found that the mean value of the Control Group is greater than that of Experimental Group I for all the three difficulty levels of the content areas.

Hence the null hypothesis is rejected and the hypothesis is accepted. It is concluded that irrespective of the difficulty level of the content areas in agriculture, ICIV is more effective when compared to LM and CNIV in modifying the cognition of farmers in agriculture. Again it is concluded that LM is more effective when compared to CNIV in modifying the cognitive behaviour among farmers in agriculture. This is vividly seen in the Graph 4.

**Null Hypothesis No.4**

There is no significant difference between CNIV and ICIV as different instructional strategies in terms of their effectiveness in modifying the cognitive behaviour among farmers in the context of varying formats of the video programmes in agriculture.

The scores of the participants as measured by the post test for the programmes of straight talk and documentary as formats were converted into percentage for both
Graph 4: Relative effectiveness among different instructional strategies in modifying cognitive behaviour among farmers in the context of the content with varying difficulty levels.
Experimental Group I and Experimental Group II. The mean and SD on these scores were computed for both the groups.

Of the fifteen video programmes which were used in Experimental Group I and II as instructional intervention, 8 programmes were straight talk in format while the remaining 7 programmes were documentary in format (Vide Table 1).

To test the hypothesis, ‘t’ test were attempted between the means of Experimental Group I and II on the scores of the participants as measured by the post-test with regard to the programmes with varying formats viz. Straight Talk and Documentary. The results of ‘t’ tests are given in the Table 11.

TABLE 11. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF THE SCORES OF CONTROL AND EXPERIMENTAL GROUPS IN AGRICULTURE IN THE CONTEXT OF CONTENTS WITH VARYING FORMATS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Groups compared</th>
<th>Format</th>
<th>M₁</th>
<th>σ₁</th>
<th>M₂</th>
<th>σ₂</th>
<th>D</th>
<th>σ₀</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Experimental group I Vs Experimental group II</td>
<td>Straight Talk</td>
<td>48.90</td>
<td>9.47</td>
<td>74.68</td>
<td>9.16</td>
<td>25.78</td>
<td>1.86</td>
<td>13.86*</td>
</tr>
<tr>
<td>2.</td>
<td>Experimental group I Vs Experimental group II</td>
<td>Documentary</td>
<td>25.08</td>
<td>5.28</td>
<td>41.30</td>
<td>7.37</td>
<td>16.22</td>
<td>1.28</td>
<td>12.67*</td>
</tr>
</tbody>
</table>

N₁ = N₂ = N₃ = 50  D.F. = 98  * - Significant at 0.01 level.

From the Table 11, it is found that there is significant difference at 0.01 level between the means of Experimental I and II for both the formats of the video programmes. It is also found that the mean value of the Experimental Group II is greater than that of the Experimental Group I for both the formats of the video programmes.
Hence the null hypothesis is rejected and the hypothesis is accepted. It is concluded that irrespective of the programme format, ICIV is more effective when compared to CNIV in modifying the cognitive behaviour among farmers in agriculture. This is clearly seen in Graph 5.

**Null Hypothesis No. 5**

There is no significant difference among different instructional strategies viz. LM, CNIV and ICIV in their effectiveness in terms of retention as revealed by the participants' performance in the retention test.

The mean and SD of scores of participants as measured by the Retention Test administered one month after the experimentation was over were computed at all levels of cognition for all the three groups. To test the null hypothesis, 't' tests were attempted between the means of Control and Experimental Groups on the scores of the participants as measured by the Retention Test at all levels of cognition. The results are given in the Table 12.

From the Table 12, it is found that there is significant difference at 0.01 level between the means of Control Group and Experimental Group I and also between Control Group and Experimental Group II at all levels of cognition except at understanding level. Again it is found that there is significant difference at 0.01 level between the means of Experimental Group I and Experimental Group II at all levels of cognition. It is also found that the mean value of the Experimental Group II is greater than that of the Control Group and Experimental Group I at all levels of cognition. It is also found that the mean value of the Control Group is greater than that of the Experimental Group I at all levels of cognition.
GRAPH 5: COMPARISON OF EFFECTIVENESS BETWEEN ICIV AND CNIV IN MODIFYING THE COGNITIVE BEHAVIOUR AMONG FARMERS IN THE CONTEXT OF THE CONTENT WITH VARYING FORMATS.
TABLE 12. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF CONTROL AND EXPERIMENTAL GROUPS ON THE SCORES AS MEASURED BY RETENTION TEST IN AGRICULTURE AT ALL LEVELS OF COGNITION

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Groups compared</th>
<th>Variables</th>
<th>M₁</th>
<th>σ₁</th>
<th>M₂</th>
<th>σ₂</th>
<th>D</th>
<th>σD</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control Group</td>
<td>K</td>
<td>35.36</td>
<td>7.45</td>
<td>32.24</td>
<td>4.96</td>
<td>3.12</td>
<td>1.24</td>
<td>2.47*</td>
</tr>
<tr>
<td></td>
<td>Vs. Experimental</td>
<td>U</td>
<td>20.66</td>
<td>5.75</td>
<td>18.78</td>
<td>5.33</td>
<td>1.88</td>
<td>1.11</td>
<td>1.69*</td>
</tr>
<tr>
<td></td>
<td>Group I</td>
<td>A</td>
<td>18.92</td>
<td>4.52</td>
<td>13.38</td>
<td>4.24</td>
<td>5.54</td>
<td>0.88</td>
<td>6.29*</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>74.94</td>
<td>16.33</td>
<td>64.40</td>
<td>10.98</td>
<td>10.54</td>
<td>2.78</td>
<td>3.79*</td>
<td></td>
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<tr>
<td>2</td>
<td>Control Group</td>
<td>K</td>
<td>35.36</td>
<td>7.45</td>
<td>44.16</td>
<td>16.22</td>
<td>8.88</td>
<td>2.52</td>
<td>3.52*</td>
</tr>
<tr>
<td></td>
<td>Vs. Experimental</td>
<td>U</td>
<td>20.66</td>
<td>5.75</td>
<td>22.92</td>
<td>5.97</td>
<td>2.26</td>
<td>1.17</td>
<td>1.93#</td>
</tr>
<tr>
<td></td>
<td>Group II</td>
<td>A</td>
<td>18.92</td>
<td>4.52</td>
<td>27.72</td>
<td>7.27</td>
<td>8.88</td>
<td>1.21</td>
<td>7.34*</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>74.94</td>
<td>16.33</td>
<td>94.80</td>
<td>27.58</td>
<td>19.86</td>
<td>4.53</td>
<td>4.38*</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Experimental</td>
<td>K</td>
<td>32.24</td>
<td>4.96</td>
<td>44.16</td>
<td>16.22</td>
<td>11.92</td>
<td>5.75</td>
<td>2.07*</td>
</tr>
<tr>
<td></td>
<td>Group I Vs</td>
<td>U</td>
<td>18.78</td>
<td>5.33</td>
<td>22.92</td>
<td>5.97</td>
<td>4.14</td>
<td>1.13</td>
<td>3.66*</td>
</tr>
<tr>
<td></td>
<td>Experimental</td>
<td>A</td>
<td>13.38</td>
<td>4.24</td>
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<td>7.27</td>
<td>14.34</td>
<td>1.19</td>
<td>12.05*</td>
</tr>
<tr>
<td></td>
<td>Group II</td>
<td>T</td>
<td>64.40</td>
<td>10.98</td>
<td>94.80</td>
<td>27.58</td>
<td>30.40</td>
<td>4.19</td>
<td>7.25*</td>
</tr>
</tbody>
</table>

N₁ = N₂ = N₃ = 50  D.F. = 98
* - Significant at 0.01 level.  # - Not significant

K - Knowledge  U - Understanding  A - Application  T - Total

Hence the null hypothesis is rejected and the hypothesis is accepted. It is concluded that when compared to LM, ICIV is more effective in its effectiveness in enhancing retention at all levels of cognition except at understanding level. But at the same time when compared to CNIV, ICIV is more effective in enhancing retention at all levels of cognition in agriculture. It is also concluded that LM is more effective when compared to CNIV in enhancing the retention at all levels of cognition in agriculture. This is vividly seen in Graph 6.
Graph 6: Relative Effectiveness Among Different Instructional Strategies in Enhancing Retention Among Farmers in Agriculture as Revealed by the Means of Their Scores Measured by the Retention Test.
Null Hypothesis No. 6

There is no significant difference between Straight Talk and Documentary as different formats of the video programmes in terms of retention as revealed by the participants' performance in the Retention Test for different instructional strategies.

To test this null hypothesis, the scores of the participants of Experimental Group I and II as measured by the Retention Test for the programmes of different formats viz. Straight Talk and Documentary were converted into percentage. The mean and SD of these scores were computed for both the Experimental Groups. 't' tests were attempted between the means of these programme formats for both of the groups and the results are given in the Table 13.

**TABLE 13. SIGNIFICANCE OF DIFFERENCE BETWEEN THE MEANS OF STRAIGHT TALK AND DOCUMENTARY AS DIFFERENT FORMATS OF VIDEO PROGRAMMES IN TERMS OF RETENTION AS REVEALED BY THE PARTICIPANTS' PERFORMANCE IN THE RETENTION TEST FOR DIFFERENT INSTRUCTIONAL STRATEGIES**

<table>
<thead>
<tr>
<th>FORMATS COMPARED</th>
<th>Sl.No.</th>
<th>Treatment</th>
<th>$M_1$</th>
<th>$\sigma_1$</th>
<th>$M_2$</th>
<th>$\sigma_2$</th>
<th>$D$</th>
<th>$\sigma_D$</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOC Vs ST</td>
<td>1</td>
<td>CNIV</td>
<td>23.66</td>
<td>3.45</td>
<td>40.12</td>
<td>8.49</td>
<td>16.48</td>
<td>1.29</td>
<td>12.76*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>ICIV</td>
<td>35.62</td>
<td>10.39</td>
<td>58.16</td>
<td>17.99</td>
<td>22.54</td>
<td>2.94</td>
<td>7.67*</td>
</tr>
</tbody>
</table>

$N_1 = N_2 = N_3 = 50$  \(\text{D.F.} = 98\)  \* - Significant at 0.01 level.

CNIV - Conventional Non-Interactive Video
ICIV - Instructor Controlled Interactive Video
Doc - Documentary
ST - Straight Talk

From the Table 13, it is found that there is significant difference at 0.01 level between the means of these two programme formats for both the groups. The mean value of the programmes of Straight Talk as programme format was found to be greater than
that of the programmes of Documentary as another programme format. Hence the null hypothesis is rejected and the hypothesis is accepted.

It is concluded that irrespective of the instructional strategy whether it is ICIV or CNIV, Straight Talk as programme format enhances retention more effectively among farmers in agriculture when compared to documentary as another programme formats. This is clearly seen in Graph 7.

**Null Hypothesis No. 7**

There is no significant difference between CNIV and ICIV as different instructional strategies in terms of retention as revealed by the participants' performance in the Retention Test for different formats.

To test this null hypothesis, the scores of the participants of Experimental Group I and Experimental Group II as measured by the Retention Test for the programmes of different formats viz. Straight Talk and Documentary were converted into percentage. The mean and SD of the scores were computed for both the Experimental Groups. Between the means of Experimental Group I and II for both the programme formats 't' test were attempted. The results are given in the Table 14.

From the Table 14, it is found that there is significant difference at 0.01 level between the means of Experimental Group I and II for both the programme formats. The mean value of the Experimental Group II is found to be greater than that of the Experimental Group I.

Hence, the null hypothesis is rejected the hypothesis is accepted. It is concluded that irrespective of the programme format whether it is Straight Talk or Documentary ICIV is more effective when compared to CNIV in enhancing retention among farmers in agriculture. This is clearly seen in Graph 8.
All the above said ratios representing different communication patterns of the instructor in Control and Experimental Group II were computed as stated based on the 16 x 16 matrix prepared for each of the 15 instructional programmes in agriculture. The mean and SD on the scores of these ratios were also computed for both the groups. The distribution of the scores of these ratios along with their mean and SD of the Control and Experimental Group II are given in the Tables 17 and 18, respectively.

II. Analysis and Interpretations of the Ratios Representing Different Communication Patterns: of the Instructor in the Control Group

From the Table 17, the following findings emerge.

1. The mean score of CCR is found to be 39.82 with the standard deviation of 3.40. The scores are found to be ranging from 34.66 to 47.42. It is found that the instructor is more concerned with content oriented part of the instructional discussion.

2. The mean score of SSR is found to be 73.03 with the standard deviation of 6.05. The scores are found to be ranging from 68.75 to 92.76. Hence it is concluded that the interaction patterns are not flexible.

3. The mean score of I/P is found to by 5.31 with the standard deviation of 1.22. The range of the scores is found to be ranging from 2.45 to 7.34. It shows that the instructor is dominating in the instructional process.

4. The mean score of I/D is found to be 0.31 with the standard deviation of 0.05. The range of the scores is found to be ranging from 0.23 to 0.40. Hence, it is concluded that the instructor is direct in this communication patterns.

5. The mean score of ITR is found to be 82.68 with the standard deviation of 2.56. The range of the scores is found to be ranging from 77.91 to 87.09. It is found that the instructor talks more than 80 per cent of the time in the instructional process.
6. The mean score of IQR is found to be 17.30 with the standard deviation of 4.67. The range of the scores is found to be ranging from 14.44 to 22.12. It is concluded that questioning behaviour of the instructor is satisfactory.

7. The mean score of IRR is found to be 65.68 with the standard deviation of 6.22. The range of the scores is found to be ranging from 51.51 to 73.94. Hence, it is concluded that the instructor is responding to the participants satisfactorily.

8. The mean score of PTR is found to be 16.2 with the standard deviation of 2.64. The range of the scores is found to be ranging from 12.28 to 17.72. It is evident

### Table 17. Distribution of Ratios Representing Different Communication Patterns of the Instructor During Instructional Process in the Control Group

<table>
<thead>
<tr>
<th>SL. No. of Programme</th>
<th>CCR</th>
<th>SSR</th>
<th>I/P</th>
<th>I/D</th>
<th>ITR</th>
<th>IQR</th>
<th>IRR</th>
<th>PTR</th>
<th>PIR</th>
<th>Silence Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>34.66</td>
<td>69.02</td>
<td>2.45</td>
<td>0.39</td>
<td>77.91</td>
<td>22.12</td>
<td>61.04</td>
<td>21.47</td>
<td>31.48</td>
<td>0.06</td>
</tr>
<tr>
<td>2</td>
<td>40.19</td>
<td>73.04</td>
<td>5.85</td>
<td>0.37</td>
<td>83.72</td>
<td>20.98</td>
<td>70.53</td>
<td>15.29</td>
<td>37.58</td>
<td>0.98</td>
</tr>
<tr>
<td>3</td>
<td>39.34</td>
<td>73.02</td>
<td>5.13</td>
<td>0.32</td>
<td>82.56</td>
<td>21.59</td>
<td>67.24</td>
<td>16.09</td>
<td>35.55</td>
<td>1.34</td>
</tr>
<tr>
<td>4</td>
<td>40.76</td>
<td>68.75</td>
<td>4.98</td>
<td>0.30</td>
<td>82.61</td>
<td>14.67</td>
<td>67.12</td>
<td>16.58</td>
<td>57.41</td>
<td>0.81</td>
</tr>
<tr>
<td>5</td>
<td>47.42</td>
<td>70.89</td>
<td>7.34</td>
<td>0.23</td>
<td>87.09</td>
<td>15.84</td>
<td>54.54</td>
<td>11.74</td>
<td>45.83</td>
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<td>6</td>
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<td>92.76</td>
<td>5.38</td>
<td>0.32</td>
<td>82.94</td>
<td>18.64</td>
<td>73.94</td>
<td>15.42</td>
<td>41.93</td>
<td>1.63</td>
</tr>
<tr>
<td>7</td>
<td>44.39</td>
<td>74.37</td>
<td>4.89</td>
<td>0.29</td>
<td>82.30</td>
<td>17.65</td>
<td>66.27</td>
<td>16.83</td>
<td>4.38</td>
<td>0.87</td>
</tr>
<tr>
<td>8</td>
<td>38.96</td>
<td>69.19</td>
<td>4.58</td>
<td>0.23</td>
<td>81.15</td>
<td>14.44</td>
<td>70.68</td>
<td>17.72</td>
<td>57.89</td>
<td>2.25</td>
</tr>
<tr>
<td>9</td>
<td>42.57</td>
<td>69.50</td>
<td>7.03</td>
<td>0.24</td>
<td>86.33</td>
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<td>51.51</td>
<td>12.28</td>
<td>47.17</td>
<td>1.39</td>
</tr>
<tr>
<td>10</td>
<td>39.82</td>
<td>69.25</td>
<td>5.52</td>
<td>0.33</td>
<td>81.86</td>
<td>17.22</td>
<td>62.00</td>
<td>17.03</td>
<td>50.70</td>
<td>3.54</td>
</tr>
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<td>37.32</td>
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<td>6.09</td>
<td>0.31</td>
<td>82.90</td>
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<td>72.22</td>
<td>16.18</td>
<td>39.76</td>
<td>0.92</td>
</tr>
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<td>12</td>
<td>34.70</td>
<td>76.25</td>
<td>6.48</td>
<td>0.27</td>
<td>85.84</td>
<td>18.42</td>
<td>66.67</td>
<td>13.24</td>
<td>31.03</td>
<td>0.91</td>
</tr>
<tr>
<td>13</td>
<td>38.45</td>
<td>71.29</td>
<td>3.76</td>
<td>0.36</td>
<td>77.98</td>
<td>18.78</td>
<td>69.44</td>
<td>20.76</td>
<td>36.73</td>
<td>1.26</td>
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<td>14</td>
<td>40.57</td>
<td>70.75</td>
<td>5.12</td>
<td>0.40</td>
<td>82.07</td>
<td>20.93</td>
<td>64.86</td>
<td>16.04</td>
<td>39.21</td>
<td>1.89</td>
</tr>
<tr>
<td>15</td>
<td>41.49</td>
<td>70.29</td>
<td>5.08</td>
<td>0.30</td>
<td>82.99</td>
<td>20.76</td>
<td>67.14</td>
<td>16.33</td>
<td>46.03</td>
<td>0.68</td>
</tr>
<tr>
<td>Mean</td>
<td>39.82</td>
<td>73.03</td>
<td>5.31</td>
<td>0.31</td>
<td>82.68</td>
<td>17.30</td>
<td>65.68</td>
<td>16.2</td>
<td>40.18</td>
<td>1.38</td>
</tr>
<tr>
<td>S.D.</td>
<td>3.40</td>
<td>6.05</td>
<td>1.22</td>
<td>0.05</td>
<td>2.56</td>
<td>4.67</td>
<td>6.22</td>
<td>2.64</td>
<td>12.87</td>
<td>0.83</td>
</tr>
</tbody>
</table>
that the instructor encourages the learner's participation in the instructional process.

9. The mean score of PIR is found to be 40.18 with the standard deviations of 12.87. The scores range from 4.38 to 57.51. It is evident that the instructor encourages the learner's initiation in the instructional process.

10. The mean score of silence ratio is found to be 1.38 with the standard deviation of 0.83. The scores range from 0.06 to 3.54. It is concluded that the participants are active in the teaching learning process.

III. Analysis and Interpretations of the Ratios Representing Different Communication patterns of the Instructor in the Experimental Group II

From the Table 18 the following findings emerge:

1. The mean score of CCR is found to be 64.26 with the standard deviation of 7.82. The scores range from 43.49 to 75.72. It is found that the instructor is more concerned with content oriented part of the instructional discussion.

2. The mean score of SSR is found to be 70.00 with the standard deviation of 3.43. The scores range from 64.47 to 75.25. It is concluded that the interaction patterns are not flexible.

3. The mean score of I/P is found to be 2.47 with the standard deviation of 0.86. The scores range from 0.72 to 3.39. It shows that the instructor dominates in the instructional process.

4. The mean score of I/D is found to be 0.2 with the standard deviation of 0.05. The scores range from 0.09 to 0.30. The instructor scores less than one in this ratio for all the programme. Hence it is concluded that the instructor is direct in his influence patterns.

5. The mean score of ITR is found to be 38.01 with the standard deviation of 5.64. The scores range from 27.09 to 50.00. It is concluded that the instructor takes
less time for discussing the content when compared to time allotted for other activities in the instructional process.

6. The mean score of IQR is found to be 8.10 with the standard deviation of 2.33. The scores range from 3.48 to 11.62. It is concluded that the instructor allotted less time for questioning during instruction.

7. The mean score of IRR is found to be 62.56 with the standard deviation of 8.16. The scores range from 50.00 to 73.12. It is concluded that the instructor responds to the participants satisfactorily.

8. The mean score of PTR is found to be 18.27 with the standard deviation of 10.36. The scores range from 10.33 to 53.04. It is evident that the instructor encouraged the learner's participation in the instructional process.

9. The mean score of PIR is found to be 45.03 with the standard deviation of 8.37. The scores range from 33.05 to 68.84. It is evident that the instructor encouraged the learner's initiation in the instructional process.

10. The mean score of SR is found to be 1.04 with the standard deviation of 0.47. The scores range from 0.41 to 1.91. It is concluded that the participants are active in the teaching learning process.
TABLE 18. DISTRIBUTION OF RATIOS REPRESENTING DIFFERENT COMMUNICATION PATTERNS OF THE INSTRUCTOR DURING INSTRUCTIONAL PROCESS IN THE EXPERIMENTAL GROUP II

<table>
<thead>
<tr>
<th>SL.No. of programme</th>
<th>CCR</th>
<th>SSR</th>
<th>I/P</th>
<th>I/D</th>
<th>ITR</th>
<th>IQR</th>
<th>IRR</th>
<th>PTR</th>
<th>PIR</th>
<th>Silence ratio</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>63.37</td>
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<td>0.30</td>
<td>37.86</td>
<td>11.36</td>
<td>65.55</td>
<td>16.25</td>
<td>40.00</td>
<td>0.41</td>
</tr>
<tr>
<td>2</td>
<td>59.79</td>
<td>73.45</td>
<td>2.08</td>
<td>0.25</td>
<td>41.86</td>
<td>8.59</td>
<td>67.78</td>
<td>20.10</td>
<td>41.70</td>
<td>1.22</td>
</tr>
<tr>
<td>3</td>
<td>57.84</td>
<td>68.53</td>
<td>2.98</td>
<td>0.28</td>
<td>50.00</td>
<td>9.68</td>
<td>67.83</td>
<td>16.79</td>
<td>33.05</td>
<td>1.86</td>
</tr>
<tr>
<td>4</td>
<td>63.15</td>
<td>72.63</td>
<td>2.73</td>
<td>0.26</td>
<td>41.81</td>
<td>11.26</td>
<td>67.61</td>
<td>18.75</td>
<td>47.62</td>
<td>1.08</td>
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<td>45.29</td>
<td>12.38</td>
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<td>1.61</td>
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<td>1.59</td>
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<td>53.02</td>
<td>17.04</td>
<td>68.84</td>
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</tr>
<tr>
<td>9</td>
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<td>2.94</td>
<td>0.09</td>
<td>31.28</td>
<td>3.48</td>
<td>50.00</td>
<td>10.65</td>
<td>52.27</td>
<td>0.91</td>
</tr>
<tr>
<td>10</td>
<td>72.39</td>
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<td>3.39</td>
<td>0.17</td>
<td>35.05</td>
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<td>69.69</td>
<td>10.33</td>
<td>50.56</td>
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<tr>
<td>11</td>
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<td>11.62</td>
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<tr>
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<td>0.14</td>
<td>31.82</td>
<td>7.45</td>
<td>61.00</td>
<td>16.91</td>
<td>41.73</td>
<td>1.44</td>
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<tr>
<td>14</td>
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<td>64.47</td>
<td>1.81</td>
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<td>60.71</td>
<td>20.57</td>
<td>48.83</td>
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<tr>
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<td>0.72</td>
<td>0.18</td>
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<td>53.04</td>
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<tr>
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<td>2.47</td>
<td>0.20</td>
<td>38.01</td>
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<td>62.26</td>
<td>18.27</td>
<td>45.03</td>
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<td>2.33</td>
<td>8.16</td>
<td>10.36</td>
<td>8.37</td>
<td>0.47</td>
</tr>
</tbody>
</table>

When we closely observe the findings and conclusions stated in the previous section, it is known that the interaction patterns emerge as a result of interaction among the instructor, participants and the media are almost identical in Control Group and Experimental Group II. The instructor is found to be equally direct in his influence patterns in both the groups. He restricts the learners' freedom to participate in the instructional process by his tendency to express views through lectures, give directions and criticize the participants with the expectation of compliance. The instructor's tendency to accept, clarify, praise and develop the ideas and feelings expressed by the
participants is almost identical in both the groups. However, his tendency to concentrate and ask questions on the content oriented part of the instructional process is more in the Control Group when compared to that in Experimental Group II. It is also known that the instructor encourages the participants to respond to his questions as well as initiate in the instructional process almost equally in these groups.

An overview of the study is stated in the next chapter along with recommendation and suggestions for further research in the area of Video Assisted Instruction in Extension Education.