

### CHAPTER III

#### THE PRESENT INVESTIGATION

The problem under the present study is a piece of experimental research. It attempted to evolve and compare the relative effectiveness of the three instructional strategies for teaching the subject matter covering the proximate principles of nutrition namely 'proteins', 'Carbohydrates' and 'fats' (which is the part of the course on 'Elementary Foods and Nutrition') to the second year Home-Science students of the M.S. University of Baroda. Besides evolving and comparing the three instructional strategies, the present study has also attempted to identify a suitable strategy for the students of high, average and low level of intelligence, with a view to helping students belonging to each level of intelligence, to attain effective performance.

The two criteria of effectiveness taken into consideration were : (1) potentialities of the instructional strategies to achieve the instructional objectives, and (2) the suitability of an instructional strategy for the learners of <sup>a</sup> particular level of intelligence. The first criterion was selected due to the conviction the investigator had that it was of paramount consideration that an instructional systemist should have at the time of selection

of media and the second criterion was chosen because the investigator felt that it is, the individual differences, in terms of the varying intelligence level, that should be given maximum weightage in deciding the merit of an instructional strategy.

Instructional strategy, in any field of education is identified considering the features of the instructional process, which have been formulated in the light of the objectives set for higher education. Some of the essential functions of the instructional process are : (1) to impart basic knowledge, (2) to develop independent study habits and reading interest, (3) to develop the ability to select and organize relevant material, and (4) to develop the power of thinking. Besides these features of the instructional process, the administrative facilities and the availability of the resources have been another set of consideration to evolve the strategy which would not only be effective but would have enough feasibility of being adopted for the actual instructional work, it is formulated for. It may be, therefore, essential to state the purpose of teaching the content matter used in the study. The main objective of teaching the proximate principles of nutrition, viz. 'proteins', 'carbohydrates' and 'fats' is to enable the students to acquire effectively, the fundamental knowledge concerning the chemistry, functions, food-sources, recommended allowances, deficiency diseases and the efficient

utilization of the nutrients by our biological system. This basic information on the above stated nutrients aids the students to understand the subjects like Meal planning, Applied nutrition, Infant nutrition, Bio-chemistry, etc. in the subsequent years. In brief, the knowledge imparted through the content matter selected for the present study is a compulsory pre-requisite for specializing in "Foods and Nutrition" area; at the faculty of Home-Science of the M.S. University, Baroda.

However, the entire course on "Elementary Foods and Nutrition" is being regularly taught only through the lecture method which includes only verbal presentation of the subject matter. It has been proved through researches that this method fails to achieve the instructional objectives. Besides it also does not suit the student population with individual differences in their learning capacities.

Therefore, with a view to modernizing the teaching style so as to gain maximum achievement of the instructional objectives by the students of varied learning capacities, the present investigation proposed to evolve three instructional strategies, each consisting of several components, which can help not only the effective acquisition of the various instructional objectives but can also take care of the students of varying intelligence learning the subject of nutrition.

Evolution and significance of the instructional strategy and its components are discussed below.

#### EVOLUTION OF THE INSTRUCTIONAL STRATEGY

In an instructional process, both, equipments based on principles of physical sciences and instructional techniques evolved from principles of behavioral science are used. It is evident that when an instructional process is looked into, it becomes evident that it involves the use of several equipments and techniques. For understanding and controlling instructional process, it is just not enough to study the use of equipments and techniques in isolation; they have to be considered in a total system aimed at realisation of instructional objectives. It is, in fact the set of features of instructional process formulated for the particular level of education, that serves as the factor which decides the use of equipments and techniques and the combination in which they would be used in an instructional process. All the features of instructional process cannot be taken care of by presenting the instructional material through only one method of classroom communication. Thus it would be necessary to use more than one technique for justifying all the pre-determined features of instructional process involved in any discipline. It is indeed very true that interest is not only increased but better sustained when students are presented with several effectively combined media, forming an instructional strategy.

## SIGNIFICANCE OF THE INSTRUCTIONAL STRATEGY AND ITS COMPONENTS

Presentation of content matter through a strategy is a key towards effective learning as it maximises the fulfilment of all the functions of an instructional process. Learning through self efforts is an important ingredient which can help to achieve the knowledge and to develop the independent study habits. These two objectives can be achieved better by using (1) programmed learning material, and (2) by presenting the teaching material through a tape-recorder along with the effective visuals and the necessary work-sheets <sup>and</sup> ~~or partly~~ through (3) the structured lectures delivered along with the use of black-board work.

### Programmed Learning:

Programmed learning encourages self study at one's own pace since its design presents a carefully, pre-arranged, logically sequenced set of material with the students' responses being reinforced at each step, as a result of which he can progress towards the desired behavioral capabilities. This feature makes the PLM more suitable for teaching material particularly at the college level, wherein the students are adult, matured learners who have already acquired a level of comprehension in language. This not only provides efficient learning but also makes the learners independent in their thought and actions; and at the same time saves pupil's and teacher's time.

### Structured Lecture with the Black-board:

Lecture as a consistent, day after day procedure, is commonly found as the method of instruction at the college level. If it is well-organized or structured, it can motivate and strengthen learning due to the well sequenced content matter. It provides face to face opportunities for clarification of doubts. It vitalizes ideas which too often appear cold and impersonal when printed in the pages of books. They say "A spoken word is far more effective than the printed one". A well prepared and delivered lecture saves the time of the pupils. A structured lecture would earn more meaning when it is coupled with a constant black-board work; as it is one of the most valuable devices for making the instruction concrete and understandable. When it is used properly it can set standards of accuracy and speed. The written matter, sketches, diagrams etc. presented on the black-board can restore the attention of the class. This can connect the aural and visual sensations which assist effective learning to a great extent. Black-board is indeed a very economical device because it can be erased and used repeatedly. It is important to note here, that if students are efficient at notes-taking, they can then, refer back to the same material to study independently.

### Taped Commentary with Visuals (Charts) and Work-sheets:

Like the two components stated above classroom communi-

a set of questions after listening to the relevant facts, also help to restore the constant attention of the students while learning through the taped material.

Thus PLM, structured lecture with black-board work and the taped commentary with charts and work-sheets were included as the main components in the strategy  $S_1$ , strategy  $S_2$  and strategy  $S_3$  respectively for the present study. These components are referred to as the main components because through these the whole content matter is presented in a thoroughly sequenced form.

However, from the instructional point of view it is better not to make the instructional strategy closed by considering any one teaching technique as the sole one to be followed for the purpose. Instead, strategy should have a provision to encourage and make the students learn through other sources. This would make the instructional strategy more open, which might add to its effectiveness. From these considerations other components like laboratory demonstrations, library references and discussions were also included, as per the need, in different strategies. These components are sorts of diversions which serve as valuable breaks from monotony caused due to learning constantly through one method. It is said that a demon which is always lying in wait is the boredom on the part of the pupil who has to learn through only reading and solving a lengthy programme. Anyone who browses through a wide range of published programmes will be

struck by the high degree of built-in-boredom. One must, therefore, surely strive to produce programmes which hold the interest as much as possible and thus should bring several other techniques to aid efficiency in learning. The old 'adage', "A change is as good as a rest", succinctly expresses a proven scientific fact which the long programmed material or series of lectures or lengthy tapped commentary can easily exploit. A change should be given in the learning process by various means depending on the teaching material.

Teaching through a strategy including various components may allow a necessary repetition, too, in a variety of ways, which is indeed highly beneficial for effective learning.

Considering the above view points the other components like Laboratory demonstrations, Library references, and discussions were included in the instructional strategies under comparison for the present study. The significance of these components is discussed below.

#### **Laboratory Demonstrations:**

Laboratory demonstrations are visualized explanations of important facts, concepts, ideas or processes. They enhance motivation in learning, by providing opportunities of direct participation in doing the activities related to the facts and the principles that are being studied through lectures, reading, tape recorders etc. Students who have



difficulty with verbal comprehension may find laboratory experiences interesting and helpful in clarifying concepts. Laboratory work may also allow the students to have experiences with a concrete task rather than just an abstract idea. Through such activities they may have direct experiences with people, things or processes. Students learn to generalize and apply generalizations in new situations. Moreover laboratory work may provide a student with meaningful group experiences. Students' concepts with of co-workers with different background are broadened as they work side by side. Furthermore, a democratic laboratory situation is conducive to changes in attitudes towards foods, in this case. However activity in the laboratory is not an end in itself, but is an integral part of a total learning experience.

#### **Library References:**

The individual method of teaching where a student can work at his own pace has been emphasized and always appreciated. New educational methods are giving more and more importance to "individual differences" of the learners. The library work becomes very important in such a scheme of education. For the success of new educational methods it is necessary for the learners to know how to consult reference books to sift out the related information. In brief, this activity will fulfil the particular objective of making the pupils

identify, select and then organize the relevant material.

#### Discussion:

As defined by Kochar (1970) "Discussion is an orderly process of collective decision-making which seeks agreement". Discussion, in fact is a social action in its purest form. It initiates ideas, enhances exchange of opinions accompanied by a search for its factual basis. It is generally accepted that the successful methods of education are those in which the learner takes an active part as a member of a group, rather than he looks on. In fact, one of the objectives of education is to develop in pupils the ability to exchange views and agree after weighing the 'pros' and 'cons'. They say two heads are better than one, but when a number of heads combine to solve a problem, wonderful results can be achieved. Thus 'discussion' is accepted by the educationists as a very useful method of teaching mainly because it makes for effective participation of the students in the learning process.

In brief, discussion as an activity provides opportunities for human interactions which is very essential in the development of higher cognitive abilities as it specifically helps students to react to others' views, evaluate different ideas presented and at length develop his own line of thinking. Therefore, it was thought more appropriate to put the students in situations where they would get a chance of interacting with their teachers and student fellows. Pre-

requisite is the basic knowledge in the content matter. This pre-requisite knowledge was given through the main components like PLM, structured lectures with black-board work and the taped commentary with charts respectively in <sup>the</sup> three strategies. After they acquire the basic knowledge then only the discussion could be held.

### THREE INSTRUCTIONAL STRATEGIES

The three instructional strategies thus identified are (i) PLM with laboratory demonstrations and discussion ( $S_1$ ), (ii) structured lecture with black board work, laboratory demonstrations and library references ( $S_2$ ), and (iii) taped commentary with charts and work-sheets, laboratory demonstrations and discussions ( $S_3$ ).

It may be seen that different components are combined to form three instructional strategies. However the component 'laboratory demonstration' is included in all the three strategies; as it was thought essential to aid concept formation related to some facts, through visual explanations. The component "library reference" was included in strategy two, with a view to assist those students who fail to take down through information listening to lectures. The component 'discussion' was omitted from strategy two, as the students were allowed to refer to the teacher during the course of lecture.

To sum up, the investigator had the following rationale for selecting the aforesaid three instructional strategies for comparison.

- (1) Programmed learning material has its merit in that it is auto-instructional, well sequenced and reproducible. The other components coupled with it are laboratory demonstration and discussion which aid in clear concepts formation and developing higher cognitive abilities which provide opportunities for human-interactions which would be, in a way, helpful in clearing the doubts also if the students had any. Hence strategy one ( $S_1$ ) finds its way into the study.
- (2) Like PLM, structured lectures are also well sequenced and reproducible. Besides the teacher is the most commonly used vehicle of the formal communicational situations in India. The other components included in the strategy are library reference work and laboratory demonstration, which assist in collecting the missed out instructional material through the independent efforts, and forming the clear concepts through visual explanations, respectively. Hence the choice of strategy two ( $S_2$ ) can be justified.
- (3) Taped commentary with charts provide a wide variety of stimuli in a structured form. Th<sup>o</sup><sub>A</sub>rough concentration of the students is achieved while listening to the commentary,

by making them solve the questions related to the facts heard. Storage and retrieval of this instructional medium is no ordeal. The hardware materials used are available and can be made available quite easily to any college in India. Software materials are also such, which can be made very easily, as per the need. The other components used are the laboratory demonstration and discussion which play the same role as explained in strategy one ( $S_1$ ). Thus the strategy three ( $S_3$ ) too, finds its way into the study.

It was seen that all the three strategies used in the problem of the present investigation were very much less expensive and were suited to the Indian conditions. Clearly stated the problem of the present investigation reads as under:-

#### THE PROBLEM

A COMPARATIVE STUDY OF DIFFERENT STRATEGIES TO TEACH NUTRITION TO THE HOME SCIENCE COLLEGE STUDENTS OF VARYING INTELLIGENCE.

#### TERMS DEFINED

The terms used in the statement of the problem may be defined as under:-

##### (i) Strategies:

Strategies, in this study, particularly refer to three

instructional strategies, each consisting of well sequenced teaching techniques which aid in the systematic order of content presentation motivating the students to attain the pre-set instructional objectives.

(ii) Nutrition:

For the present investigation "Nutrition" includes the following:-

- (a) Teaching the content matter on the nutrient 'proteins' - which forms Unit No.1 ( $U_1$ ).
- (b) Teaching the content matter on the nutrient 'Carbohydrates' - which forms Unit No.2 ( $U_2$ ).
- (c) Teaching the content matter on the nutrient 'Fat' - which forms the Unit No.3 ( $U_3$ ).

As discussed before these three nutrients form the part of the course on 'Elementary Foods and Nutrition' taught in the II year at the Home-Science College of the M.S. University of Baroda.

(iii) Varying Intelligence:

The term "Varying intelligence" refers to the three different levels of intelligence viz. (i) high level, (ii) average level, and (iii) low level of intelligence to which the students, forming the sample of the study, belonged. These three levels of intelligence were assigned to different students after judging their results on a non-verbal intelligence test of Raven's

Progressive Matrices; which was administered just before commencing the experiment.

#### THE PURPOSE OF THE STUDY

The main purpose of this study is to develop and compare the three instructional strategies to identify a suitable instructional strategy to teach the undergraduate students of Home-Science College; the content matter on three nutrients viz. 1) proteins, 2) carbohydrates, and 3) fats so as to enable them to achieve maximum instructional objectives. For the years together, the subject of "Elementary Foods and Nutrition" of which the above nutrients form the part, is being communicated through the lecture method which includes only the verbal presentation of the subject matter. As has been proved by the several researches this method is not a healthy one for it not only fails to maximise learning but also does not take care of the student population with individual differences, in their learning capacities.

As the past and the recent researches in the field of education reflect, most of the investigators have tried to compare any two methods of teaching, each having a single component at a time. The present trend is to develop programmed learning materials on different subjects to make the process of learning auto-instructional. Several studies have been also undertaken to compare PLM with the traditional method of teaching, to establish the effectiveness of PLM. But this alone is not enough to make the process of learning

effective. The need of the day is to develop strategies formed of different components which can take care of different aspects of the process of learning and thereby help to achieve desired quality in education. It is important to understand that the process of developing a strategy having different components is based on several criteria viz. instructional objectives, characteristics of the learners, subject matter, resources available, attributes of the media, cost and time involved etc. It is essential to study the inter-relationship of these factors and determine their relationship with the variables so that the process of selection of a strategy would not remain subjective. This calls for the researches to empirically establish the relative effectiveness of one strategy over the other alternative strategies in a given context. Researches of this kind have not hitherto been undertaken in India, except for the comparative studies between programmed learning materials and traditional teaching as stated before. The findings of the strategy characteristics researches, often undertaken elsewhere have a handicap in that, they can hardly be applied to Indian conditions since the very nature of the Indian Society is uncomparably different from those of others; and India's problems and priorities are hence of a different dimension. This highlights the necessity of undertaking such researches in Indian conditions. This does not explain that the



can, 1) plan nutritive cheap low-cost meals for the family, for the individuals of different age and income groups, 2) plan some of the therapeutic diets for treating some of the nutritional deficiency diseases, 3) know the better ways of preparation and cooking of foods so as to conserve the maximum nutrients, 4) foster desirable attitudes and habits towards foods, and 5) avoid food fads.

Such knowledge will on one hand prevent disappointment and wasteful expenditure and on the other hand will minimize exploitation of gullibility of common man by unscrupulous manufacturers and traders. Thus to teach the subject of nutrition effectively so as to assure optimum gain of knowledge by the students when taught through an efficient instructional strategy the investigation was undertaken to fulfill the following objectives.

#### OBJECTIVES

The investigator maintained the following objectives for the study.

1. To prepare (a) programmed learning material with the answer sheets, (b) structured lectures, and (c) the tapped teaching material with charts, and work-sheets containing sets of questions - all in English language on three units viz. 1) proteins, 2) carbohydrates, and 3) fats; for the students of II year of Home-Science College of the M.S. University, Baroda.

2. To find out the relative effectiveness of the three instructional strategies viz. Strategy  $S_1$ , Strategy  $S_2$  and Strategy  $S_3$ , in terms of the achievement of the instructional objectives in case of all the students together.
3. To find the differences in the effective use of the three instructional strategies viz. Strategy  $S_1$ , Strategy  $S_2$  and Strategy  $S_3$  as judged in terms of the achievement of the instructional objectives, by the students of any of the three levels of intelligence separately i.e. high level, average level and low level of intelligence.

#### SCOPE AND LIMITATIONS

The present study aims to develop; and compare the relative effectiveness of the three instructional strategies in terms of achievement of the instructional objectives with a major emphasis on teaching only a part of the course on 'Elementary Foods and Nutrition', covering the content matter on three nutrients namely 'proteins', 'carbohydrates' and 'fats'. As such there are no attempts made to teach the whole course on 'Elementary Foods and Nutrition' through any instructional strategy at college level. The scope of the investigation is limited in the sense that the syllabus in the same course is taken as the basis for providing the selected content matter for the study. However a very few absolutely necessary modifications and alterations have been done.

The investigator herself who has been teaching the same course over a decade was alone in charge of evolving the three instructional strategies as well as carrying out the entire experiment for the investigation. However consultations were done with experts to ascertain the reliability of the hardware as well as the software materials, used in the experimentation process.

Students' achievement in terms of instructional objectives have been measured immediately after the completion<sup>of</sup> the instructional process.

Students were divided into three random groups each having an equal strength, to perform the experiment. However, in order to determine the suitability of an instructional strategy for the students belonging to particular level of intelligence; the students were again batched into three groups, according to intelligence level, for the sake of statistical analysis only. A non-verbal intelligence test on Ravan's Progressive Matrices was used to judge the intelligence level of the students.

Besides, the Latin Square Design assumes that there is no interaction between the medium variable and the teaching unit variable. But, there might have been some interaction, which has escaped undetected. Since the objective was to compare the effectiveness of the strategies there was an assumption that the other variables, viz. group and teaching unit are no source of variance. Moreover there might very

well have been several discrepancies in the selection of the content matter, the presentation of the instructional materials etc. If more sophisticated techniques were handy, the materials developed could have been given more presentability.

The time period was only 6 hours in each instructional presentation. That is a learner was exposed to an instructional strategy only for 6 hours. Therefore, the novelty aspect can surely be expected to play in the performance of the students in the criterion tests.

Another limitation of the study was that the sample of the students was much deviant from the norms of the average Indian student. They were typically urban, hailing from middle or upper class families. This limits the extent of generalisability to a good extent.

The aforesaid limitations might have come in the way of achieving valid conclusions pertaining to the objectives set for the investigation.

However it would not be wrong to state here that the present study was an attempt to try and experiment with an approach which claims to be scientific and systematic, and which has so far not been used in India especially for teaching the subject of Foods and Nutrition at college level. If the results are rewarding and encouraging, the same experiment may be extended to many other English medium colleges outside Gujarat and at a later stage to a still

larger sample at the national level with necessary improvements and modifications.

The present Chapter has only discussed, the significance of different components which have the potential for fulfilling the instructional objectives. But this is not enough for teaching a well-organized course. For the effective teaching-learning process, it would be indispensable that specific role of each component or teaching technique is worked out in details; and that suitable learning experiences to be provided through each component are chalked out in advance. In order to make an instructional strategy effective, specific and reproducible, it is, in fact, necessary that structuring and the development of the instructional material for each component is done. Besides, it also demands sequencing and scheduling of the utilization of the teaching material. All these aspects which cover the process of development of an effective instructional strategy, are discussed in the next Chapter.

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