

CHAPTER II

REVIEW OF THE PAST RESEARCHES AND RELATED STUDIES IN THE FIELD

Reviewing the researches and studies in the field of education in India and elsewhere, it seems quite clear that the use of educational technology is gathering momentum and the various teaching techniques at almost all the levels of education are undergoing a radical change in the past few years. Obviously higher or university education too, is trying to make a headway towards a variety of methods and materials for teaching different subjects. Studies do reveal attempts at employing single components or a set of components depending on the nature of the subject or course to be taught and also depending on the needs of the learners. There appears to be a greater awareness for attaining the instructional objectives in almost all disciplines and it has been now accepted that one single component like lecture or demonstration or assignment does not serve the purpose of achieving the objectives formulated in advance.

Educational practioners, therefore, have turned their faces towards teaching technology where researches show encouraging findings. Developing a teaching strategy is one such finding which when used for different age groups,

subjects and situations, ensures better learning with greater interaction on one hand and the attainment of instructional objectives almost in toto. Probing deep into such attempts in higher education, the impression one carries is that the researchers have, most of the time, tried to compare the different kinds of teaching techniques to establish the effectiveness of one over the other in the given context. Very few studies on instructional strategy development have been undertaken. However at CASE few such studies are underway where instructional strategies are being developed for teaching different subjects at different levels of education, the details of the same are given on the page 9. Such attempts however seem to be inadequate in disciplines other than education.

Most of the studies in the field of nutrition have attempted to reveal the importance of different teaching methods to increase the knowledge of nutrition; that too, at school or community level only. It was difficult to trace a single study which has attempted to develop and compare the different teaching strategies, which could be useful for teaching at the college level. Hence the need to go for the present study.

Glancing through the related literature and researches both in the western countries and in India the following few studies have been mentioned herebelow.

WESTERN COUNTRIES

Studies in Education

Studies on the comparison of teaching methods; including all the varieties of techniques used for teaching:

A number of studies have been undertaken in the United States to compare the effectiveness of one technique of teaching with that of another. But majority of these as Stickell (1963) remarked are done without having carefully defined as to what is being exactly compared. As Levie and Dikie (1973) mention it, what is really necessary is the comparison of the properties of stimulus materials which manifest in the physical parameters of the media. What exactly they lay an emphasis upon is the matching media attributes to task-learner situation characteristics. Most of the researches carried out in early fifties, sixties and seventies concentrate mostly upon the comparison between pictorial stimuli and verbal stimuli, visual stimuli and auditory stimuli etc.

Haugh (1952) researched that reading is superior to listening with regard to the 11th class students when tested for immediate recall. James (1962), Cody (1962) and Thalberg (1964) arrived at the same results with regard to the College Students. Gulo and Baron (1965) found print superior to lecture, T.V. lecture and radio on multiple choice retention test. These results reveal very clearly the superiority of reading over listening. Shultz (1969)

concluded that there is no significant difference between reading and listening in verbal learning. Shultz and Kasschan (1966) researched that visual stimuli is superior to auditory stimuli for words of low meaningfulness while auditory stimuli for words of high meaningfulness. Shultz and Hopkins (1968) arrived at the same results in verbal discrimination task. Cooper and Gaeth (1967) found that for high grade level students, auditory stimuli was superior to visual stimuli, but for low grade level students visual stimuli was superior to auditory stimuli in learning meaningful words. It is obvious that these studies do not equally favour either auditory or visual stimuli.

Studies showing comparison between
pictorial stimuli and verbal stimuli:

Rowher, Lunch, Levin and Suzuki (1967) and Jenkins (1968), found pictures superior to words as stimulus items in paired associate learning. Jenkins, Neale and Deno (1967) and Haber (1970) found greater recognition for pictures than corresponding nouns. These findings suggest that pictures provide more cues for recall and recognition. Allen (1967) found that pictorial illustrations increased learning from printed programmed sequences only when subject matter content consisted of material having concrete references. Contrary to this study, Baker and Popham (1965) found that adding pictorial beauty to verbal material did not increase learning, but resulted in high ratings for interest and enjoyment.

Gropper (1966) concluded that a visual plus verbal order of presentation is appropriate for concept learning tasks and that the addition of words to picture facilitates the formation of longer verbal chains and the use of more sophisticated technical language. Gridge (1978) studied the effect of three levels of realism of visual representation in an instructional programme on three types of learning with seventh grade students and found that all three forms of illustrations, outline, shaded and photographic similarly produced greater achievement than no illustrations. This finding held true for short as well as long term retention results in the aggregate total achievements. Chute (1978) through an experimental study investing the comparative effectiveness of colour and monochrome version of an instructional film presentation on incidental and task relevant discrimination learning, concluded that children who viewed the colour film scored significantly higher for incident items, on the immediate test as well as delayed test, and that both the treatment groups expressed a significantly higher preference for colour versions of the films.

Studies showing comparison between
audio plus visual; and audio or
visual alone:

Van Mondfans and Travers (1965) found no additional advantage for audio plus visual presentation when simple pictorial stimuli were presented on visual and their names

on audio. However they found simultaneous representation of audio and visual stimuli better than their sequential presentation. Severin (1967) researched that a word as the audio and a related picture as the visual was superior to either alone; but a combination of an unrelated word and picture was inferior to either alone. Ingersoll (1970) classified people as visual attenders and aural attenders which emphasizes individual differences influencing the media effectiveness. Thomas (1977) carried out a study to investigate into a specific question - Does varying the inclusion of pictorial illustration with written text, influence the reading comprehension of the fourth grade science students? His findings were, picture neither facilitated nor hindered the reading comprehension of students; and no interactive effect was found between picture/non-picture treatment and achievement level. Dahlberg (1977) designed a study to investigate the relationship between the presentation of audio and visual cues within the instructional television programme; and viewers' recognition of these cues; the findings of which indicate that audio and audio-visual cues were equally effective in communicating information. The visual cues tested in this study communicated less effectively. Powers (1978) conducted a study to determine whether there would be any differences in the scores, on the tests on selected short stories among three groups of eleventh grade students who (1) read the

stories, (2) viewed film versions of the stories, and (3) listened to record readings of them. Conclusions that have been reached from the results of the study are: 1) Students reading of printed short stories is generally superior to other methods; 2) Students are weak in listening skills; 3) Film versions of the short stories are relatively effective than the recorded readings of the short stories; 4) Film versions and recordings are useful supplements to printed short stories; 5) Students who read the stories significantly scored the highest. But there were no statistically significant differences between the scores of listeners and viewers.

Studies in Nutrition

Osuchukwn (1978) undertook an investigation to determine the dietary practices of the participants of the weld country food stamp programme with implication for nutrition education; with an objective of providing insight into the nutritional significance of the food stamp programme. A survey design utilized personal interviews of the participants.

The findings revealed that the mothers do need the knowledge of foods and nutrition to select nutritious foods for their families. It was also concluded that almost 72% of the participants ate less than one third of the recommended daily servings of foods rich in Calcium; 70% of the recipients obtained less than one third recommended daily allowances for iron and 65% for Vit. A.

Wood (1978) attempted to explore the effect of nutrition education on milk-waste in grades two and three. He concluded that the special nutrition education programme is very necessary and also effective in reducing milk waste among the Mexicans.

Beatrice (1978) planned a research with an aim to identify food and nutrition competencies needed by older adolescents by the time of completion of high school for satisfactory personal and family living. The specific objectives were to: 1) identify basic food and nutrition competencies to be acquired by older adolescents by the time of completion of high school; 2) identify basic competencies acquired by youth who have graduated from high school and are attending college or not pursuing any further studies; 3) compare differences in food and nutrition knowledge acquired by youth who studied food and nutrition in high school and those who did not, and differences in food and nutrition knowledge acquired by male and female respondents; 4) identify food practices of and opinions about foods held by youth who have graduated from high school; and 5) make recommendations for curriculum planning.

Only 13 of the 29 competencies evaluated by knowledge test were found to have been acquired by all or some of the adolescents. Female scored significantly higher on the knowledge test than males. Favourite snacks of the respondents were soft drinks and fruits, and 97% ate snacks everyday,

but 45% did not consider snacks as contributing substantially to the total diet. Reasons for skipping meals were either lack of time or a desire to control weight.

Recommendations included using the competencies identified in the study to revise and/or up-date existing high school "Food and Nutrition" programmes, and as a basis for Home-Economics teacher education at the under-graduate levels.

Studies showing comparison between programmed learning and traditional teaching:

Another kind of studies which may be considered as researches in teaching, is the comparison studies of programmed learning with what is usually referred to as "conventional" or "traditional" method of teaching. These can be taken as the comparison of verbal visual (written or printed) presentation allowing self-paced students' participation and immediate feedback as may be the case with the programmed learning and verbal presentation of the communicator or practising teacher directly involved; as in the conventional method. Hartley (1972) reviewing 110 such studies conducted in countries outside India; reported that in 41 studies programmed instruction group was significantly superior to the other in terms of test results, 15 studies found traditional teaching superior to programmed instruction and the remaining 54 studies' results did not indicate any

significant difference between the two methods. He has further pointed out that any individual study is limited in its implications, and that the overall picture shows a sorry state in terms of scientific rigour.

Tooperzer (1977) developed a self instructional programmed text on health planning and used the same in an investigation to study its effectiveness. The programmed text was administered to the learners in the experimental group. Control group was established to monitor any change in health planning knowledge that might be due to out-side influences. The review of the findings indicated that the self instructional text was very successful in increasing the levels of knowledge for the experimental group while for the control group, the health planning knowledge remained basically the same.

Another study undertaken by Gauntlett and Beare (1978) to investigate into the relationship between teaching and attainment of knowledge and skill performance by Nurse AIDES in rural area proved that overall the programmed instruction tool was more effective in teaching skill and learning of cognitive knowledge compared to the teacher taught method.

INDIA

Studies in Education

Indian investigators too conducted a large number of studies comparing programmed instruction and "conventional"

On-Going Doctoral Studies at CASE ~ Baroda.

Sr. No.	Title	Components of Strategy to Teach different Units	Subject	Level School/Collegiate
1.	Evolving a Multi-Media Approach for Teaching Biology at the Secondary School Level.	Team teaching, Field trip, Deviated PLM + Lab. experiments, Deviated PLM + Discussion, Deviated PLM + Group activities, Demonstrations + Discussion, Quiz, Taped Commentary and Overhead projector.	Biology	School ~ Std. VIII
2.	Development of Modules for Maximising Attainment of Instructional Objectives in Physics ~ Standard VIII.	Same as above ~ but with simple PLM.	Physics	School ~ Std. VIII
3.	Evolving a Multi-Media Approach to Teaching at Post-Graduate Level.	PLM, Discussion, Lecture and Library reference work.	Education-Technology	College ~ M.Ed.
4.	Developing a Teaching Strategy and Studying its Effect on Classroom.	PLM + Library work, discussion and Practical Work.	Education Evaluation	SNDT College ~ B.Ed.
5.	A Study of the Effect of Simulation on Performance of Teacher Trainees in Educational Technology.	Lecture, PLM, Library work, and Simulation	Education Psychology	College ~ B.Ed.

or "traditional" method of instruction. In fact, Kulkarni and Kapadia (1974) reviewing the research work done in the country at doctoral and institutional level concluded that the majority of the studies were comparison studies.

Shah (1968) conducted the first systematic approach in the field of programmed learning in India. She developed a programme in Mathematics on "Solving Equations" for the class VI students and conducted an experiment using it; in an English medium school in Delhi. Two experimental groups were set up along with a control group. Students in one of the experimental group learnt independently through programmed material, while the other group was assisted by the teacher while reading the programme. It was revealed through the results that the group taught by programme alone did significantly better than the conventional lecture group on the post test. However no significant difference was found between the mean post test scores of the two experimental groups.

Sharma (1968) prepared a programme on "Earth's rotation and revolution" and administered it to the students of class VIII for the experiment. Mean achievement score of the experimental group which was taught through programmed instruction was found to be significantly higher than that of the control group which was taught by the teacher through the lecture method.

Mullick (1968) conducted an experiment on 128 B.Ed. students taking the correspondence course of Delhi University. The experimental group was given a programmed lesson on "Rank Correlation"; the control group were taught lessons on the same topic prepared on conventional lines. Based on the post test performance, it was concluded that the programmed lesson was better than the conventional lesson.

Shah (1969) developed the programmed learning material covering the whole syllabus in Algebra of standard VIII and used the same in her experiment. For the purpose of experimentation two comparable groups were set up in four schools of Ahmedabad. It was found that the total mean score of the experimental group was higher than that of the control group indicating the superiority of programmed instruction over the conventional method of teaching.

Om Prakash Mathur (1970) developed a programme in civics on "The Organs of UNO"; for the students of standard X; and used the same to conduct an experiment to study the effectiveness of programmed instruction. Two groups, each of thirty students from two different schools were selected as the sample of the investigation. The reliability of difference between mean scores of the experimental and control groups at the pre-test and the post-test stages was used to analyse the data. The findings revealed that the auto-instructional programme was as useful as the traditional method of teaching in the class in respect of achievement in civics.

Mehta (1973) conducted an investigation involving 252 pupils of grade V belonging to six schools in the city of Baroda. The experimental group was administered the programmed reading material prepared by the investigator whereas the control group was taught through the conventional teaching method. Results showed that students in the experimental group were significantly better than their counterparts in the control group, in terms of their counterparts in the control group.

Govinda (1975) developed a programmed text for the course "Educational testing and techniques of evaluation" for the B.Ed. students and studied its effectiveness in terms of the performance of the students on criterion test. The sample was divided into two matched groups viz. the experimental group and a control group. The results of the study indicated that the programmed text as a whole is as effective as the lecture method adopted in the control group in terms of learning effect.

Unlike comparison studies, the present and the most recent trend in educational researches is to form an instructional strategy including various components and to establish its effectiveness. Studies of this kind have an aim of strengthening the learning process through an effective teaching style.

One such investigation was undertaken by Sansanwal (1977) who developed the instructional material for each of

the components viz. programmed learning material (PLM), library work, discussion and seminar to form an instructional strategy to teach the course on 'Research Methodology' for the M.Ed. students; and studied its effectiveness. The results revealed that the developed instructional strategy was found to be effective to the extent that 70.00 per cent of students got above 70.00 of marks on all the criterion tests.

In the studies reported above all most all the researchers have concluded that programmed learning method is more effective than the 'conventional' method which has also been referred to as 'traditional' or 'lecture' method. However it is doubtful whether such a conclusion would stand good on a close scrutiny of the details of these experiments. First of all, these studies comparing programmed learning and the "traditional" teaching suffer from lack of generalisability because the terms "traditional" or "conventional" teaching; or "lecture" method are very loosely defined. Lumsdaine (1963) has rightly pointed out that the "conventional" method has usually meant some unspecified combination of presentation by some instructor plus perhaps some unspecified use of some text or other study material. Since the very method to be compared is non-specific and non-analytically defined, it does not permit for any sensible meaningful conclusion to be drawn about the comparative effectiveness of another method.

Most of the comparison studies have the purpose of wider generalization rather than the limited purpose of evaluating one particular strategy. Yet these researches are taking into consideration, gross instructional situations and hence their results are often applicable to actual class-room conditions. Therefore it is highly essential to strike a balance between a category of studies as the media attribute comparisons which are basic researches and the other extreme where a researcher tends to rely upon very vague definitions. This emphasizes the necessity of such researches which compare effectiveness of well-defined and thoroughly analysed strategies for dealing with well defined instructional contexts.

Studies of comparison can be carried out with two meaningful scientific purposes. First purpose is to make an overall assessment of the strategy to determine how much does it teach and then to decide whether enough has been learnt through its use declaring its suitability for instructional purposes when compared to learning effected by other instructional strategy being compared. Thus, a comparative evaluation experiment aids in establishing the validity of an instructional strategy. However in such comparisons, in order to draw meaningful conclusions about the effectiveness of a strategy, the alternative strategies which are being compared, must be analytically defined in details in terms of the core software material and the

components involved in the presentation process. Besides there should be no discrepancy as regards the content input in the different strategies under comparison; as far as possible even the sequence of presentation of different content points also should be the same; as the order of learning of different sub-headlines may affect overall learning. Moreover, actual instructional time under the strategies should be equated. A second purpose of a comparative evaluation study is diagnostic. For this purpose, learning effects are to be measured and compared. Such a measurement would guide a researcher in sorting out the best strategy out of the ones used in the experiment for comparison.

Studies in nutrition:

"The process of teaching-learning of any subject, consists of several components e.g. adequate and appropriate syllabi, good text books, possession of sound knowledge by the teacher and a positive impact on children. These components are inter-dependent and for a successful programme of nutrition education, each component should be as perfect as possible"; mention Champakam, Madhavan and Balsubramanian (1966); who together undertook a study with an aim (i) to evaluate the knowledge of the teachers, (ii) to motive the use of devices used by the teachers to make the children learn, and (iii) to measure the impact of teaching on children.

The study covered 47 teachers and 1302 children in 55 classes in 22 schools of Hyderabad.

A questionnaire, developed after adequate pre-testing was administered to the teachers to test their knowledge in nutrition. The performance of the teachers in the class-room was assessed by careful observation on the spot. The impact of teaching on the children's gain in knowledge and change in attitudes was measured through objective types of tests administered before and after teaching. The time actually allotted for teaching nutrition and the time utilized by the teachers were also compared.

The nutritional knowledge of the teachers was found to be inadequate. Eight out of nine teachers in the English medium schools communicated even wrong information while teaching. For example, no attempt was made by the teacher to correct wrong statements such as:

"There are seven basic cereals which are important for health"; and "Root vegetables like potatoes and tapioca are rich in proteins", contained in the text books used in these schools. Only one teacher among those observed was an exception to this and she took special efforts to teach correct facts to the children.

It is an accepted fact that children learn and remember easily what they see and do than what they hear and read. It is therefore the task of the instructor to provide the conditions in which learning can occur best. But through

this study, it was interesting to find that in none of the Telugu medium aided schools any aid was used. Probably lack of training of teachers may be a factor that may explain the absence of aids. About 48% of the classes in government schools and only 30% in English medium schools were taught with aids. The position could be similar in many schools. It is therefore that the government has also launched a programme to train the teachers teaching the subject of nutrition, in Nutrition and Health Education.

The study reported that although 3 to 4 weeks were available per year for teaching nutrition, the time actually utilized was far below this. Besides this, some noticeable impact of the teaching on the knowledge of children in classes IV and V was seen. The performance of children in class VI was found to be very poor.

In the study, just quoted, on the teaching of nutrition in elementary schools in Hyderabad, it was pointed out that the knowledge of the average elementary school teacher in nutrition was far from satisfactory. In another study by Champakam and Balsubramanian (1967) an attempt was made to assess whether (i) proper training of teachers with regard to the content and methodology of nutrition education will make a better impact on the knowledge of the prospective teachers than is the case at present; and (ii) the better knowledge thus gained is utilized by the teachers in improving the nutritional standard of their own diets.

Out of the five schools in Hyderabad which train teachers for elementary schools; three residential schools were randomly selected for conducting the study. Two of them served as experimental schools and the third as a control. The experimental and the control schools had 129 and 72 women teacher-trainees respectively.

A nutrition education programme was arranged in the experimental schools. The programme included: (i) Preparation and supply of teaching materials such as lesson plans and necessary aids to the teachers; (ii) Orientation of the teachers in the topics using the teaching materials supplied; (iii) Diet surveys in the hostels attached to the training schools; and (iv) Informal discussions with the warden and the student leaders in the hostel.

Two questionnaires were administered in experimental as well as the control schools; one to judge the knowledge of the trainees in nutrition and the other to collect the information about (i) the routine of the hostel regarding marketing, cooking and serving of food; (ii) the pattern of the diet supplied in the hostel to the trainees, and (iii) the attitude of the trainees towards the hostel diet.

Eight lessons were planned covering the subject matter of nutrition contained in the syllabus. Each lesson was preceded by a short introduction, followed by questions and discussion. Appropriate visual aids like food charts and flash cards etc. were supplied in advance to the teachers

in the experimental schools. The contents and the methods of teaching were also discussed with the teachers.

No teaching materials were supplied nor guidance for teaching given to the teacher in the control school. The teachers were allowed to teach all the topics in nutrition as per the syllabi and according to their usual procedure.

The impact of teaching was measured by administering a test and scores were compared with those obtained before teaching. It was revealed that the gain in nutritional knowledge was highly significant after the administration of the nutritional programme in the experimental schools but no change was observed in a control school where no special nutrition programme was attempted. Besides, a considerable change in the quality of the diet in the experimental schools was also noticed as a result of the nutrition programme.

Devdas, Chandrasekhar and Bhooma (1973) attempted to investigate into the scope for nutrition-education in the elementary school programme. 215 children studying in Sri Avinashlingam Trust Basic School formed the subjects for this study. A theme "importance of Vit. A in human nutrition" was selected and taught through different methods namely skit, song, story telling with flash cards, demonstration and lecture to five different groups of 25 children each. Tests were then conducted to compare the effectiveness of the different methods of instruction.

It was concluded from the study that, (i) nutritional knowledge imparted through the integrated curriculum was retained by the children in all the classes to a highly significant level, (ii) the lesson taught through demonstration gave a retention which was significant at five per cent level, (iii) teaching through songs was found to be the best method. Flash cards, dramatization, result demonstration and lecture ranked next in the order mentioned, and (iv) after nutrition education the consumption of protein rich foods, green leafy and other vegetables and fruits increased in the meal plan of the families. The nutritional knowledge of the mothers had also improved after nutrition-education.

Thus the study proved that the nutrition education imparted to children through the school curriculum as well as by other methods had a significantly beneficial impact on the nutritional knowledge of the children and the nutritional practices of their families.

Generally the studies in nutrition education aim at exploring the possibilities in enhancing the knowledge of nutrition amongst students, teachers or people in the community but the study undertaken by Devdas, Jamala, Chandrasekhar and Murthy (1974) attempted to find out if an indigenous cheap infant food could be popularized in the rural communities through imparting nutrition education to the mothers.

The aim of the study was to formulate low cost infant weaning foods based on locally available indigenous foods and to popularize an acceptable recipe among the rural communities through imparting nutrition-education to the mothers regarding weaning food.

Six ready to consume mixtures suitable for infants have been developed, standardized and evaluated for protein quality. Among the six ready to consume mixtures, the maize green-gram mixture supplying 305 calories and 11.46 gms. of protein for 80 gms. of food mixture was supplemented to 100 rural children, for a period of 12 months.

The effect of supplementation was assessed in terms of the increments in heights, weights, haemoglobin levels and clinical picture of the children. The results showed significant improvements in the nutritional status of the experimental group over control group.

Devdas, Chandrasekhar and Vasanthamani (1975) planned a study to investigate into the effect of integrating nutrition education to the primary school curriculum.

Hundred pupils from each of the third, fourth and fifth classes of the five different schools of Coimbatore city were selected to form the sample of the study.

A questionnaire was administered to and a test conducted for all the children to assess their initial nutritional knowledge.

On the basis of the initial knowledge of the children appropriate nutritional concepts were selected for each class. Lesson plans were then developed for subjects such as English, Tamil, Science, Geography, History, Mathematics and Arts and Crafts, incorporating the nutrition concepts, to the extent feasible. Aids such as charts, posters and flash cards were also prepared.

Tests were conducted at the end of each lesson, to evaluate the impact of the integrated nutrition education in the primary school curriculum.

The results of the study revealed that there was a significant increase in the nutritional knowledge of the children who participated in the nutrition education programme as compared to that of the children in the control group. This led to a conclusion that nutrition education imparted through the school curriculum had a significant influence on the nutritional knowledge of children.

The study has also brought out the need for intensive orientation of the primary school teachers in the elementary principles of foods and nutrition. Foods and nutrition and the basic principles involved in teaching nutrition in the primary school curriculum should form an integrated part of the teacher training curriculum, if effective learning in the nutrition is to take place in the primary school.

Apart from the experimental studies and researches carried out in the field of education as well as nutrition,

sincere attempts have been made to produce easy learning materials on nutrition, in the form of books, guides etc. for the children as well as the practising teachers of primary level. This was because it was decided to introduce population education in schools on the recommendations of the National Seminar on Population Education held in August 1969. So far several steps have been initiated by NCERT to integrate the subject of population education with the existing school curricula at various levels.

Nutrition has been the major area which has been identified and forms an important and integral component of population education. In order to impart knowledge in this area to the school children, teachers need resource books, guide books, supplementary reading materials, teaching aids etc. Keeping in view the above considerations, an attempt has been made to prepare suitable source books on nutrition.

The following are some of the books, guides and manuals describing either the important basic principles of foods and nutrition or those of health, or touching both, the aspects of nutrition as well as those of health.

- (i) Food Primer - for nursery children.
- (ii) Guide Book for Nutrition and Health Education
for primary school teachers.
- (iii) Nutrition and Health Education Manual for
Primary Teachers.

- (iv) Supplementary Reader on Nutrition Health Education and Environmental Sanitation - For Class IV.
- (v) Supplementary Reader on Nutrition Health Education and Environmental Sanitation - For Class V.
- (vi) Science Supplement (Teachers' Guide) For Standard I, II, III, IV and V (Available Separately Standard-wise).
- (vii) Science Supplement (Text book for Students - For Standard III, IV and V) (Available Separately Standardwise).

The first five publications are by Dr. Rajammal P. Devdas, the Principal of the Avinashlingam College, Coimbatore, and the following ones are published by the Foods and Nutrition Department, Faculty of Home-Science, Baroda. These publications were financially aided by NCERT and UNICEF.

Reviewing the researches in the field of education as well as the same in the field of nutrition, stated above it can be concluded that so far the investigators have attempted to establish the effectiveness of one single method over the other. In fact, the consensus of studies made since 20 years, is that no one mechanical teaching device, or a teaching method, in and of itself, is better than another. Teaching only by lecture, recitation, discussion

tutorial, reading-study, correspondence or laboratory demonstration alone has not been proved to be intrinsically better than the other technique at a time. The effect of research on effectiveness of teaching should be shifted from the "tactics" of teaching to the "logistics" of learning to methods which in contradistinction to the pedagogical, may be described as the methods of scholarship, of inquiry of problem-solving or of critical thinking. Thus the need of the day is to formulate suiting instructional systems incorporating new methods of teaching which would enhance improvement in the process of learning in the foreseeable future.

It is an accepted fact that teaching and learning go hand in hand. Any dichotomy between teaching and learning would create an unbridgeable gap which leads us to say that we can do nothing about the one until we know more about the other. However the dichotomy completely disappears when one speaks of a teaching-learning system. For one can then begin to study systematically the nature of the system, what actually happens in that process, and consider what occurs, when one manipulates different variables that affect it.

However, glancing through the relevant researches, in the field of education, as well as in the field of nutrition, the investigator could also gather that tremendous efforts are being exercised to bring about positive changes to achieve quality in classroom communication at school level but it is hard to trace any research being undertaken to

evolve and test suitable instructional methods for teaching the subject of nutrition at college level. As reported in the study by Beatrice (1978) just a year ago, that there is a need to revise and/or update the existing high school Food and Nutrition programme, as what has been taught in the high-school is not remembered and applied well by the students who just have finished the school studies. It would be not wrong to state that the situation is the same in India too, even after the students have graduated from the Home-Science Colleges.

Any way, keeping in view the three main aspects discussed in the Chapter I, viz. 1) the great importance which can be attached to the subject of nutrition which concerns the very survival of the human race, 2) the persisting class-room defects that come in the way of effective teaching, and 3) 'Nutrition' being the branch of science included in the discipline of higher education; the investigator strongly believes that scientific methods must be employed to teach this subject. The investigator, as an experienced teacher, thinks it important, on ^{the} part of a teacher, to realize that she has to serve the student population with individual differences in the class-room, which makes one single method of teaching meaningless for the thorough communication of the instruction, as it fails, to assist the acquisition of maximum number of pre-set instructional objectives, by the maximum number of students.

It was with this view that the investigator has evolved, compared and also attempted to identify suitable instructional strategies, to teach the subject of nutrition to the Home-Science College Students of varying intelligence. All the details regarding the present investigation are given in the pages that follow.

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