CHAPTER III

PROCEDURE

3.1 Introduction

The present investigation was undertaken to establish the suitability of PLM in promoting home science education for adolescent girls. It was an experimental design using three methods of study. In two of the three experimental conditions programmed learning material (PLM) was used. Under the first condition it was used for self - study that is for auto - instructional purpose whereas under the second condition it was used as an aid to conventional method of teaching that is as an aided method of study. In the third condition the students were treated with the conventional method of teaching namely the lecturer-cum-discussion method.

The investigator participated in all the three experimental conditions. Under the first condition the investigator distributed the PLM but did not give any formal instruction concerning the topic to be mastered through its use. In the second experimental condition the investigator utilized first twenty minutes of every class period in delivering lecture on one of the four sub-topics,

then the students were given the PLM covering that sub-topic taught during the twenty minutes lecture. Under the third condition the investigator taught the students with the conventional methods of teaching namely the lecture-cum-discussion method.

3.2 Population

The present experiment was conducted on all the five divisions of ninth grade (Gujarati Section) at the Maharani High School for girls at Baroda. Due to the administrative conditions it was not possible for the school authorities to allow the investigator to select forty five students under each of the three experimental conditions as the experiment was to be conducted for four weeks during the second half of the academic year. Hence, all the 260 students of the five divisions of ninth grade were treated under the three experimental conditions.

3.3 Sample

For purpose of analysis of data according to the input variables it was initially decided to select fifteen students each belonging to the three levels of IQ on the basis of their scores on the selected standardized test to measure the group intelligence. However, when the selected IQ test was administered it revealed that majority of the students belonged to the IQ scores between 110 to 130. Few had less than 110 scores and very few had IQ scores higher than 130. Moreover grouping the

student on this basis and separating them from their original class divisions for the purpose of the experiment was not possible and permissible. Due to the administrative considerations such as time table and the other subjects to be taught it was not feasible to have the students grouped on the basis of IQ.

Some of the difficulties inherent in the researches in automated instructions as pointed out by W.J. Cass (1968) can be summarized as per the following :

1. Insufficient experimental control.
2. Difference in experimental and control group in so many respects that it is impossible to tell which of the differences in the treatment accounts for the difference in perfomance.
3. Inability of a researcher to control previous experiences and the aptitudes.
4. Too large a sample to judge independent learning. It is desirable to have observations on small number of subjects in totally unfamiliar materials.
5. A need for testing in a real classroom situation.

In the present investigation the administrative considerations necessitated the need for testing in a real classroom situation, hence actually influenced the selection of the sample. The investigator conducted the experiment in a real class-room situation during the actual teaching session of an academic term. Therefore, the sample for the study was drawn on the basis of the presence of the student through out the experiment. Preference

was given to all those present all throughout the teaching period under the three experimental conditions.

There were five divisions of ninth grade class in the Maharani High School for girls where the experiment was conducted. Eighty five students belonging to divisions A and D were treated with the use of PLM for self study. Ninety students of B and E divisions used PLM as an aid to conventional method of teaching namely the lecture method. Sixty students of C division were treated with the conventional method of lecture-cum-discussion.

A similar procedure was followed by Sharma (1964) who developed a programme on solving equations and evaluated it against the lecture method. The investigator selected three sections of sixth class from an English medium school in Delhi. Two of them were treated as experimental groups and one was treated as a control group. There were thirty students in each group.

Treatments assigned to the three groups were by simple randomization. The first experimental group studied on its own through PLM. The second experimental group was given the same PLM but in addition to it the class teacher helped the students. The control group was taught through the lecture method. The duration of the experiment was five days, two periods of thirty five minutes each per day.

In the present investigation students from all the five divisions of the ninth grade were treated under the three experimental treatments. On completion of the experiment on all

the students of these five divisions the presence of the students was checked. It was found out that forty five students remain constantly present under the first and second experimental condition. However, under the third condition about forty students were found to have 100 cent percent attendance. Hence under the third experimental condition five more students who missed only one class of teaching during the experimental time were included. So the total sample included for analysis of data was of 135 students consisting of forty five students each of the three experimental conditions.

3.4 Sampling Method : Purposive Method

Sampling method used was that of pre-defined criteria of having hundred percent of physical presence in the class during the time of the experiment. Hence, the method was a purposive method of sampling.

3.5 Categorization of the Variables

The input variables considered for analysis in the present investigation were intelligence, overall class achievement, achievement in home science, extent of preparation as indicated by the pre test, the school adjustment on the basis of the number of years spent by them in the school, the time taken on the basis of time recorded at the beginning and on completion on each section during the experimental period as well as the socio-economic status (SES) of the students.

3.5.1 Group Intelligence Test

As the sample under study was Gujarati knowing adolescent girls, it was decided to look for a standardized test which is developed in Gujarati for arriving at the IQ score for the group under study. Hence Desai-Bhatt Group Intelligence Test (Appendix A) available at Ahmedabad which is widely used for collection of data regarding IQ of Gujarati knowing population was selected.

Since it was decided to collect classwise data regarding IQ only fifty test booklets were ordered. They were used for measuring intelligence of ninth grade students belonging to five divisions at the Maharani High School for girls. In all three hundred answer sheets were ordered in order to commute the IQ scores. Students from the five divisions of IXth class were given the test during a class period of forty five minutes selected during two weeks previous to that from which the experiment was to commence in the year 1976-77.

The key was prepared and punched for ease of scoring. On completion of the scoring, IQ score for each student was arrived at as per the manual of instructions provided along with the test materials. The IQ score for the students under study ranged between 90 to 140 scores. For catagorization of the sample the same was grouped on the basis of range indicated in the manual. The students under study were divided in three categories as per the following :

1. Students having a score of 90 to 109 as Average
2. Students having a score of 110 to 119 as Above Average
3. Students having a score of 120 to 140 as Extra Ordinary

3.5.2 Overall Class Achievement

In order to get the overall class achievement the class registers of the previous year that is of the VIIIth grade for the students were referred to get the total scores in annual examination. For the repeaters of the IXth class, the annual examination results of IXth class was referred to. The mean and standard deviation for the same was worked out for all the students irrespective of their division. The whole group was then divided into three categories based on the range of marks according to one standard deviation plus and minus the mean.

The mean score for the class achievement for group of students under study was found to be 368.48888 and the standard deviation was 84.8912. The categorization of students for class achievement was done as per the following : those with a total class achievement score of 454 or more were categorized as high achievers; those between 285 and 453 as medium achievers; and those with 284 and less than that score as low achievers.

3.5.3 Achievement in Home Science

For arriving at the level of achievement in Home Science for the group under study, the same procedure which was followed to arrive at overall class achievement was adhered to the mean score

for achievement in Home Science was found to be 48.5704 and the standard deviation was 10.6831. The following three categories were formed on the basis of achievement scores for the purpose of categorization of the students and for ease in computation of the data.

Those having a score of 60 or more than that were considered as high achievers, those between 39 and 59 as medium achievers and those having a score of 38 and less than that as low achievers.

3.5.4 Extent of Preparation

A test (Appendix B) prepared by the investigator in consultation with the subject matter teachers in Home Science was administered in all the five divisions of IXth grade (Gujarati Section) at the Maharani High School for girls to arrive at the score indicating the extent of preparation while entering the experimental condition. A test consisting of objective items on the related topics previously covered as well as on the topic to be taught was administered on all the students of IXth grade (Gujarati Section). A key was prepared to check the answers. The mean and standard deviation for the whole group was calculated to work out the extent of preparation in order to divide the group into three categories. The mean for pre-test scores was found to be 79.0074 and the standard deviation was 9.2660. The students under study were categorized on the basis of the following range of scores; students achieving more than 89 were categorized as well prepared; those having scores between 70 to 88 as average prepared

and those having a score of 69 or less than that as less prepared.

3.5.5 Adjustment to School

While administering the tests mentioned above, it was observed that some students were in the Maharani High School for girls right from the fifth grade whereas some joined the school in eighth grade. These students were divided according to their year of admission in terms of the grades to which they admitted. The A and B division had students who joined the school from fifth grade. The C division had students who joined the school from fifth grade as well as some who joined in eighth grade. The D and E divisions had all the students who joined the school in 8th grade.

In the present investigation it was assumed that the level of adjustment to the school environment of the students will vary. This, in turn, may have some effect on their achievement under the three experimental conditions. Thus, it was planned to categorize them to judge their adjustment to the school on the basis of their admission to the school. Those who were in the school from fifth grade were considered as students well adjusted to the school environment whereas those who were admitted in eighth standard were considered as students less adjusted to the school environment.

3.5.6 Time Taken in Studying the Content

Time taken to study the content under various experimental conditions where PLM is used is considered to be an important variable by the researchers in this field of education. This is because learning through the use of PLM permits individual pacing of time to arrive at the expected behavioural outcome.

In the present investigation an inherent arrangement in the PLM was made to note the time at the beginning and at the end of the completion of PLM on one sub-unit of the selected topic on the basis of the average time taken by intellectually average students during the group testing of the PLM. Students who were slow in learning were instructed to mention the time at the end of the class period. They were allowed to continue with the same unit in the next period.

For the purpose of categorizing the sample under study on the basis of time taken the following procedure was adopted. A total time taken for completing the whole unit on saving was arrived at by adding the time taken on each unit. Then the total scores for the sample under study were arranged to arrive at the medien time taken to study the content given in the PLM.

The Median time to study the content was found to be 132 minutes. Those who took more than the median time were categorized as those who required more time. Those who took

less than the median time were considered as those requiring less time. The time taken under the conventional method remained constant that is 460 minutes in total. In case of those who were treated under the aided method a constant of twenty minutes was added to the actual time taken on PLM as an aid.

For the purpose of analysis of the data on the basis of time taken, students under the two experimental conditions namely those using PLM as self instructional method and using it as an aid, were considered. No analysis for those who were treated under the conventional method of study was done.

3.5.7 Socio-Economic Status (SES)

Socio-economic status is arrived at by computing the points on the basis of education, occupation and income of the mid individual. In the present investigation a teacher-made test (Appendix C) to arrive at the SES was used. In the preparation of the test one expert, each from economics department of the Faculty of Commerce and from the Sociology department of the Faculty of Arts were consulted. A scheme to score the test was on the basis of the points earned was also developed in consultation with the same experts. The data revealed that the sample represented the middle socio-economic group only. Further examination helped in categorizing them into three separate categories namely that of high middle, middle, middle and low middle income group. The same are used for arriving at the

differences in scores earned under three experimental conditions by the sample under study.

3.5.8 The Items on the Test

The immediate retention test (IRT) (Appendix D_1), and the delayed retention test (DRT), (Appendix D_2) to arrive at the immediate retention score and the delayed retention score consisted of both the subjective as well as the objective items. Researches dealing with the use of methods of study using PLM have revealed that the achievement scores on the subjective and the objective items vary on the basis of the methods of study, and also due to the intelligence level and the time taken. In the present investigation, therefore, the total scores achieved on all subjective test items as well as objective test items were recorded for the IRT and DRT. The same were then recorded in a tabular form for students having different levels of intelligence and taking different amount of time for studying the content under the different methods of study for computing the data. The data were then analyzed to categorize the students on the basis of mean and standard deviation for subjective as well as objective items on the IR immidiate retention as well as delayed retention test.

The average mean score for objective items on IRT was found to be 63.555 and the standard deviation was 13.1125. Therefore the students were categorized as per the following : Those scoring seventy seven and above were high achievers ; those who

ranged between 51 and 70 were the average achievers and those having a score of fifty or less than that as low achievers.

The average mean score for objective items on DRT was 62.8963 with a standard deviation of 13.8942 . The categorization of student for the same was as per the following : Those scoring seventy eight and above were considered as high achievers, those ranging between the scores of 55 and 77 as average achievers; and those scoring forty nine and less than that as low achievers.

As regards to the scores on subjective items, the mean for IRT scores was found to be 39.8074 with a standard deviation of 14.0476. The students were categorized as those scoring fifty two and above being high achievers; those in the range of 25 to 51 as average achievers and those scoring twenty four and less than that as low achievers.

As for the DRT scores, on subjective items the mean was found to be 37.8595 with a standard deviation of 19.8521. The high achievers were those scoring fifty eight and above. The average achievers ranging between the scores of 19 and 57 and the low achievers scoring eighteen and below that.

3.6 Hypothesis of the Study

According to M.J.Cass(1968) one of the major hypothesis which can be tested through the researches in PLM is that'the use of self-paced instructional devices yields more learning and better retention than does group paced devices and this relationship

holds for all types of learning tasks and for all types of learners.'

In the present investigation, too, the investigator has tried to establish the effectiveness of PLM as self study method as well as an aid for promoting understanding of selected concepts in 'Savings' under the topic finance management in the area of Home Management under Home Science for adolescent girls. The study further attempts to establish the significant relationship if any between the selected input variables and the immediate as well as delayed retention scores of the students treated under all the three experimental conditions. It also tries to establish the suitability of PLM independently as an auto-instructional method, as an aid and over the selected conventional method of study.

The broad hypothesis of the study were :

1. There will be no significant difference in the IRT and DRT Scores on the basis of the methods of treatment irrespective of any personality variables.
2. There will be no significant difference in the IRT and DRT scores of students due to the intelligence level, class achievement, achievement in Home Science, Extent of preparation as well as adjustment to the school environment, time taken and the socio-economic status.
3. There will be no significant difference in the scores of the students on objective and subjective items of the immediate retention and delayed retention test on the basis of their level of intelligence and time taken to go through the PLM.

3.8 Coding and Analysis of Data

The data collected were coded as per the categorizations discussed in the previous part (3.5) of this chapter. Two way analysis of variance was used to compute the f-value. This was done in order to find out which of the two variables - the experimental method of study or input variable such as IQ/ Class achievement / achievement in Home Science / Adjustment to school / Preparation / Time taken or SES - was independently responsible for variations in achievement scores on the immediate as well as delayed Retention Tests. The same was also used to study the interaction effect of the experimental condition alongwith the single input variable.

The average mean and the mean on each of the categories according to the experimental conditions as well as the input variables were also calculated and used for discussing the findings.

For calculating the f-value the formula given by Chakravarty, Laha and Roy (1967) was used as the data consisted of unequal number of sample in each cell for all the input variables. (Appendix E).

However, for calculating the f-value to find out significant differences in the scores under each of the three different experimental conditions the formula given by Garette (1961) was used as it had equal number of sample in each of the three categories. It was a simple analysis of variance with

75

experimental conditions as the single variable. (Appendix F)

3.9 Conclusion

The procedures followed to promote the desired study according to the plan helped in arriving at the findings which helped in revealing the extent of suitability of PLM in the following ways :

- For self study
- As an aid
- Over the conventional method of study
- For the students varying on account of IQ, Class Achievement, Achievement in Home Science, Extent of Preparation, Adjustment to School, Time Taken and SE Status.

The findings on account of the procedures adopted also helped in drawing inference for the group under study and making suggestions for further studies in the area of Home Science Education involving the use of PLM.