METHODOLOGY

CHAPTER 3

METHODOLOGY

In the present study, the investigator has aimed at developing instructional materials for selected aspects of Children's Clothing course offered to the second year B.Sc. (Home Science) students, and to study its effectiveness as self-instructional material.

This study was an experimental study and was conducted at the college of Home Science, Assam Agricultural University, Jorhat, Assam, where the investigator has been teaching for the last eight years. Class-room experiments were carried out in the second semester from the month of October to December 1991 for a period of seven weeks. For this study the students of the second year B.Sc class were divided into two groups on the basis of the scores obtained in the Intelligence test. One group was taught by the conventional method and the other by the developed instructional material.

This chapter on methodology is divided into four sections, each describing the procedure for its respective aspect.

3.1 Development of instructional Material.

3.2 Tools used

3.3 Experimentation.

3.4 Plan for statistical analysis.

3.1 Development of instructional material :

This has three major stages :

(1) Preparation,

(2) Writing the programme and

(3) Tryout and revision.

3.1.1 Preparation :

Preparation for programme writing involves selection of content or topic, preparing content out line, defining objectives in behavioural terms and selection of media for instruction.

According to Sampath et al (93), there are three essential factors involved in the selection of the content. The programmer must select the subject matter with which he/she is familiar. Secondly he/she must restrict himself/herself with a very small area of subject-matter. Lastly he/she must choose a subject matter that is easy to programme.

Keeping the above suggestions in mind, the investigator studied the syllabus of the B.Sc. programme offered by the syllabus of the Faculty of Home Science, M.S.University of Baroda and the Faculty of Home Science, Assam, Agricultural University, Jorhat, where the investigator has been working herself.

It was decided to take up a topic from the "Children's Clothing" course. This was the second course in clothing construction after learning the basic techniques of clothing construction in the introductory course offered in the first year of B.Sc. (Home Science). "Children's Clothing" course was offered in the second semester of the second year. This course was offered to all the students of the second year class. From the course content, the topic "Clothing for the pre-school child" was selected at random by the lottery method.

An outline of the selected topic was prepared by analysing the contents of the topic in terms of specific objectives. The selected topic had both theory and practical sections. The theory section was divided into four sub-sections for proper sequencing of the contents and to facilitate the making of instructional material. These sections were -

1. Introduction.
2. Importance of suitable clothing.
3. Functions of suitable clothing.
4. Selection of clothing for the pre-school child.

(a) Allowance for growth.
(b) Self-help features.
(c) Construction.
(d) Ease of care.

The practical section consisted of stitching garments for pre-school children. For this purpose a frock was designed by the investigator keeping in mind the self-help features which are so important in developing independence and self-confidence in the child. The investigator tried to incorporate a number of basic sewing techniques into a single garment, at the same time taking care to keep the garment simple in style so that pre-school children may learn to dress by themselves.

The designed frock had a small yoke attached to a gathered skirt, butterfly sleeves, round neckline and was open all through the front. The neckline was finished with a bias binding and the underarms with a bias facing. The fasteners were buttons and buttonholes.

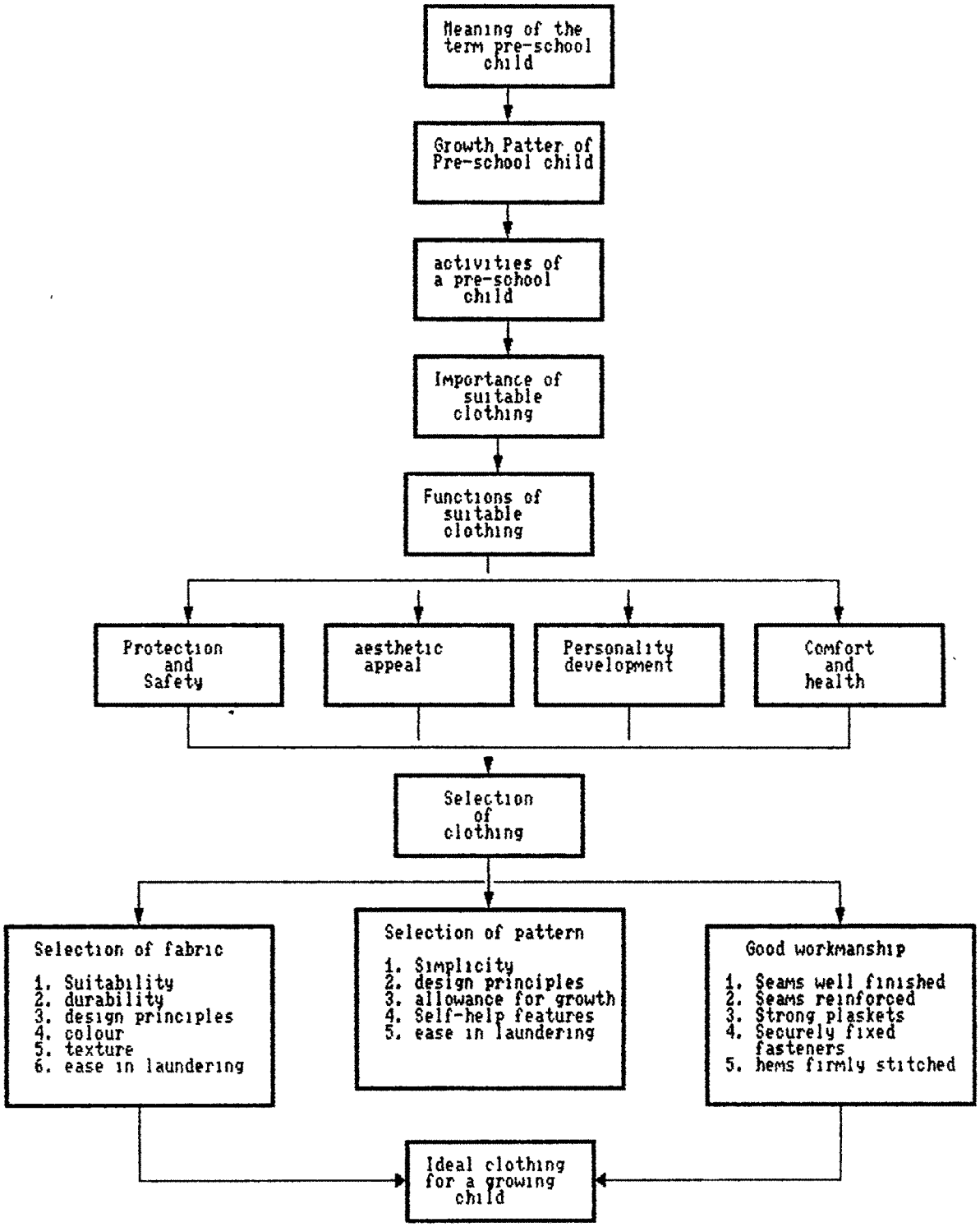
To facilitate the presentation of selected matter in a systematic and proper sequence, a flow chart was prepared (Fig. 2). This flow chart schematically showed at a glance the pattern in which the contents of the selected topic would be taught during the classroom experiment.

The next important step in the preparation for developing instructional material was the listing down of behavioural objectives.

Gagne (29) states that learning exhibits itself as a change in behaviour of an individual before being placed in a learning situation with the behaviour that is exhibited after the treatment. Sharma (104) has similar views and opines that

FLOW CHART

Fig.2 Clothing for the Pre-School Child



learning is a modification of behaviour through activities and experiences and the educational activities should be disigned to bring desirable changes in the behaviour of students. Behaviour has been difined by Sampath et al (93) as any visible activity displayed by the learner and hence can be observed and measured.

The conventional objectives are broad, covering many points without making them explicit. Objectives must be stated in meaningful terms in the form of observable and measurable behaviours. Instead of stating the objectives as 'knowledge' or 'understanding', it must clearly be stated using action verbs such as to 'write', 'recite','identify', 'solve', 'construct', 'list', 'label', etc.

Behavioural objectives refer to a students actual ability to use what she knows and not mere cognitive awareness. A person who undertakes to teach through instructional technique has to analyse the behaviour involved in the instructional material and desires that learners will fulfil the objectives of the matter taught. For this purpose, it was necessary to formulate the behavioural objectives in terms of the terminal behaviour of the students, i.e., what the students are expected to achieve and attain after studying a particular content matter through a specific instructional strategy. Each type of behavioural objective in a list is not something that should be attempted to be achieved seperately; all are interwoven in a complex manner.

The following list provides the behavioural objectives which should be achieved by the students as their terminal behaviours after studying the selected course content.

Behavioural Objectives

On completion of the programme, the students will be able to :

1. define the term pre-school child ;
2. state the measurements required to draft a basic bodice block for a child ;
3. explain why pre-school children should have few garments;
4. mention the factors that will influence the planning of a childs wardrobe;
5. state the importance of suitable clothing for pre-school children ;
6. state the functions of suitable clothing ;
7. Point out which features in a garment may be dangerous to the child;
8. mention the requirements in a childs garment besides protection and safety;
9. explain why cotton is considered to be the most suitable fabric for children's garments;
10. explain the importance of good fit in pre-school children's garments;
11. explain the term "growth features" ;

12. mention at least two ways to increase the length and at least two ways to increase the width of a child's garment;
13. define the term "self-help garments" ;
14. explain the importance of self-help garments;
15. list down at least four "self-help" features in a garment;
16. mention the ways of reinforcing places of greatest wear in children's garments;
17. explain why elaborate trimmings are not suitable for pre-school children's garments;
18. straighten a fabric for cutting;
19. lay pattern pieces correctly;
20. transfer markings on to the fabric from paper pattern;
21. cut a fabric for garment construction;
22. staystitch curved edges;
23. do smocking on a dotted fabric;
24. attach yoke to a gathered edge;
25. finish a curved edge by the use of a bias binding;
26. finish a curved edge by the use of a bias facing;
27. attach a frill to a plain surface;
28. make buttonholes on garment openings;
29. sew on buttons as placket fasteners;

An experiment which includes teaching of certain content matter often demands a required behaviour of the students prior to the conduct of the experiment. This is known as the entering behaviour.

For the present study it was essential that the students had passed their introductory course in clothing construction so that they were familiar with the basic techniques of clothing construction. This was a prime necessity as the programme was a linear one and no provision was kept for branching out for learners not familiar with the basic techniques.

Selection of instructional media :

Instructional media are those media that provide a direct link between the work of the course developer and the student, and its selection is considered as an integral part of the total instruction development process.

When using instructional media the role of the teacher is usually that of a course monitor, administration, councellor and supervisor. Students work by self direction and by the guidance provided within the instructional media themselves.

To achieve the course purposes, attempt should be made to seek the least complex media available, and if possible, only one medium should be used - audio or visual - to determine if the required student performance is achieved. If so, then there is no need for a more complicated audio-visual presentation (4).

The selection of efficient, and effective media for instruction requires balancing lesson content and purposes

with the characteristics of specific media. In the selection process, compromises are often made. So, in order to avoid decisions made by whim or convenience, media selection charts presented by Anderson (4) were followed. It was found from these charts that the following media would be appropriate for the selected content.

For the theory section, it was found that printed material (programmed texts and manuals) would be most suitable. For the practical section it was found that printed material along with physical objects would be most suitable.

Accordingly, programmed learning material in the printed form was used for theory, and detailed printed instructions along with illustrations and sample pieces at various stages of construction were used for the practical section.

3.1.2 Writing the programme :

The instructional material was prepared by the linear style of programming in which the selected content was presented in a logical sequence of small steps, enabling the learner to learn according to his own speed and capacity. These small steps are called frames. Each frame consisted of a single statement or a single idea. The statement was followed by an objective type question which the learner was expected to answer before proceeding to the next step. The answer to the question was provided in the left hand column

which was kept covered by means of a card. The learner could check the answer after she had answered the question. If her answer was correct, she could proceed to the next step. If her response was not correct, she was directed to study the same frame again so that she was able to give the correct answer to the question that followed. In this way, the learner could not proceed to the next step without understanding the previous one. Thus learner's response was reinforced at each step.

In order to help the learners make the correct response and eliminate error she is given assistance in the form of 'primes' and 'prompts' in the introductory frames. Cues were also provided.

For the practical section, detailed step-by-step instructions along with illustrations were prepared for the construction of the frock designed by the investigator. A stitched frock and sample pieces at various stages of construction were prepared to be exhibited for the benefit of the learners. A total number of six sample pieces were prepared to show the different stages of garment construction.

For establishing content validity, the prepared instructional material was given to five subject-matter experts from the Clothing and Textiles Dept., Baroda and two from the Dept. of Clothing and Textiles, Jorhat. For validity of the tool, the material was also given to two

experts from education. Among them one was from the Home Science Education and Extension Dept. Baroda and the other from the Centre for Advanced studies in Education, Baroda. Experts gave their comments and suggestions on improving the programme. On the basis of suggestions received from experts, the programme was revised and then finalised through individual tryout.

3.1.3 Tryout and revision :

For the individual tryout three girls were selected who had completed their introductory course in clothing construction. The investigator sat with one girl at a time while she was asked to work through the programme so that the investigator could make observations and note down the points where the student found the matter or the instructions difficult to understand. Help was not offered to the student until asked for. In this way it was easy to find out the places where the programme needed revision. Items which were difficult were simplified. Attempt was made to use very simple terms and language throughout the programme so that no students would face any problem in understanding it. The first draft of the instructional material did not have any illustrations for the theory section but later some figures/sketches were introduced on the suggestions given by an expert. These illustrations broke the monotony of the programme and made it interesting to the students. Yellow coloured cambric fabric with white pin dots was provided for stitching of the garment. Other accessories like sewing

Plate 1 : Garment stitched during individual try-out.

thread, embroidery thread for smocking and buttons were also provided by the investigators.

3.2 Tools Used

Tools used for measuring the intelligence, achievement and the reactions of the students were the Raven's Standard Progressive Matrices for intelligence and the achievement test and the reaction scale developed by the investigator.

3.2.1 Intelligence Test (Raven's Standard Progressive Matrices) : Raven's Standard Progressive Matrices (SPM) is a standardized non-verbal test to measure the intelligence of different age groups.

The SPM is a test of a person's capacity at the time of the test to apprehend meaningless figure presented for his/her observation, see the relation between them, conceive the nature of the figure completing each system of relations presented, and by so doing, develop a systematic method of reasoning. The scale consists of 60 problems divided into five sets of 12. The five sets provide five opportunities for grasping the method and five progressive assessments of a person's capacity for intellectual activity. To ensure sustained interest and freedom from fatigue, the figures in each problem are boldly presented, accurately drawn and as far as possible, pleasing to look at. The scale is designed to provide a reliable estimate of a person's capacity to think clearly when allowed to work steadily at his or her own speed from the begining to the end without interruption.

3.2.2 Achievement test :

An objective type test involving recall, recognition and application oriented items, concerning all the aspects of the contents taught, was constructed. Fill in the blanks, choose the correct answer, give reasons for and short answer questions were included in the test for the theory section (Appendix V).

Content validity of the questions was established with the help of seven experts from the department of clothing and Textiles. The experts gave their comments on the test constructed for clarity of language and suitability of the test for measuring the achievement of second year Home Science students in the selected content. Changes were made in a few questions according to the suggestions given by the experts. For the practical section the same frock was repeated to see how much the student had learnt.

3.2.3 Reaction Scale :

The reaction of students towards any new approach is important. The continuation or discontinution of a new approach depends not only on its effectiveness but also on the acceptance by the learners. It is not surprising that even when administrators and teachers find a new practice sound for adoption, it may fail if the student community happens to have, in general, a definitely unfavourable attitude towards it, and resists its adoption. Hence the

reaction of the students towards any approach becomes an important criterion for validating an approach. In the light of such a significance with regard to knowing the reaction of students towards self-instructional materials for teaching Clothing and Textiles, an attempt has been made to measure the reaction of 15 students who learnt through instructional materials.

An attitude scale developed and standardized by Govinda (34) to measure the attitude of students towards instructional materials was available but it did not serve the purpose of the investigator as it did not contain statements in relation to the development of skill which is an important aspect in the present study. Therefore, taking the scale developed by Govinda as a basis, a reaction scale was developed to see the reaction of the students towards self-instructional materials for teaching both theory and practical aspects of clothing.

For this purpose, a large number of statements were developed reflecting the reaction of students towards self-instructional materials. From this primary pool, sorting was done and 40 statements were selected, which were then given to ten experts to judge them for relevance and clarity of language. Appendix VII Judges gave their views on the same. Any statement which was marked irrelevant by any judge was omitted. The statements marked relevant but ambiguous by more than two judges were omitted. If any statement was

marked relevant but ambiguous by one or two judges, attempt was made to simplify the statement and make it more clear. Finally there were only 28 statements in the final scale (Appendix VIII).

3.3 Experimentation

3.3.1 Target population :

For this study the target population was second year B.Sc.(Home Science) students who had completed the introductory course in Clothing & Textiles in the first year. For this study the sample was second year B.Sc. (Home Sc.) students of the Faculty of Home Science, Assam Agricultural University, Jorhat, who had registered in the year 1989. It was decided that those who complete the programme will only be included in the study. Out of 31 students, one was unable to continue the programme due to her illness. The sample finally consisted of 30 students divided into two groups of 15 each.

3.3.2 Data Collection :

3.3.2.1. For the intelligence test : Copies of the Raven's Standard Progressive Matrices along with the manual and answer sheets were procured from "Mansayan", Delhi. The manual was thoroughly studied and discussed with a clinical psychologist practicing at Jorhat, Assam. She trained the investigator in conducting the said test. As only eighteen booklets could be procured, the test was conducted in two

groups in the month of October 1991. This test was conducted before starting the experiments.

3.3.2.2. The experiment was conducted from October 1991 to December 1991 for a period of seven weeks, and consisted of four stages.

(a) Pre-test

(b) Experimental teaching.

(c) Post-test.

(d) Delayed Retention test.

Same question paper was used for the pre-test, post-test and delayed retention test. All these tests were given to the whole class during different stages of the experiment. Pre-test was administered just before starting the experimental teaching, post-test was just after completion of experimental teaching and delayed retention test was 28 days after the post-test.

To conduct the experimental teaching, the class was divided into two groups on the basis of scores obtained from the intelligence test. Group 'A' consisted of fifteen students and group 'B' consisted of sixteen students. The means of the scores on the intelligence test for both the groups were compared using the 't' test for which the calculated value was 0.3166 which was much below the tabulated value of 2.04 at 0.05 level and 29 degrees of freedom, showing that the differences in the means of the two groups was not significant.

As mentioned earlier, it was decided that students with 100 percent attendence would only be included in the study. Therefore one student from Group 'B' had to be omitted as she could not complete the programme due to her illness. The means of the scores on the Intelligence test were compared again using the 't' test for which the calculated value was 0.4618 which was much below the tabulated value of 2.05 at 0.05 level and 28 degrees of freedom, showing that the difference between the two groups was not significant, and the two groups could be considered as statistically equal.

The selection of which group would be taught by which method was done by the lottery system.

Two pieces of paper were taken. On one was written conventional method and on the other was written instructional method. The pieces were folded into small size and placed in a bowl. Any one girl was asked to come forward and pick up a piece. A girl from group 'B' came forward and picked up one piece. It was decided that whatever was written on the paper would be for group 'B' to which she belonged. On the paper was written instructional method. So group 'B' was taught by the instructional method and group 'A' by the conventional method.

The investigator taught both the groups and personally conducted all the tests in order to avoid any differences that may arise due to the differences in the personality of

the teachers. Practical section was also started side by side for which white fabric with grean pin-dots was provided by the investigator. Students were instructed to work in the department only. Extra classes were arranged for both the groups according to their free time.

After the theory section was over, a post test, i.e. immediate retention test (IRT) was conducted which was announced only at the beginning of the experiments and no reminder was given after the theory section was over. The test was administered to both the groups at a time.

When the practical section was over, students were given evaluation sheets which covered all the details of the garments to evaluate the frock which they had stitched so that they may realise their own errors (Appendix IV). A practical test was administered in which the students were asked to stitch another frock using the same paper pattern. The smocking part was omitted in the test as it was just a means of decoration in the first frock. Pale pink cambric fabric was provided for the second garment.

Both the frocks were evaluated by three experts from Clothing & Textile department to avoid any bias. The mean of the three scores was taken as the actual score obtained.

After an interval of 28 days, a delayed retention test (DRT) was conducted to find out how much the students could retain after a gap of four weeks. The scores on the achievement tests, i.e. IRT and DRT, and the scores on the

Plate 2 : First garment stitched during experimentation.

Plate 3 : Second garment stitched during experimentation.

two garments by experts and self evaluation were treated for analysis.

3.3.2.3 Reaction of the students were taken on a five point scale developed by the investigator. These reactions were taken after the experimental teaching and the IRT were over.

3.3.2.4 Scores of the students in English and Clothing and Textile course in the previous semester were taken from the academic cell of the Faculty of Home Science, Assam Agricultural University, Jorhat, as an indicator of their competence in English and in Clothing and Textiles.

3.4 Plan for statistical analysis

The intelligence test used in the study was a standardized one, therefore, the procedure described in the manual of the test was followed for scoring the test.

A students score on the scale was the total number of problems she solved correctly. The maximum obtainable score on the test was 60. The manual described the procedure for categorizing students according to their obtained score, as follows :

Grade I. "Intellectually superior", if the score lies at or above the 95th percentile;

Grade II. "Definitely above the average in intellectual capacity", if the score lies at or above the 75th percentile;

Grade III. "Intellectually average", if the score lies between the 25th and 75th percentiles;

Grade IV "Definitely below average in intellectual capacity", if a score lies at or below the 25th percentile;

Grade V "Intellectually impaired", if the score lies at or below the 5th percentile.

According to the above mentioned process the distribution of students into different grades was done as shown in the table below. :

Table 1 : Students categorized according to their scores in the intelligence test.

Grade	Category	N
Grade I	Intellectually superior	11
Grade II	Above average	10
Grade III	Average	8
Grade IV	Below average	1
Grade V	Intellectually impaired	0
Total		30

Since the experiments were to be conducted with two groups of students who were equal in intellectual capacity, students were divided into two groups on the basis of their scores obtained in the intelligence test.

Table 2 : Distribution of sample into two groups according to intelligence.

Grade	Group 'A'	Group 'B'	Total
Grade I	6	5	11
Grade II	5	5	10
Grade III	4	4	8
Grade IV	0	1	1
Grade V	0	0	0
Total	15	15	30

As seen from table 2, the frequency of sample distribution is not identical in the two groups. Therefore, the mean score obtained by both the groups were compared using the t' test. The calculated value of t' was 0.4618 which was very much below the tabulated value of 2.05 at 0.05 level and 28 degrees of freedom, indicating that the difference in the means of the two groups was not significant. The two groups could therefore be considered as statistically equal.

The groups were further categorized into high and low according to their intelligence for further analysis. Joshi (52) in her study had divided the students into two groups of "above average" and "average and below".

The "above average" group comprised of students who were in the category of intellectually superior and above average. The "average and below" group comprised of students who were in the categories of average and below.

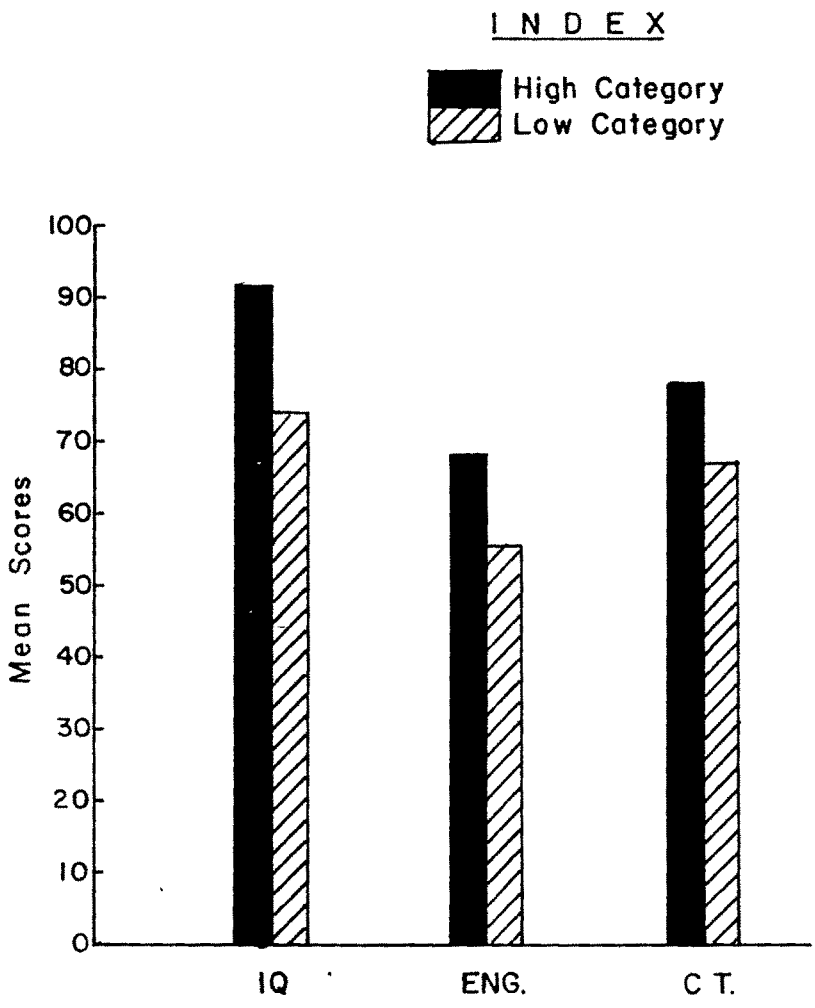
In this present study two categories of high and low had to be formed for analysis. Since there were no students in the fifth grade of intellectually impaired, the other four grades were divided into two categories of high and low each comprising of two grades. The pattern was similar to that followed by Joshi. The distribution of the students in the high and low category was as shown in the Table 3.

Table 3 : Distribution of students into high and low categories.

Category	Group 'A'	Group 'B'	Total
High	11	10	21
Low	4	5	9
Total	15	15	30

Scores of the students in the English course, which were taken as an indicator of their competence in English, were also divided into high and low categories. This was done by calculating the mean score and students who obtained the mean and above scores were categorized as high and those scoring below mean were categorized as low.

FIG.3 MEAN SCORES OF THE HIGH AND LOW CATEGORIES IN IQ, ENG., AND C.T.



The scores of the students in the Clothing and Textile course in the previous semester were also similarly categorized into high and low for use in the analysis.

The statistical analysis made use of in the study was as follows :

To know the distribution of the students according to the categories of the variables, frequency and percentages were calculated.

To find out the overall and variablewise performance of the students of the two groups, means, percentages and standard deviations were calculated.

To test the difference in the mean achievement of the two groups in the IRT and DRT the following formula for t' test was applied (31) :

$$SE_{DM_1-M_2} = \sigma_D = \sqrt{(\sigma^2 M_{x_1} + \sigma^2 M_{x_2})(1 - r^2 xy)}$$

$$t = \frac{M_{x_1} - M_{x_2}}{\sigma_D}$$

This formula makes use of correlation between variables. Since the same test was used for pre-test, IRT and DRT, the 't' value for the difference in the means of the two groups on the IRT was calculated in relation to the pre test scores. Similarly, the 't' value for the difference in the

means of the two groups on the DRT was calculated in relation to the IRT scores.

The formula for difference between means in small independent samples was also used to calculate the 't' values when the scores were grouped into high and low categories. The formula used is as follows :

$$SD = \sqrt{\frac{\Sigma (X_1 - M_1)^2 + \Sigma (X_2 - M_2)^2}{(N_1 - 1) + (N_2 - 1)}}$$

$$SE_D = SD \sqrt{\frac{N_1 + N_2}{N_1 N_2}}$$

$$t = \frac{M_1 - M_2}{SE_D}$$

The Pearson's Product Moment of correlation was applied to find the coefficient of correlation between the different variables. The formula used was -

$$r = \frac{\Sigma XY - N.M_x.M_y}{\sqrt{[\Sigma X^2 - N(M_x)^2][\Sigma Y^2 - N(M_y)^2]}}$$