CHAPTER IV

PLANNING AND PROCEDURE

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CHAPTER IV
PLANNING AND PROCEDURE

4.1 Introduction

Planning is an essential step in the process of research. In other words, planning is a mapping strategy. As McGrath puts it:

"The activities related to design in research are comparable to those of the architect in designing an intricate structure. As the architect does his designing before construction activities get underway, so should the researcher do his designing, before he gets his project underway."

In deciding upon research plan, the researcher must consider certain fundamental steps which are essentially the same for any type of research design, he proposes to use:

"The factor that must often differentiate between good and poor research is not the funds available, the size of the sample or sophistication of the statistics, it is the care and thought that goes into research plan."


A good research work cannot just happen. It includes a number of operations carried out with patience and accuracy. For such a serious work, planning requires utmost care and insight.

4.2 Title of the Study

The problem of the present study is "An Investigation into the role of General Ability of pre-primary school children in relation to reading readiness". For the purpose of the study, it has been thought essential to develop a new test for the present study. So the present research consists of the following two parts:

i. The development of a general ability test for pre-primary school children and for the children of standard first of the primary schools.

ii. Studies on the role of general ability of the children of pre-primary schools i.e. kindergarten class I and kindergarten class II in relation to their reading readiness.

4.3 Specific Objectives

Following are the objectives of the investigation covering both the above mentioned parts of the study:
1. To develop a general ability test for measuring the general ability of the children of pre-primary and primary schools of classes K.G. I, II and Standard I.
2. To establish norms of the test of general ability.
3. To study whether there exist any sex differences with regard to general ability.
4. To study whether there exist any area differences with regard to general ability.
5. To study the role of general ability in the development of reading readiness among pre-primary school children.
6. To study the relationship between general ability and reading readiness of the pre-primary school children.
7. To study the impact of general ability on reading readiness of pre-primary school children from rural and urban areas.
8. To study the impact of general ability on reading readiness with regards to sex differences.
9. To study the interaction effect between reading readiness and the independent variables like general ability, area and sex of pre-primary school children.
To fulfill the above mentioned objectives, the study was to be conducted in two parts. The details about the planning and procedure of both the parts of study viz., (1) Construction and Standardization of a general ability test and (2) Studies on the role of general ability in relation to reading readiness of pre-primary school children are given hereafter.

4.4 Construction and Standardization of General Ability Test

The first part of the study has been divided into three sub-parts:

1. Planning and procedure of the test
2. Construction of the test items and their experimental try-outs, and
3. Final run of the test, establishment of norms and reliability and validity studies.

1. Planning and Procedure of the Test

The test needs great care, right from the planning to the work of complete standardization, for devising a highly reliable and valid tool. Regarding the plan and procedure, the following process has been adopted.

Before preparing a design of the test, some of the existing tests, both in foreign countries and in India,
were reviewed with a view to selecting the base for the type of items to be included in the present test. The lists of the tests reviewed for the purpose have been given in the previous chapter. The review of the existing tests was helpful to the investigator in selecting the types of test items. He has accepted Flanagan's concept of General Ability and constructed items for the test on that principle.

"After deciding the type of the test, it was essential to decide age-range and grade for the standardization of the test. As per primary education act, a pupil is admitted to Std. I at the age of 6, or after 5 completed years. So the present study is meant for the pre-primary school children and the age range for the test was decided from 2 years 6 months to the age of 6 years. The details regarding the age range and grades have been given in Chapter V.

For the selection of ability components Flanagan's concept has been considered as a base. Two types of items have been included in the test: information type items and reasoning type items. Necessary guiding points have been prepared for the (i) information part, (ii) reasoning part, and (iii) for both the parts of the test."
Regarding the weightage to be assigned to each part of the test and each type of items, the expert opinions were taken from various teachers of psychology, experts in test construction and experienced teacher-educators working in the pre-primary teachers' colleges. As per their opinion, fifty-five per cent of weightage has been given to the information part, and forty-five per cent of weightage has been given to the reasoning part. The information items have been classified into five types and their examples have been selected from five broad areas viz., home, community, nature and recreation, science and social science. The reasoning part items have been classified into three main types. For testing children, the test materials, viz., test booklets, answer-sheets, scoring key, directions for administering the test and ready-reckoner for obtaining IQs have been planned to be developed along with the process of construction and standardization of the test.

The detailed procedure of the test has been given in the first portion of Chapter V.

2. Construction of the Test Items and their Experimental Try-outs

After plan and procedure of the test, a pool of test items has been prepared in the non-verbal form of
figures and pictures. For the try-out of the manuscript, 205 items were constructed and out of them 189 items were selected for the administration of the pre-pilot test after trying out the manuscript on a very small group of children and after consulting a few teachers and teacher educators. The total number of items for each part has also been finalized. At the manuscript try out stage, the investigator found out that most of the children were not able to respond themselves in the test booklets. To remove this hurdle, the investigator got separate answer-sheet cyclostyled and entered himself the pointed out responses received from the children into the answer-sheets. This practice proved to be very convenient for collecting data.

It was found that the children got confused when they saw the whole page full of pictures at a time. To avoid this, the investigator covered all the rows of pictures except the one that a child was expected to attempt upon. Thus accurate answers were ascertained from the children by making visible only one picture-row to the testee at a time. The plastic window container has been presented in Appendix F.

Two separate booklets one for information part items and the other for reasoning part items and separate
answer-sheets were cut by an artist on stencil sheets and mimeographed. Then the pre-pilot test was administered on 113 children who were given sufficient time to complete the work. The approximate time-limit for completing both the parts was also decided.

The distractor analysis of the items of the pre-pilot test for both the parts was made and 57 items for information part and 46 items for reasoning part, were selected for the pilot test. Then a few figures and pictures which needed clarity and exactness were modified or improved in accordance with the children's reactions. A few instructions for administering the test were also improved.

The pilot test was then administered to 434 children of nine districts of the Gujarat State. Out of 434 answer-sheets, 370 complete answer-sheets were selected for distractor analysis, and they were scored.

Then the 370 answer-sheets were arranged in the descending order of the scores. Thereafter, 27 per cent i.e. 100 answer-sheets from the top and 100 answer-sheets from the bottom were taken for further analysis and item analysis of the items of the pilot-test for both the parts was done. For selection of items for the final test, two statistical procedures viz.,
computation of difficulty value of items to study item-
difficulty and obtaining discriminative index of items 
to observe item-validity were followed. Then the items, 
found significant at 0.05 level, with difficulty values 
between 0.40 and 0.80 and items having discriminating 
index 0.30 or more were finally selected. Thus 30 
information items and 24 reasoning items were selected 
for inclusion in the final test.

3. Final Run of the Test, Establishment of Norms and 
Reliability and Validity Studies

As the test was to be administered on a large sample, 
it was necessary to get the test booklets printed. 
Eleven zinc material blocks were processed for the test 
items and one stencil paper was cut for the answer-sheets 
and a plastic window container was also prepared.

One thousand test-booklets were printed and 2500 
answer-sheets were cyclostyled. A manual of directions 
for the final run of the test was also cyclostyled.

The time limit for every test item in Part I was 
approximately fixed as 30 to 35 seconds which was totally 
controlled by the tester, while the time limit for part 
II test items was 25 minutes. The total time-limit for
the administration of both the parts including instructions comes to about 40 to 45 minutes.

The sample consisted of 2,199 children of classes K.G.-1, K.G.-2 and I which was representative of area and sex. Thus, these were 689 urban boys and 494 rural boys, and 532 urban girls and 484 rural girls, who duly represented area, sex and classes K.G.-1, K.G.-2 and Standard I. The stratified sampling method was applied to select the said sample.

The test was administered with the help of the teacher educators, officers of the Vocational Guidance Institute, M.Ed. students who had offered methods of experimentation and educational statistics, the head masters, and experienced teachers with aptitude of testing. Necessary details regarding the testees were entered in respective answer sheets.

By using the window scoring key, all the answer sheets were scored and the total raw scores were entered in the space provided in the answer sheets. The total scores were used without correction for the establishment of norms.

The calculations reported for the present test are (1) Grade Norms, (2) Age Norms, (3) Calculation of PRs, (4) Deviation IQs and (5) Classification of children according to their IQs.
The grade norms were established by distributing the children of K.G.-1, K.G.-II and standard I. The area-wise, sex-wise, mean, median and standard deviation of the scores were computed. The data has been presented graphically also. The mean difference between boys and girls was also checked with the help of critical ratio technique. To observe nature of the total population, mean, median, standard deviation, quartile deviation, skewness and kurtosis were calculated.

The age norms were determined by classifying the scores of the children into groups of one year range each. The age range was decided by considering 2 years - 6 months to 3 years 5 months as 3 years, 3 years-6 months to 4 years, 5 months as 4 years and so on. Upto 6 years. The age-norms were calculated by classifying 2,199 children into each age-group and age-wise frequency distribution of the scores of total population was prepared. Then mean, median and standard deviation of each age-group were calculated. The distribution of scores of age-groups 3 to 6 years has also been shown graphically. Age-wise reliability of the mean and S.D. was also found out. The significance of difference between the means of different age-groups was also computed. After computation, it was found that there were 58 children in the age range 7 years (Std. I), so the age norms for the age-groups 3 to 6
years only has been established. After deciding the age norms, percentile ranks were calculated for the age-groups 3 to 6.

For the present test, the Deviation IQ's have been computed with a mean of 100 and S.D. of 15. The S.D. of the total population of the present test has been considered as the S.D. of all the age-groups. The deviation IQs for different age-groups have been computed and tabulated.

After computing deviation IQs from different age-groups of the population, the distribution of IQs for each group has also been found out separately. After classification of children according to their IQs and after the analysis of their grade standing, Chi-square ($X^2$) calculation was applied to study the normality of IQ distribution of the population.

To find out the reliability of the present test, the following methods have been applied:

1. Test-retest method.
2. Split-half method by (a) S.B. Formula for all the standards, (b) Rulon formula and (c) Flanagan Formula.
3. Rational Equivalence method (a) K.R. Formula-20, (b) K.R. Formula-21, (c) Tucker's Modified K.R. Formula, and
The validity of the present test has been found out under the following heads:

i. Concurrent Validity,
ii. Predictive Validity,
iii. Cross Validity,
iv. Congruent Validity,
v. Content Validity, and
vi. Factorial Validity

The above-mentioned points regarding the final run of the test, establishment of norms and reliability and validity studies have been discussed in detail in part III of Chapter V.

4.5 Studies on the Role of General Ability in Relation to Reading Readiness

Under this section, the investigator aims to investigate the role of general ability as one of the factors affecting reading readiness as a whole and different components of reading readiness.

The section consists of four sub-sections. They are:

i. The tools for the study.
ii. Sample of the study.
iii. Hypotheses of the study.
iv. Systems of the analysis of data.
(i) The Tools used for the Present Study

Dependable tools are necessary for any research study. As mentioned in the first section of this chapter, it is attempted to develop a tool to measure general ability of the children of pre-primary schools and standard first of primary schools. For the measurement of reading readiness of children, a standardized test of reading readiness was used.

Description and Psychometric Properties of the tests:

(1) General Ability Test for the children of K.G. I, K.G. II and Std. I:

The general ability test has been constructed and standardised for the children of classes K.G. I, K.G. II and Std. I. The detailed description of the process of test development, establishment of various norms and the reliability and validity estimates has been given in the entire Chapter V to follow.

(2) Reading Readiness Test

The test has been constructed and standardized by V.R. Umrajwala for the use of the children of K.G. 1 and K.G. 2 classes. The test consists of 5 sub-tests viz., Word meaning, Visual discrimination, Sentence meaning,
Copying and auditory discrimination. The test bears reliability indices varying from .80 to .95 and validity estimate .63. The detailed description of the test has been given in Chapter III Section 3.12.

(ii) **Sample of the Study**

The sample of the study consisted of 2199 children for the establishment of norms of the general ability test. For the purpose of the study of the role of general ability on reading readiness, a sample of 400 children were randomly selected keeping area and sex in mind. The scores thus obtained of 400 children were tabulated in the following form for further statistical treatment.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Class</th>
<th>Sex</th>
<th>Area</th>
<th>IQ Levels</th>
<th>Raw scores obtained in Reading Readiness and in each of the Components of Reading Readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean : Disc- : ence : ing : Story : Scor</td>
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<td>ing : imina : Mean : Disc- : Read</td>
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<td>tion : Read</td>
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<td></td>
<td></td>
<td></td>
<td>ness</td>
</tr>
</tbody>
</table>

(iii) **Hypotheses of the Study**

A hypothesis is powerful tool in a scientific inquiry. It enables the investigator to relate the hypothesis to observation and observation to hypothesis. In the present
study, the three crucial variables, general ability, area and sex of the children of K.G.-I and K.G.-II have been considered as correlation variables.

Totally 36 null hypotheses have been formulated on the basis of the objectives of the study. The hypotheses for component of reading readiness viz., word meaning are as follows:

Hypothesis: 1 There is no significant difference in the grasp of word meaning (a component of reading readiness) between the children of K.G.-I from rural and urban areas.

Hypothesis: 2 There is no significant difference in the grasp of word meaning (a component of reading readiness) among the children of K.G.-I belonging to the different levels of general ability.

Hypothesis: 3 There is no significant difference in the grasp of word meaning (a component of reading readiness) between the boys and girls of K.G.-I.

Hypothesis: 4 There is no significant difference in the grasp of word meaning (a component of reading readiness) between the children of K.G.-II from rural and urban areas.

Hypothesis: 5 There is no significant difference in the grasp of word meaning (a component of reading readiness)
among the children of K.G.-II belonging to the different levels of general ability.

**Hypothesis : 6** There is no significant difference in the grasp of word meaning (a component of reading readiness) between the boys and girls of K.G.-II.

In this way, the Hypotheses for the Other Components of Reading Readiness viz., Visual discrimination, Sentence meaning, Copying, Auditory discrimination and for the total scores on reading readiness have been formulated as denoted below:

Hypotheses : 7 to 12 (Visual discrimination)
13 to 18 (Sentence meaning)
19 to 24 (Copying)
25 to 30 (Auditory discrimination)
31 to 36 (Total scores on Reading Readiness Test)

The verbatim statements of the hypotheses No. 7 to 36 will be presented in Chapter VI.

(iv) **Systems of the Analysis of Data**

The data yielded by the tests viz., general ability test and reading readiness test have been analysed according to the hypotheses and statistics has been applied as detailed here:
(1) **Correlation**

It has been used to study the tendency of two things to vary together, directly or reversely. In the study, the product moment co-efficient of correlation has been used to find out the relationship between general ability and each of the components of reading readiness viz., word meaning, sentence meaning, copying, auditory discrimination and the total scores.

(2) **Analysis of Variance**

The F-ratio has been used to find out the significant difference of variables which are found as the same variance (homogeneity). Before applying ANOVA it is thought of an essential aspect to apply Fmax test of homogeneity of variance. If the value of Fmax test is below or equal the table value of F for given df, ANOVA will be applied. The present study consists of the $X^3$ crucial variables: viz., general ability, area and sex. The calculation is based on the scores of reading readiness components viz., word meaning, sentence meaning, copying, auditory discrimination and the reading readiness scores. Hence, the three way design for criterion variable i.e. 2x2x3 factorial design is considered as the most appropriate one for the present study. The 2x2x3 factorial design has been formed in the given tabular form.
The level of significance at 0.05 and 0.01 levels of confidence has been accepted in the present study.

The summary of (2x2x3) three-way analysis of variance has been given in the following form of table.
### Summary of Variance

<table>
<thead>
<tr>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main effect</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Area</td>
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<td></td>
</tr>
<tr>
<td>I.Q.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Interaction</td>
<td></td>
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<td></td>
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<tr>
<td>I x A</td>
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<td></td>
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<tr>
<td>I x S</td>
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<tr>
<td>A x S</td>
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<td></td>
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<tr>
<td>I x A x S</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
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<td></td>
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<tr>
<td>Total</td>
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<td></td>
</tr>
</tbody>
</table>

The detailed discussion of the studies on the role of general ability in relation to reading readiness and to different components of reading readiness has been presented in Chapter VI.

Thus, this chapter contains planning and procedure of the study in details.