Chapter III

DESIGN OF THE STUDY
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3.1 Prologue:

A research design is the logical, systematic planning and directive of a piece of research.

According to Kerlinger (1969), "Research design is the Plan, structure and strategy of investigation conceived as to obtain answers to research questions and central variance".

The plan is overall scheme or programme of the research. It includes an outline of everything the investigator will do from writing hypothesis and operational implications to the final analysis of data. The structure of research is more specific. It is the outline, the scheme, and the paradigm of the operation of variables. (Strategy is also more specific than plan. It includes method to be used to gather and analyse the data.

The present research work is of a descriptive type. It is suggested by many educationists that descriptive research can be used to obtain information's about current existing situation. The type of problems covered under such studies include:- describing the characteristics of communities, Establishing the properties of people in specified population who had certain views or attitudes or testing, whether certain variables are associated.

Thus descriptive research deals with relationship between variable, the testing of hypothesis and development of generalizations, principles, or theories that have universal validity. It is concerned with functional relationships.

The method of descriptive research is particularly appropriate in behavioral sciences; because many of the types of behavior that interest the researcher can not be systematically examined and analysed with the help of descriptive research only\(^2\).

Descriptive studies are not limited to only one method of data collection. These may employ any or all of the method like, observation, questionnaire, interviewing and scaling, techniques used by social scientists. Data is collected with the help of opinion survey in such studies\(^3\).

This section deals with design of the study in detail. The variables and the control employed, the size and selection of sample, the source of data, the tools, the method employed for gathering data, the reliability of instrument used and their statistical procedure used. This section consists of subsection i.e.: (1) Procedures used (2) Method of data gathering (3) Description of data gathering instruments.\(^4\)

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Hence taking in consideration all these facts the present researcher conducted the study in stages viz.-

1) Acquired the “Socio-economic Status Scale” (revised Hindi Version, 2003) constructed by Dr. R. L. Bhardwaj from National Psychological Corporation, Agra, for measuring the employees Socioeconomic Status.

2) Preparation of “Employees Health Problem Questionnaire” to find out the health problem of the university employees.

3) Preparation of “Attitude scale” on the basis of ‘Likert Attitude Scale’, for measuring the attitude of university employees towards physical fitness.

3.2 Population:

The employees working in 3 (three) non-agricultural, Universities in Vidharbha region of Maharashtra, Viz Kavi Kulguru Kalidas Sanskrit University, Ramtek, Rashtra Sant Tukdoji Maharaj University, Nagpur, and Sant Gadge Baba Amravati, University, Amravati respectively having 35, 1015 and 600 full time employees were the total population for the present study.

3.3 Sample:

A sample of 550 employees was selected from three universities of Vidharbha region of Maharashtra. Thus the sample comprised of 10 employees from Kavi Kulguru Kalidas Sanskrit University, Ramtek, 340 employees from Rashtra Sant Tukdoji Maharaj University, Nagpur, and 200
employees from Sant Gadge Baba Amravati University, Amravati, were selected to provide balanced representation (30% of the total population form each universities).

The most important criterion in selecting this sample was that it was representative of the population. Such criterion required the utilization of a stratified random sampling method. The population was first broken-down into groups, and a random sample was selected from each group.\textsuperscript{5}

This study’s sample broken down into two groups viz Administrative employees (Officers, Clerks and Peons) and Academic employees (Professor, Readers and Lecturers), by applying stratified random sampling method to choose the sample from both strata.

After this the researcher randomly selected 335 administrative and 215 academic employees as a sample for the present study.

Thus the researcher selected a total sample of 550 employees for the present research.

3.4 The Tools:

Having selected the sample, the next task was to choose suitable tools for the collection of data. The selection of tools for a particular study depends upon various considerations such as objectives of the study, the amount of time at the disposal of the investigator, availability of suitable tests, personal competence of the investigator to administer the tools, score & interpret the test results and like.

Taking into consideration these factors and having read the literature and researches already conducted related to the study as mentioned in Chapter II, the present researcher used the following tools to collect the data:

1) "Socio-economic Status Scale" constructed by Dr. R. L. Bhardwaj.

2) "Employees Health Problem Questionnaire" constructed by investigator himself.

3) "Attitude scale" constructed by investigator himself on the basis of 'Likert Attitude Scale'.

3.4.1 Construction of Employees Health Problem Questionnaire:

After reviewing the many employees health problem questionnaire from health problem literature and from WHO website and other related websites, a 35 items questionnaire was developed. The questionnaire was designed to be answered quickly with a check mark in a box proceeding Yes and No type questions. A review panel evaluated the questionnaire content validity. The panel (five registered permanent doctor form A Govt. Hospital) evaluated the extent to which item reflected participants knowledge of health problem issue. The questionnaire was pilot tested among on university employees. Results of the pilot test determined the questionnaire reliability. The reliability coefficient was .82 to .84 for internal consistency. The panel’s suggestions, and the pilot test recommendations were incorporated into the revised final instrument.

The questionnaire was divided into 2 sections. Viz. Section-A for the Bio-Data and Section-B for Medical history of the employees.
Items that was included in the Section-A:

1) Name of the employee:
2) Name of the university:
3) Address:
4) Job status: Administrative Academic
5) Gender: Male Female
6) Area of belongingness: Urban Rural

In the Section-B of the questionnaire, 38 items related to medical history, which includes total body systems (Cardiovascular, Respiratory, Nervous, Digestive, Musclo-Skeletal, Excretory, Endocrinal, Reproductive and Special Sense system) health problems were examined. The final format of the questionnaire is given in Appendix - IX.

3.4.2 Construction of Attitude Scale:

The present investigator selected 'Likert' technique for the construction of the attitude scale because of its merits given as under:

1) It avoids the difficulties encountered in using the judging group to construct a scale.
2) It yields reliabilities as high as those obtained by other techniques with fewer items.
3) It is easier for calculations.

To understand the complex nature of an individual it was necessary to know the background of an individual. This information was also very helpful in scoring and interpreting the responses, the same information
was collected with the help of same Bio-data used in Section-A of employees health problems questionnaire (3.4.1).

At the initial stage the present investigator collected 119 statements expressing different sets of opinions with the help of supervisor, colleagues and other scholars in the field of physical education. While constructing the statement the three components related to the study (Physical Fitness in particular) viz. the product, the process and the content were considered.

The criteria for construction of the statements was used as under:-

1) The statement should express one opinion or thought; it should involve only one idea.

2) The statements should not be factual, it should be capable of eliciting an opinion.

3) The statement should be clearly intelligible to the respondents.

4) The linguistic structure and words should be simple and should not lead to multiple interpretation.

5) The statements should not be composed of double negatives.

6) The statements should not be such that it is endorsed by almost every one or by almost no one.

7) The use of modifier (like, only, just, merely, all etc.) should not be such as to cause ambiguities.

There after the carefully edited list of statements was presented to experts for necessary corrections and suggestions. Necessary corrections
were executed as per the suggestions received and the statements were classified into two parts viz. favourable and unfavourable. Out of these retained items, 48 were favourable statement and 42 were unfavourable.

3.5 Pilot Study:

After constructing the preliminary opinionnaire it was tried on a random sample of 100 employees of S.G.B. Amravati University in the presence of investigator to avoid consultation with each other and to remove the doubts raised. No time limit was fixed for filling in the opinionaire. The respondents gave their opinion on a five point scale ranging from Strongly Agree to Strongly Disagree.

The items were scored as follows:

I. The favourable items were weighted as:

<table>
<thead>
<tr>
<th>Weight scale value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree (S. A.)</td>
<td>5</td>
</tr>
<tr>
<td>Agreed (A)</td>
<td>4</td>
</tr>
<tr>
<td>Undecided (U)</td>
<td>3</td>
</tr>
<tr>
<td>Disagree (D)</td>
<td>2</td>
</tr>
<tr>
<td>Strongly Disagree (S. D.)</td>
<td>1</td>
</tr>
</tbody>
</table>
II. The Negative statements were scored in reverse order as given below:

<table>
<thead>
<tr>
<th>Weight scale value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Strongly Agree (S.A.) 1</td>
</tr>
<tr>
<td>b) Agree (A) 2</td>
</tr>
<tr>
<td>c) Undecided (U) 3</td>
</tr>
<tr>
<td>d) Disagree (D) 4</td>
</tr>
<tr>
<td>e) Strongly Disagree (SD) 5</td>
</tr>
</tbody>
</table>

Each individual's score was the total number of points for all the items. Items found unmarked were awarded a weight of three (3) points. The possible range of scores for the scale was calculated from the total number of items with weightage of one and five for statements expressing favorable nor unfavorable attitudes.

Thus the scores ranged from 90 to 450. A mid point score 270 indicated neither favorable or unfavorable attitude.

According to total scores of the subjects the subjects were arranged in descending order from those of highly favorable attitude to less favourable.

This arrangement helped in selecting those statements which discriminated the subjects with greater degree of reliability.

The main aim of pilot study was to select items which discriminated those with favourable attitude from those with unfavourable attitude. For this purpose the item analysis was carried out as described below:-
3.6 **Item Analysis** :

For item analysis the entire group of subjects (N=100) was arranged according to the attitude scores. Thereafter twenty seven percent of area covered by very high scores and twenty seven percent of the area covered by very low scores were the optimum groups for use when item analysis data was obtained.

Davis\(^6\) (1949) said that, "we make use of the proportion of success in the highest and lowest 27% of the total sample because these data are those employed in obtaining a discrimination index".

3.7 **Statistical Calculation** :

For two groups of subjects and each statement of the subjects of these group statistical analysis related to critical discrimination ratio was found out. So each statement was then analysed to find out the frequencies of different weights; both in the 'high' and 'low groups'. From these frequencies; the mean and the standard deviation for each item was calculated. Difference between the means, when means are uncorrelated; the 't' formula for testing their difference was used as below:-

When the two samples are of equal size i.e. \( N_1 = N_2 \) the Fisher's 't' value for uncorrelated means quoted by 'Gilford'\(^7\):-

\[
t = \frac{M_1 - M_2}{\sqrt{\frac{\Sigma x_1^2 + \Sigma x_2^2}{N_1 (N_1 - 1)}}}
\]


where $N_1 = \text{size of either sample}$

OR

$$t = \frac{X_H - X_L}{\sqrt{\frac{\Sigma X_H^2 (X_H)^2 + \Sigma X_L^2 (X_L)^2}{N (N - 1)}}}$$

where $X_H$ is the mean value of the 'High' group.

$X_L$ is the mean value of the 'Low' group.

$X_H$ is the score of the High group.

$X_L$ is the score of the Low group.

where, $\Sigma X_H = \Sigma F_X$ and $\Sigma X_L = \Sigma f_X$

A sample table showing tabulation for calculation for critical ratio.

<table>
<thead>
<tr>
<th>Categories</th>
<th>High</th>
<th></th>
<th></th>
<th>Low</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight X</td>
<td>F</td>
<td>$F_X$</td>
<td>$F_X^2$</td>
<td>X</td>
<td>f</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>5</td>
<td>14</td>
<td>70</td>
<td>350</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Agree</td>
<td>4</td>
<td>9</td>
<td>36</td>
<td>144</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Undecided</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>18</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27</td>
<td>78</td>
<td>517</td>
<td>27</td>
<td>50</td>
<td>251</td>
</tr>
</tbody>
</table>

$$X_H = \frac{\Sigma X_H}{N} \quad \text{Mean} = \frac{115}{27} = 4.25$$

$$X_L = \frac{\Sigma X_L}{N} \quad \text{Mean} = \frac{77}{27} = 2.85$$
\[ X_H^2 = 517 (X_H)^2 \]
\[ = (4.25)^2 \]
\[ = 18.10 \]

\[ X_L^2 = 251 (X_H)^2 \]
\[ = (2.85)^2 \]
\[ = 8.12 \]

\[ X_H - X_L = 4.25 - 2.85 \]
\[ = 2.05 \]

\[ t = \frac{2.05}{\sqrt{\frac{517 - 18.10 + 251 - 8.12}{27 (27 - 1)}}} \]

\[ t = \frac{2.05}{\sqrt{\frac{741.78}{702}}} = \frac{2.05}{1.03} = 1.99 \]

The formula for critical ratio and 't' are same therefore the present researcher calculated 't' value for each statement as per the above mentioned formula and the researcher used 0.05 as the level of significance. the 't' value for this is 1.98 for the degree of freedom 98.

The final scale for measuring attitude of respondents consisted 55 statements out of 90 statements . In which 29 [Twenty nine] statements were favorable and 26 items were unfavorable .

**Reliability :-**

The reliability of the instrument (opinionnaire) was calculated with the help of split -half method and it was found 0.92 (N=100).
The validity of the test :-

As all possible items that are relevant to physical Fitness were collected from different sources and included in the opinionnaire, it can be reasonably assumed to have content validity.

Garrett states that "to be valid a test must be Reliable". Moreover all possible items that are relevant to Physical fitness of University employees, were collected from different sources and included in opinionnaire. Hence it can be reasonably assumed to have significant content validity.

The final scale of 55 items selected on the basis of their obtained 't' value which was given in the Appendix No.- VII.

3.8 Data Collection:

The present researcher visited personally to Kavi Kulguur Kalidas Sanskrit University, Ramtek, Rashtra Sant Tukdoji Maharaj University, Nagpur, and Sant Gadge Baba Amravati, University, Amravati, and distributed the tools (Socio-economic Status Scales, Employees Health Problem Questionnaires and Opinionnaires) to 600 employees. While filling up the opinionnaire from employees he explained the meaning of questions and statement to make it convenient for filling of the tools. He collected 580 Socio-economic Status Scales, Employees Health Problem Questionnaires and Opinionnaires (Attitude Scale towards Physical Fitness) from employees. The present researcher assured them all that the information passed on by them

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would be kept secret and used for present research purpose only. Due to language problem the Employees Health Problem Questionnaire and Attitude Scale towards Physical Fitness were prepared in Marathi Language as to provide more convenience to the employees while filling the tools same. Thus he could ultimately collect 580 tools from employees duly filled as per instructions given to them.

The present researcher then verified each and every tool filled in by employees. After verification he had to reject 30 tools of employees due to mistakes committed in them. Thus he retained 550 tools. As such the present researcher collected the data for tabulation and statistical analysis.

3.9 Statistical Formula Used:

To find out the difference and relationship in between socio-economic status, health problems and attitude towards physical fitness of university employees working in Vidarbha Region universities of Maharashtra if any; ⁹ Chi-square's Contingency and Additive Properties, both \( \chi^2 \) statistical technique was employed.

\[
\text{Chi-square (} \chi^2 \text{)} = \sum \frac{(f_0 - f_e)^2}{f_e}
\]

where, 
\( f_0 = \text{frequencies observed} \)
\( f_e = \text{frequencies expected} \)

\( \text{d.f.} = (C - 1) (R - 1) \)

where, 
\( \text{d.f.} = \text{Degree of freedom} \)
\( C = \text{No. of Columns in the table} \)
\( R = \text{No. of Rows in the table} \)

The data pertaining to this study was also analysed by using percentage (%) and average percentage statistics independently.

In case of measuring the difference between attitude towards physical fitness among various variables, if any the 't' test (critical ratio) was employed.

\[
\text{Sem} = \sqrt{\frac{SD_1^2}{N_1} + \frac{SD_2^2}{N_2}}
\]

\[
' t' = \frac{M_1 - M_2}{\text{Sem (Standard Error of Mean)}}
\]

where

\( M_1 \) = Mean value of group one.

\( M_2 \) = Mean value of group two.

\( SD_1 \) = Standard deviation of group one.

\( SD_2 \) = Standard deviation of group two.

\( N_1 \) = Size of sample in group one.

\( N_2 \) = Size of sample in group two.

The level used in testing null hypothesis of the present study for significance difference was 0.05.

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