CHAPTER III

METHODOLOGY AND PROCEDURE OF THE STUDY
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CHAPTER-III
METHODOLOGY AND PROCEDURE OF THE STUDY

In this chapter the description of the quantitative design used to complete the research was attempted to explain the ultimate goal of the study i.e. to find out the impact of Mid-Day-Meal Scheme on enrolment and retention of the students in the primary schools. To investigate the impact the study was presented in the following sub-headings:

3.1. Research Design
3.2. Population
3.3. Sample and Sample Size
3.4. Tools
3.4.1. Development of Tools
3.4.2. Tools Administration / Data Collection
3.5. Processing and Analysis of Data

3.1. Research Design

"Research Design may be referred to as research plan, structure and strategy of investigation conceived so as obtain answer to research questions and control variances" (Kerlinger, 1973). The plan is the overall scheme of the program of the research. According to Selting Wrightsman & Cook (1981), "Design is deliberately a planned arrangement of condition for the analysis and collection of data in a manner that aims to combine relevance to the research purpose with economy of procedure". It includes an outline of what the investigator will do from writing the hypothesis and their operational implications to the final analysis of data. Strategy implies how the research objectives will be reached and how the problems encountered in the research will be tackled. Research design sets up the framework for the whole study. It tells us what observations to make, how to make them, how to analyze the quantitative representations of the observations. Design doesn’t tell us precisely what to do rather it suggests the directions for making the observations and analysis.

This chapter gives a brief account of the method used in the study, the population, the sample chosen, the tools used, and the development of the tools, procedure adopted for the collection of
data and techniques used for the analysis of data. For the purpose the researcher passed through the following gateways to prove the hypotheses for the fulfillment of the research objectives. The stepwise description is hereunder:

STEP-I- Development of Tool for the Investigation
STEP-II- Administration of the Developed tools
STEP-III – Tabulation of the Collected Data
STEP-IV – Interpretation of the tabulated Data
STEP-V – Analysis of Interpreted Data
STEP-VI – Testing the Hypotheses
STEP-VII – Enlisting Each and every activity as a Research Report

3.2. Population

Any group of individuals that have one or more characteristics in common that are of the interest to the researcher can be defined as population (Best & Kahn, 1993).

The population for the present study comprised of 32 government primary schools of 08 selected blocks from the four selected districts of Western Uttar Pradesh and the officials involved in the functioning of the scheme.

3.3. Variables under Study

The dependent variable is 'dependent' on the independent variable. As the experimenter changes the independent variable the change in the dependent variable is observed and recorded. In an experiment the independent variable is the variable that is varied or manipulated by the researcher and the dependent variable is the response that is measured. In other words we can say that an independent variable is the presumed cause whereas the dependent variable is the presumed effect.

In this study Enrolment and Retention were the major dependent variables, whereas the Mid Day Meal Scheme was the major independent variable. Though, the researcher had genuinely tried to explore the other related independent variables also for the sake of comparison such as free
uniforms, scholarships, academic performances etc which could affect directly or indirectly to the level of enrolment and retention in the government primary schools.

3.4. Sample & Sample Size:

The outputs of every research are the findings that are generalized across the entire population under the study. It is therefore necessary to choose a sample that is the representative of the entire population. The precision in sample estimates is directly proportional to the sample size. The larger the sample size the more accurate will be the results of the study and vise-a-versa. The large sample also contains less standard error.

"A sample is a segment of population selected to represent the population as a whole. Simple random sample may be defined as a subset of individuals (a sample) chosen from a larger set (a population) where each individual is chosen randomly and entirely by chance such that each individual has the same probability of being chosen at any stage during the sampling process" (Yates, David & Daren, 2008). The samples are indeed never chosen haphazardly rather they are selected in an absolutely systematic manner so that they should belong to the true representative of the entire population under study. "Sample refers to a small representative proportion of population selected for observation & analysis. A sample is a sub-group of population" (McCall, 1980).

3.4.1. Sampling Frame:

Primary and secondary information was collected to test the various parameters inherent in the objectives. The sampling frame consisted of districts, tehsils / blocks, villages, schools and households of Western Uttar Pradesh. Each unit of sampling frame was selected by using a multistage stratified sampling method along with the convenience sampling.

3.4.2. Selection of Districts:

While selecting the four districts from Western Uttar Pradesh the criteria was convenience sampling which would be easy and economical to investigate the target population. The selected districts were:

1. Aligarh
2. Saharanpur
3.4.3. Selection of Blocks:
Two blocks from each district were selected in this way total 8 blocks from 04 selected districts were selected on the basis of simple random sampling method.

3.4.4. Selection of Schools:
From a list of all types of schools and centers which were maintained in the sample (selected) blocks, at least 4 primary schools from each block run by the state government were selected. In total 32 schools were selected on the basis of convenience sampling.

3.4.5. Selection of Villages:
The village where the sample school was located stood selected as a sample village for canvassing the schedules. Concluding the selection of each stratum the following table provides the required information:

<table>
<thead>
<tr>
<th>Districts</th>
<th>Blocks</th>
<th>Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aligarh</td>
<td>Atrauli</td>
<td>Bahadurpur, Chakaathal, Kunjal Pur and Lohagarh</td>
</tr>
<tr>
<td></td>
<td>Dhanipur</td>
<td>Alinagar, Barautha, Rustampur Alum, and Tajpur</td>
</tr>
<tr>
<td>Saharanpur</td>
<td>Gangoh</td>
<td>Jogipura, Satsara, Tabarakpur and Vilaspur</td>
</tr>
<tr>
<td></td>
<td>Nanauta</td>
<td>Chowra, Dadanpur, Jaidpura and Mohammadpur Gada</td>
</tr>
<tr>
<td>Moradabad</td>
<td>Sambhal Nagar</td>
<td>Timar Das Sarai, Hateem Sarai, Kanya Kot and Garvi</td>
</tr>
<tr>
<td></td>
<td>Kundarkee</td>
<td>Lalwara, Mehrauli, Jaitpura and Nanpura</td>
</tr>
<tr>
<td>Meerut</td>
<td>Daurala</td>
<td>Andawli, Dulhera, Surani and Ulakhpur</td>
</tr>
<tr>
<td></td>
<td>Mawana</td>
<td>Batnaur, Falwada, Meerpur and Paharpur</td>
</tr>
</tbody>
</table>

Table-3.1.
Selection of Districts, Blocks & Villages
3.4.6. Sample of Beneficiary Students

From all selected schools for the study, 500 enrolled beneficiary students were selected randomly by giving a minimum representation of one boy and one girl beneficiary from each standard i.e. from classes 1st to 5th. In case of non-availability of a girl student in any of the classes in a co-education school, the shortfall was made up from boys. The questionnaire entitled ‘Questionnaire for Students’ (Annexure- A₁ & B₁) was used to investigate the randomly selected students.

3.4.7. Sample of Teachers

In total 60 teachers were investigated through the questionnaire entitled “Questionnaire for Teachers” (Annexure- A₂ & B₂). The teachers were selected on the basis of stratified random sampling. Since equal numbers of teachers were not available in all the selected school therefore per school number of teachers was not fixed so the teachers were selected as per their availability in the sampled schools.

3.4.8. Sample of Parents/Guardians of Sampled Students

From the same sample schools the parents/guardians of 300 enrolled beneficiary students were selected for administering the parents’ questionnaire (Annexure- A₃ & B₃).

3.4.9. Sample of Headmasters

Headmasters of all the sampled schools were sampled for the investigation regarding the execution of MDM scheme in each school. There were 40 headmasters investigated through the questionnaire entitled ‘Questionnaire for Headmasters’ (Annexure- A₄ & B₄).

3.4.10. Sample of Grampradhans

Grampradhans are the elected village representatives of the Grampanchayats. Generally there is one Grampradhan for each village. The state government has assigned the responsibility of MDM execution in the villages to the Grampradhans. 20 Grampradhans among the randomly selected villages from 2 blocks of all four districts were investigated through the questionnaire entitled “Questionnaire for Grampradhan” (Annexure- A₅ & B₅).
3.4.11. Sample of ABSAs (Assistant Basic Shiksha Adhikari)

ABSA's are accountable for the administration of the MDM scheme among all the schools in a particular block. This officer is appointed to assist the BSAs (Basic Shiksha Adhikaris). BSAs are accountable for the whole district. Total 10 (ten) ABSAs were investigated through the questionnaire entitled ‘Questionnaire for ABSAs’ (Annexure- A6 & B6). Since there is a provision of only one ABSA for one block therefore the sample size was confined to 10 only.

3.4.12. Sample of Cooks

Cooks are considered to be the sole stakeholders of the scheme. They were proved as first information centre for the investigation. Therefore 30 cooks from the selected schools were selected for the investigation through self developed interview schedule (Annexure- A7 & B7).

3.4.13. Self Spot-Observation

It was decided that the observations would be made on the spot to understand the reality during the survey. The checklist (Annexure- A8 & B8) for the same were developed to make the things pre-decided on certain evaluative parameters such as hygienic conditions, quality, logistics procedure, procurements of the MDM inputs and the attitudes of the teachers, headmasters & other staffs during food distribution.

Following table shows the size of the sample, target group, types of tools and sampling methods used to collect the data from those samples.
Table-3.2.
Sample & Sample Size

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Target Group</th>
<th>Types of Tool</th>
<th>Total Sample Size</th>
<th>Sampling Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Students</td>
<td>Questionnaire</td>
<td>500</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>2.</td>
<td>Teachers</td>
<td>Questionnaire</td>
<td>60</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>3.</td>
<td>Parents</td>
<td>Questionnaire</td>
<td>300</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>4.</td>
<td>Headmaster</td>
<td>Questionnaire</td>
<td>40</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>5.</td>
<td>Grampradhan</td>
<td>Questionnaire</td>
<td>20</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>6.</td>
<td>ABSA</td>
<td>Questionnaire</td>
<td>10</td>
<td>Convenience Sampling</td>
</tr>
<tr>
<td>7.</td>
<td>Cook</td>
<td>Checklist</td>
<td>30</td>
<td>Stratified Random</td>
</tr>
<tr>
<td>8.</td>
<td>Self Observation</td>
<td>Checklist</td>
<td>40</td>
<td>Selected Schools</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

3.5. Tools

Since the present study is an evaluative study based on the data collected from both primary and secondary sources, interviews and observations. The data from the secondary sources related to enrolment and retention was collected from the schools’ records viz-a-viz MDM registers, attendance registers, and admission registers etc.

To study the theoretical background of MDM in India and Western Uttar Pradesh in particular secondary sources were consulted. Those sources were comprised of:

1. The Guidelines on National Program on Nutritional Support to Primary Education, developed by MHRD,
2. Mid-Day-Meal Annual Work Plan 2011-12,
3. Various Monitoring Reports on MDM,
4. Office orders and notifications related to MDM,
5. VEC manual and all official documents,
6. Letters and information relating to the school meal program from DEO, SDEO and
7. MDM Cell, in all four selected districts.
Opinion of cooks, school children, parents and members of VEC and administrators were obtained through interviews and structured and unstructured questionnaires. Questionnaires were prepared for teachers, students, parents, cooks and administrators in charge for implementing MDM scheme. Data Capture Format for obtaining information from the schools about MDM was also prepared.

3.5.1. Development of Tools:
For the purpose of complete investigation of the impact of Mid-Day Meal Scheme on enrolment and retention, eight different tools were developed. The researcher developed the tools by following the same steps for all the eight tools. The detailed explanation of tool i.e. 'questionnaire for students' is hereunder:

3.5.1.1. Attitude Scale for the Impact on Enrolment and Retention:
The impact attitude scales were developed on Likert Method (1932). The scales were designed to elicit information from the respondents concerned to the impact of Mid-Day Meal Scheme on enrolment and retention in the primary schools. The development of the investigation tools passed through the following five phases:

i. Collection and writing of Items
ii. Scrutiny
iii. Try out
iv. Scoring
v. Item Analysis

3.5.1.2. Phase –I – Collection and Writing of Items:
The researcher collected the items from the different sources, in other words the number of statements that could provide enough information regarding the impact of MDM on enrolment and retention were collected to construct the Five- Points Likert Scale. It revealed the respondents’ behavior across the content areas and across the researcher’s objectives. For the purpose the researcher surveyed the available resources of relevant information in electronic and print media, text books, existing psychometric scales and research articles etc. The initial
Methodology and Procedure of the Study

investigation generated a long list of items pertaining to the determinants of the Mid-Day Meal and its impact. The list was then categorized into the following several aspects of MDM and its impact:

<table>
<thead>
<tr>
<th>S. N</th>
<th>Categories</th>
<th>Related Objectives</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enrolment</td>
<td>1, 2</td>
<td>1, 2</td>
</tr>
<tr>
<td>2</td>
<td>Retention &amp; Attendance</td>
<td>3, 4</td>
<td>3, 4</td>
</tr>
<tr>
<td>3</td>
<td>Quantity and Quality of MDM</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Problems in coordination with stakeholders</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Laxity in the Execution of MDM scheme</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Reasons for Enrolment / Attendance</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Table-3.3. Objective-wise Categorization of items

On the basis of this survey the researcher then formulated the thought provoking and enquiry-based questions which were to address these aspects. A preliminary draft of 63 items for the students was prepared to explore all possible dimensions of the impact of MDM on them. The distribution of all the items over different dimensions was decided according to their weightage compared to the determined objectives of the study. The occurrence of each aspect in the scale and the final selection of items were made to include all aspects in fair measures and after realizing the short comings in the preliminary drafts, the researcher modified the scale as a whole. In the initial draft the items were of multiple choice type having five alternatives. The negative items were also included in order to make the testing more valid. Obviously those negative items were in the contradiction of the positive statements to make the evaluation more accurate. Finally the information of multiple choice questions was converted into five-point Likert Scale.

3.5.1.3. Phase-II- Scrutiny:
For the scrutiny purpose the researcher invited the intellectuals for open critique of the selected items after its first draft. As a result the healthy suggestions were expected from all the concerned persons such as authorities, experienced teacher-educators, researchers in education,
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staff working at primary schools and linguistic experts in order to improve the quality of the tool. This was carried out to appraise the overall design, sequential arrangement of the items, reshaping of the items, situational appropriateness of the language, its clarity and cognitive & logical validity of the content. As a result the experts communicated their valuable suggestions and critical comments required for the development of the tools. On those bases some of the statements were modified, reframed, deleted or new statements were framed and incorporated so as to make the scale more effective. After getting the experts’ approval the revised version of the scale was used for the tryout.

3.5.1.4. Phase-III- Tryout:
The number of items constructed till then was considerably larger than the number of items needed for the final test. The initial form of ‘MDM impact on students’ consisting of 63 items was administered over a sample of 90 subjects. The respondents in tryout study were volunteers from the target population. These respondents included the students from 05 different schools of 02 blocks randomly selected from the primary schools of rural and urban areas. According to Nunally (1970), "The number of individuals for tryout of tests should be three to four times of the number of items". Instructions to the respondents required to respond to each of the items were according to their extent of agreement or disagreement on a 5-point scale.

3.5.1.5. Phase-IV- Scoring:
The responses had been given different weightage for all the positive statements in the tools the response category was:

- SA - 'Strongly Agree' a weight of 5,
- A - 'Agree' a weight of 4,
- U - 'Undecided a weight of 3,
- D - 'Disagree' a weight of 2, and
- SD - 'Strongly Disagree' was given a weight of 1,

In contrast the negative statements were polarized just reverse of the same. This reverse polarity was used for the subsequent analysis. The marking was according to the positive and negative
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statements from all 63 items. Finally the sum of these items was resulted as the MDM impact on the students.

**Code-sheet and Analysis of Data:** To evaluate the accuracy and simplicity the numeric codebook was designed for the interpretation of the responses and the same data was used for further statistical analysis. All the items in the scales were numbered and each response was assigned a value. The code-sheet was a two-dimensional matrix consisting of total number of variables in the scale versus the number of students in each school. First of all the data was manually entered on the coded sheet in MS-Excel sheet, then SPSS (Statistical Package in Social Studies) software was used to analyze the same.

**3.5.1.6. Phase-V Item Analysis:**

With the help of the ‘Pearson’ product-moment correlation technique the item-analysis was done to determine the discrimination power of each item with the total test. It was aimed that to make the developed scales homogeneous by checking the consistency of each item with the total test and by discarding the items which proved inconsistent. The Items found to have a correlation of 0.40 or less with the total test were discarded. Based on this analysis 07 items were discarded from the questionnaire. To remove the effects of the eliminated items the scores of the respondents on them were deducted from their total scores and item total correlation was again computed in respect of the remaining items.

**3.5.1.7. Reliability:**

The meaning of reliability can be understood by the definition of *Gay and Airasian, (2000)*; ‘Reliability is the degree to which a test consistently measures whatever it is measuring and the reliability coefficient indicates the consistency of the scores produced. It relates to the extent to which an instrument provides similar results every time it is administered to the same sample at different times’.

"The consistency of data is achieved when the steps of the research are verified through the examination of such items as raw data, data reduction procedures and process notes" (Campbell
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Here it is the researchers' responsibility to assure high consistency and accuracy of the tests and scores.

To find the correlation of the scores of the subjects on odd items of the test with their scores on even items the split-half reliability coefficient method was used. The correlation coefficient thus obtained was 0.83 which when corrected by Spearman Brown Prophecy Formula increased to 0.91.

With the tryout data the reliability for the developed tool was established by using Cronbach's Alpha Method. The Cronbach's $\alpha$ (alpha) is a coefficient of internal consistency. It is the most commonly used measure of reliability as an estimate of the reliability of a psychometric test for a sample of examinees. It was first named alpha by Lee Cronbach in 1951, as he had intended to continue with further coefficients. The measure can be viewed as an extension of the Kuder-Richardson Formula 20 (KR-20) which is an equivalent measure for dichotomous items. Alpha is not robust against missing data. "If the items in a test are correlated to each other the value of alpha is increased. However a coefficient alpha does not always mean a high degree of Internal Consistency because Alpha is also affected by the length of the test: If the total length is too short the value of Alpha is reduced (Nunally 1994 Streiner, 2003).

The theoretical value of alpha varies from zero to 1, since it is the ratio of two variances. However depending on the estimation procedure used, estimates of alpha can take on any value less than or equal to 1 including negative values, although only positive values make sense. Higher values of alpha are more desirable. Some professionals as a rule of thumb require a reliability of 0.70 or higher (obtained on a substantial sample) before they will use an instrument. Furthermore the appropriate degree of reliability depends upon the use of the instrument. For example an instrument designed to be used as a part of the battery of tests may be intentionally designed to be as short as possible and therefore somewhat it is less reliable. In the extreme case of a two-item test, the Spearman-Brown prediction formula is more appropriate than Cronbach's alpha. A commonly accepted rule of thumb for describing internal consistency by using
Cronbach's alpha is as follows, however, a greater number of items in the test can artificially inflate the value of alpha and a sample with a narrow range can deflate it.

For this purpose, all the tools of the study went through the process of reliability check. The $\alpha$ coefficient values were calculated, following table shows the internal consistency of the items of all the tools through obtained $\alpha$ coefficient value.

<table>
<thead>
<tr>
<th>SN</th>
<th>Tools developed for</th>
<th>Main Purpose for tools</th>
<th>Reliability - Cronbach's $\alpha$ coefficient</th>
<th>Validity Methods*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Students</td>
<td>To investigate the view regarding the effects and execution of MDM</td>
<td>0.812</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>2</td>
<td>Teachers</td>
<td>To understand the reality of MDM</td>
<td>0.791</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>3</td>
<td>Parents</td>
<td>To know the actual reasons of enrolment &amp; retention.</td>
<td>0.784</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>4</td>
<td>Headmasters</td>
<td>To understand the accountability of the execution of the scheme</td>
<td>0.779</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>5</td>
<td>Grampradhan</td>
<td>To investigate the logistics for the MDM scheme.</td>
<td>0.812</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>6</td>
<td>ABSAs</td>
<td>To understand the legal accountability of the executives</td>
<td>0.774</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>7</td>
<td>Cooks Checklist</td>
<td>To know the quality &amp; quantity of the ingredients &amp; cereals for MDM</td>
<td>0.714</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
<tr>
<td>8</td>
<td>Spot-Observations</td>
<td>To observe the ground-realities of MDM sites and its execution</td>
<td>0.821</td>
<td>Face Validity &amp; Content Validity</td>
</tr>
</tbody>
</table>

The above table shows that the $\alpha$ coefficient of the MDM Impacts on students scales was found 0.812 which falls under the category of Good (Low-Stakes Testing), for teachers the $\alpha$ coefficient 0.791 which was falling under the same category,
3.5.1.8. Validity:

According to Brown (1996) "The validity refers to the extent to which an instrument measures what it is designed to measure". It is also known as the measurement tool of the strength of conclusion, inference and proposition.

Face validity refers to "the degree which a test measures an intended content area" (Gay & Airasian, 2000). The content validity for the instrument was also established by the panel of the experts. The instrument was evaluated during and after development. Feedback from the panel experts was used to make modifications and clarifications prior to and after conducting the pilot study. The content validity was claimed on the basis of the fact that items were accumulated as a result of a thorough investigation of the literature on Mid-Day meal's effectiveness. Further, those items were reviewed and evaluated by a number of experts keeping in mind their expertise in the language, experience in the field of research and primary education, exposure to the population and sampled students and their satisfaction level. Therefore only those items were included in the scale for which there had been 100% agreement amongst judges regarding their relevance to Mid-Day Meal effectiveness.

3.5.1.9. Final Form of the Students' Opinion Scale:

The Questionnaire for the students in its final form consisted of 30 highly discriminating Items. The scale which was revised on the basis of inputs from the preliminary analysis of the try out was administered to the sample of the present study. A copy of the scale is attached as ANNEXURE I.

3.6. Development of Other Tools

On the basis of one questionnaire, i.e. Questionnaire for student other 05 tools (Questionnaires of teachers, parents, headmasters, Grampradhans and ABSAs), Checklist of the cooks and Observation schedule were also developed by following the same steps such as-

Stage I - Collection and writing of items
Stage –II -Scrutiny
Stage –III – Tryout
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Stage - IV - Scoring
Stage - V - Reliability
Stage - VI - Validity
Stage - VII - Finalizing the Items

After following the above stages of item development for all the tools the items were finalized. The following table summarizes the stages of item development for all the tools in brief:

<table>
<thead>
<tr>
<th>SN</th>
<th>Tools</th>
<th>Sample Size</th>
<th>Tryout</th>
<th>Total written items</th>
<th>After scrutinizing</th>
<th>Post Reliability</th>
<th>Final-Post Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Students’ Opinion</td>
<td>500</td>
<td>90</td>
<td>63</td>
<td>51</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>Teachers’ Opinion</td>
<td>60</td>
<td>16</td>
<td>69</td>
<td>58</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>3.</td>
<td>Parents’ Opinion</td>
<td>300</td>
<td>60</td>
<td>58</td>
<td>50</td>
<td>42</td>
<td>21</td>
</tr>
<tr>
<td>4.</td>
<td>Headmasters’ Opinion</td>
<td>40</td>
<td>8</td>
<td>71</td>
<td>61</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>5.</td>
<td>Grampradhans’ Opinion</td>
<td>20</td>
<td>5</td>
<td>51</td>
<td>39</td>
<td>31</td>
<td>23</td>
</tr>
<tr>
<td>6.</td>
<td>ABSAs’ Opinion</td>
<td>10</td>
<td>2</td>
<td>55</td>
<td>40</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td>7.</td>
<td>Cooks’ Checklist</td>
<td>30</td>
<td>4</td>
<td>55</td>
<td>33</td>
<td>29</td>
<td>25</td>
</tr>
<tr>
<td>8.</td>
<td>Self Observation</td>
<td>40</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>18</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1000</td>
<td>185</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3.6.1. Tools Administration

The survey of the study began with the visit to the government primary schools of Aligarh district which was followed by the extensive field survey from the four selected districts of Western Uttar Pradesh. The government primary school Chakaithal & the government primary school Kunjalpur from Atrauli Block and the government primary school Barautha & the government Primary school Rustampur Alum from Dhanipur Block of Aligarh district were visited to collect the samples for Item-analysis. It was found that the enrolment in these four (04) schools ranged from 34 to 155 and the daily attendance ranged from 26 to 140 (according to the teachers estimates and personal observation). Number of the teachers varied from 2 to 8 in
sampled primary schools of both the blocks of the district. Data collection included the planned and unannounced visits to the schools to observe the meals’ preparation and its distribution in its natural settings. Detailed questionnaires and interview schedules in both the languages (Hindi and English) were administered with the government primary schools’ headmasters, students, parents of enrolled children, headmasters and other functionaries. Questions and answers were repeated and explained as it was necessary to prevent misunderstanding. Cooks were asked short and simple questions. The questionnaires were distributed and collected from all the 30 cooks of the sampled schools. Through the questionnaires the researcher tried to find out their perceptions about the school meal program, its implementation and impact. In administering the questionnaires finally several officers of the district involved in its implementation were interviewed in order to acquire their views about the implementation, the monitoring strategies and success and problems of the scheme.

3.6.1.1. Data Collection:
For the purpose of complete and successful investigation following two types of data were collected:

1. Primary data collected through direct investigation from students, teachers, parents, headmasters, Grampradhans, ABSAs, cooks and observation schedule.
2. Secondary data collected from the school records for the purpose of comparative empirical evidences of enrolment and dropouts which led to retention.

3.6.1.2. Hurdles in Data Collection:
Though it was quite easy to visit the school during its working days and working hours but to get the permission for the data collection or investigation from the authorities was quite difficult. Especially the school authorities including teachers were not so positive about the cooperation rather they were a little scared and had feeling that the investigation might be from the higher authorities. The researcher faced many problems as majority of the parents were illiterate. The same kinds of difficulties were in the way of investigation from the Grampradhans also but after making them to understand the purpose they helped and cooperated later on. The teachers and the headmasters though face so many problems in the proper execution of the MDM scheme in
the schools yet they were not ready to provide the real and exact information of the scheme however after taking them in confidence only they could reveal some reality. The great difficulty was faced to contact the ABSAs, because being the inspecting authority they were always in the field and it was quite difficult to meet them.

3.7. Processing & Data Analysis:

All the above questionnaires, schedules and observations sheets were checked properly for its completeness. The data had been analyzed separately under separate sections as indicated in the tools of study. The questionnaires’ responses were arranged under categories mentioned in the chapter.

3.7.1. Scoring Procedure:

Prior to conduct the analysis in the preliminary analysis the internal consistency of each scale was first examined. The final statements were selected after the item analysis and judgmental validity. All statements of the questionnaires were scored by counting the total responses obtained and by adding their weightage assigned to each statement.

3.7.2. Data Analysis:

Data analysis is the process of evaluating the data by using analytical and logical reasoning to examine each component of the data provided. Data from various sources is gathered, reviewed, and then analyzed to form some sort of findings or conclusions. There are a variety of specific data analysis method, some of which include data mining, text analytics, business intelligence, and data visualizations.

3.7.3. Statistical Techniques Employed:

The obtained data was analyzed by employing both Descriptive as well as Inferential Statistics. A brief description of it is given below-
3.7.3.1. Descriptive Statistics-
Descriptive Statistics are the statistical methods used to organize and summarize the data through the measures of Central Tendency and measures of Variability. In the present study Percentages were used to serve the purpose.

- Percentage:
In the process of classification and tabulation the size of data might be fairly large in quantity and the figures may be very big so it may not be easy to draw inferences from them. To remove this difficulty percentages are calculated so that big figures are reduced to small ones and a relative study of the data is possible because absolute figures are unfit for the relative study. Percentages are obtained by a combination of two or more figures. They are derived from the absolute figures collected for the purpose of investigation. In percentage one figure is taken as base and is represented by 100 and the other figure is expressed as a ratio of this base.

3.7.3.2. Inferential Statistics
Inferential Statistics are used to make the inferences about the population. According to Sekron (2003); “Inferential Statistics is employed when generalizations from a sample to the population are made”

In the present study the Inferential Statistics used were - ANOVA, Post-Hoc Scheffe’s test, Paired sample t-test and One-sample t-test. For the sake of investigation of the established relationship between MDM and the Enrolment/Retention in the sampled schools the researcher employed suitable statistical techniques for analyzing the quantitative data in accordance to the nature of variables involved and the objectives of the study. Following table has summarized the statistical techniques used in the data analysis of this study:


### Table-3.6

**Statistical tools used: (Courtesy SPSS-V.19.0)**

<table>
<thead>
<tr>
<th>SN</th>
<th>Statistical Tools Used</th>
<th>Reasons for Adopting Statistical Tools</th>
<th>Target Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Paired sample t-test</td>
<td>Data was of two era pre &amp; post MDM period so for comparison between these two it was used.</td>
<td>2 &amp; 4</td>
</tr>
<tr>
<td>2</td>
<td>Analysis of Variances (ANOVA)</td>
<td>ANOVA was used to know the difference of opinions between the means of the samples.</td>
<td>1,3,5 &amp; 7</td>
</tr>
<tr>
<td>3</td>
<td>Percentage.</td>
<td>For straight &amp; simple comparison of scoring from the collected primary data through questionnaires this descriptive statistics was used.</td>
<td>1,3,5,6, 7 &amp; cooks’ checklist</td>
</tr>
<tr>
<td>4</td>
<td>One sample t-test</td>
<td>For spot observation schedule to analyze the differences in the expected assumed mean and obtained mean of the spot observation data for getting the real condition of the execution of MDM scheme in schools it was used.</td>
<td>Spot observation schedule</td>
</tr>
<tr>
<td>5</td>
<td>Mean values</td>
<td>To know the most effective reason of enrolment and retention in the schools this technique was used.</td>
<td>8</td>
</tr>
</tbody>
</table>

- **Paired Sample t-Test**

A paired sample t-test is used when the data is collected from only one group of people on two different occasions or under two different conditions. Pre-test and Post-test experiment designs are the examples of the type of situation where this technique is appropriate.

- **Analysis of Variances (ANOVA):**

  Analysis of variance (ANOVA) is a statistical method that analyses the independent and interactive effects of two or more independent variables on dependent variables (Kerlinger, 1983). ANOVA provides an effective way to determine whether the means of more than two samples are too different to attribute to sampling error. The F-ratio is computed by using the following formula:

  \[
  F = \frac{V_b}{V_w} = \frac{\text{between the group variance}}{\text{within the group variance}}
  \]

  The critical values of F-ratio are found in F table which indicates the critical values necessary to test the null hypothesis of selected levels of significance.
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- **Scheffe’s Test for Post-Hoc Analysis:**

  Post-Hoc Analysis is done in the situations in which the investigator has already obtained a significant ANOVA with a factor that consists of three or more means and additional exploration of the difference among means is needed to provide specific information on which means are significantly different from each other. Scheffe’s Post-Hoc test is perhaps the most popular among all the Post-Hoc tests. The formulae of Scheffe's Post-Hoc test is inbuilt in the SPSS software so it was done through that package.

  - **Degrees of freedom (df)** refers to the number of values that are free to vary after the restriction has been placed on the data. For instance if we have four numbers with the restriction that their sum has to be 50 and three of these numbers can be anything they are free to vary but the fourth number is definitely restricted. For example the first three numbers could be 15, 20, and 5, the sum of which would be 40, it means that the fourth number has to be 10 in order that they sum to 50. The degrees of freedom for these values are then three. The degrees of freedom here is defined as \( N - 1 \), the number in the group minus one restriction \( (4 - 1) \).

  - **Level of Significance:** The null hypotheses are accepted and rejected on the basis of some level of significance (alpha level) as a criterion. In educational and psychological circles, the 5% (0.5) alpha (\( \alpha \)) level of significance is often used as a standard for rejection. If the null hypothesis is rejected at 0.05 level it means that 5 times in 100 replications of the experiment the null hypothesis is true and 95 times this hypothesis would be false. The more stringent test of significance is 0.01, which suggests that a 99% probability exists that the obtained results are due to the experimental treatment and hence once in the 100 replications of the experiment the null hypothesis would be true.
• **One-Sample t-test:**

The one-sample $t$-test is used when we want to know whether our sample comes from a particular population but we do not have full population information available to us. For instance, we may want to know if a particular sample of college students is similar to or different from college students in general. The one-sample $t$-test is used only for tests of the sample mean. Thus our hypothesis tests whether the average of our sample ($M$) suggests that our students come from a population with a known mean ($\mu$) or whether it comes from a different population. In the present study Observation Schedule was analyzed with the help of One-Sample $t$-test. The formula used for computing the test was:

$$t = \frac{X - \mu}{SD} \frac{1}{\sqrt{n - 1}}$$

Where,

- $\bar{X} = $ Real Mean
- $\mu = $ Assumed mean

• **Mean Value:**

Mean is the simplest but most accurate measures of Central Tendency. It is computed by dividing the sum of all the scores by the number of scores popularly known as averages is technically called the 'Arithmetic Mean.' The calculation procedure of Mean is hereunder:

$$\bar{X} = \frac{\sum X}{N}$$

(Best & Kahn)

Where:

- $\bar{X}$ (Sometimes called the X-bar) is the symbol for the Mean.
- $\Sigma$ (The Greek letter sigma) is the symbol for summation (sum of).
- $X$ is the symbol for the scores in a distribution.
- $N$ is the symbol for the number of scores.
In mathematics, Mean has several different definitions depending on the context. In probability and statistics, mean and expected value are used synonymously to refer to one measure of the central tendency either of a probability distribution or of the random variable characterized by that distribution.

The statistical analysis and the interpretation of the data by using the above mentioned methodology designed for the present investigation have been presented and discussed in the preceding chapters. Almost all used tools were analyzed on the same pattern, except the checklist processed for cooks and few special open-ended questions from all stakeholders. Self-observation schedule and cooks’ checklist were analyzed separately on the basis of its subjectivity.
3.8. References:


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