CHAPTER-5

MAJOR FINDING AND DISCUSSION

5.1   Introduction:

Major findings were drawn based on data analysis and interpretation in the previous chapter. The findings are presented in this chapter are from descriptive analysis, factor analysis and correlation analysis. Descriptive analysis describes the status input variables and output variables in elementary school. Whereas, factor analysis interprets component hidden within dimension. Factor analysis helps to understand the variables. Coefficient of correlation helps to find significant correlation among variables.

5.2   Finding from Descriptive Analysis:

Variables in the study, determined into five dimension. Physical facility, academic facility, human resources, support system and output variables. Descriptive analysis describes Status of Elementary Education in Mehsana District.

5.2.1 Status of Physical Facility in Elementary School:

Physical facility in elementary school is determined into eight variables.

1. **Compound wall of the school:** Negative skewness indicts more score falling on higher values. 59.15% schools gain the maximum scores. It is found that majority schools have compound wall in good condition. It indicates that majority school have completely surrounded, strengthen and appropriate compound wall. Hence, majority schools are safe due to compound wall of the school.

2. **School entrance gate:** Negative skewness indicts more score falling on higher values. 64.79% schools gain the maximum scores. It is found that majority schools have entrance gate in good conditions. It indicates that majority schools have attractive, strengthen and appropriate entrance gate. Hence, majority school are safe due to school entrance gate.

3. **Compound of the school:** Negative skewness indicts more score falling on higher values. 75th percentile is nearer to maximum score. It is found that majority schools have safe, attractive and greenly compound. Majority school have adequate playground for children. Cleanliness is also found good in majority of school.

4. **Building of the school:** Negative skewness indicts more score falling on higher values. 75th percentile is nearer to maximum score. It is found that majority schools have safe and strengthen building. Majority schools have rooms with concrete ceiling. Majority schools have separate room for principal and separate storeroom.

5. **Infrastructure Facility in Std-7 classroom:** Negative skewness indicts more score falling on higher values. 59.15% schools gain the maximum scores. It is found that majority schools have appropriate infrastructure facility in std-7 classroom. It indicates that std-7 classroom has proper seating arrangement, blackboard, ventilation, electricity, fans.

6. **Water arrangement:** Nearly zero skewness indicates normal distribution in the groups. Scores are distributed from minimum to maximum. It is found that water arrangement is not appropriate in the many schools. It indicates that there is not appropriate water arrangement regarding no. taps, cleanliness, and drainage in many schools.

7. **Sanitation facility:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is nearer to minimum. It is found that sanitation facility is not appropriate in majority of school. It indicates that there is lack of running water facility, lack of cleanliness. In many schools latrine is locked at the time of visit.

8. **Scores of classroom-student ratio:** Negative skewness indicts more score falling on higher values. Negative kurtosis indicates that the observation cluster less and have shorter tails than those in the normal distribution. It is found that scores of classroom-student ratio is appropriate in majority of schools.

5.2.2 Status of Academic Facility in Elementary School:

Academic facility in elementary school is determined in to six variables.

1. **T.L.M. in std-7 classroom:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is nearer to minimum score. It indicates that no. of T.L.M. is less in in std-7 classroom.

2. **Different display boards in school:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is equal to median. It indicates that display boards are not properly maintained in majority of schools. News, good thoughts, *Aajnu Gulab, Aajnu Dipak* is not properly displayed on boards in majority of school.

3. **Library in School:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is nearer to minimum score. It indicates that majority school do not have appropriate no. of books. Books are not regularly issued to student. Many schools do not have register for issuing books.

4. **Science Laboratory in School:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is nearer to minimum score. It indicates that majority schools do not have science laboratory in school. It is also found that experiments are not regularly carried out in majority of school.

5. **Facility of open education in school (online, offline):** Nearly zero skewness indicates normal distribution in the groups. Scores are distributed from minimum to maximum. It is found that facility of open education is normally distributed from inappropriate to appropriate in elementary schools. T.V., Dish antenna do not work properly in many schools. Students do not watch educational programme regularly by means of open education in many schools.

6. **Computer education facility in school:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is nearer to minimum score. It indicates that majority schools do not have computers in working condition. Majority schools do not teach computer as a subject.

5.2.3 Status of Human Resources in Elementary Education:

Human resources in elementary school are determined in to three variables.

1. **Teacher indicators:** Negative skewness indicts more score falling on higher values. Zero kurtosis indicates that the observation cluster has the normal distribution. It is indicts scores of teacher indicators are normally distributed.

2. **Average job satisfaction:** Negative skewness indicts more score falling on higher values. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. It indicates that

3. **Scores of pupil-teacher ratio:** Nearly zero skewness indicates normal distribution in the groups. Scores are distributed from minimum to maximum. It is found that scores of pupil-teacher ratio are normally distributed relatively from inappropriate to appropriate.

5.2.4 Status of Support System in Elementary School:

Support system of elementary school is determined in to four variables.

1. **Mid day meal scheme in school:** Negative skewness indicts more score falling on higher values. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. 75th percentile is nearer to maximum. It indicates that there is kitchen shed in majority of school. Majority students takes mid-day meal regularly.

2. **Visit of school:** Positive skewness indicates more score falling on lower values in the groups. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. 25th percentile is nearer to minimum. It indicates that no. of visit by monitoring staff is not appropriate in majority of schools.

3. **Community contribution:** Positive skewness indicates more score falling on lower values in the groups. 25th percentile is equal to minimum score. It indicates that there is inappropriate community contribution in majority of schools.

4. **School management committee (SMC):** Positive skewness indicates more score falling on lower values in the groups. It indicates that no. meeting by SMC is relatively inappropriate in majority of school.

5.2.5   Status of Output Factors in Elementary School:

Output factors in elementary school in determined in to four variables.

1. **Average achievement:** Positive skewness indicates more score falling on lower values in the groups. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. It indicates that average achievement is relatively less in majority of schools.

2. **Participation in sports:** Positive skewness indicates more score falling on lower values in the groups. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. It indicates that participation in sports at various level is relatively less in majority of schools.

3. **Participation in science- mathematics exhibition:** Positive skewness indicates more score falling on lower values in the groups. Positive kurtosis indicates that the observation cluster more and have longer tails than those in the normal distribution. It indicates that participation in science-mathematics exhibitions at various level is relatively less in majority of schools.

4. **% Present students by head count:** Negative skewness indicts more score falling on higher values. Negative kurtosis indicates that the observation cluster less and have

shorter tails than those in the normal distribution. It indicates that percentage of present students by head count is relatively appropriate in majority of school.

5.3 Finding from Principal Component Analysis:

Principal component analysis interprets component hidden within dimension. Principal component analysis analyses grouping of variables within dimension.

1. **Physical Facility:** There are eight variable in physical facility. Looking at coefficient of correlation and principal component methods among physical facility variables, there are extractions of three components. It is found that component – 1 is comprised of compound of the school, building of school and infrastructure facility in std-7 classroom. Component- 2 is comprised of water arrangement, sanitation facility and student-classroom ratio. Component- 3 is comprised of compound wall of the school and school entrance gate.

2. **Academic Facility:** There are six variable in academic facility. Looking at coefficient of correlation and principal component methods among academic facility variables, there are extractions of three components. It is found that component – 1 is comprised of different boards in school, facility of open education in school (online, offline), computer education facility in school. Component- 2 is comprised of T.L.M. in std-7 classroom. Component- 3 is comprised of library in school, science laboratory in school.

3. **Human resources:** There are three variable in human resources. Looking at coefficient of correlation and principal component methods among human resources variables, there are extractions of three components. It is found that component – 1 is comprised of Total Teacher Indicators and Marks of Pupil-Teacher Ratio. Component- 2 is comprised of Average Job satisfaction. Due to very less variables and no significant correlation, principal component analysis is not very useful for human resources variable.

4. **Support System:** There are for variable in support facility. Looking at coefficient of correlation and principal component methods among support system variables, there are extractions of two components. The principal component analysis suggests that component – 1 is comprised of visit of school, community contribution, school management committee. Component- 2 is comprised of mid day meal scheme in school.

5. **Output Variables:** There are four variable in output facility. Looking at coefficient of correlation and principal component methods among output variables, there are extractions of two components. The principal component analysis suggests that component – 1 is comprised of average achievement of Std-7 Students and percentage of present students by head count. Component- 2 is comprised of participation of sports and participation in science-mathematics Exhibition.

5.4 Finding from Correlation Analysis:

5.4.1 Coefficient of Correlation between Different Input Variables and Aggregate Output Variable:

It is found that Science Laboratory in School, Computer education facility in school, Community contribution are significantly correlated with aggregate output variables at 0.01 level.

It is found that Water arrangement, Scores of student-classroom ratio, Average of job satisfaction of teachers, Visit of school by CRCC, BRCC and other officials are significantly correlated with aggregate output variables at 0.05 level

It is found that Compound wall of the school, School entrance gate, compound of the school, Building of the school, Infrastructure facility in Standard-7 classroom, sanitation facility, T.L.M. in std-7 classroom, Different display boards in school, library facility, Learning Facility through ICT in school (BISEG and other Means), Average of teacher indicators, Scores of Pupil-teacher ratio, mid-day meal in school, School Management Committee are not significantly correlated with aggregate output variables.

5.4.2 Coefficient of Correlation among Input Variables:

1. **Physical Facility:** The coefficient of correlation between physical facility and academic facility is 0.650; it is significant at 0.01 level. The coefficient of correlation between physical facility and support system is 0.283; it is significant at 0.05 level. The Physical facility is significantly correlated with academic facility and support system. Whereas, physical facility is not significantly correlated with human resources.

2. **Academic Facility:** The coefficient of correlation between academic facility and physical facility is 0.650; it is significant at 0.01 level. The coefficient of correlation between academic facility and support system is 0.397; it is significant at 0.01 level. The academic facility is significantly correlated with physical facility and support

system. Whereas, academic facility is not significantly correlated with human resources.

3. **Human Resources:** Human resources is not significantly correlated with any other input variables.

4. **Support System:** The coefficient of correlation between support system and physical facility is 0.283; it is significant at 0.01 level. The coefficient of correlation between support system and academic facility is 0.397; it is significant at 0.01 level. The support system is significantly correlated with physical facility and academic facility. Whereas, support system is not significantly correlated with human resources.

5.4.3 Coefficient of Correlation between Input Variables and Aggregate Output Variables:

1. The coefficient of correlation between physical facility and aggregate output variables is not significant.

2. The coefficient of correlation between academic facility and aggregate output variables is significant at 0.05 level.

3. The coefficient of correlation between human resources and aggregate output variables is significant at 0.05 level.

4. The coefficient of correlation between support system and aggregate output variables is significant at 0.05 level.

It is found that output variables is significantly correlate with academic facility, human resources and support system. Whereas, physical facility is not significantly correlate for output variables. It looks obvious.

5.4.4 Coefficient of Correlation between Aggregate Input Variables and Aggregate Output Variables:

The coefficient of correlation between aggregate input variables and aggregate output variables is significant at 0.01 level.

5.5 Efficiency Analysis by Stochastic Frontier Production Model:

The efficiency scores range from 0.503 to 0.998. The skewness of efficiency scores is negative indicating more score falling on higher values in the groups. The value of kurtosis is negative. Negative kurtosis indicates that the observation cluster less and have shorter tails than those in the normal distribution.

The Computer Programme FRONTIER 4.1 (Version 4.1c) by Team Coelli provides intercept term (β_0) is significant at 0.01 level. The table 4.88 shows that coefficient of β_2, β_3, β_6, β_{12}, β_{15}, β_{16}, β_{19}, β_{20}, and β_{21} have positive sign and significant t- ratio. It indicates that these input variables positively inclined with efficiency scores. These are school entrance gate; compound of the school; water arrangement; science Laboratory in school; average of teacher indictors; average job satisfaction of teachers; visit of school by CRCC, BRCC and other officials; community contribution and School management committee (SMC). These variables are contributing significantly in efficiency scores.

The coefficient of β_5, β_9, and β_{18} have negative sign and significant t-ratio. It indicates that these input variables negatively inclined with efficiency scores. These are infrastructure facility in Standard-7 classroom; T.L.M. in std-7 classroom; and mid-day meal scheme in school. These variables having higher scores are contributing negatively to efficiency scores. The students come from poor family background take more benefit of mid-day meal. Mid-day meal scores are negatively inclined with efficiency scores. Facility of std-7 is also negatively inclined with efficiency scores. It also found in the research work of Nalla Gounden (2003) on Madya Pradesh DPEP Data that teaching aid index was negatively inclined with efficiency scores. In present study, building of the school, sanitation facility is also negatively inclined with efficiency scores, but they are not significant.

5.6   Discussion:

The concept of efficiency suggests that how any firms, units etc. produce more outputs, if they have similar inputs. Any unit consuming less input and produces more outputs, it said to be efficient. In any industry settlement, researcher can calculate inputs and outputs in terms of consumption and production; and unit can be in terms of investment and profit. Output of any educational units is based on pedagogy process with available resources. In any educational settlement, estimation of output variables indicates that how inputs are utilized. It is common understanding that if there are more inputs, there will be more outputs; and less input produce less outputs. For any educational settlement, deciding about inputs and outputs are always be critical task. Measurement of these inputs and outputs, it is also called quantification of variables; is one of the prominent task. In educational settlement, each variable is measured with different quantification techniques. Each variable has different unit of measurement. Therefore, interpretation of these variables is also critical. Interpretation of these variables can be done using

statistical techniques. It is not absolute, but relatively describes. Interpretation of variables describes using descriptive analysis. Each variable has different measure of central tendency and measure of dispersion. But skewness and kurtosis are indicators of distribution of scores of variables. Skewness indicates that more scores are falling on higher value or lower value in groups. If the value of skewness is negative, it indicates that more score falling on higher values in all the groups. If the value of skewness is positive, it indicates that more score falling on lower values in all the groups. The value of skewness gives understanding about variables and gives indication about distribution of score and inclination of scores of variables.

Findings form descriptive analysis suggest that there is variation in skewness and kurtosis value. The following table describes variables having negative skewness.

Table-5.1 Negatively skewed variables

Sr. No.	Name of Variables	Skewness	Kurtosis
1	Compound wall of the school	More Score falling on higher values	Leptokurtic curve
2	School entrance gate	More Score falling on higher values	Leptokurtic curve
3	Compound of the school	More Score falling on higher values	Leptokurtic curve
4	Building of the school	More Score falling on higher values	Platykurtic curve
5	Infrastructure facility in Standard-7 classroom	More Score falling on higher values	Leptokurtic curve
6	Average of teacher indicators	More Score falling on higher values	Mesokurtic curve
7	Average job satisfaction of teachers	More Score falling on higher values	Leptokurtic curve
8	Mid day meal scheme in school	More Score falling on higher values	Leptokurtic curve
9	School management committee (SMC)	More Score falling on higher values	Platykurtic curve
10	Percentage of Present students by head count	More Score falling on higher values	Platykurtic curve

Locking at the variables with negative skewness, it is observed that five variables from physical facility, two variables from human resources, two variables from support system and one variables from output variables. These variables have more scores on higher values. Median is higher than mean.

The following table describes variables having positive skewness.

Table-5.2 Positive Skewed Variables

Sr. No.	Name of Variables	Skewness	Kurtosis
1	Sanitation facility	More score falling on lower values	Platykurtic curve
2	Scores of Student-classroom ratio	More Score on higher values	Platykurtic curve
3	T.L.M. in std-7 classroom	More score falling on lower values	Platykurtic curve
4	Different display boards in school	More score falling on lower values	Platykurtic curve
5	Library in school	More score falling on lower values	Platykurtic curve
6	Science Laboratory in school	More score falling on lower values	Leptokurtic curve
7	Computer education facility in school	More score falling on lower values	Platykurtic curve
8	Visit of school by CRCC, BRCC and other officials	More score falling on lower values	Leptokurtic curve
9	Community contribution	More score falling on lower values	Platykurtic curve
10	Average achievement of standard-7 students	More score falling on lower values	Platykurtic curve
11	Participation in sports	More score falling on lower values	Leptokurtic curve
12	Participation in science - mathematics exhibition	More score falling on lower values	Leptokurtic curve

Locking at the variables with negative skewness, it is observed that two variables from physical variables, five variables from academic facility, two variables from support system and three variables from output variables. These variables have more scores on lower values. Mean is higher than median.

The following table describes variables having normal distribution with reference to value of skewness.

Table-5.3 Variables Having Normal Distribution

Sr. No.	Name of Variables	Skewness	Kurtosis
1	Water arrangement	Normal Distribution	Platykurtic curve
2	Learning facility through ICT in school (BISEG and other Means)	Normal Distribution	Platykurtic curve
3	Scores of Pupil-teacher ratio	Normal Distribution	Platykurtic curve

Locking at the variables with nearly zero skewness, it is observed that one variables from physical variables, one variables from academic facility and one variables from human resources. The scores of these variables are normally distributed. Mean and median lie at same place.

Look at analysis done by principal component analysis, in the physical facility variables; it is found that component – 1 is comprised of compound of the school, building of school and infrastructure facility in std-7 classroom. Here, researcher can summarized that compound of the school, building of the school and infrastructure facility in std-7 classroom are closely related and make one common component. Component- 2 is comprised of water arrangement, sanitation facility and student-classroom ratio. Here, researcher can summarized that water arrangement, sanitation facility and student-classroom ratio are closely related and make common component. Component- 3 is comprised of compound wall of the school and school entrance gate. Here, researcher can summarized that compound wall of the school and school entrance gate are closely related and make common component. In academic facility variables, it is found that component – 1 is comprised of different display boards in school, facility of open education in school (online, offline), computer education facility in school. Here, researcher can summarized that different display boards in school, facility of open education in school (online, offline) and computer education facility in school are related and make common component. Component- 2 is comprised of T.L.M. in std-7 classroom. Component- 3 is comprised of library in school, science laboratory in school. Here, researcher can summarized that library in school and science laboratory in school are closely related and make common component. In the human resources, it is found that component – 1 is comprised of total teacher indicators and scores of pupil-teacher ratio. Here, researcher can summarized that total teacher indicators and scores of pupil-teacher ratio are closely realated and make common component. Component- 2 is comprised of average job satisfaction. In the support system variables, it is found that component – 1 is comprised of visit of school, community contribution, school management committee. Component- 2 is comprised of mid day meal scheme in school. In the output variables, it is found that component – 1 is comprised of average achievement of Std-7 Students and percentage of present students by head count. Component- 2 is comprised of participation of sports and participation in science-mathematics exhibition.

Look at analysis done by correlation techniques; it is found that aggregate output variable is significantly correlate with academic facility, human resources and support system. Whereas, physical facility is not significantly correlate for aggregate output variable. The correlation analysis of individual input variables, it is found that science laboratory in School, computer education facility in school, community contribution, water arrangement, scores of student-classroom ratio, average of job satisfaction of teachers, visit of school by CRCC, BRCC and other officials are significantly correlated with aggregate output variable are significantly correlated with aggregate output variables.

The efficiency analysis by FRONTIER 4.1, the efficiency scores range from 0.503 to 0.998 The mean score of efficiency scores in the present study is 0.84 in the model where inefficiency distribution assumed is half-normal distribution. In the study of Nalla Gounden (2003), the range of efficiency scores was 0.02 to 0.96; the mean score of efficiency scores is 0.66 in the model-1 (Inefficiency distribution assumed is half-normal distribution) and 0.74 in the model-2 (Inefficiency distribution assumed is truncated normal distribution). In many U.S. study of efficiency of schools, the mean score is found higher than in India. (Nalla Gounden, 2003)

The efficiency analysis by FRONTIER 4.1; it is found that School entrance gate; compound of the school; water arrangement; science Laboratory in school; average of teacher indictors; average job satisfaction of teachers; visit of school by CRCC, BRCC and other officials; community contribution and School management committee (SMC) have positive sign and significant t- ratio. It indicates that these input variables positively inclined with efficiency scores. These variables are contributing significantly in efficiency scores.

Infrastructure facility in Standard-7 classroom; T.L.M. in std-7 classroom; and mid-day meal scheme in school have negative sign and significant t-ratio. These variables having higher scores are contributing negatively to efficiency scores. It indicates that these input variables negatively inclined with efficiency scores. The students come from poor family background take more benefit of mid-day meal. Mid-day meal scores are negatively inclined with efficiency scores. Facility of std-7 is also negatively inclined with efficiency scores. It also found in the research work of Nalla Gounden (2003) on Madya Pradesh DPEP Date that teaching aid index was negatively inclined with efficiency

scores. In present study, building of the school, sanitation facility is also negatively inclined with efficiency scores, but they are not significant.

Scores of Student-classroom ratio, scores of Pupil-teacher ratio are not significantly correlated with efficiency scores. Hanushek (1979, 1986, 1994) one of the pioneers in the area of education production, has reviewed almost all the studies which estimated the relationship between school inputs and standardized test scores and concludes, "The results are consistent in finding *no* strong evidence that teacher-student ratios, teacher education, or teacher experience have an expected positive effect on student achievement. According to available evidence, no one can be confident that hiring more educated teachers or having smaller classes will improve student performance. Teacher experience appears only marginally stronger in its relationship".

Deep Sankar (2007) has an attempt was made to estimate the efficiency of producing elementary education outcomes at the states level of India using the non-parametric technique of DEA. Deep Sankar (2007) stated that the factors that contribute to efficiency scores are ambiguous, mainly because the lagging states showing better efficiency. In the efficiency studied specification of output factors is very difficult. School is a multi-product firm and products are not causally related. In this context, output specification is not correct one.