

## **CHAPTER: 6**

### **SUMMARY AND IMPLICATIONS**

#### **6.1 Introduction:**

The concept of 'efficiency' refers to the relationship between the inputs into a system (be it agricultural, industrial or educational), and the outputs from that system (be they wheat, vehicles or educated individuals). According to Oxford Advanced Learners' Dictionary the term 'efficiency' means the relationship between the amount of energy that goes into a machine or an engine, and the amount that it produces. Another meaning of the term 'efficiency' means the ratio of the effective or useful output to the total input in any system. The concept of efficiency relates the outcome of a process to its input. A system is said to be efficient if a maximum output is obtained from given input, or if a given output is obtained with minimum input. Inputs and outputs have somehow to be valued so that they may be aggregated; and usually prices are used to perform this valuation function. Efficiency has thus to do with the ratio between output and input: How much do we get for what we put into the system? The analysis of efficiency thus deals with a comparison of costs and benefits. An activity is efficient when it leads to the output (or mix of outputs) with reference to inputs. The desired outputs of an education system are things like academic achievement, positive attitude and development of job skills. Cost refers to the level of input needed to get the output. A program is efficient when the desired mix of outputs is maximized for the given level of inputs (cost), OR, where inputs are minimized for the desired mix of outputs.

UNESCO (1998) has defined efficient school in following manner. Efficient school can be defined in terms of three commonly found factors. First efficient schools are those which obtain good outcomes, in terms of examination results. This operational definition makes it easy to quantify efficiency because examination results are a measurable entity. However, it may have negative implications as far as the school processes are concerned. In order to be efficient, schools may tend to be examination-oriented, which is hardly a welcome feature, especially at the primary level. Secondly, efficient schools are those which are well managed. This definition focuses on internal management of the school. It starts with the belief that any school is efficient where the interaction between different stakeholders is cordial and mutually reinforcing so that the teachers are the happy to

teach, parents are willing to send their children to school and children enjoy the learning process. Thirdly, efficient schools are those which give good results at a reasonable cost, affordable to the society as a whole and to the different individuals in the society. In this definition, it is the cost and equity considerations which are dominant. A closer look at these definitions indicates four dimensions of efficiency, namely, focus on outcomes, favorable internal managements, cost effectiveness and equity. Needless to add, all these four dimensions should be an integral part of an efficient school. So, theoretically, efficient school related factors comprises of academic performance, participation of students in sports and other competitive events, repetition rate / dropout rate of the school, favorable internal managements, cost effectiveness, equity etc...

## **6.2 Statement of the Problem:**

### **A Study of Efficiency of Elementary Schools in Mehsana District of Gujarat State**

## **6.3 Objectives of the Study:**

1. To study the input factors in terms of physical facility, human resources, academic facility and support system in elementary schools.
2. To study the output factors in elementary schools.
3. To study the efficiency of elementary schools.

## **6.4 Hypothesis of the Study:**

The hypotheses are as follows.

Ho 1: There will be no significant correlation between physical facility and academic facility.

Ho 2: There will be no significant correlation between physical facility and human resources facility.

Ho 3: There will be no significant correlation between physical facility and support system.

Ho 4: There will be no significant correlation between academic facility and human resources.

Ho 5: There will be no significant correlation between academic facility and support system.

Ho 6: There will be no significant correlation between human resources and support system.

Ho 7: There will be no significant correlation between physical facility and output variables.

Ho 8: There will be no significant correlation between academic facility and output variable.

Ho 9: There will be no significant correlation between human resources and output variable.

Ho 10: There will be no significant correlation between support system and output variable.

Ho 11: There will be no significant correlation between aggregate input variables and aggregate output variable.

## **6.5 Operationalization of Terms:**

**Efficiency:** Efficiency of elementary school is determined in terms of the output with reference to the inputs.

### **Input Variables:**

Input variables comprises of physical facility, academic facility, human resources and support system.

**Physical facility:** Physical facility of elementary school is determined in terms

1. Compound wall of the school: It is surrounded school premises.
2. School entrance gate: It is entrance of the school premises.
3. Compound of the school: It is part of school covering open area of school premises. It covers external look of school.
4. Building of the school: It is constructed area of school comprises of rooms.

5. Infrastructure facility in Standard-7 classroom: It is an infrastructure facility like fan, light, ventilation, blackboard etc. in standard – 7 classroom.
6. Water arrangement: It is arrangement of water for drinking and other uses in school premises.
7. Sanitation facility: It is urinal and latrine facility in the school premise.
8. Student-classroom ratio: It is ratio of students and classroom.

Student-classroom ratio = No. of student in school divided by no. of classroom

**Academic facility:** Academic facility is determined in terms

1. T.L.M. in std-7 classroom: It is no. of T.L.M. in std-7 classroom.
2. Different display boards in school: It is different boards in the school for staff details, list of SMC Members, news, *Aajnu Gulab*, *Aajno Dipak*, Good thoughts
3. Library in School: It is facility for borrowing books from school for students and teachers.
4. Science Laboratory in School: It is facility for conducting science experiment in school.
5. Learning Facility through ICT in school (BISEG and other Means): It is facility T.V., Disk Antenna, D.V.D./C.D. Player, System for BISEG telecast their use in day-to-day teaching-learning process.
6. Computer education facility in school: It is no. computer available in working condition in school and their use in day-to-day teaching-learning process.

**Human resources:** Human resources of elementary school is determined in terms

1. Average of teacher indicators: Teacher indicators comprises of teacher's educational qualification; professional qualification; TAT/TET/HTAT exam passed; till which std English learned; Knowledge of computer; rendering services as expert in training session; any publication work; members in NGO, organization, club
2. Average job satisfaction: Job Satisfaction or dissatisfaction as the result of various attitudes the person holds towards his job, towards his job, towards related factors, and towards life in general. (The definition is given by Gilmer and adopted by Dr. S. P. Gupta) It is average score of teachers in school on Teacher's Job satisfaction Scale (TJSS).

3. Pupil-teacher ratio: It is ratio of pupils and teachers in school.

Pupil-teacher ratio = No. of student in school divided by no. of teachers

**Support system:** Support system of elementary school is determined in terms

1. Mid day meal scheme in school: It is arrangement of foods for students in the school.
2. Visit of school by CRCC, BRCC and other officials: It is no. of visit by CRC coordinator, BRC coordinator, Education officer and others responsible personal.
3. Community contribution: It is community contributed for school in terms of article/ thing/object/cash or any other way.
4. School management committee (SMC): It is mandatory committee as directed by RTE-2009 for looking different functions of the school.

**Output Variables:**

Output Variables in elementary school is determined in terms of

1. Participation in sports: It is participation of students in sports activity at different level.
2. Participation in science- mathematics exhibition: It is participation of students in science- mathematics exhibition at different level.
3. Average achievement: It refers to scholastic dimension of std-7 students. It is average score of students of std-7 on achievement test.
4. Percentage of present students by head count: It is percentage of present students by head count on day of visit in school.

## **6.6 Delimitation of the Study:**

The present study was delimited to the Government Gujarati medium elementary schools with I to VI standard is included in the present study. The private elementary schools and English medium elementary schools will not be included for the present study.

## **6.7 Method of the Study:**

The present study is quantitative research. Survey method of descriptive type has been employed for the study.

## 6.8 Population

Mehsana district of Gujarat state was the geographical area of present study. In the Mehsana district, there are 1250 elementary schools. In the present study, research design demands the following criteria of the school for the selection of sample.

- Having higher class 7 or 8
- Having medium of instruction is Gujarati
- Run by local body

Considering the above criteria of the elementary school, the target population were 713 elementary schools. The following table describes Block wise population, target population and sample of study.

**Table : 6.1 Block Wise Population, Target Population**

<b>Block</b>	<b>Population No. of School</b>	<b>Target Population No. of School</b>
Bacharaji	81	53
Kadi	198	123
Kheralu	110	69
Mehsana	266	132
Satlasana	91	57
Unjha	83	57
Vadanagar	107	62
Vijapur	172	85
Visnagar	142	74
Total	1250	712

All the students of std-7 and all the teachers of the school were the population of present study.

## 6.9 Sample:

The following table shows the sample of present study.

**Table: 6.2 Sample Size: No. of Students and Teachers**

Sr. No.	Block	No. of School	Total number of students in Std-7	Number of students given Achievement Test	Percentage of Students in Sample	Total number of teachers	Number of teachers filled TJSS	Percentage of Teachers in Sample
1	Becharaji	5	197	144	73.10%	49	44	89.80%
2	Kadi	12	476	337	70.80%	117	111	94.87%
3	Kheralu	7	263	219	83.27%	64	64	100.00%
4	Mahesana	13	532	445	83.65%	135	136	100.74%
5	Satalasana	6	223	174	78.03%	45	38	84.44%
6	Unzha	6	255	214	83.92%	58	58	100.00%
7	Vadanagar	6	272	212	77.94%	62	61	98.39%
8	Vijapur	9	329	253	76.90%	88	84	95.45%
9	Visanagar	7	238	207	86.97%	62	62	100.00%
	<b>Total</b>	<b>71</b>	<b>2785</b>	<b>2205</b>	<b>79.17%</b>	<b>680</b>	<b>658</b>	<b>96.76%</b>

### **6.10 Tools:**

For the present study, the following tools were prepared.

#### **1. School Information Schedule**

In light of objectives of the study, school information schedule collects the following information of elementary school.

- Enrolment, retention, dropout and number of repeater student
- Information on teachers: Educational qualification, number of period taken in each subject
- Incentives: free books and assignments, other writing materials, scholarship, mid day meal
- Participation in sports activity
- Participation in science maths exhibition
- Various school competitions and programme
- Information on school management committee
- Community contribution

#### **2. School observation schedule**

In light of objectives of the study, school observation schedule collects the following information of elementary school.

- Details to be noted immediately after reaching school
- Compound wall of the school
- School entrance gate
- School building
- School bulletin board
- Water Arrangement
- Sanitary facilities
- Sports facility
- Availability of rooms in school
- T.L.M.
- Facility of school library
- Facility of laboratory in school
- Facility of e - learning in the school
- Computer education facility
- Mid day meal Scheme

### **3. Teacher information schedule**

Teacher information schedule is developed to know teacher's educational qualification, professional qualification, teacher aptitude test cleared, knowledge of computer, till which STD English learned, render services as expert in training session, any publication work, members in NGO, organization, club etc.

### **4. Teacher's Job Satisfaction Scale:**

Teacher's job satisfaction scale was used which was developed by S. P. Gupta in Indian conditions. The scale has 80 items. The TJSS was originally in English language. The TJSS was translated in Gujarati language.

### **5. Achievement test**

Achievement test comprises of six subject i.e. Gujarati, Hindi, English, Science and technology, Mathematics and Social Science. The items of achievement were objective type. It has multiple choice questions, answer in one word and answer in one line. Achievement test covers syllabus of first semester in std-7.

### **6. Field diary**

Researcher noted the important observation in his field diary during data collection. He noted the approach of head teacher, many other things that were not included in any tool.

#### **7. Volunteer's Observation schedule:**

M.Ed. and M.S.W. students helped in data collection as volunteers. Volunteers' Observation schedule was developed to know school prayer activity, present student in prayer and approach of head teacher.

#### **8. Photographs**

Photographs were taken during data collection. Photographs helped during data analysis.

For the present study, the following information was used.

#### **9. DISE data**

DISE Data helped to select the sample of the study. It was also helped to crosscheck the data gathered from other tools.

### **6.11 Data Collection:**

Data collection was done in three phases spread over six months from October 2012 to March 2013.

Phase: 1 Administration of achievement test and job satisfaction inventory

Phase: 2 Collection of school information Schedule

Phase: 3 Employing School observation Schedule

### **6.12 Data Analysis:**

Descriptive analysis, principal component analysis and correlation analysis has been used for the treatment of data and analysis of data in the present study.

### **6.13 Major Findings and Interpretation:**

#### **6.13.1 Finding from Descriptive Analysis:**

The following table describes interpretation of skewness and kurtosis.

**Table: 6.3 Skewness and Kurtosis of variables**

<b>Sr. No.</b>	<b>Name of Variables</b>	<b>Skewness</b>	<b>Kurtosis</b>
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	Water arrangement	Normal Distribution	Platykurtic curve
7	Sanitation facility	More score falling on lower values	Platykurtic curve
8	Scores of Student-classroom ratio	More Score on higher values	Platykurtic curve
9	T.L.M. in std-7 classroom	More score falling on lower values	Platykurtic curve
10	Different display boards in school	More score falling on lower values	Platykurtic curve
11	Library in school	More score falling on lower values	Platykurtic curve
12	Science Laboratory in school	More score falling on lower values	Leptokurtic curve
13	Learning facility through ICT in school (BISEG and other Means)	Normal Distribution	Platykurtic curve
14	Computer education facility in school	More score falling on lower values	Platykurtic curve
15	Average of teacher indicators	More Score falling on higher values	Mesokurtic curve
16	Average job satisfaction of teachers	More Score falling on higher values	Leptokurtic curve
17	Scores of Pupil-teacher ratio	Normal Distribution	Platykurtic curve
18	Mid day meal scheme in school	More Score falling on higher values	Leptokurtic curve
19	Visit of school by CRCC, BRCC and other officials	More score falling on lower values	Leptokurtic curve
20	Community contribution	More score falling on lower values	Platykurtic curve
21	School management committee (SMC)	More Score falling on higher values	Platykurtic curve
22	Average achievement of standard-7 students	More score falling on lower values	Platykurtic curve
23	Participation in sports	More score falling on lower values	Leptokurtic curve

Sr. No.	Name of Variables	Skewness	Kurtosis
24	Participation in science - mathematics exhibition	More score falling on lower values	Leptokurtic curve
25	Percentage of Present students by head count	More Score falling on higher values	Platykurtic curve

The index of skewness takes the value zero for a symmetrical distribution. A negative value indicates a negatively skewed distribution; a positive value indicates a positively skewed distribution.

The kurtosis index measures the extent to which the peak of a uni-modal frequency distribution departs from the shape of normal distribution. A value of zero corresponds to a normal distribution; positive values indicate a distribution that is more pointed than a normal distribution and a negative value a flatter distribution.

### 6.13.2 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.

### **6.13.3 Finding from Correlation Analysis:**

#### **6.13.3.1 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.

#### **6.13.3.2 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.

#### **6.13.3.3 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.

#### **6.13.3.4 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.

#### **6.13.4 Finding from 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 ( $\alpha_0$ ) is significant at 0.01 level. The table 4.88 shows that coefficient of  $\alpha_2$ ,  $\alpha_3$ ,  $\alpha_6$ ,  $\alpha_{12}$ ,  $\alpha_{15}$ ,  $\alpha_{16}$ ,  $\alpha_{19}$ ,  $\alpha_{20}$ , and  $\alpha_{21}$  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 indicators; 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  $\alpha_5$ ,  $\alpha_9$ , and  $\alpha_{18}$  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 A. M. Nall Gounden on Madhya 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.

#### **6.14 Implications of Present Study:**

After the analysing the variables are responsible for efficiency of elementary education, the following implications can be drawn for functionary and policy Makers.

Visit of school by CRCC, BRCC and other officials; community contribution and School management committee (SMC) make common component; and all three contributing positively to efficiency of the school. These findings can interpret as following ways.

In the government elementary schools, development of physical facility and academic facility are reliant on government grants and community. Researcher is head teacher of elementary school. It is obvious that in the elementary school, majority infrastructure facility is developed by government grants through Sarva Shiksha Abhiyan Scheme. Building, rooms, sanitation facility, compound wall of the school are also developed by government grants. Whereas school entrance gate, water arrangement, some of the academic facility are drawn from community also. Findings of the research suggest that the variables related to support system such as community contribution and variables which can be enhanced with inputs from community are significantly correlated with efficiency. It is suggested to school functionary that community involvement and contribution should be enhanced through various ways.

School management committee (SMC) should be enhanced through various ways as it is positively contributed to efficiency of the school.

Visit of school by CRCC, BRCC and other officials should be increased using appropriate observation tools. It leads school functionary to enhance quality of education.

Mid day meal is negatively correlated efficiency. That means those school having more scores in mid day meal variables, are less efficient. Generally, it is understood that the students come from poor family take more benefit of mid day meal. It is suggested that children from poor family should get more educational inputs for contributing positively to efficiency of elementary school.

Average of teacher indicators and job satisfaction of teachers are contributing positively to efficiency of elementary school. Measure should be taken by appointing authority for more qualified teachers. Measure also should be taken by government to increase the job satisfaction among teachers.

Academic facility, human resources and support system are positively correlated with output variables. So efforts should be made to enhance such variables.

### **6.15 Suggestions for Further Research:**

The present Study has thrown some light and insight into measuring efficiency. But research is an endless process for finding truth. The possibilities for further research are indicated below.

1. The present study conducted in Mehsana district of Gujarat state. Therefore, the conclusions may not be universally valid. There is a need of cross validation of the reported results.
2. The present study confined overall 21 input variables and 4 output variables. Study can be expanded to more variables.
3. Quantification of variables was the major task in the present study. There can be a chance for employing for another techniques.
4. In the present study, Quantitative method has been employed. There can be a chance for employing qualitative method for deep investigation.
5. It will be right to advice for Grounded theory approach for studying the efficiency.

### **6.16 Conclusion:**

The present research gives insight to look in elementary school. The variables studied in the present research are based on quantification techniques. Quantifying, observing and assigning marks to each variable are logical and deep-seated work. Researcher hopes for more researches in the efficiency analysis of elementary school with different techniques.