4 Research Methodology

4.1 Prologue

This subject purports to analyse the principals and teachers general perception of TQM. The survey also tries to study the various indicators which are the most influencing needs for improving the school quality. To rank the indicators of TQM that can be successfully implemented in their school to attain school quality according to the principals and the teachers. To see the difference in suggestions of the factors for the improvement of the school as compared to other schools by the principals and teachers. In summation, the study finally focus to determine the result of identifying critical elements of TQM on the school performance and the job satisfaction level from the perception of teachers.

An overview of the research methodology used in this thesis is shown in this chapter, with specific reference to the relevance of the qualitative research approach and the case-study method. The philosophical theory of knowledge (epistemological) views adopted in this research is discussed as a hypothetical framework for the study. Furthermore this chapter discusses population and sampling methods, outlines and explains the choice of data-collection methods, discusses the data-analysis techniques; and briefly explains how the data are triangulated. The chapter also elucidates how objectivity, validity and reliability are maintained in the research, and concludes with a brief discussion of moral issues and the role of the researcher in the process.

4.2 Research Design

Research is a tool that is building block and a sustaining pillar of every discipline – scientific, marketing, services, education or otherwise- that one knows of. Definitions of research designs are quite varied and ambiguous. (Thyer & Thyer, 1992) set a research design as “a designed or detailed plan for how investigation study is to be directed- operationalizing variables so they can be valued, selecting a sample of concern to study, gathering data to be used as a source for testing hypothesis, and analysing the
consequences”. Huysamen (1993:10) offers a closely related definition of design as “The strategy or proposal according to which data is collected to explore the research hypothesis or inquiry in the most inexpensive way”. Further, (Sondhi & Chawla, 2011), derive that management research is an unbiased, structured, and sequential method of research, headed towards a clear implicit or explicit business objective. This inquiry might lead to validating existing postulates or arriving at new theories and models. Thus, research design is the specific framework that has been produced to seek responses to the research question, the research method is the technique to garner the data needed to serve the research problem, within the created framework.

4.2.1 Defining the Research Problem

Setting a research problem is a sort of prelude to the end result one desires to achieve and hence it takes considerable thought and psychoanalysis. (Sondhi & Chawla, 2011) A clear definition of what is meant by TQM factors, school performance and job satisfaction need to be constructed so that there is complete clarity in the judgement regarding the components of the constructs that needs to be gathered.

4.2.2 Formulation of Research Design Process

(Jick, 1979) advocates the simultaneous or a sequential use of the qualitative and quantitative methods of investigation. On conducting an extensive review of the literature, the research scope and objective are identified. There are a number of patterns available for investigating the research aims. Hence, in case the research objective is diffused and requires a fine tuning, refinement exploratory design is used which lead to slightly more concrete than descriptive design. Thus, a research design is formulated to study the perception of principal and teachers towards the total quality management, identify the factors responsible for the success and failure of the school performance, and to study the impact of TQM factors and teachers’ job satisfaction of the primary schools.

4.2.2.1 Exploratory Research Design

Exploratory research is generally used to clarify the thoughts and opinions about the research problem or the respondent population, or to provide insights on how doing more conclusive (casual) research. The result of this exploratory study could provide
inputs for a further study using factor analysis. It helps to generate hypothesis for further studies. Exploratory research is employed to search the different dimensions of the problem, so that a fuller discernment of the research framework can be built up. The exploratory research is unstructured and the sample used to obtain the information is small and mostly determined on the basis of the convenience of the researcher. The focus is on gaining insights and familiarity for later investigation. The research is flexible and gives all freedom to a researcher to interpret the problem. For exploratory research, secondary source of data, that have been picked up from the literature study of previous data in terms of facts and images, which have been issued and are also valid.

4.3.2.2 Descriptive research design

To get the insight of the problem descriptive research method is to be conducted. They are mainly used to describe the characteristics of some relevant group for the research, understand consumer perceptions about any services, the business or market characteristics. Further, it helps to understand the degree of association between service variable, and to do some forecasting about production, sales or other phenomenon of interest. The structural nature of this research provides a clear direction of information collection, definition of the problem, formulation of the hypothesis, and collection of structured, detailed, and relevant data. Thus, descriptive research is a framework used for a conclusive research. The cross-sectional study is a positivistic design to gain information at a single point of time, moreover this type of the study is strongly retained in the context of quantitative research (Collis & Hussey, 2003); (Elshaer, 2012). In the light of the above, in this study a cross-sectional studies was carried out on a section of responses from the population units under study to collect a wide array of information regarding the TQM critical factors. (E.g. Schools of Ahmedabad district).

4.3.2.3 Measurement and Scaling

According to (Sondhi & Chawla, 2011), measurement means assigning numbers or some symbols to the characteristics of certain objects. In research we do not measure the objects but we measure the characteristics of it. Thus, in research we don’t measure the people / consumers, but measure only their perceptions, attitude or any other relevant characteristics. Thus, assigning the numbers help to permit statistical analysis of the resulting data and also facilitates the communication of measurement results. An
extension of measurement is scaling, which involves creating a continuum on which measurements on objects are located. Measurement is the actual assignment of a number to each respondent from 1 to 5 whereas, the scaling is the process of placing the respondent on a continuum with respect to their satisfaction. Each scale of measurement represents a particular property or set of properties of the abstract number system. Here in this research nominal scale and ordinal scale are used.

Nominal scale numbers are assigned for the purpose of identification of the characteristics of objects. A frequency distribution table can be prepared for the nominal scale variable. Whereas, an ordinal scale tells us the relative positions of the objects and not the difference between the magnitude of the objects. An ordinal scale is a measurement scale that assigns values to objects based on their ranking with respect to one another. The respondents were required to indicate their degree of agreement or disagreement ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4= agree, and 5 = strongly agree.

4.3.3 Questionnaire Structure

One of the most complex aspect of carrying out research is the development and construction of questionnaires for survey research. Designing a questionnaire entails a series of a logical successive steps(Malhotra & Dash, 1999). A questionnaire is a list of questions sent to a number of persons for them to answer. Questionnaire design is one of the important areas of research. It is constructed in a way that answers the hypothesis or research problem, but also has the capability to identify new issues. Questionnaire design (Gupta & Gupta) is an art and not a science, and therefore, it depends on an individual’s creative powers to get it right.

The questionnaire is divided in three sections. In the first section the respondents are required to tick the given preference of the statements which is closely describing the demographic variables such as gender, educational qualification, length of the service in the current school and also overall teaching experience, and their designation. In the second section the respondents are required to give their ranks for the given list of questions regarding the need for improvement or suggestion for implementing TQM factors in the school. Lastly, it consists of items intended to reveal the respondents’ perceptions regarding the TQM factors using in school in order to achieve better school
performance and job satisfaction. This section consists of 65 items which are grouped into different categories (i.e. customer focus, continuous improvement, team work, training, empowerment, feedback, process management, top management support, involvement, job satisfaction and school performance. A sample of the finalised questionnaire is presented in Appendix I and II.

The length of questionnaire should be relatively short to avoid transient mood states such as boredom and fatigue (Lindell & Whitney, 2001), (LEE, 2010). The questionnaires were in the form of statements of Likert-type scale. Five-point scale is found to be adequate for measuring the individual items in the case of subject- centred scale (Preston & Colman, 2000).

4.3.3.1 Pilot Study

Pilot testing refers to testing and administering the designed instrument on a small group of people from the population under study. After the confirmation of the survey questionnaire, data should be collected from about 100 respondents to determine if any errors that have still remained which have to be improved or refined (Zikmund, 1997). Hence, a pilot study of 100 respondents was conducted prior to the final data collection. It served as a basis for improving the structure and questionnaire of the survey.

In universal, the answerer of the pilot study was furnished with a complete set of questionnaire together with a cover letter, which explained the aim of the subject area, assuring the anonymity of the answerers. The survey suggested a positive feedback towards the overall format and presentation of the questionnaire and minor suggestions were taken over and amended.

4.3 Respondents Selection and Data Preparation

4.3.1 Population

Population is defined by (Neuman, 2006) as the abstract idea of a large group of cases from which a researcher draws a sample from which results are generalised. Sapsfod (2007) adds that population means the entire set of objects spoken about and about which generalisations are made. The population in this study therefore comprises all primary schools in Ahmedabad district of Gujarat State.
4.3.2 Sampling

(Zikmund, 1997), defined sampling as a subset or relatively small fraction of the total number of elements in the sample and the data or variables in the population. Sample is defined by (Neuman, 2006) as a small set of cases a researcher selects from a larger pool and generalises to the population.

4.3.3 Sampling Procedure

The samples of this study are principals and teachers of the primary school. Principals of the schools which are surveyed are selected for the study so as to know how much the principals are aware of the TQM factors so that they can really motivate and encourage the teachers to attain the quality of the school. Teachers are also surveyed as they are the backbones of the functioning of the school and hence the study relates the perception of the principals and teachers towards the TQM factors. In the present study 26 principals and 374 teachers are surveyed.

4.3.3.1 Sampling Technique -- Convenience Sampling

Convenience sampling refers to the collection of information from members of the population who are conveniently available to the researcher. As the epithet implies, the convenience sampling is a sampling procedure left to the researcher who are easily available to fill the questionnaire. The researchers has practised convenience sampling technique as the sampling scheme.

4.3.3.2 Sampling Size

Many researchers have acknowledged that the size of samples is important as it affects the magnitude of difference in covariance matrices (Kline, 2011a);(Byrne, 2009). The finding with sample below the appropriate number cannot be generalized as representative to the population under study. ((Bartlett, Kotrlik, & Higgins, 2001). An analysis using factor analysis and structural equation modelling (SEM) method mostly expects a sample size that ranges from 150 to 200. (Byrne, 2009). But, a large sample size (e.g., 350 to 550 ) , is more superior as larger the sample size is, the easier the model to converge correctly or accomplish precise solution (Anderson & Gerbing, 1988); (Joseph F Hair, Anderson, Tatham, & Black, 1998).
As a general thumb rule, the minimum sample size is to have at least five times as many observations as the number of variables to be analysed and more acceptable sample size would have a 10 : 1 ratio if other multivariate assumptions are met (Joseph F Hair et al., 1998); (Bentler & Chou, 1987). In this study, the total number of parameter (items) estimates is 59 and in order to follow (Joseph F Hair et al., 1998); (Bentler & Chou, 1987) standard, the minimum sample size should be 295 (59 x 5). In the present study there are 374 respondents, above the threshold size. As said by (Joseph F Hair et al., 1998) the researcher should always try to obtain the highest cases per variable ratio to reduce the chance of over fitting the data.

4.3.4 Data Collection and Preparation

4.3.4.1 Response Rate and Timing

According to (Baruch & Holtom, 2008) the response rate for surveys reported in the organizational research is 2.7 percent at individual level where as at organizational level the average response rate is 35.7 percent. Since the present study collected data at the individual level, a benchmark of response rate around 70 percent was considered. To get a better response rate, in the present study several response facilitation techniques were used such as timing, follow-up, the length of questionnaire, and anonymity. As a result, 378 out of 450 questionnaires were returned sufficiently completed, with a response rate of approximately 84.44%, which is considered large enough to establish a depiction and reliable data for analysis which is coherent with (Tambor et al., 1993).

4.3.4.2 Timing

Initially, a preliminary notification technique using telephone was employed before the survey distribution. (Tambor et al., 1993) achieved a high response rate of 74.6 percent with continuous reminders through postcard and telephone during the follow up. By using these techniques of follow-ups, by sending mail remainders, and making phone calls for reminding within three week time the questionnaire were filled.
4.4 Statistical Analyses

The adage ‘Speak with data and Act with data’ aptly recognizes the importance of facts and data (Bose, 2011). Utilization of facts and data in proper ways, statistical methods can be developed for reducing variation, stabilization of the process, and supporting further improvements. Quality in work processes are never similar, variations are present in it and these variations show a statistical distribution. Hence information present in variation can be statistically analysed to determine the different reasons of variation so they can be removed which controls the variation. Proper implementation of the statistical techniques do not mislead, rather they give indications and management to anticipate, detect and correct non con-firmity and decrease variability in the organisation, thus improving quality and accomplishing better quality (Bose, 2011). Combined effect of statistical knowledge and initiatives for improvement is an indication of matured management.

The statistical procedures used in this study analyse the data for addressing the research questions from simple descriptive statistic, reliability and validity test, correlation, ANOVA to advanced multivariate technique structural equation modelling (SEM).

In the foremost portion of data analysis, initially univariate statistical analysis was conducted using Statistical Package for the Social Science (SPSS) version 22 to screen the data and examine it. Initially, coding of the questionnaire is necessary before entering the data in SPSS software. Then, to detect the presence of outliers, missing data and for checking normality assumptions screening of data was performed. Next, a series of statistical analysis were also performed to examine the reliability, validity, t-test, ANOVA, Freidman test, and correlation for the principals and teachers, both separately and further, for teachers’ data factor analysis (exploratory factor analysis) and structural equation modelling were used in the field.

In the second phase of data analysis, structural equation modelling (SEM) was employed to run the confirmatory analysis, to probe the relations among the TQM factors, school performance, and job satisfaction as well as the mediating effect of process management and continuous improvement in the school operation and also the mediating force of school performance on job satisfaction of the instructors. SEM methodology was adopted for final analysis on this study as it permits researchers to
examine multiple relationships at the same time while combining measurement error into the estimation process (LEE, 2010); (Frazier, Tix, & Barron, 2004); (Curkovic, Melnyk, Calantone, & Handfield, 2000). AMOS integrates an easy-to-use graphical interface with and is certainly user-friendly as the researcher need not write computer code or syntax to conduct data analysis (J F Hair, Anderson, Tatham, & Black, 2010); (Byrne, 2009). In this study, application of SEM was executed using SPSS version 22 for, and Analysis of Moment Structures (AMOS) version 16.

4.5 Epilogue

The methodology and research design used in this study are presented in this chapter. In the present research number of methods are examined to investigate the relationships among various variables under study. Based on the previous research work from the inputs from review of literature study on total quality management, the survey instruments are developed and are modified further as per the context of the study. The data are collected through survey using questionnaires. A pilot study has been carried out to confirm that the instrument used are reliable and also checked its validity for calculating further statistical tools for final study. For the purpose of testing hypothesis, various statistical techniques employed have been intricately discussed in this chapter.