CHAPTER – 3

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, methodology and procedure of the study has been discussed in detail. There are different methods of education that are commonly used in this field. **Descriptive Survey Method** was used for the present study. Descriptive Survey method is a method of research, which concerns itself with the present phenomena in terms of practices, processes, conditions, relationships or trends that are going on. Methodology is the procedure or techniques adopted in a research. The basic function of research is to understand the nature of the problem of the study, identify factors that contribute towards the occurrence of events, analyze them and draw conclusion. Methodology occupies an important position in research and it formally lays out the detailed description of the research. Research Methodology is the backbone of any research.

Descriptive research does not fit neatly into the definition of either quantitative or qualitative research methodologies; instead it can utilize the elements of both, often within the same study. The descriptive research refers to the type of research questions, design and data analysis that will be applied to a given topic and brings hidden facts into light in a logical manner. Descriptive studies, primarily concerned with finding out 'what is', and 'what might be' applied to investigate Kothari (2007). Descriptive survey methods are prominent in the area of social sciences for conducting exploratory research. It is concerned with the present and attempts to determine the status of the phenomenon under investigation. The terminology of descriptive survey research is designed such a way that it helps the researcher to obtain relevant and accurate information about the current status of the phenomena under the study and to draw out valid generalizations and conclusions from the available information.

Descriptive surveys collect and provide following three types of information:

a) What exists, with respect to the variables or conditions in a situation.
b) What researcher wants, by identifying standards or norms with which to compare the present conditions or what experts consider to be desirable.
c) How to achieve a goal, by exploring possible ways and means on the basis of the experience of the others or the opinions of experts.

In simple words, the purpose of descriptive research can be summarized in four points as given below:-

a) Identify present conditions that point to present needs.
b) Study the immediate status of a phenomenon.
c) Find facts.
d) Examine the relationship of traits and characteristics.

3.2 Characteristics of Descriptive Survey

Some of the characteristics of descriptive survey are as follows:-

a) They are non-experimental. They deal with relationships between non-manipulated variables in a natural, rather than an artificial setting.
b) They use the logical methods of inductive-deductive reasoning to arrive at generalizations.
c) They are characterized by discipline inquiry, requiring expertise, objectivity and careful execution.
d) They often employ method of randomization so that error may be estimated when inferring population characteristics from observation of samples.
e) The variables and procedures are described as accurately and clearly as possible so that the study can be replicated by other researches.
f) They use techniques of observation, description and analysis.
g) Descriptive surveys investigate phenomena in their natural setting with the purpose of both immediate and long range.

3.3 Steps in Descriptive Survey Method

Like any other methods of research descriptive survey method follows the following steps for the study:-

(i) Statement of the problem

(ii) Identification of information needed to solve the problem

(iii) Selection or development of instrument for gathering data

(iv) Identification of target population and determination of any necessary sampling procedure

(v) Design of the procedure for data collection

(vi) Collection of data

(vii) Analysis of data

(viii) Preparation of the report

In this study descriptive survey method is used as the researcher used all the above steps which are properly explained in the coming pages of this chapter.

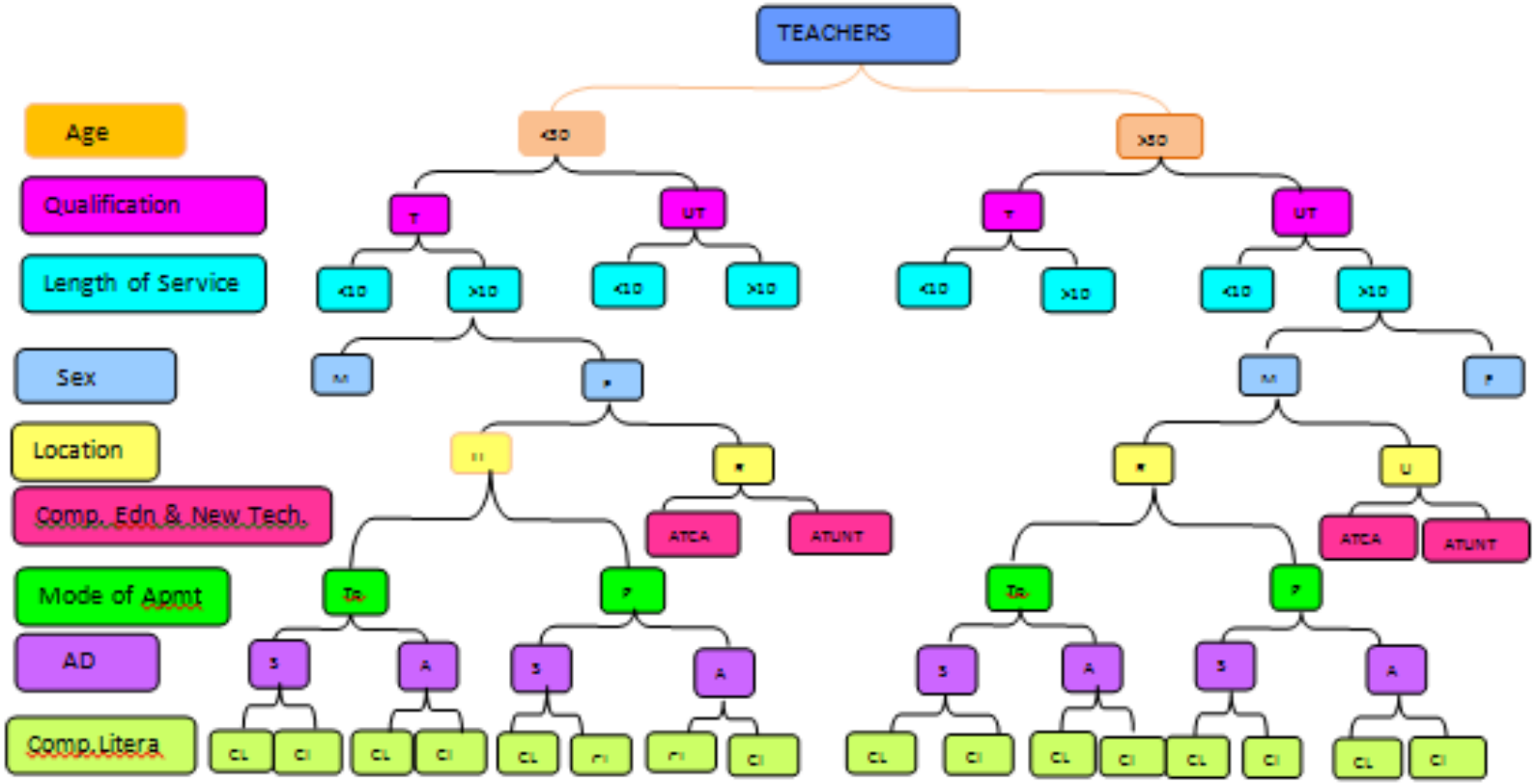
3.4 Factorial Design of the Study

The present study attempted to study the influencing factors of teacher effectiveness of catholic missionary schools in the state of Nagaland.

Various variables (components) were considered for this study. They were referred to as factors. They are placed at different levels in the figure-3.1. These variables or components are age, qualification, length of service, gender, locality, attitude of teachers towards computer education, attitude of teachers towards using new technology, mode of appointment, academic discipline and computer knowledge of teachers. Factorial design is given in the form of a diagram which is also explained briefly in the following pages.

FACTORIAL DESIGN

CATHOLIC MISSIONARY SCHOOL TEACHERS OF NAGALAND



From the above diagram, it is indicated that <30=Less than 30 years, >30=More than 30 years, T=Trained, UT=Untrained, <10=Less than 10 years, >10=More than 10 years, M=Male, F=female, U=Urban, R=Rural, ATCA=Attitude Towards Computer Education, ATUNT=Attitude Towards Using New Technology, P=Permanent, Tp=Temporary, A.D=Academic Discipline, S=Science, A=Arts, CL=Computer Literate, CI=Computer Illiterate. This design is (2x2x2x2x2x2x2x2x2x2) Factorial Design.

Figure 3.1: Shows the Factorial Design of the Study

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3.5 Operational Definitions of the Key Terms Used

i) Teacher Effectiveness

The term 'Teacher Effectiveness' refers to the effectiveness of teachers in teaching. An effective teacher succeeds in producing desired changes among the students through his/her teaching. The criteria used to assess teacher effectiveness were; (i) preparation and planning for teaching, (ii) classroom management, (iii) knowledge of subject matter, (iv) teacher characteristics and (v) interpersonal relations. Judged on the basis of variables like age of teachers, qualification, length of service, gender, locality, attitude of teachers towards computer education, attitude of teachers towards using new technology, mode of appointment, academic discipline and computer knowledge of teachers, the teacher effectiveness had been measured with reference to the aforesaid criteria.

Influencing factors refer to the factors that influence teacher effectiveness. The present study considered following five factors that influence teacher effectiveness:-

a) Preparation and Planning for Teaching

Preparation and planning for teaching is refered to the ability of the teacher in planning lessons well in advance, to adjust teaching time judiciously, to go to class and leaving it on time, to make teaching interesting by giving examples, to be systematic in preparation of lessons, to organize subject matter in agreement with course objectives, to administer tests to the students, to plan lessons according to the individual differences, to summarize the lesson at the end of the class, to consult colleagues if necessary while planning the lessons and to plan lessons based on techniques tested and found suitable.

b) Classroom Management

Classroom management is refered to the ability of the teacher to motivate students for learning, to use audio visual aids, to resort to remedial teaching whenever necessary, to interact with students, to be objective in evaluating students, to stimulate the intellectual curiosity of students, to conduct tests periodically to evaluate teaching, to have clarity in teaching, to guide students to complete assignments, to encourage students to be punctual in their assignments, to maintain discipline in the classroom within the framework of democratic atmosphere, to ask more thought provoking questions and to discuss students' performance in tests with them.

c) Knowledge of Subject Matter

Knowledge of Subject Matter is refered to the ability of the teacher to have full control over the subject that he/she teaches, to exchange experiences of subject-matter with colleagues, to update the knowledge of subject matter, to keep on acquiring new knowledge, to have substantial knowledge of human development and learning, to discuss the content of the subject matter with ease and confidence and to have a great deal of interest in the subject he/she is teaching.

d) Teacher Characteristics

Teacher characteristics is refered to the ability of the teacher to possess supportive behaviour, to be fairly creative, to have good expression, to be emotionally balanced, to be reasonably active, to go to school neatly dressed and smart, to be punctual in attending school work, to possess pleasing manners, to have fairly good memory, to have pleasant and approvable gestures in the classroom, to have sense of duty and responsibility, to have pleasant and distinct voice, to value academic achievements, to provide laudable example of his/her personal and social living to students, to show understanding and sympathy in working with students, to take criticisms from others as a feedback for his/her own self-improvement and to love students.

e) Interpersonal Relations

Interpersonal relations is refers to the ability of the teacher to cooperate in the work of the school, to be friendly with colleagues, to invite students to discuss outside the class, not to discriminate students for personal reasons, to take a great deal of interest in parent-teacher association, to contribute in the meetings of professionals and scholarly societies, to help students to face personal and educational problems, to maintain cordial human relations, to be reasonably obedient to the principal, to support the genuine causes of teaching community and to consider the duty to be devoted to get a good name to the school.

ii) Catholic Missionary School

Catholic Missionary School refers to the school which is run by Catholic Missionaries.

iv) Nagaland

Nagaland is one of the North Eastern states of India. It borders the state of Assam to the west, Arunachal Pradesh and part of Assam to the north, Burma to the east, and Manipur to the south. The state capital is Kohima, and the largest city is Dimapur. It has an area of 16,579 square kilometers (6,400 sq.m.) with a population of 1,978,502 and the literacy rate is 73.45% as per 2011 Census of India.

3.6 Variables Used for the Study

The following variables used for the study:-

i) Age

Age of teachers was considered in this study as one of the demographic variables. In the present study age has been categorized into two such as (i) from 19 to 30 years and (ii) from 31 to 58 years. It is generally believed that the young teachers are more energetic and active, and may use more teaching skills while teaching. At

the same time teachers who are seniors may have more experience in teaching and have more knowledge of subject matter and may perform well.

ii) Qualification

Qualification of teachers was considered in this study as one of the demographic variables. Here, qualification is referred to trained teachers and untrained teachers who were involved in teaching. In the present study, the term 'trained' was referred to the teachers who had completed general qualifications like Higher Secondary, Degree and Post-graduation and have undergone any of the teacher training programmes like PSTE, D.El.Ed., B.Ed. and M.Ed. The term 'untrained' was referred to the teachers who had completed only general qualifications like Higher Secondary, Degree and Post-graduation and have not undergone any of the teacher training Programmes like PSTE, D.El.Ed., B.Ed. and M.Ed. It is generally believed that the trained teachers are more competent in teaching than the untrained. The school authority expects better performance from trained teachers as they may be paid higher compensation than untrained teachers since the former is supposed to have the knowledge of subject matter as well as possess better teaching skills.

iii) Length of Service

The present study considered length of service as one of the demographic variables. Length of service in teaching is referred to the duration in which a person served as a teacher in an institution. Length of service of teachers in this study has been categorized into two such as (i) from 6 months to 10 years and (ii) from 11 years to 35 years.

iv) Gender

The present study considered gender as one of the demographic variables. Male and female teachers are considered for the study.

v) Locality

Locality in this study was referred to urban and rural areas. In Nagaland, the schools are situated in both urban and rural areas. Teachers serving in rural areas may have comparatively less transport and communication facilities unlike the teachers serving in urban areas. This aspect may bring about differences in teacher effectiveness. Hence locality is taken as one of the demographic variables in this study.

vi) Attitude of Teachers towards Computer education

In the present study the attitude of teachers towards computer education was taken as a variable. Allport (2002) defines attitude as, "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related". Attitude is a personal disposition, which impels an individual to react to an object, situation or proposition in favourable or unfavourable ways. In this study attitude of teachers towards computer education is referred to teachers' personal dispositions which impel them react to computer education in favourable or unfavourable way. Computer education is referred to the computer literacy that is given in the classroom. This variable is taken for the purpose of finding out whether the attitude of teachers towards computer education determines influencing factors of teacher effectiveness.

vii) Attitude of Teachers towards Using New Technology

Attitude of teachers towards using new technology was taken as a variable in the study. New technology in this study is referred to the use of various technological tools in education such as Internet, Sound Systems, Computers, Power Point, E-mail, Electronic Information Resources, Web Resources, Electronic Conference, Multimedia, Digital Cameras and Portable Scanners. In the present study attitude of teachers towards using new technology is referred to teachers' personal dispositions which impel them to react to the use of new technology in favourable or unfavourable

way. The present study aimed at finding out whether the attitude of teachers towards using new technology determines teacher effectiveness.

viii) Mode of Appointment

Mode of appointment was taken as one of the demographic variables in the present study. Two modes of employment such as permanent and temporary are considered in this study. In the present study permanent teachers is referred to the teachers whose appointments have been regularised by the management of the school and the temporary teachers are those teachers whose appointments have not been regularised. Schools generally appoint teachers on regular and temporary basis. Teachers appointed on regular basis are expected to perform better than contract teachers since they receive better compensation than the temporary teachers. Moreover, schools need temporary teachers also to substitute teachers who go on leave for various reasons. Besides, schools also appoint teachers in the beginning of the appointment for a probationary period.

ix) Academic Discipline

Academic Discipline of the teachers was considered as one of the demographic variables in the study. Science and arts subjects are considered for the study. Generally teachers of science stream may possess or use more technical skills since they deal with more practical subjects where as arts teachers may possess better communication and administrative skills. Teachers are able to use their skills according to opportunities given to them. Students are the subjects of teaching activities but the key factor of the effect of teaching is the teacher because the quality of education is influenced by the effectiveness of teacher.

x) Computer Knowledge of Teachers

In the present study computer knowledge of teachers was referred to the teachers with computer knowledge and teachers without computer knowledge. In this study the computer knowledge was meant as computer literacy. Teachers with

computer knowledge may use their knowledge of computer and computer skill in teaching the students by making use of computer labs, audio visual rooms and smart classrooms. The present study tried to compare the teacher effectiveness of teachers with computer knowledge and teachers without computer knowledge.

3.7 Population of the Study

Population consists of all the 2587 teachers teaching in all the 120 Catholic Missionary schools in the state of Nagaland. Out of 120 schools 90 schools are situated in the rural and rest 30 are in urban area.

Sl.No.	District	Urban	Rural	Total No. Of Schools
1	Dimapur	12	10	22
2	Kiphire	1	8	9
3	Kohima	7	20	27
4	Longleng	1	3	4
5	Mokokchung	1	5	6
6	Mon	1	4	5
7	Peren	2	3	5
8	Phek	2	14	16
9	Tuensang	1	7	8
10	Wokha	1	11	12
11	Zunheboto	1	5	6
	Total	30	90	120

Source: Survey of Education Commission, Diocese of Kohima, 2015-2016.

Table-3.1: Shows the List of Schools Managed by Catholic Missionaries in the State of Nagaland

It is revealed from the above table-3.1 that there are 22 schools in Dimapur District which are run by Catholic Missionaries, 9 schools in Kiphire District, 27 schools in Kohima District, 4 schools in Longleng District, 6 schools in Mokokchung District, 5 schools in Mon District, 5 schools in Peren District, 16 schools in Phek District, 8 schools in Tuensang District, 12 schools in Wokha District and 6 schools in Zunheboto District.

Sl.No	District	Urban		Rural		Total No. of teachers
		Male	Female	Male	Female	
1	Dimapur	186	419	38	61	704
2	Kiphire	22	38	35	68	163
3	Kohima	65	202	82	191	540
4	Longleng	10	20	15	17	62
5	Mokokchung	29	45	21	37	132
6	Mon	27	42	12	15	96
7	Peren	38	53	9	24	124
8	Phek	58	79	58	85	280
9	Tuensang	19	57	33	57	166
10	Wokha	39	54	37	69	199
11	Zunheboto	12	25	29	55	121
	Total	505	1034	369	679	2587

Source: Survey of Education Commission, Diocese of Kohima, 2015-2016

Table-3.2: Shows the Number of Teachers Working in the Catholic Missionary Schools of Nagaland

It is reflected from the above table-3.2 that there are 704 teachers working in Dimapur District of Nagaland, 163 teachers in Kiphire District, 540 teachers in Kohima District, 62 teachers in Longleng District, 132 teachers in Mokokchung District, 96 teachers in Mon District, 124 teachers in Peren District, 280 teachers in Phek District, 166 teachers in Tuensang District, 199 teachers in Wokha District 121 teachers in Zunheboto District.

3.8 Sample of the Study

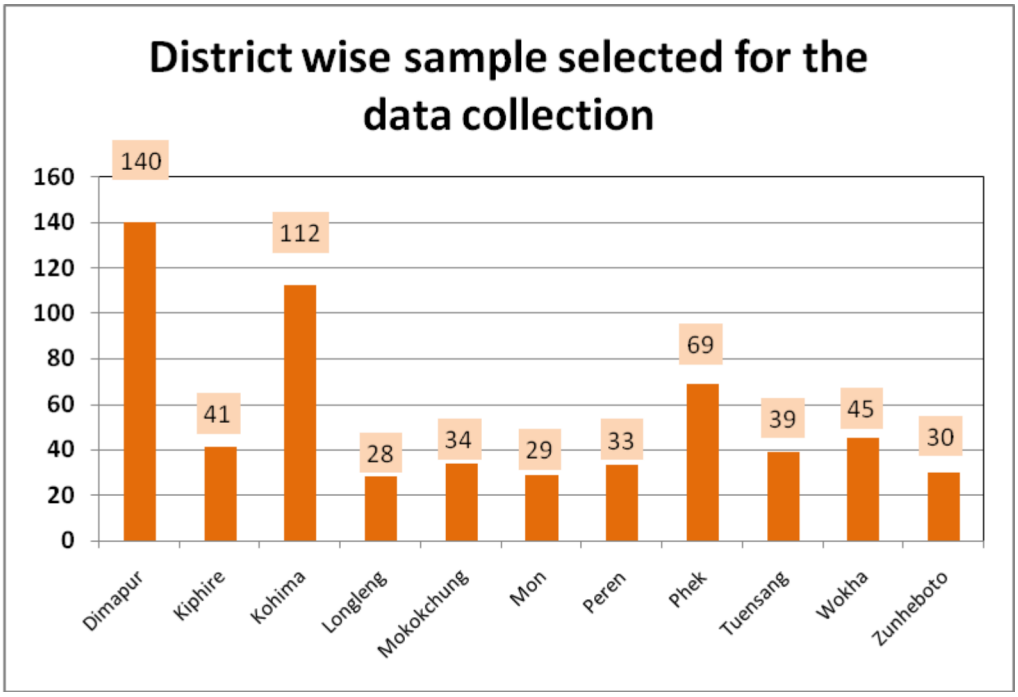
Purposive and Stratified Random Sampling Technique was used for the selection of the sample. Sample consisted of 600 effective teachers who were chosen on the basis of principals' rating and students' performance of the schools under study. In order to include all the components in the sample with proper proportion 23% of the population which includes both male and female teachers who are serving in rural and

urban areas were taken for the study. The details of the selection of the sample are given below:-

		Male		Total	Female		Total	Total
Sl No	District	Urban	Rural		Urban	Rural		Sample
1	Dimapur	32	17	49	63	21	84	140
2	Kiphire	7	11	18	10	16	26	41
3	Kohima	19	22	41	37	34	71	112
4	Longleng	4	6	10	8	10	18	28
5	Mokokchung	6	7	13	12	10	22	34
6	Mon	7	4	11	12	6	18	29
7	Peren	8	5	13	14	9	23	33
8	Phek	11	14	25	21	23	44	69
9	Tuensang	5	8	13	10	16	26	39
10	Wokha	6	9	15	13	17	30	45
11	Zunheboto	4	7	11	7	12	19	30
	Total	109	110	219	207	174	381	600

Source: Survey of Education Commission, Diocese of Kohima, 2015-2016.

Table- 3.3: Shows District Wise Sample Selected for the Data Collection



Source: Survey

Figure-3.2: Shows Bar Graph of the District Wise Sample Selected for the Study

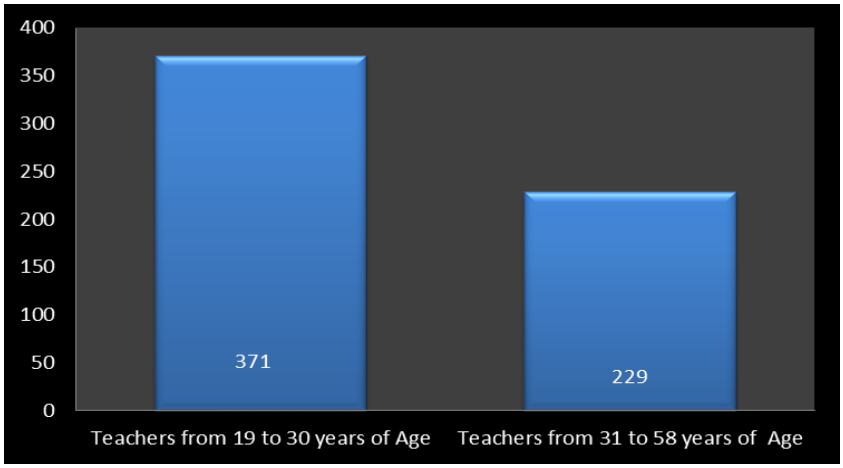
It is revealed from the above table-3.3 and Figure-3.2 that 140 teachers were taken from Dimapur District as sample, 41 teachers from Kiphire District, 112 teachers from Kohima District, 28 teachers from Longleng District, 34 teachers from Mokokchung District, 29 teachers from Mon District, 33 from teachers from Peren District, 69 teachers from Phek District, 39 teachers from Tuensang District, 45 teachers from Wokha District and 30 teachers from Zunheboto District.

a) Sample Based on Age of Teachers

Sl. No.	Age of Teachers	Number of Teachers	Total
1	Teachers from 19 to 30 years of Age	371	600
2	Teachers from 31 to 58 years of Age	229	

Source: Survey

Table 3.4: Shows the Number of Selected Sample of Teachers between 19 to 30 Years and between 31 to 58 Years



Source: Survey

Figure-3.3: Shows the Bar Graph of Number of Selected Sample of Teacher between 19-30 Years and between 31-58years

It is reflected from the table-3.4 and figure-3.3 that 371 teachers from 19 to 30 years of age and 229 teachers from 31 to 58 years of age were selected as the sample for the study based on age of teachers.

b) Sample Based on Qualification of Teachers

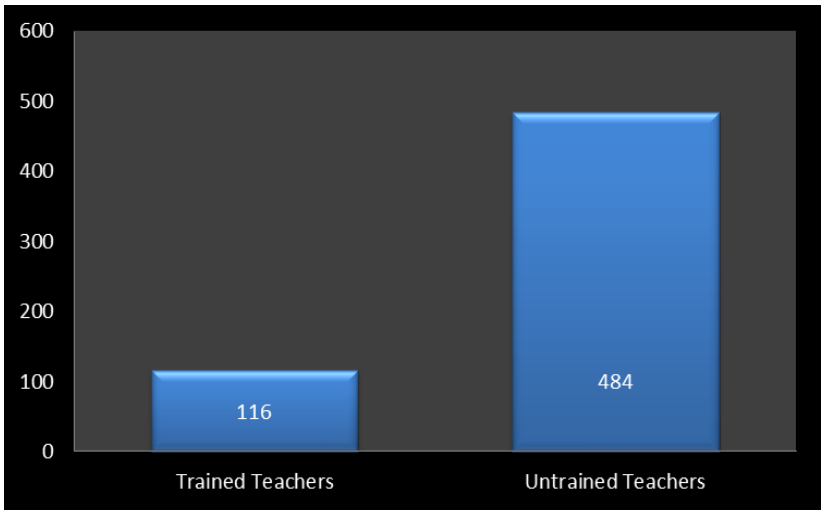
Sl. No.	Qualification of Teachers	Number of Teachers	Total
1	Trained Teachers	116	600
2	Untrained Teachers	484	

Source: Survey

Table-3.5: Shows the Number of Selected Sample of Trained and Untrained Teachers

N.B: i) Trained: Trained means the teachers who had completed general qualifications like Higher Secondary, Degree and Post-graduation and had undergone any of the teacher training programmes like PSTE, D.El.Ed., B.Ed. and M.Ed.

ii) Untrained: Untrained means the teachers who had completed only general qualifications like Higher Secondary, Degree and Post-graduation and had not undergone any of the teacher training Programmes like PSTE, D.El.Ed., B.Ed. and M.Ed.



Source: Survey

Figure-3.4: Shows the Bar Graph of Number of Selected Sample of Trained and Untrained Teachers

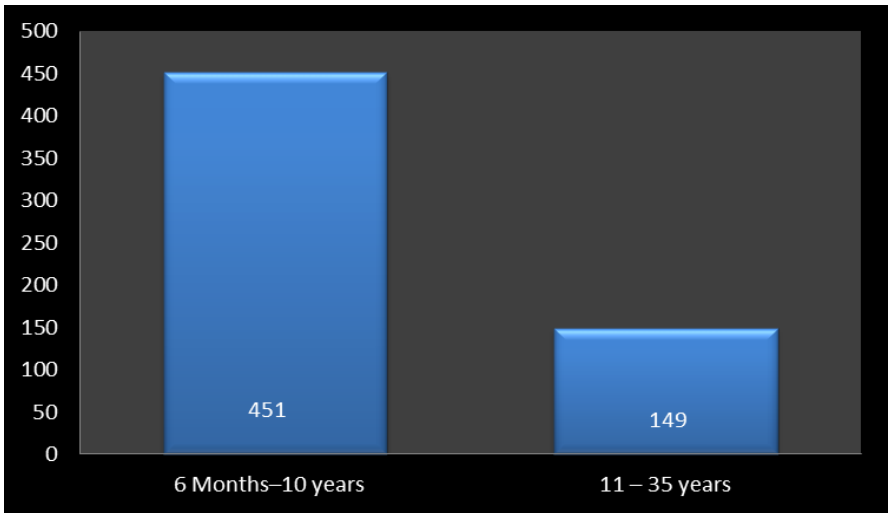
It is found from the table-3.5 and figure-3.4 that 116 trained teachers and 484 untrained teachers were selected as the sample for the study based on qualification of teachers.

c) Sample Based on Length of Service of Teachers

Sl. No.	Length of service of Teachers	Number of Teachers	Total
1	6 Months–10 years	451	600
2	11 – 35 years	149	

Source: Survey

Table-3.6: Shows the Number of Selected Sample of Teachers Based on Length of Service



Source: Survey

Figure-3.5: Shows the Bar Graph of Number of Selected Sample of Teachers Having Length of Service from 6 Months to 10 Years and from 11 to 35 Years

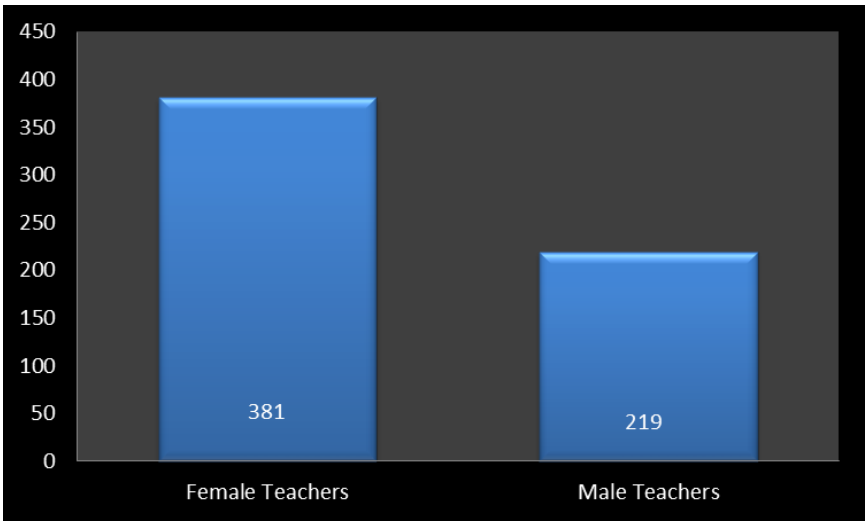
It is reflected from the table-3.6 and figure-3.5 that 451 teachers who had length service from 6 months to 10 years and 149 teachers who had length of service from 11 to 35 years were selected as sample for the study based on length of service.

d) Sample Based on Gender of Teachers

Sl. No.	Gender	Number of Teachers	Total
1	Female Teachers	381	600
2	Male Teachers	219	

Source: Survey

Table 3.7: Shows the Number of Selected Sample of Male and Female Teachers



Source: Survey

Figure-3.6: Shows the Bar Graph of Number of Selected Sample of Male and Female Teachers

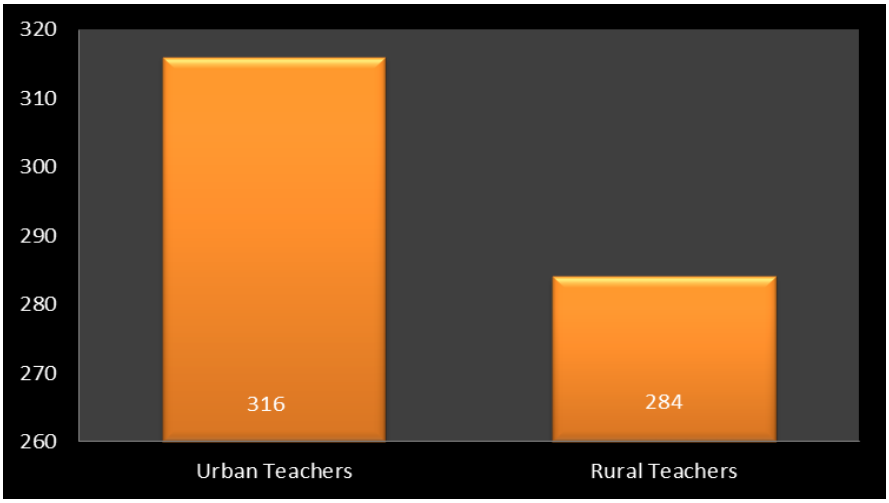
It is found from the table-3.7 and figure-3.6 that 381 female teachers and 219 male were selected as the sample for the study based on gender of teachers.

e) Sample Based on Locality of School

Sl. No.	Locality of School	Number of teachers	Total
1	Urban Teachers	316	600
2	Rural Teachers	284	

Source: Survey

Table-3.8: Shows the Number of Selected Sample of Teachers of Urban and Rural Schools



Source: Survey

Figure-3.7: Shows the Bar Graph of Number of Selected Sample of Teachers of Urban and Rural Schools

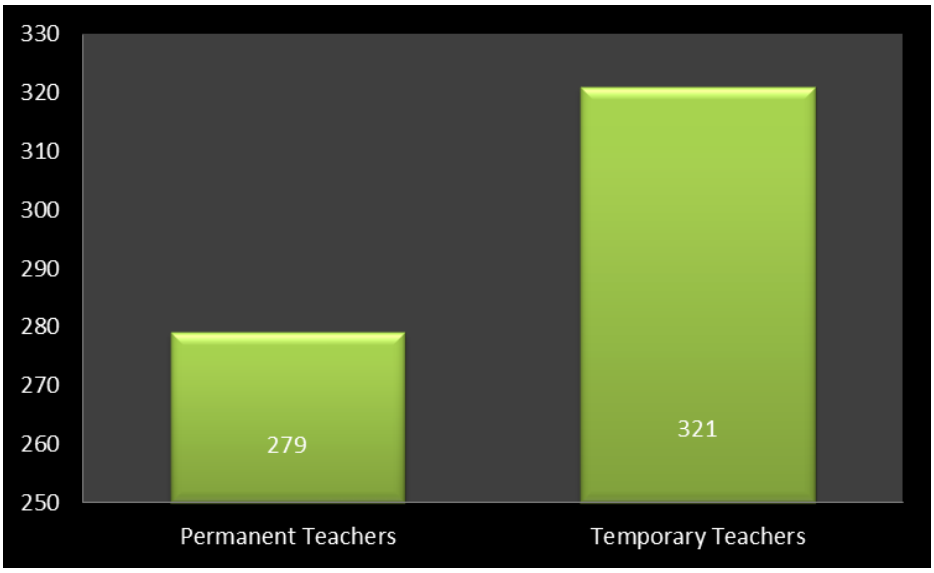
It is reflected from the table-3.8 and figure-3.7 that 316 urban teachers and 284 rural teachers were selected as the sample for the study based on locality of the school.

f) Sample Based on Mode Appointment of Teachers

Sl. No.	Mode of Appointment of Teachers	Number of teachers	Total
1	Permanent Teachers	279	600
2	Temporary Teachers	321	

Source: Survey

Table-3.9: Shows the Number of Selected Sample of Permanent and Temporary Teachers



Source: Survey

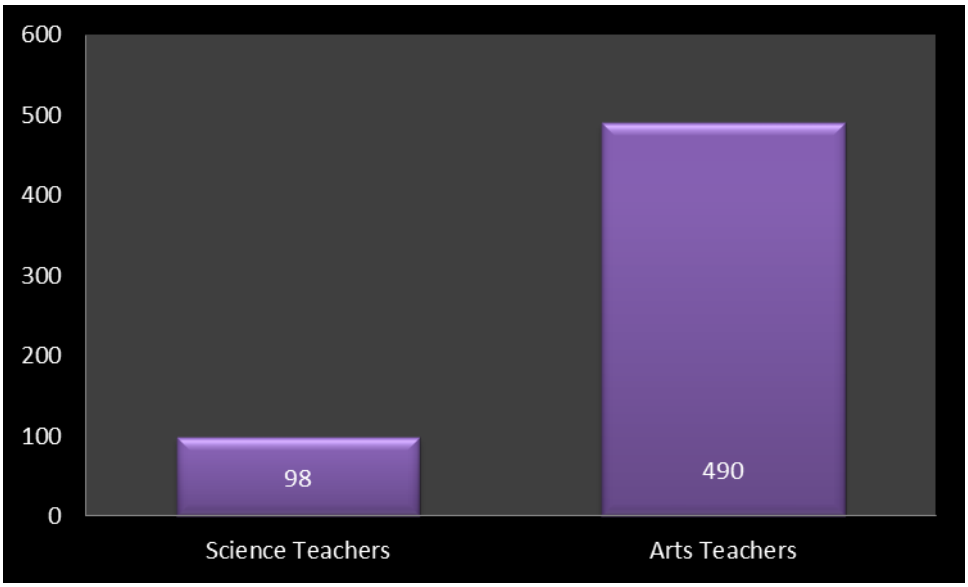
Figure-3.8: Shows the Bar Graph of Number of Selected Sample of Permanent and Temporary Teachers

It is found from the table-3.9 and figure-3.8 that 279 permanent teachers and 321 temporary teachers were selected as the sample for the study based on mode of appointment of teachers.

g) Sample Based on Academic Discipline of Teachers

Sl. No.	Academic Discipline of Teachers	Number of teachers	Total
1	Science Teachers	98	598
2	Arts Teachers	490	

Table-3.10: Shows the Number of Selected Sample of Science and Arts Teachers



Source: Survey

Figure-3.9: Shows the Bar Graph of Number of Selected Sample of Science and Arts Teachers

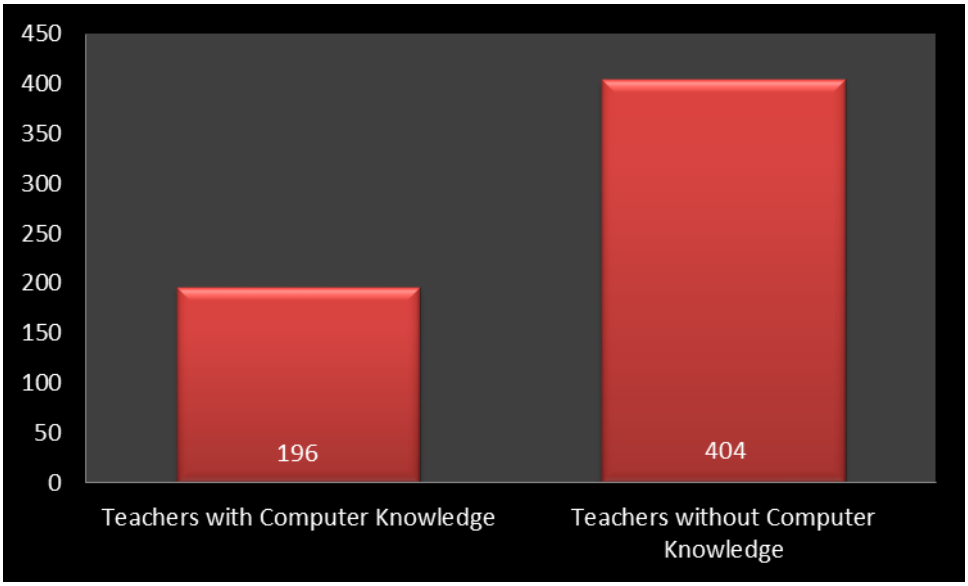
It is reflected from the table-3.10 and figure-3.9 that 98 science teachers and 490 arts teachers were selected as the sample for the study based on academic discipline.

h) Sample Based on Computer Knowledge of Teachers

Sl. No.	Computer Knowledge of Teachers	Number of teachers	Total
1	Teachers with Computer Knowledge	196	598
2	Teachers without Computer Knowledge	404	

Source: Survey

Table-3.11: Shows the Number of Selected Sample of Teachers with Computer Knowledge and Teachers without Computer Knowledge



Source: Survey

Figure-3.10: Shows the Bar Graph of Number of Selected Sample of Teachers with Computer knowledge and Teachers without Computer Knowledge

It is found from the table-3.11 and figure-3.10 that 196 teachers with computer knowledge and 404 teachers without computer knowledge were selected as the sample based on computer knowledge of teachers.

3.9 Tools Used for the Study

The investigator used the following tools for the collection research data:

i) Kulsum Teacher Effectiveness Scale developed and standardized by Umme Kulsum.

ii) Attitude towards Using New Technology Scale developed and standardized by S. Rajasekar.

iii) Attitude of Teachers towards Computer Education Scale developed and standardized by the researcher.

3.10 Description of the Tools

The description of the development and standardization of the above mentioned tools are given in the following pages.

3.10.1 Kulsum Teacher Effectiveness Scale

In this session a brief explanation of the process of construction and standardization of Kulsum Teacher Effectiveness Scale (KTES) is given. Teacher Effectiveness Scale measures teachers' various functions related to his teaching. This scale was developed and standardized by Umme Kulsum (2006). Teacher effectiveness is not a new concept to us. We have been listening that some teachers are the most effective ones. This means that those teachers have attained the needed competence in their roles and functions, such as the preparation and planning for teaching, classroom management, and knowledge of subject matter, teacher characteristics and their interpersonal relations. Also these teachers excel in their other personality characteristics. They are said to be the best teachers.

We have also been listening that some teachers are the least effective ones. They are inferior in respect of their roles and functions as well as in their personality characteristics. They are said to be the least effective ones. From these points of view, it may be perceived that the most effective and least effective teachers could form the ends of a continuum and in between these two ends lie teachers who are meditatively effective.

There are quite a few teacher effectiveness scales developed by other investigators to measure the effectiveness of teachers working at different levels. These scales have been developed abroad as well as in India. The review of these scales done by those investigators helped the investigator in identifying the limitations of the scales developed in general on the concept of teacher effectiveness. Therefore, the investigator took a decision to construct a scale on teacher effectiveness by following the standard procedures for developing a scale. The investigator wanted to

try out the ladder technique of Kilpatrick and Cantril (1960) for constructing a scale on teacher effectiveness.

For assessing teacher effectiveness, a self-anchoring scale was constructed on the lines of the self- anchoring striving scale of Kilpatrik and Centril (1960). In its format the scale was constructed in the present study more or less corresponded to the one developed by Muthayya (1971).

The rationale behind choosing the self –anchoring striving scale technique for the purpose of the present study was as follows:

i) Investigator successfully used the scale to assess the general as well as the educational aspirations.

ii) Conceptualization of the top and bottom anchoring points with the help of the picture of a ladder that was quite familiar to the teachers was thought to be much easier and meaningful.

iii) The self-anchoring striving scale based on the first person approach was thought to be more empirical.

iv) The scale did not involve rigidity-predefined dimension, verbal categories, prepared phrases or sentences and the like as outlined by the originators of the scale.

v) The fact that this scale would be easily understood by the teachers and their effectiveness would be elicited accordingly, was realized to be true in the subsequently try-out of the scale.

The investigation in the perspective examined the areas (variables) worth being included in the tool to be developed. The tool should be objective, comprehensive, measuring content validity, easily amendable for administrator and acceptable to the respondents. Hence, one has to think about teacher effectiveness in terms of characteristics of a teacher, his personality, attitudes etc., process (teacher-pupil interaction) and production variables (outcomes of teaching-learning process, namely pupil achievement). Finally after exhaustive review and consultation; five areas were

finalized: namely, (1) Preparation and planning for teaching, (2) Classroom management, discipline, motivation, interaction, evaluation. (3) Knowledge of subject-matter its delivery and presentation including B. B. Summary. (4) Personality characteristics of teachers, and (5) Interpersonal relations of teachers with others. These five areas cover all aspects of teacher's functions and hence have the merit of adequate conceptual framework and content validity.

The scale had 60 statements. The test-retest reliability of the scale was found to be 0.63 with a time gap of 16 days. The split-half reliability coefficient correlation was found to be 0.68.

Criterion related validity have been established for the scale. Correlations of the teacher effectiveness rating scale and teacher effectiveness scale comes out to be 0.85. There exists significant difference ($t=99$, $p>0.01$ level) between effective and ineffective teachers as based on the rating of their headmasters.

The Scale is self-administrable. To ensure careful understanding of the instructions, proper instructions need to be given by the testers besides the individual reading them. There is no time limit and there is no right, or wrong responses. Hence the individual teachers are quite free to express their responses as they perceive, keeping in view the maximum possible effectiveness (high/most) of teachers and the least possible effectiveness (low/least) of teachers, as frame of reference for individual rating.

Each item elicits two responses; (1) step number on Now, and (2) Step number aspiring to attain in the next three years. The time dimension of the next three years was to score as a frame of reference for the 'now' (present) effectiveness, hence the step number given for each item for present time was taken as the score of the effectiveness of each of the respondent teacher. Total score of the respondent ranges from 0 to 600. The specimen copy of the scale is given in Appendix-I(A).

3.10.2 Attitude towards Using New Technology Scale

In this session a brief explanation of the process of construction and standardization of Attitude towards Using New Technology Scale (ATUNTS) is given. This scale measures the attitude of teachers towards using new technology. This scale was developed and standardized by S. Rajasekar. He has described the scale with the following words that Technology tools have become a part and parcel of our life. The introduction of technology to the field of education has completely changed the conventional way of teaching and learning by modifying and making the enormous use of technology in the field of education. In order to make the best use of our resources, it is essential that all persons engaged in the educational enterprise and especially the teacher should understand adequately the dynamics and mechanism of educational technology and provide the best possible education to the students. Also the favourable attitude of teachers' using new technology in teaching will certainly make teachers use them in appropriate situations in teaching and thus measuring of teachers' attitude towards using new technology in teaching is very much needed.

The teachers' attitude towards using new technology scale has been constructed and standardized in a way to measure teachers' attitude towards using new technology in teaching. It is of Likert type scale having as many as 40 statements; out of which 18 were favourable worded and remaining 22 of them were unfavourable worded. The statements were categorized with the experts' opinion under the dimensions namely Hardware and software; hardware include, materials used in the classroom, economy and impact while the later include programme, economy and impact of software. Each statement is set against a five-point scale of 'Strongly Agree', 'Agree', 'Undecided', 'Disagree' and 'Strongly Disagree' and weights of 5, 4, 3, 2, 1 are given in that order for the favourable statements and the scoring is reversed for the unfavourable statements. The scores in this scale range from 40 to 200 in the direction of the most unfavourable to the most favourable.

Attitude towards using new technology scale has construct validity as items were selected having the 't' values equal to or more than 1.75 (Edwards, 1975). Its

intrinsic validity was found to be 0.98, which clearly states that the scale is valid. The reliability of this scale is shown by split-technique (Consistency) followed by the use of Spearman-Brown prophecy formula that was found to be 0.95 which is high and indicates that the scale is reliable. The specimen copy of the scale is given in Appendix-I(D).

3.10.3 Attitude of Teachers towards Computer Education Scale

This scale measures the attitude of teachers towards computer education. This scale was developed and standardized by the investigator. The Steps of Construction and Standardization of Questionnaire are illustrated systematically in the section 3.11.

3.10.4 Teacher Effectiveness Rating Scale

Teacher Effectiveness Rating Scale is part of Kulsum Teacher Effectiveness Scale (KTES). This scale was used for rating the effectiveness of teachers while teaching. This rating scale is used by the supervisor to rate the functions of the teacher by putting tick mark on the numerical values given in the columns. The rating is done based on the five influencing factors of teacher effectiveness such as preparation and planning for teaching, classroom management, knowledge of the subject matter, teacher characteristics and interpersonal relations. The specimen copy of the scale is given in Appendix-I (B)

3.10.5 Interview Schedule

A few statements form Kulsum Teacher Effectiveness Scale (KTES) were modified in the form of an interview schedule with the help of various experts. It was a closed ended type of structured interview schedule which is in the question form. A structured interview through questionnaires is suitable to achieve the aim of this research since it allows the researcher to develop an understanding of the interviewees world so that the researcher can influence it, either independently or collaboratively

through interaction with the interviewees during the interviews Easter by-Smith et al (2002).

Structured interview through questionnaires has its benefits as it allows the researcher to ask follow-up questions in order to get extra information, which is accurate in a questionnaire Hussey and Hussey (1997). There is more specific probe in the topics that can be introduced only after the main issues have been raised if the interviewees have not discussed them already in the context of the main subject area Patton (2002). Follow up questions are useful because they can increase the richness and depth of the interviewees responses Patton (2002).

Interview I is closed ended type and it has 30 statements in the question form with 'Yes' or 'No' response. The statements numbered 2, 6, 11, 23, 27 and 33, are in the question series 1-6 which are based on preparation and planning for teaching, statements numbered 3, 7, 12, 16, 20, 24 and 28 are in the question series 7-13 which are based on classroom management, statements numbered such as 1, 8 and 14 are in the series 14-16 which are based on knowledge of subject matter, statements numbered such as 4, 9, 13, 18, 21, 25, 30 and 31, are in the series 17-24 that are based on teacher characteristics and statements numbered such as 5, 10, 15, 19, 22, 26 are in the series 25-30 that are based on interpersonal relations. The questions given in the above are related to factors influencing effectiveness that are required to be ticked by the respondents with 'Yes' or 'No' answers.

Interview Schedule II consists of 15 closed ended type statements in the question form with 'Yes' or 'No' response. It has been prepared from the 15 statements of Teacher Effectiveness Scale (TES). It was administered to the sample of 550 students of secondary schools of 11 districts of Nagaland. It comprises of 3 statements each from all the 5 influencing factors of teacher effectiveness. The statements numbered 2, 23 and 49 are in the question series 1-3 which are based on preparation and planning for teaching, statements numbered 3, 16 and 28 are in the question series 4-6 which are based on classroom management, statements numbered such as 1, 17 and 46 are in the series 7-9 which are based on knowledge of subject

matter, statements numbered such as 35, 47 and 52 are in the series 10-12 that are based on teacher characteristics and statements numbered such as 19, 22 and 42 are in the series 13-15 that are based on interpersonal relations. The questions given in the above are related to factors influencing effectiveness that are required to be ticked by the respondents with 'Yes' or 'No' response. The specimen copies of the interview schedules are given in Appendix-I (E and F).

3.11 Steps in Construction and Standardization of Attitude of Teachers towards Computer Education Scale

In this session the process of construction and standardization of attitude of teachers towards computer education scale is explained. After a thorough analysis of the tool available on computer education, it was found that, they were inadequate to achieve the objectives of the present study, which aimed at comprehensive measure of attitude of teachers towards computer education. More over the available scales developed were in the field of management studies rather than schools. Further, all these scales were found to have very few items. Therefore, it was decided to develop a fresh comprehensive scale on attitude of teachers towards computer education.

The various steps for construction and standardization of the Opinionnaires can be discussed in the lines given below:

a) Decision on the type of tool and method of standardization
b) Collection of statements
c) Arrangements of the statements (items)
d) Pre-piloting
e) Primary tryout of the Questionnaire
f) Item analysis and Selection of statements
g) Reliability of the Scale
h) Validity of the Scale

3.11.1 Type of Tool and Method of Standardization

Research Questions were designed with the help of the guide and literature review. An appropriate research method, population, sampling procedure and the variables related to attitude of teachers towards computer education were chosen. Six areas or dimensions related to computer education were selected for the construction of scale such as: a) Objectives, b) Curriculum, c) Teacher, d) Teaching Methods and Aids, e) Evaluation, and f) Computer Education in General.

3.11.2 Collection and Development of Statements

An initial pool of 228 statements was considered by the investigator by taking the help from the guide. These statements were scrutinized and the investigator judged their representation according to the dimensions and the applicability of each statement in and outside the classroom. The statements were also examined in terms of their representing the behaviours denoted under each component/dimension of the student.

3.11.3 Arrangement of Statements

The investigator did the arrangements of the 228 statements which were collected for the construction of the scale. For arrangement of the statements various standards suggested were adopted i.e., the suggestions of Wang (1932), Thurstone & Chave (1929), Likert (1932), Bird (1940), and Edwards & Kilpatrick (1948), as summarized by Edwards (1969), were followed. These suggestions are given below:-

a) Avoid statements that refer to the past rather than to the present
b) Avoid statements that are factual or capable of being interpreted as factual
c) Avoid statements that may be interpreted in more than one way
d) Avoid statements that are irrelevant to the psychological object under consideration
e) Avoid statements that are likely to be endorsed by almost everyone or by almost no one

f) Select statements that are believed to cover the entire range of the affective scale of interest
g) Keep the language of the statements simple, clear, and direct
h) Statements should be short, rarely exceeding twenty words
i) Each statement should contain only one complete thought
j) Statements containing universals such as all, always, none, and never, often introduce ambiguity and should be avoided
k) Words such as only, just, merely and others of a similar nature should be used with care and moderation in writing statements
l) Whenever possible, statements should be in the form of simple sentences rather than in the form of compound or complex sentences
m) Avoid the use of words that may not be understood by those who are to be given the completed scale
n) Avoid the use of double negatives

The preliminary draft items were reduced to 220 statements after removing the vague and overlapping items and they were finalized and distributed to 10 Experts in the field of education to appraise the content coverage, conceptualization and precision. 9 experts responded with remarks, suggestions and latest thoughts. Based on 80-100% unanimity (concurrence) of the judges, items were modified and finalized 126 statements for the try out form of the scale.

3.11.4 Piloting of the Statements

For piloting, a primary estimate is done to find out the difficulty value of statements or to see whether the statements are weak or good. It is also known whether the language used for statement is proper or not. The piloting of Teachers Attitude towards Computer Education was done keeping in mind the following objectives:

a) To examine responses for each statement.
b) To prepare instructions for the attitude scale
c) To check whether the language of statement is suitable to principals/teachers or not,

d) To find out the estimate of time used for the attitude scale.

e) To find out weaker statements

3.11.5 Try out of the Scale

The scale was meticulously modified and redrafted according to the dimensions with the suggestions of experts to whom it was sent for content validation. It was administered to a sample of 50 teachers of Catholic missionary schools of Dimapur and Kohima districts. The final item selection for the scale was done by selecting the items on the basis of 'r' values obtained on item total correlation which were significant at 0.05/0.01 level and beyond. This technique is based on homogeneity principle, which emphasizes the item scores correlation with the total score. And the scale outlined the perfect homogeneity as that which measures the same universal factor in all individuals and in all its items.

A five point Likert scale was employed to collect the data on attitude towards computer education, namely strongly agree, agree, undecided, disagree, strongly disagree. The respondents were asked to indicate the attitude towards computer education in the school by choosing the level mentioned in each statement. Each try out form was scored giving weightage to each of the alternative response of the statements in the pattern given below: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1. All the positive items of the tryout form were scored as 5 to 1 and the scoring was reverse for negative items i.e., the negative items were scored as 1 to 5 and the total score ranged from 126 to 630.

3.11.6 Method of Item Analysis

"In constructing a new test, the final sets of items were usually identified through a process known as item analysis." (Linda Croker) There are two Approaches of Item Analysis for any type of research which can be discussed in brief: i) Qualitative Analysis, ii) Quantitative Analysis.

a) Qualitative Analysis: It includes the consideration of content validity (content and form of items), as well as the evaluation of items in terms of effective item-writing procedures.

ii) Quantitative Analysis: It includes principally the measurement of item difficulty and item discrimination.

In the first place the investigator studied the different methods as suggested in various reference books and researches undertaken. According to one method of item analysis, a correlation is found out on the summation of the scores of subjects on one statement with the scores of other on all statements. If the correlation is positive and significant, it can be said that the things which are measured by the attitude scale is given a place in the scale.

According to another method as suggested by Edward A. L. items can be selected by using t-ratio (critical ratio). Thus, for selection of items/statements the responses on all statements by every subject are arranged in deseeding order and item analysis is conducted on the basis of responses given by subjects with the highest scores.

The statements having higher "t" value should be selected. Approximately, half of the selected items should be positive and negative. Inclusion of both types of statement will reduce the possibility of problems. According to Edward, the method of selection of statements through t-value is good and appropriate method.

Therefore, in the present study the mean difference of every statement through one sample t-test (SPSS V.16) is used for simple and suitable process of selection of statements in adequate numbers. After studying various references and discussions with experts and the guide, it was decided to use the method of "t" ratio, as suggested by Edwards. The statements in attitude scale were analyzed by using statistical technique such as One-Sample t-test (SPSS V.16), item by item finding out the 't' value of each statement at the .01 level of significance.

3.11.7 Reliability of the Scale

There exist a close relationship between the two concepts of reliability and validity as they both emphasize test efficiency. Reliability is concerned with the stability of test scores and does not go beyond the test itself. In the present study, the reliability of the scale was established on a sample of 50 teachers of different schools of Dimapur district, the sample constituted the one other on which the test was tried out. This was resorted with an effort to achieve cross validation of the scale. In the present research two types of reliabilities have been established and they are as follows:

a) Test-retest reliability

b) Split-half reliability

i) Test-Retest Reliability

Test-retest reliability refers to a measure of consistency of a psychological test or assessment. This kind of reliability is used to assess the consistency of a test across time.

The Test-retest is a statistical method used to determine a test's reliability. The test is performed twice; in the case of a questionnaire, this would mean giving a group of teachers the same questionnaire on two different occasions, if the correlation between separate administrations of the test is high (~7 or higher), then it has good test-retest reliability.

Category	Sample	Spearman -Brown Coefficient	Pearson Product Moment Correlation
Test	50	0.795	0.660
Retest	50	0.703	0.542

Table-3.12: Shows Test-retest Reliability

The test was given and repeated on same group of 50 teachers of Dimapur and Kohima districts of Nagaland with the gap of 30 days and the correlation was

computed between the first and second set of scores by using Pearson Product Moment Correlation. Using this method the reliability for the Teachers' Attitude towards Computer Education was found to be high with a gap of one month between the two administrations. Pearson Product Moment Correlation clearly indicates in the table 3.12 that initial test value is 0.660 and re-test value is 0.542 which shows that the scale is highly reliable.

ii) Split-Half Reliability

The Split-Half method determines the internal consistency of the test relatively. A measure of consistency where a test is split in two and the scores for each half of the test is compared with one another. If the test is consistent it leads the researcher to believe that it is most likely measuring the same thing. Split-half reliability is a useful measure when impractical or undesirable to assess reliability with two tests or to have two test administrations (Cohen & Swerdlik, 2001).

Category	Sample	Split-Half Reliability Value	Remarks
Test	50	0.795	Reliable
Re-test	50	0.703	Reliable

Table-3.13: Shows Split-Half Reliability

For the present scale split half reliability was computed with 50 samples by two ways, first half and second half, of the items and Guttman's Split-Half Coefficient testis applied to test the reliability of the two groups of items. Table 3.13 indicates that the Split-half Coefficient test value is 0.795 and re-test value is 0.703 which shows that the scale is highly reliable.

3.11.8 Validity of the Scale

Validity is the extent to which a test measures what it claims to measure. It is vital for a test to be valid in order for the results to be accurately applied and interpreted.

Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the investigator is attempting to measure. Validity has three components.

1. Relevance- The document must have a purpose to what you want to say and have evidence to back it up.
2. Accuracy- the document must be correct which can be put a point across.
3. Utility- the document provides formative and summarizes results with the right information.

For the present scale the following different types of validity have been established.

i) Content Validity

When a test has content validity, the items on the test represent the entire range of possible items the test should cover. Individual test questions may be drawn from a large pool of items that cover a broad range of topics. For this present study the content validity was established by rewording and modification of the items with the consultation of experts in the field which has been deliberated and mentioned in the earlier part of the discussion under section 3.11.2 and 3.11.3.

iv) Concurrent Validity

Concurrent validity is the degree to which the scores on a test are related to the scores on another, already established, test administered at the same time, or to some other valid criterion available at the same time. Example, a new simple test is to be used in place of an old cumbersome one, which is considered useful, measurements are obtained on both at the same time. Logically, predictive and concurrent validation are the same, the term concurrent validation is used to indicate that no time elapsed between measures.

3.11.9 Final Attitude Scale

The final attitude of teachers towards computer education has 100 statements out of which 50 are positive and 50 negative. All the selected items according to the dimensions are shown in the tables below:

Areas/Dimensions		Total Number of Items
A.	Objectives	29
B.	Curriculum	15
C.	Teacher	10
D.	Teaching Methods & Aids	16
E.	Evaluation	12
F.	Computer Education in General	18
Total		100

Table-3.14: Shows the Number of Items Selected for Final Scale Attitude of Teachers towards Computer Education According to the Dimensions

As for the try out scale the final attitude scale also consisted of five point Likert scale and was employed to collect the data on attitude towards computer education namely strongly agree, agree, undecided, disagree, strongly disagree. It was administered to 600 sample teachers of Catholic schools of Nagaland. The respondents were asked to indicate the attitude towards computer education in the school by choosing the level mentioned in each statement. Each item was scored giving weightage to each of the alternative response of the statements in the pattern given below: Strongly Agree (SA) = 5, Agree (A) = 4, Undecided (U) = 3, Disagree (D)= 2, Strongly Disagree (SD) = 1. All the positive items were scored as 5 to 1 and the scoring was reverse for negative items i.e., the negative items were scored as 1 to 5 and the total score ranged from 100 to 500.

The present study is in line with the other studies conducted by different investigators such as, Samanta Roy (1971), in her study entitled "A Study of Teacher Attitude and its Relationship with Teaching Efficiency", 'Study of 'Cognitive And Affective Computer Attitudes of Teachers' by Kumaran and Selvaraju (2001), McCormick (1993), Hardy (1998) and Stenzel (1982). Thus, the present study possesses concurrent validity, in establishing the Teachers' Attitude towards Computer Education and so the administration of the attitude scale was found most appropriate. The specimen copy of the scale is given in Appendix-I (C).

3.12 Procedure for the Collection of Data

The investigator personally went to the various Catholic Missionary Schools in Nagaland to collect the required data, took the interview and observed the various teaching skills of the sampled teachers. Data collection was done for one and half years. The investigator was unable to visit a few schools which were in the remote areas more than twice due to lack of transportation and hence, the principals of those schools sent the required data through hand post and postal service. The teacher effectiveness rating scale and interviews were administered with the help of principals and teachers of concerned schools.

3.13 Statistical Techniques Used

The data was analyzed with simple averages, percentages, Mean, Standard Deviation, and 'T'-test for significance between Means and they are presented through various tables and graphs.

A 't'- test is an analysis of two population means through the use of statistical examination; a 't'- test with two samples is commonly used with small sample sizes, testing the difference between the samples when the variances of two normal distributions are not known. A 't'- test statistical significance indicates whether or not the difference between two groups' averages most likely reflects a "real" difference in the population from which the groups were sampled. 't'- test is often called Student's 't'- test in the name of its founder "Student". 't'- test is used to compare two different set of values. It is generally performed on a small set of data. 't'- test is generally applied to normal distribution which has a small set of values. This test compares the mean of two samples. 't'- test uses means and standard deviations of two samples to make a comparison.