CHAPTER III: METHODOLOGY

3.1 Statement of the Problem

Literature review shows that the use of animation in education had different levels of impact on students. This overall finding continues the debate about the value of animation in presenting a concept in teaching. Theoretically, the results of the most of the earlier studies strengthened the conclusions that animation facilitates learning.

But, these studies, where animation was effective in learning, have been done in the context of developed countries, particularly belongs western countries. But, the same, yet to be proved in the context of developing countries like India. Here, the context is entirely different compared to western countries, as there are different varieties ranging from one extreme to another, such as students studying in the poorest circumstances to the most sophisticated environment. This denotes the significance to do the study in these varieties. Karnataka, being one of the leading states of India in education, industry, standard of living; conducting a study here, on role and effectiveness of animation in education would be highly relevant in the context of developing countries.

3.2 Significance of the Study

As education sector is moving towards ‘e-learning’ and trying to adopt new approaches in teaching, animation is emerging as a promising tool of communication in classrooms. Animation has been a very popular and powerful medium of communication in different areas like advertisement, films, and TV channels and so on. Effective use of animation will open flood gates of possibilities even in educational sector, especially in developing countries like India, where education plays a crucial role in the future of the country. Animation is
considered as one of the sophisticated tools for educational communication, so it should be effectively used in developing countries.

As there are no many studies which have been done in this area, this study will set a right direction for the use of animation technology in Karnataka. This study will also be relevant in national and international context. Researchers, academicians, policy makers, instructional designers and teachers are the benefiting stakeholders of the study. The findings of the research will be helpful in designing the animated instructional materials in future and it also will encourage the effective use of animation technology in classrooms. Over all, it will set a standard for the modern education system in countries like India.

3.3 Objectives of the Study

The study is aimed at achieving following objectives-

3.3.1 General objective:

The study generally aims to examine the effectiveness of the use of animation as tool for communicating ideas or information in primary schools, taking Karnataka as the study area.

3.3.2 Specific Objectives

The specific objectives of the study are-

- To investigate the importance of animation as a tool of communication.
- To study the role of animation in education in the context of developing countries taking Karnataka as a study area.
- To examine the advantages and disadvantages of using animation as a tool of communication in primary level education.
3.4 Research Methodology

The current study has been conducted using both primary and secondary data. Primary data was collected using experimental and questionnaire based survey method. Experiment is conducted to examine the effectiveness of animation on academic performance of primary level students. Questionnaire based survey, was done among the teachers of primary school to understand the merits and demerits of use of animation in primary level education. Secondary data was accumulated from various research journals, articles, web sources and government documents.

3.4.1 Research Design

The current study is undertaken using experimental method. Experiment is a study in which a treatment, procedure, or program is intentionally introduced and the result or outcome is observed. Here, ‘animation’ is used as treatment to observe its effectiveness as a medium of communication and its influence on the performance of students is observed. True experiments have four elements: manipulation, control, random assignment and random selection. The most important of these elements are manipulation and control. Manipulation means that something is purposefully changed by the researcher in the environment. Control is used to prevent outside factors from influencing the study outcome. Here, in the study, too attempts were made to observe the effectiveness of animation as a tool of communication and its impact on student’s performance in the manipulated environment by taking four districts of Karnataka as study areas. Four districts were selected using the cluster sampling method considering the social, economic and educational background. In every district, two schools were chosen-one English medium and another one Kannada medium. In order to understand the effectiveness of animation, in both of the schools; students of class second, fourth and sixth were selected and in every class students were divided into two groups- control and experiment. In control group, concerned subjects were taught using traditional teaching
methods. But in the experimental group, which is also called as treatment group, animation instructional materials were used in teaching. Both, in control and experimental groups, the same subjects were taught by the same teacher and the students were given the same question papers in their respective pre-test and post-test. The only difference between the two groups was the treatment, i.e., use of animation. Attempts were made to ensure that both the experimental group and the control group were similar in number and care has been taken to avoid the selection bias by randomly assigning the students to control and experimental groups in concerned classes. Before, finalizing the question papers and the method of teaching, a pilot study was conducted to a small group of 40 students in Shreedevi Primary school, Devinagara in Dakshina Kananda district.

Besides, a questionnaire based survey was also conducted among the teachers of primary school to understand the merits and demerits of use of animation as a tool of communication in primary level education. The survey was conducted using random sampling method. Fifteen variables were curved on various aspects of educational animation and response was collected, in four scales like strongly agree, agree, disagree and strongly dis agree; in the form of their agreement to statements. Reliability and validity of the questionnaire was tested in a small sample group of 15 teachers before using it for actual survey.

**3.4.2 Research Questions**

The study was conducted on the basis of following research questions-

- Can we consider animation as an effective tool of communication in primary level education?
- What is the role of animation instructional material in improving students’ academic performance?

- Can animation play a significant role in improving academic excellence of primary school students in developing countries?

- What are the advantages of use of animation as communication tool in primary level education?

- What are the demerits of use of animation content in educational communication in primary school?

3.4.3 Population

The ideal sample is large enough to serve as an adequate representation of the population, which helps the researcher to generalize the findings. There is no fixed number of percentages of subjects that determines the size of an adequate sample. It may depend upon the nature of the population of interest or the data to be gathered and analyzed. If the size of the sample is large, the possibility of error is small. But at the same time most important aspect in social science research is the care with which the sample is selected than the size.

Here, the population selected for the study was primary school students and teachers of Karnataka. The study was aimed at examining the effectiveness of animation as a tool of communication in primary school. Hence, the students from both lower primary and higher primary school were included in the study. Students who belong to different geographical areas of Karnataka, hail form diversified socio-economic condition was selected. The study included both English and Kannada medium students in the sample. Questionnaire based
survey was done among the teachers of various primary schools of Karnataka. The study included teachers from different parts of Karnataka, from both English and Kannada medium schools.

### 3.4.4 Sampling Procedure

Sampling implies taking any part of the population or universe as representative of that population or universe. Instead of studying the entire big unit, small section which is called as ‘sample’ is used for study. There are two methods of sampling used in research- random (probability) and non-random (judgment) sample. In judgment sampling, the researcher selects the items to be drawn from population based on his/her judgment about how well these items represent the whole population. In random sampling individual judgment plays hardly any role in selection of sample. Here, researcher uses specific statistical process to ensure equal probability of every item in population.

In the current study, Cluster sampling technique was used. Karnataka is a state which belongs to different socio-economic condition. Apparently, educational standard of the students also differs with districts due to various factors. Out of 28 districts of Karnataka, 4 districts were selected for the study, which represents the whole population. These districts were selected considering the geographical area, educational standard, socio-economic condition and technological exposure of the primary school students. In every selected district, or cluster, two schools were selected; one English medium and another Kannada medium, using simple random sampling. In selected school experiment was conducted in second, fourth and sixth standard. In each class, students were divided into two groups, control and experimental group, using simple random sampling technique. For questionnaire based survey, simple random sampling was used and study was done among the teachers of
primary schools of Karnataka. The sample included teachers from different geographical areas of Karnataka.

3.4.5 Locale of the Study

The study was conducted in two schools each, of four districts of Karnataka, in Bengaluru urban, Chamarajanagara, Dakshina Kannada, and Bidar districts. The rationale behind selecting these districts for study was to include the sample from all parts of Karnataka comprising students from different social, economic and educational background, which can represent the population of the state as a whole.

Fig 01: Locale of study

Bengaluru urban district is playing a vital role in the development of Karnataka state. Considering the socio-economic aspects, Bengaluru urban district is, arguably, the most advanced district in the state. The capital of Karnataka, Bengaluru, is a part of the same district and the city is popular worldwide. Because of the growth of IT sector, Benagaluru is known as Silicon Valley of India. Bengaluru urban district attracts people from different part of the country as well as from the world. According to the census of 2011, 88.1% of the populations of the district live in urban area. The majorities of the primary students in the
district, whose parents are mostly educated professionals, are exposed to the modern technology. Considering these factors two schools in the district were selected. The study was conducted in Prajna Vidya Nikethana, in Byatarayanapura, which is an English medium school and in Govt. higher primary school, in Tippenahalli, in which medium of instruction is Kannada.

Chamarajanagara was another district included in the study. Chamarajanagara is located in the southern end of Karnataka, sharing border with Kerala and Tamil Nadu. It is considered as one of the least developed districts in the state. Chamarajnagara district has distinctive demographics. It includes people from all castes and religion. Having a large percentage of forest cover, it has high population of tribals, which includes soligas, Jenu Kurubas, Betta Kurubas. Besides, a major chunk of the population belongs to scheduled caste, schedule tribe and other backward classes. In Chamrajanagara district, Govt. higher primary school in Hardanahalli, which is a Kananda medium school and Universal Learning school in Chamrajanagara, an English medium school was selected from this district.

The third district chosen for the study was Dakshina Kannada, a costal district in the state of Karnataka. Dsakshina Kananda is one of the leading districts the field of education. Primary and secondary education has reached all sections of society here. As a result of tremendous progress and high standard of education, the district is recording the high pass percentage in SSLC and PUC examinations from a long time. From this district, Akshara Bharthi Vidyalaya, in Vamadapadvu and Govt. primary school, Hokkadigoli was included in the study from this district.
The fourth district selected for the study was Bidar. It is the north most district of Karnataka, which shares border with Maharashtra. Bidar is identified as one of the developing districts of Karnataka. The educational standard of the district has been a cause of concern as it has abysmal academic record. It has continued to be among the last five districts in SSLC examination results for over a decade now (Desai, 2014). Keeping these factors in mind, two schools, Jnana Sudha English medium school and Govt primary school, Naubad was selected for the study from Bidar district.

3.4.6 Period of the Study

The research design was prepared in the year 2011. The data was collected in the month of July and August, 2012 by conducting experimental studies on the students of primary schools in selected four districts of Karnataka. The questionnaire based survey among the teachers was also done during the same time. Data was analysed in between January 2013 to December 2013. Final report was prepared during March 2014 - January 2015.

3.4.7 Data Collection

The study was conducted using primary and secondary data. Primary data was collected using an experimental study and a questionnaire based survey was designed and developed in keeping view of general and specific objectives of the study. The experimental study was done among the primary school students, where as a questionnaire based survey was conducted among the teachers of primary school of Karnataka in order to understand the effectiveness of animation as tool of communication in education. Secondary data was collected by studying various research articles, books, web resources and Karnataka government documents/reports on primary school education related to the use of ICT in education and efficacy of animation in teaching and learning.
3.4.7.1 An Experimental Study

For the experimental study, the students of second, fourth and sixth standard students were selected. Three different subjects were randomly selected- Mathematics for second, language for fourth and science for sixth standard. The animated instructional material was collected on these subjects from the pool of animated instructional material prepared by Ajim Premji foundation which is approved by the Govt. of Karnataka and currently being used in primary schools of Karnataka. Three topic were selected, considering the syllabus of second, fourth and sixth standard students. While selecting the topic and finalizing the animation instructional material, two primary school teachers were consulted to make sure that the selected topics matches with the syllabus and standard of current primary school education. For the study on pupils of second standard, topics like addition and subtraction, for fourth standard grammar and for sixth standard a lesson on parts of human body were finalized after consulting the experts.

Before the actual experiment was undertaken, a pilot study was conducted in Shreedevi primary school, Devinagara in Dakshina Kanand district. 45 students, belonging to second, fourth and six standards had participated. Amendments were made to the question paper and mode of presentation of the animation material, after considering the response from the students.
During the course of the experimental study, for every class two question papers, one for pre-test and another one for post-test was prepared. For the second standard, ten problems related to addition and subtraction were given in pre-test. Each question carried two marks. Another question paper on the same topic with the same level of difficulty but with different set of question was prepared for post-test. Maximum marks in both the tests were 20. While preparing the question paper, care has been taken to make sure that the selected topics are covered in animation content. In both, pre-test and post-test, the difficulty levels of questions were same. The same question paper was translated into English in order to avoid any difference between Kannada and English medium schools.
Selected subject for fourth standard was language. An interactive animation content explaining the components of sentence construction like verb, noun, and pronoun in Kannada was used for Kananda medium students. Here too, two separate question papers were used in pre-test and post-test. But the same difficulty level was maintained in both pre-test and post-test. First five questions in the question paper were to rearrange the words into proper, meaningful sentence. These Five questions were for two marks each. The second segment of the question paper carried 5 multiple choice questions, 4 answers each, were given in the bracket, and students had to select, one, the right answer. In the third and final segment, 5 sentences were given and students were instructed to identify verb, adverb or adjective in that sentence. Each question carried one mark each and total mark for the test was 20. For English medium students, similar kinds of questions were given but the pattern was changed according to the content. Here, the first six questions were to rearrange the words into a meaningful sentence. These six questions carried two marks each. In the second segment eight multiple questions were included, it carrying one mark each. So the total mark in the test was 20.
Sixth standard students attended the class for a lesson on functioning of human body parts. The lessons were presented in the form of songs or narration along with the animation displaying functions of human organs. Here, pre-test and post-test included 10 multiple choice questions. All the questions were from the topic covered in the class. Every question had four answers and students were told to choose the right answer. The questions given in pre-test and post-test were same. Same pattern and difficulty level were maintained. Each question carried 2 marks and maximum mark was 20. The same questions were given in Kannada and English in order to avoid any discrepancies between Kananda and English medium schools.

As mentioned earlier, the study was conducted in 8 schools in four districts of Karnataka. In every class, students were divided into two group control and experimental group using lottery method of sampling. In both the groups before the commencement of the class a test was given to access their knowledge level on particular subject. 45 minutes were given for the pre-test. After the test, classes were done by a qualified teacher. Time allotted for the
teaching was 2 hours. Here, in control group, during the teaching hour teacher taught the subject using traditional teaching methods. Chalk and talk method was the main technique used here. After the class, another test was conducted and care has been taken to make sure that question paper was akin to the pre-test. The duration for the post-test was also same as pre-test: 45 minutes. To understand the effectiveness of the class scores of pre-test and post-test were compared.

In experimental group, the subjects were taught with the assistance of animation instructional material. Here too the same procedure was followed, 45 minutes were given for pre-test and post-test and 2 hours for teaching. The same topic which covered in control group was taught in experimental group as well, but the content was presented using animation. After the class, both pre-test and post-test question papers were evaluated and marks were compiled in SPSS. In all 8 schools of Karnataka the same teacher conducted the class using the same method in Kannada and English medium schools.

To understand the difference in the effectiveness of animation on different subjects, a small group of Kannada medium students was selected from Govt. Primary school Hokkadigoli, Dakshina Kannada. Here, a study was conducted in second, fourth and sixth standard where students attended classes and given tests in all three subjects- Mathematics, Science and Language in both control and experimental situation. Their scores were compared with different subjects in order to arrive at the conclusion on the difference in the efficacy of animation in teaching different subjects. A separate set of question paper was prepared for this. 45 minutes were given for pre-test and post-test and 2 hours for teaching.
A qualified primary school teacher, who has completed D.Ed, has conducted classes in all the schools of Karnataka. The teacher has conducted the class using charts, games and chalks-talk method, which is appropriate to the concerned subjects in control group. And the same subject and topics were covered with the help of animation in experimental group. Throughout the study single teacher had handled the class in all the schools of Karnataka to maintain uniformity in teaching method and instructional materials used; and to avoid the possible influence of extraneous factors in the study.

3.4.7.2 Questionnaire Based Survey

A detailed questionnaire was prepared covering all the aspects of use of animation as a tool of communication in primary school education. Questionnaire was divided into two parts. First part of the questionnaire contained demographics details of the respondents like gender, qualification, age, etc. The second part of the questionnaire included 15 statements pertaining into different aspects such use of as animation as a tool of communication, advantages and disadvantages of using animation in education, factors involved in preparing good animation instructional material for effective communication in classroom. The opinions were collected, in four point scale, as agreement/disagreement to the statements in the form of ‘Strongly agree’, ‘Agree’, ‘Dis Agree’, and ‘Strongly disagree’.

Before the actual survey, a pilot survey was undertaken with a small sample group of teachers in Govt. primary school, Hokkadigoli in Dakshina Kananda district to test the reliability and validity of the questionnaire. Modifications were done to the questionnaire after considering the various points put forward by the respondents.
3.5 Field Diary

While doing the experimental study a field diary was maintained by the research scholar. This includes all the detailed descriptions on the animation instructional materials, traditional teaching aids used, mode of presentation of the materials, student’s response in the class. The obtained detail gives a better idea about their areas of interests, perceptions and attitudes on both use of animation and traditional teaching aids in the class room.

3.6 Hypothesis

The broad hypotheses of the study are as follows-

\(H_0\): The use of animation as a tool of communication in education will not have significant effect on improving student’s performance.

\(H_0\): Effectiveness of animation will be similar on both English medium students and Kannada medium students when it is used as communication tool in education.

\(H_0\): There will not be any difference in the effectiveness of animation on the performance of rural and urban students when it is used in primary education.

\(H_0\): Use of animation will have equal positive effect on the performance of male and female students.

\(H_0\): Animation will have similar effect on student’s performance when it is used as a tool of communication in teaching subjects like Mathematics, Language and Science.
The above stated hypotheses are in null form and addressed to the general and specific objectives of the study. As the study envisages analyzing data for drawing inferences, individual research questions have a hypothesis which was tested using appropriate statistical tests.

3.7 Data Analysis Method

Data analysis means the categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions. The purpose of analysis is to reduce data to intelligible and interpretable form so that the relations of research problems can be studied and tested. To interpret is to explain, to find meaning. Interpretation takes the results of analysis, makes inferences pertinent to the research relations studied, and draws conclusions about these relations.

Here, a detailed study was done using experimental method in 8 schools, belonging to 4 districts of Karnataka state. In the state, this study was carried out in Bengaluru, Dakshina Kannada, Chamarajanagara and Bidar district with the sample sizes of 167, 120, 121 and 136 respectively. A contingency table for the marks of pre-test and post-test was prepared. The data was analyzed by splitting it into different clusters according to the schools, districts, medium of instruction, area, gender and subjects. Mean and standard deviation were calculated in every set, for both pre-test and post-test. To understand the association between the score of control and experiment group students, Pearson correlation was found for the pre-test and post-test, using Statistical Package for Social Sciences (SPSS) after which conclusions were arrived at. As the sample size was more than 30 in each Z test was used to test hypothesis using Microsoft excel when there was two variables. While comparing the performance of students in 3 subjects ANOVA test was used for data analysis.
Survey was undertaken among the teachers of the same districts- Bengaluru, Dakshina Kannada, Chamarajanagara and Bidar with the total sample size of 132. The collected data was tabulated and analyzed using Microsoft excel. Percentage, mean and standard deviation was calculated for all 15 variables to arrive final conclusion.

### 3.8 Operational Definitions

*Animation:* Animation is an illusion of movement created through the rapid display of sequence of images. In educational context it can be defined as content presentation using a combination of media. Animation instructional content generally involves integration of multimedia such as audio, video, images and text.

*Primary school students:* Students who are studying in primary or elementary schools entering structured education, after pre-school. In the context of Karnataka, primary education consists of seven years of schooling starting at the age of six after pre-school.

*Tool:* Anything used as means for accomplishing task or purpose. It can also be defined as a means of performing an operation or achieving an end.

*Rural & Urban:* Rural area is a geographic area that is located outside cities and towns. An urban area is a location characterized by high human population density and vast human-built features in comparison to the areas surrounding it. Urban areas include cities, towns conurbations.
*Edutainment*: Educational entertainment is often referred as edutainment. It includes content that is primarily educational but has incidental entertainment value, and content that is mostly entertaining but contains educational value.