3.1 INTRODUCTION

Research may be termed as the systematic investigation of verified knowledge and study of materials, sources in order to establish facts and reach new conclusions. It is an organised effort to collect information, to analyse it, to put it together and finally evaluate it.

This chapter on methodology describes elaborately the sample that was chosen, the research design, the objectives of the study, the hypotheses of the study, tools used for the study, construction and validation of the tools, data collection, statistical techniques used for data and analysis.

3.2 STATEMENT OF THE PROBLEM

The High school stage is a very important stage for the students as it forms the base for higher education both academic and technical. English Language plays an important part in their life. It helps them to widen their intellectual horizon. English language is the gate way to all modern knowledge and modern progress. It is a means of communication and social control. According to J. Whatmough, “Language is human… a verbal systematic symbolism, a means of transmitting information from a form of social behavior with a high degree of convention”

Grammar occupies an important place in the teaching learning of a language. It has a utilitarian value for a student. It is a means to the learning of the language
efficiently and correctly. It helps the pupil to speak with interest. Language teaching was mostly grammar centered. The common practice was grammar first, language next. Thus the learner of the language had to memorize the rules of grammar along with their exceptions. In this process, the learner often found himself confused. Teaching of grammar in the traditional method kills interest and initiative of the language learner. The class room activities should be made enjoyable.

The quality of education offered at the stage is bound to determine the quality of further education at higher levels. So, the study of English tenses helps the high school students gain the knowledge of English language with ease, comfort and confidence and help them overcome the anxiety, frustration and apathy which always accompany the language acquisition as they create a sort of plateau which makes the learner stagnate and consequently unable to move to a higher level.

The efficacy of lecture method also known as the chalk and talk method, in teaching grammar leads to boredom in students despite their potential for learning. It is difficult to make the high school students understand the definitions of tenses through the traditional grammar methods. With the passage of time the notions and ideas about grammar and its teaching underwent a constant change. Today grammar is not a separate subject. It is the descriptive part of a language. It cannot be taught in isolation. Conscious, intelligent habit forming is much more effective than an unintelligent mechanical parrot like method of learning.

In the light of the information revolution and the scientific challenges of the 21st century, there is a sweeping trend to use computers in all aspects of life and education is no exception. On the other hand, the world is heading towards
knowledge economy and a lot of money is invested in computer assisted language learning instructional software programs.

The computers have brought a revolution in education. It has unique combination of tutorial, interactive and visual capabilities which has a beneficial effect on the learner. It provides new possibilities of learning, thinking and growing emotionally and cognitively.

The rapid emergence of information technology has opened new vistas, making children more creative and providing them with an individualized learning environment.

If the teacher explains the definitions and types of tenses by using graphics, animations with audio effects, the concepts are retained in mind for a longer period of time. By reviewing and rehearsing the animated pictures with definitions and examples, students can get an opportunity to correct misconceptions and understand the tenses clearly.

By using CALL as a tool the teacher can present English tenses more effectively and even the dullest tasks could be transformed into an adventure. It motivates the learners to learn English tenses easily and offers high-quality interactive feedback on grammar whenever the student feels or needs it. Therefore, it is worth investigating the impact of such CALL programs on the performance of learners.

Hence, the problem in the present study is stated as “Impact of CALL in Learning English Grammar among High School Students”.
3.3 STAGES OF THE STUDY

1) Choosing the topic for teaching and experiment.

2) Reviewing the pertinent literature.

3) Identifying the relevant technology and tools for the development.

4) Selecting the experimental design for the study.

5) Identifying the sample for the study.

6) Developing a CALL programme for English tense.

7) Developing and administering a test for attitude towards English, comparing government and private school students, boys and girls and control and experimental group students.

8) Developing and administering a test for academic motivation towards English, comparing government and private school students, boys and girls and control and experimental group students.

9) Developing and administering a test for self-concept towards English, comparing government and private school students, boys and girls and control and experimental group students.

10) Developing and administering a Pre test for academic achievement in English tense for government and private school students, boys and girls and control and experimental group students.
11) Classifying the subjects as control group and experimental group.

12) Implementation of CALL programme as a treatment to the experimental group and providing traditional approach to the control group.

13) Developing and administering a Post test for academic achievement in English tense for government and private school students, boys and girls and control and experimental group students.

14) Analysis of the data.

15) Interpretation of the data.

16) Arriving at the conclusion.

3.4 RESEARCH DESIGN OF THE STUDY

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre test</th>
<th>Treatment</th>
<th>Post test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>X₁</td>
<td>Traditional method</td>
<td>X₃</td>
</tr>
<tr>
<td>Experimental</td>
<td>X₂</td>
<td>CALL Programme</td>
<td>X₄</td>
</tr>
</tbody>
</table>

It is evident from the design that there are two groups namely, the control group and the experimental group. The control group students were taught through the traditional method of teaching and the experimental group students were taught through the CALL programme. X₁ is the pre test for control group, X₂ is the pre test
for experimental group, $X_3$ is the post test for control group and $X_4$ is the post test for experimental group.

The present study seeks to measure the impact of CALL in learning English grammar among the high school students with special reference to tenses. The experimental method is used for this study.

According to Best, John W. (1997), experimental design is the blueprint of the procedures that enable the researcher to test hypothesis by reaching valid conclusions about relationships between independent and dependent variables. In the present study the investigator has followed the experimental group design.

### 3.5 POPULATION AND SAMPLE

There are fourteen co-educational government high schools and ten co-educational private high schools in Karaikal district. The investigator had selected randomly 50% of the government high schools constituting seven co-educational government high school and three private co-educational schools were randomly selected for the study out of the ten private schools based on the 50% of the selected government high schools which formed the sample for the study. In total 10 high schools were selected of which 7 were government schools and 3 were private schools. The investigator selected all the 9th standard students from the sample schools constituting a total of 325. Out of the 325 respondents 209 students were from the government school and the remaining 116 students were from the private school. The girl respondents were 168 and 157 respondents were boys.
The table 3.1 shows the distribution of respondents based on school type.

**Table 3.1**

Distribution of Respondents by School Type

<table>
<thead>
<tr>
<th>Distribution of Respondents</th>
<th>Government School</th>
<th>Private School</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>209</td>
<td>116</td>
<td>325</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.1 shows Distribution of Respondents by School Type
The table 3.2 shows the distribution of respondents by Sex.

### Table 3.2

Distribution of Respondents by Sex

<table>
<thead>
<tr>
<th>Distribution of Respondents</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>157</td>
<td>168</td>
<td>325</td>
</tr>
</tbody>
</table>

**Figure 3.2 shows Distribution of Respondents by Sex**

![Distribution of Respondents by Sex](image-url)
3.5.1 Distribution of the Test Group

The students were divided into two groups namely, Control group and Experimental Group. The control group students who were taught through traditional method of teaching consisted of 5 Boys and 5 Girls selected randomly from each school based on their quarterly marks in English constituted a sample of 100 for the control group and the remaining 225 students were taught through CALL programme in the experimental group.

The ten control group students of ninth standard from each school were selected based on their performance in quarterly marks in English with the median value. The five students above the median value and five students below the median value from each school were selected as control group students constituting a total sample of 100 students.

From the sample which consisted of 325 respondents, Both control and experimental students were given pre test for achievement in English Tenses, in addition to that they were given a test for attitude towards English, Academic Motivation and Academic Self Concept.

The control group students were taught through traditional method of teaching and experimental group students were taught through Computer Assisted Language Learning Programme (CALL).
The table 3.3 shows the distribution of respondents by Test Group.

**Table 3.3**

<table>
<thead>
<tr>
<th>Distribution of Respondents</th>
<th>Control</th>
<th>Experimental</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>225</td>
<td>325</td>
</tr>
</tbody>
</table>

*Figure 3.3 shows Distribution of Respondents by Test Group*

The table 3.4 shows the overall distribution of respondents by School type, Sex and Test Group.
3.6 DATA COLLECTION PROCEDURE

The investigator collected data from the ninth standard students of the sample institutions. It consisted of administration of pre test, implementation of CALL programme, administration of tests for Attitude towards English, Academic Motivation towards English and Self Concept towards English and administration of Post Test for control group and experimental group. The students were given instructions to respond to the statements for Attitude, Motivation, Self concept and Academic Achievement. The investigator checked all the statements after they had been filled in to see if any blanks had been left out for it was essential that all statements were answered and the scale was complete in all respects.

Finally the analysis was done in order to find out the impact of CALL under two different teaching learning environments.

The investigator consulted the experienced teachers who handle English subject in the government and private high schools in order to finalize the duration of the treatment. On the basis of the suggestions of the above experts the control group students of each school were taught for 2 periods a day for 5 days through traditional method and the experimental group students were divided according to the availability of computers and taught for 2 periods a day for 5 days in total, the duration of the treatment was finalized for 10 periods for traditional teaching and 10 periods for CALL method of teaching for each group of students.
3.7 PILOT STUDY

A pilot study was conducted in order to ascertain the reliability and validity of the tools constructed and adopted for the present study. For this purpose a sample of 33 students studying IX standard in Kamarajar Government High School, Poovam, Karaikal, were selected. The CALL Programme developed by the investigator was presented to 33 students to check whether the CALL Programme would prove to be effective. The tools constructed by the investigator were also presented to the 33 pilot students to find out their validity and reliability.

3.8 CONSTRUCTION AND VALIDATION OF THE TOOLS

3.8.1 TOOLS USED FOR THE STUDY

1. CALL programme for teaching English tense developed by the investigator.

2. Academic Achievement test in English tense (Developed by the investigator)

3. Attitude scale towards English (Developed by the investigator)

4. Academic Motivation scale (Developed by the investigator)

5. Self concept scale (Developed by the investigator)

3.8.2. ATTITUDE SCALE TOWARDS ENGLISH

The attitude scale was used to measure the level of attitude towards English. The scale was constructed and validated by the investigator.
The attitude scale towards English consisting of 25 items was designed by the investigator and was given to the professors of English, professors of education, experienced teachers who handled English subject in high schools and educational psychologists. On the basis of the suggestion of the above experts some items were restructured and some were eliminated. Finally, 15 statements were selected for this tool.

The attitude scale towards English was presented to the pilot group of 33 students to find out the validity and reliability of the test.

3.8.2.1 SCORING

To measure the Attitude, 5 point Likert type scale ranging from ‘1’ for “strongly disagree” to ‘5’ for “strongly agree” and ‘2’ for “disagree”, ‘3’ for “no opinion” (neither agree nor disagree) and ‘4’ for “agree” is given in between. A copy of the attitude scale towards English is given in the Annexure.

The Cronbach’s alpha reliability coefficient, computed for the reliability analysis for overall reliability of the scale measuring attitude toward English is 0.8381, which shows that there is high degree of internal consistency among 15 items in the scale measuring attitude toward English among high school students in Karaikal. Hence, it is found that the scale items measuring attitude toward English are highly reliable, internally consistent and the collected data can be used for subsequent analysis.

After identifying the internal consistency of the scale measuring attitude toward English, the data is subjected to factor analysis to find out whether the attitude
toward English is uni-dimensional or multi-dimensional. To examine the dimensionality in attitude toward English, principal component factor analysis with varimax rotation is applied. Varimax, the most commonly used orthogonal rotation was undertaken to rotate the factors to maximise the loading on each variable and minimise the loading on other factors.

Factor analysis is a statistical method commonly used during instrument development to cluster items into common factors, interpret each factor according to items having a high loading on it and summarise the items into a small number of factors. Loading refers to the measure of association between an item and a factor. A factor is a list of items that belong together. Related items define the part of the construct that can be grouped together.

The first part of the factor analysis is to find out eigenvalue, percentage of total variance and cumulative percent of total variance for factors underlying the attitude toward English. The eigenvalue for a given factor measures the variance in all the variables which is accounted for by that factor. If a factor has a low eigenvalue, then it contributes little to the explanation of variances in the variables and may be ignored as redundant with more important factors. According to Kaiser (1960) criterion, the factor with eigenvalue above ‘one’ is valid factor and can be retained for further analysis.

It is found that the attitude of high school students towards English consists of five facets. In order to identify the nature of each facet, the loadings of every item with five valid factors obtained from the analysis are shown in the Annexure.
Table 3.5 shows the description of scale items and valid factors for Attitude

**Table 3.5**

Description of scale items and valid factors for Attitude

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Items</th>
<th>Factor label with value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>I would learn English even if it were not a compulsory subject at school</td>
<td>Importance 0.819</td>
</tr>
<tr>
<td>14</td>
<td>English should be the medium of instruction in the tertiary studies</td>
<td>Importance 0.819</td>
</tr>
<tr>
<td>6</td>
<td>English is an important language in all parts of the world</td>
<td>Importance 0.700</td>
</tr>
<tr>
<td>15</td>
<td>I need English in order to succeed in higher education</td>
<td>Importance 0.663</td>
</tr>
<tr>
<td>11</td>
<td>If I use English, I am praised by my family</td>
<td>Ethical value 0.745</td>
</tr>
<tr>
<td>4</td>
<td>When someone speaks English it creates a good impression about him</td>
<td>Ethical value 0.730</td>
</tr>
<tr>
<td>3</td>
<td>When someone speaks English I think he is educated.</td>
<td>Ethical value 0.721</td>
</tr>
</tbody>
</table>
From the examination of the table 3.2, it is understood that the scores for items 7 (0.819) and 14 (0.819) followed by the scores of items 6 (0.700) and 15 (0.663) are highly loaded with the first factor. The first factor characterizes importance given by the high school students in learning English. Therefore, this factor is identified as “important”.

The second factor is more pronounced by three items, viz., item 11 (0.745) followed by items 4 (0.730) and 3 (0.721). The second factor reveals the value
creation for those who use and speak English extensively. Hence, the second factor is named “ethical value”.

The third factor is loaded with the items 10 (0.787) followed by items 12 (0.726) and 13 (0.676). The third factor reveals the study of more English and found to express the learning attitude of the high school students, and hence it is named “learning”.

The fourth factor is highly correlated with items 8 (0.785) and 9 (0.768). The fourth factor exposes the high school students’ attitude in terms of advantages of learning English. Therefore, the fourth factor is identified as “advantage” as it reveals the advantages of speaking English.

The fifth and last factor is enunciated by item 1 (0.822), item 2 (0.767) and 5 (0.630). The fifth factor exposes the willingness and enjoyment in studying English. Therefore, the fifth factor is named as “Enjoyment”.

In sum, from the inferences of the factor loadings, it is found that the attitude of high school students towards English comprises of five facets as follows: Importance, Ethical value, Learning, Advantage and Enjoyment.

3.8.2.2 NUMBER OF EXTRACTABLE FACTORS GRAPHICALLY USING SCREE PLOT

Figure 3.4 shows Plots of eigenvalues for dimensions of attitude towards English.
3.8.3 ACADEMIC MOTIVATION TOWARDS ENGLISH

The academic motivation scale was used to measure the level of motivation towards English. The scale was constructed and validated by the investigator.

The motivation scale towards English consisting of 30 items was designed by the investigator and was given to the professors of English, professors of education, experienced teachers who handled English subject in high schools and educational psychologists. On the basis of the suggestion of the above experts some items were restructured and some were eliminated. Finally, 22 statements were selected for this test.

The academic motivation scale towards English was presented to the pilot group of 33 students to find out the validity and reliability of the test.

3.8.3.1 SCORING

To measure the level of academic motivation towards English, 22 statements with 5 point Likert scale ranging from “strongly disagree to strongly agree” is used.

The academic motivation scale towards English among the high school students comprises of six major facets, they are Amotivation, External Regulation, Identified Regulation, Intrinsic Motivation, Introjected Regulation and Integrated Regulation.

To know the characteristics of each dimension, loadings of every one of 22 items with six valid factors obtained from the analysis are given in Annexure.
Table 3.6 shows the description of scale items and valid factors for Academic Motivation

### Table 3.6

Description of scale items and valid factors for Academic Motivation

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Items</th>
<th>Factor label with value</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>I never boast about my grades in English</td>
<td>Amotivation 0.911</td>
</tr>
<tr>
<td>14</td>
<td>I am not one of the smartest students in my English class</td>
<td>Amotivation 0.901</td>
</tr>
<tr>
<td>7</td>
<td>Academics are the last thing that I want to talk about when hanging out with my friends</td>
<td>Amotivation 0.898</td>
</tr>
<tr>
<td>10</td>
<td>I learn English simply for the sake of learning</td>
<td>Amotivation 0.889</td>
</tr>
<tr>
<td>15</td>
<td>I get frightened that I will not remember anything when I take a test in English</td>
<td>Amotivation 0.869</td>
</tr>
<tr>
<td>21</td>
<td>I like to be one of the most recognized students in the English classroom</td>
<td>External Regulation 0.839</td>
</tr>
<tr>
<td>11</td>
<td>When I have to make an academic choice, I go to my parents for advice</td>
<td>External Regulation 0.808</td>
</tr>
<tr>
<td>5</td>
<td>School helps me to gain valuable knowledge in English</td>
<td>External Regulation 0.776</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Regulation Type</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>22</td>
<td>I study well when I am alone</td>
<td>External Regulation</td>
</tr>
<tr>
<td>17</td>
<td>I feel that my ability is sufficient in the classroom</td>
<td>Identified Regulation</td>
</tr>
<tr>
<td>6</td>
<td>My quality of performance is dependent on my grade in the class</td>
<td>Identified Regulation</td>
</tr>
<tr>
<td>8</td>
<td>When I receive a low grade in English exam, I try to hide it from others</td>
<td>Identified Regulation</td>
</tr>
<tr>
<td>20</td>
<td>I like to spend time reading about things that interest me</td>
<td>Identified Regulation</td>
</tr>
<tr>
<td>12</td>
<td>I prefer difficult tasks as opposed to moderate tasks</td>
<td>Intrinsic Motivation</td>
</tr>
<tr>
<td>16</td>
<td>My academic interests are not influenced by anyone but myself</td>
<td>Intrinsic Motivation</td>
</tr>
<tr>
<td>9</td>
<td>I feel good about myself when others do not understand material that is clear to me</td>
<td>Intrinsic Motivation</td>
</tr>
<tr>
<td>3</td>
<td>When faced with a difficult test, I expect to fail before I expect to do well</td>
<td>Introjected Regulation</td>
</tr>
<tr>
<td>4</td>
<td>I feel that challenging English assignments can be great learning experiences</td>
<td>Introjected Regulation</td>
</tr>
<tr>
<td></td>
<td>Item</td>
<td>Regulation</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>18</td>
<td>I find my ability to be higher than most of my peers</td>
<td>Introjected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulation</td>
</tr>
<tr>
<td>2</td>
<td>No matter how much I like or dislike a class, I still try to learn from it</td>
<td>Integrated Regulation</td>
</tr>
<tr>
<td>1</td>
<td>I want to learn everything I need to learn</td>
<td>Integrated Regulation</td>
</tr>
<tr>
<td>19</td>
<td>I enjoy learning English subject</td>
<td>Integrated Regulation</td>
</tr>
</tbody>
</table>

The first factor is loaded with items 13 (0.911), 14 (0.901), 7 (0.898), 10 (0.889) and 15 (0.869). The first factor characterises the low academic motivation and hence, the first factor is labelled as **Amotivation**.

The second factor is loaded with items 21 (0.839) and 11 (0.808) followed by items 5 (0.776) and 22 (0.745). The second factor explains the motivation regulated through external means such as classroom situation, parents’ advice and school level status (helping students). Therefore the second factor is identified as “**external regulation**”

The third factor is loaded with items 17 (0.872), 6 (0.872), 8 (0.845) and 20 (0.840). The third factor exposes the motivation of the high school students regulated through identified sources such as ability of the student in the classroom, assessing the performance through grade in the class and spending time in reading about things that interest them. Hence, the third factor, which posses most of the qualities of academic motivation regulated through identified things, is named as “**identified regulation**”.
The fourth factor is loaded with items 12 (0.893), 16 (0.889) and 9 (0.825). The fourth factor exposes the internal characteristics of the students. Therefore, the fourth factor is labelled as “intrinsic motivation”.

The fifth factor is loaded with items 3 (0.871), 4 (0.814) and 18 (0.805). The fifth factor exposes the self-worthiness of the high school students in respect of their expectation to fail, considering the challenging assignments as great learning experience, judging their ability to be higher than their peers. The introjected regulation is the one with which an individual begins to internalise the reasons for his or her actions. That is, introjected regulation is the kind of behaviour where one feels motivated to demonstrate the ability to maintain self-worth. Hence, the fifth factor is assigned the name “introjected regulation”.

The sixth factor is loaded with items 2 (0.823), 1 (0.799) and 19 (0.757). The sixth factor characterises the most autonomous kind of extrinsic motivation such as students’ efforts to learn from the class irrespective of their likes and dislikes towards a class and learning everything that needs to be learnt. Integrated regulation is the one which occurs when regulations are fully assimilated with self and are included in a person's self evaluation and beliefs on personal needs. Therefore, the sixth factor is named after “integrated regulation”.

In sum, it is found from the factor analysis of data on academic motivation of high school students towards English that there are six major facets of academic motivation, viz., amotivation, external regulation, identified regulation, intrinsic motivation, introjected regulation and integrated regulation.
3.8.3.2 NUMBER OF EXTRACTABLE FACTORS GRAPHICALLY USING SCREE PLOT

Figure 3.5 shows Plots of eigenvalues for dimensions of motivation towards English.
3.8.4 SELF-CONCEPT TOWARDS ENGLISH

The self-concept scale was used to measure the level of self-concept towards English. The scale was constructed and validated by the investigator.

The self-concept scale towards English consisting of 25 items was designed by the investigator and was given to the professors of English, professors of education, experienced teachers who handled English subject in high schools and educational psychologists. Necessary changes were made on the basis of the suggestion of the above experts. Finally, 20 statements were selected for this test.

The self-concept scale towards English was presented to the pilot group of 33 students to find out the validity and reliability of the test.

3.8.4.1 SCORING

The self-concept towards English among high school students was measured using an instrument comprising 20 Likert type scale items with five options, viz., strongly disagree, disagree, neither disagree nor agree, agree and strongly agree. For the purpose of analysis, these option levels are numerically from 1 for strongly disagree to 5 for strongly agree. The data obtained based on the above measurement scale are then analyzed for ascertaining the internal consistency and reliability in order to proceed with further analysis. After ascertaining the internal consistency and reliability of the data, they are then subjected to factor analysis for exploring the major dimensions underlying high school students’ self concept towards English language. The results of the reliability and factor analysis are given in Annexure.
Table 3.7 shows the description of scale items and valid factors for Self-concept.

**Table 3.7**

Description of scale items and valid factors for Self-concept

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Items</th>
<th>Factor label with value</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>I am usually interested in learning English</td>
<td>Self-Effort 0.851</td>
</tr>
<tr>
<td>12</td>
<td>I am willing to do my best to pass in English subject</td>
<td>Self-Effort 0.848</td>
</tr>
<tr>
<td>8</td>
<td>I study hard for my English tests</td>
<td>Self-Effort 0.847</td>
</tr>
<tr>
<td>17</td>
<td>I always do poorly in English tests</td>
<td>Self-Effort 0.771</td>
</tr>
<tr>
<td>20</td>
<td>I am not willing to put in more effort in my English Subject</td>
<td>Self-Effort 0.741</td>
</tr>
<tr>
<td>11</td>
<td>I often forget what I have learnt</td>
<td>Self-Effort 0.713</td>
</tr>
<tr>
<td>5</td>
<td>If I work hard, I think I can go to Polytechnic or University</td>
<td>Self-Confidence 0.849</td>
</tr>
<tr>
<td>3</td>
<td>I am able to help my classmates in their English homework</td>
<td>Self-Confidence 0.830</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Dimension</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>19</td>
<td>I am able to do better than my friends in English subject</td>
<td>Self-Confidence</td>
</tr>
<tr>
<td>1</td>
<td>I can follow the lessons in English easily</td>
<td>Self-Confidence</td>
</tr>
<tr>
<td>14</td>
<td>I often feel like quitting school</td>
<td>Self-Confidence</td>
</tr>
<tr>
<td>13</td>
<td>I get frightened when I am asked a question in English by the teachers</td>
<td>Self-Confidence</td>
</tr>
<tr>
<td>6</td>
<td>I pay attention to English teachers during lessons</td>
<td>Self-acceptance</td>
</tr>
<tr>
<td>18</td>
<td>I do not give up easily when I am faced with difficult questions</td>
<td>Self-acceptance</td>
</tr>
<tr>
<td>15</td>
<td>I am good in English subject</td>
<td>Self-acceptance</td>
</tr>
<tr>
<td>7</td>
<td>Most of my classmates are smarter than I am</td>
<td>Self-acceptance</td>
</tr>
<tr>
<td>9</td>
<td>My teachers feel that I am poor in my work</td>
<td>Self-efficacy</td>
</tr>
<tr>
<td>16</td>
<td>I am always waiting for the English lessons to end</td>
<td>Self-efficacy</td>
</tr>
<tr>
<td>4</td>
<td>I often do my English homework without any difficulty</td>
<td>Self-efficacy</td>
</tr>
<tr>
<td>2</td>
<td>I day dream a lot</td>
<td>Self-efficacy</td>
</tr>
</tbody>
</table>
The Self Concept towards English among the high school students comprises of four major facets, they are Self-effort, Self-confidence, Self-acceptance and Self-efficacy.

The first factor is highly correlated with items 10 (0.851), 12 (0.848) and 8 (0.847) followed by items 17 (0.771), 20 (0.741) and 11 (0.713). The first factor exposes the effort of the students to do best in English tests and in English subject. Hence, this factor is named as “self-effort”.

The second factor is highly correlated with items 5 (0.849) and 3 (0.830) followed by items 1 (0.760), 19 (0.756), 14 (0.701) and 13 (0.678). The second factor exposes the essence of confidence of the high school students that working hard is essential to pursue higher studies, feeling capable of helping their classmates, doing better in English subject compared to the performance of the friends. Hence, the second factor is identified with name ‘self-confidence’.

The third factor is highly correlated with items 6 (0.846) and 18 (0.826) followed by 15 (0.771) and 7 (0.673). The third factor characterises the students’ acceptance of their strengths and weaknesses like paying attention to the teachers during lessons and not give up easily when faced with difficult questions. Hence, the third factors is identified as ‘self-acceptance’.

The fourth factor is highly correlated with items 9 (0.779), 16 (0.773), 4 (0.714) and 2 (0.701). The fourth factor exposes the student’s own judgement about his own performance in the class. Therefore, the fourth factor is named as “self-efficacy”.
To sum up, the Self Concept scale towards English among the high school students comprises of four major facets, they are Self-effort, Self-confidence, Self-acceptance and Self-efficacy.

3.8.4.2 NUMBER OF EXTRACTABLE FACTORS GRAPHICALLY USING SCREE PLOT

Figure 3.6 shows Plots of eigenvalues for dimensions of self-concept towards English.
3.8.5 ACADEMIC ACHIEVEMENT TEST

Separate achievement test were used for the pre test and the post test to measure the level of achievement in English tenses. These separate achievement tests were developed by the investigator. On the basis of suggestions of the expert 50 multiple choice questions were selected for pre test and finally 50 multiple choice questions were selected for post test.

The questions were based on the unit of tenses from IX standard English subject which was selected for the present study. The achievement test items contain five answers. The students have to select the best answer from the given alternatives. Each question carries 1 mark. Thus the score value lies between 0-50 for each test. The content validity of each tool was established based on the opinions given by the experts.

3.8.6 ADMINISTRATION OF PRE-TEST

The investigator administered the validated test tool to the learners of both the control and the experimental groups. This was to assess their entry behaviour. During the test, effective supervision was provided in order to prevent the exchange of information among the learners. The distance among the learners had been considerably increased.

The Achievement test in English Tenses constructed by the investigator was administered to the subjects of both control and experimental groups in order to assess their entry behaviour. The pre test scores on achievement test were collected.
The Attitude Scale towards English was constructed by the investigator and was administered to the subjects of both control and experimental groups.

The Academic Motivation Scale towards English was administered to the subjects of both control and experimental groups.

The Self-concept towards English Scale, constructed by the investigator, was administered to the subjects of both control and experimental groups.

3.8.7 ADMINISTRATION OF POST TEST

At the end of the treatment, the post test for achievement in English tenses, was conducted for the experimental group. The post test scores were collected.

3.9 CALL PROGRAMME

The present globalised world has thrown more challenges to the students. Apart from specializing in their respective fields, they should also be good at communication. And this communication is essentially in the global language, English. Hence, it becomes the moral responsibility of the teachers to train their students to communicate in English effectively and successfully. To meet the challenges of this technological era a strong and effective form of education has to be developed. CALL offers promising results in this challenging scenario by providing resources for improving the proficiency level of the students in English.

Teachers have started using computers in the teaching of English grammar. Effectiveness of the use of computers in language learning has continuously being
explored by the researchers. The major benefits of using the computer in language learning are as follows:

1. Individualization in a large class
2. The fun factor
3. Easy review of learnt materials when needed
4. Saving time and energy of the teacher
5. Drawing and holding the attention of the students

Computers make it possible for the learners to receive information in varied sensory and conceptual modes through the use of colour, sound and graphics. Many ready-made programme on language learning are available in the market but they do not satisfy the local demand or fit into the cultural context for one or the other reason. Individual programme make it possible to compose a lesson and customize it to the needs of the students.

3.9.1 DEVELOPMENT OF CALL PROGRAMME

The process of development of CALL programme includes various phases such as analysis, designing, developing, evaluation and implementation is shown in Figure 3.7.
3.9.2 ANALYSIS PHASE

Analysis phase includes the selection of the content and software analysis.

3.9.2.1 SELECTION OF THE CONTENT

The sample selected for the present study is the IX standard students of High school education and the content area is selected from the IX standard English subject prescribed for the State Board of Secondary Education of Tamil Nadu Government. One of the units from English subject namely ‘Tenses’ was selected for the investigation as it is essential for the students to frame sentences in English and to communicate with other students in English. English language plays a significant role in the Indian society. It is the official language of communication and to a large extent the official medium of higher education.

Knowledge needed for the social, economic and technical advancement of the country is found in books written in English. Even warnings designed to keep us safe from danger are written in English. All competitive examinations whether for entry into educational institutions or occupation include tests in one’s competence in the use of English. In effect, English is the language of education, administration, law, communication and commerce. It is the mark of elitism in the Indian society. Once one chooses to educate oneself, one has no good reason not to speak English well. One’s deficiency in the use of English can easily be exposed in an interaction with another person.

Ability to speak English well is used as a standard measure of one’s ability in the field of education in the Indian society. The acquisition of language includes
acquisition of grammatical forms of standards English. The study of grammar in this sense is, therefore, a means to acquiring a proficiency in academic English. Learning a language is to a very large degree learning how to operate the verbal forms of that language.

An understanding of the grammar of English is prerequisite to good and effective communication in English. Grammarians call ‘the tense’ the main word in the sentence i.e., the heart of the sentence, without tense no group of words is grammatically a sentence.

Thus, in the present study the researcher employed computer technology in the core part of language learning (i.e.,) English tenses in the given context and tailored a Computer Assisted English Language Learning programme.

While selecting the topics for the experiment, care has been taken to include the topics prescribed by the State Board of Education. The investigator consulted with the teachers who handle English at high school level in order to identify the content area which requires more explanation and visual presentation. During the discussion, the investigator could clearly mark out the content area for the study.

To decide the content area for the topic the investigator referred various grammar books and websites. After thoroughly studying the available material and consulting the experienced teachers, the following content areas were selected for CALL programme.

The details of the unit and content area included in the study is shown in Figure 3.8.
3.9.2.2 SOFTWARE ANALYSIS

The investigator developed the CALL programme using the latest software packages, which were compatible with most of the computer systems widely used. Some of the software packages used in the development of the courseware were Adobe Flash V C S4, Action Script Version AS3, Photoshop, Text Aloud and Audacity V2 0.5.

3.9.3 SOFTWARE PACKAGES USED IN THE CALL PROGRAMME

3.9.3.1 Adobe Flash V C S4

Flash is a vector animation software, originally designed to create 2D animations. Vector graphics are ideal for the web because they are so lightweight. Flash movies load faster and save on download time because Flash is vector based. Flash intelligently ‘caches’ it’s movies so they don’t have to be reloaded. Flash gives the user (the person viewing/using the Flash movie) a more responsive ‘rich-client’ like experience. Flash is helpful in making Interactive E-learning Interactions (Drag and Drop, Match the following Etc.)

3.9.3.2 Action Script version AS3

Adobe Flash Professional is undoubtedly the most popular tool for custom e-Learning development. With the help of its inbuilt programming language Action Script developers can code interactions, communicate with servers, program animations etc. The latest version of Action Script is Action Script 3.
3.9.3.3 Photoshop

The Image Editing Software is Photoshop. Photoshop is the most leading and popular graphic editing software provided by the Adobe system and used to edit different kinds of pictures, photographs, creating backgrounds etc. Photoshop have many uses: to colour, correct the digital images, prepare them for printing or web, design web pages, slice pages (make hyperlinks), it can also create gif animations and make brand new images painting or drawing them with drawing tools. Photoshop can be used to make real and unreal compositions using mask tools and many, many other things.

The Animation Type is 2D Animation. The Animation Speed is 24FPS (Frames Per Second). The Interface Size is 1024 x 768 (layout)

3.9.3.4 Text Aloud

The Software Used for Audio Recording is Text Aloud. Text Aloud converts any text into spoken words. It reads text, e-mail, web pages, and documents using the choice of voices. Unique Text to MP3 or WMA conversion saves the daily reading to audio files for download to the portable player.

3.9.3.5 Audacity V2.0.5

The Software used for Audio Editing is Audacity V2.0.5. Audacity is a free, easy-to-use, multi-track audio editor and recorder for Windows, Mac OS X, GNU/Linux and other operating systems. The interface is translated into many languages.

The software packages used in the CALL programme is shown in Figure 3.9
3.9.4 DESIGNING THE FEATURES OF CALL PROGRAMME PHASE

Designing the features of CALL programme includes the various steps such as system environment, flow charting, voice recording, animations, text blocks, text, movie, buttons, learning interactions (quiz program, games) and scripting for CALL programme etc.

3.9.5 SYSTEM ENVIRONMENT

The CALL programme was developed under strict compliance of the software engineering concepts. The investigator with the help of the software engineer developed this CALL programme. The CALL programme will work on any multimedia enabled computer with all Windows family of operating systems.

3.9.6 FLOW CHARTING

A flowchart is essential before developing a CALL programme. It shows a product, which starts with the front page with title screen then moves to a main page and then moves to home page. CALL programme starts with the front page, moves to title screen then moves to the main page and then to the home page. From the home page, the user can access any level of programme. The user can access two sessions namely the learning and interactive sessions. From the menu page the user can access the content area separately. From the menu page, the user can access the texts with animation items or return from text page to the home page or to the menu page as shown in the Annexure.
3.9.7 VOICE RECORDING

The Software Used for Audio Recording is Text Aloud. Text Aloud converts any text into spoken words. The text used in the script is converted into required voice. The converted voice was edited and added to each subtopic.

3.9.8 ANIMATIONS

In the present CALL programme, 2D animations are introduced for each sub-topic. Animations, through visual perception, upgrade instruction about the content to a great extent as shown Annexure.

3.9.9 TEXT BLOCKS

In the CALL programme, the static text blocks are used at the left side of the layout and the texts are added at the left side to the movie as shown in the Annexure.

3.9.10 TEXT

In the present CALL programme, the text is presented in concise, informative and interesting manner in the text blocks. The text is also added for the title, definitions and examples as shown in the Annexure.

3.9.11 MOVIE

The movie for each sub-topic is kept at the right of the layout in Annexure.
3.9.12 BUTTONS

In the CALL programme, an ‘Enter’ button is provided in the front page to enable the user to access the title screen, the ‘Start’ button is provided in the title screen to enable the user to enter the main page and a ‘continue’ button is provided in the main page to enable the user to enter into the content area. ‘Home’ button takes them to the home page. Home page takes them to the learning section and exercise section with games directly as shown in the Annexure.

In the menu page, many buttons for each sub-topic are provided from where the user can access the text with animations for each sub-topic separately as shown in Annexure.

In the CALL programme, in the text page eleven buttons are used. Of these, the five buttons namely, Quit, ‘Home’, Menu, Previous and Next remain constant in all the stages, so as to enable the user to navigate/browse from one level to another level.

3.9.13 INTERACTIVE SESSION (Exercises)

In the CALL programme, interaction for the students for the content area, English tenses exists in the form of Match sentences, Fill up the blanks, Drag and Match, Tenses classification in the form of click and drag, Tenses Quiz Show, Rearranging, Test your Tenses and Click on the Past Tenses and they are arranged sequentially. Each question in the quiz is considered an interaction is shown in the Annexure.
In the CALL programme, the multiple choice learning interaction is designed for the English tenses. The multiple choice questions are presented content-wise. The learners have to respond to the multiple choice questions from among the alternatives. The students have to respond to each question before moving on to the next question. The quiz templates contain a mechanism that counts a cumulative score for each content area separately. After responding to all the questions of each content area, the cumulative score of that content area will be displayed at the end is shown in Annexure.

3.9.14 FEEDBACK

The computer presents, checks out and gives feedback. If the student clicks submit button then he will get the following feedback. For the correct answer the feedback is “correct”, and “well-Done” is shown in Annexure.

If the student clicks an incorrect answer then he will get the following feedback. For the incorrect answer the feedback is “Try Again”. The feedback is displayed through a text box is shown in Annexure.

3.10 SCRIPTING FOR CALL PROGRAMME

After deciding the content area for the CALL programme, the investigator classified each content area into various topics for making it logically sequenced. According to the learning principle and by keeping in mind students’ ability to grasp one idea at a time, each topic is divided into different sub-topics. Each sub-topic is presented in each frame with colour and 2D animated pictures.
While preparing the script, the investigator ensured proper use of language that was easy to understand and simple to remember. To get the attention of the students and to make the learning more interesting and effective, apt illustrations and visuals were included in the script. To enhance the students’ understanding of the various concepts, colourful and meaningful 2D animations were used in the script. The organization and arrangement of the frames were done in a logical order. For the purpose of self evaluation and entertainment, quiz programs and games were presented for the content area. After completing the scripting of the content, the script was given to a software engineer to convert the content into an electronic format.

### 3.11 DEVELOPMENT PHASE

In the development phase, the development of the programme, preliminary administration (Pilot study) and correction/revision of the programme are included. After the completion of the development of CALL programme on the basis of design, it was edited with reference to i) level of accuracy, ii) level of difficulty, iii) level of clarity of operational instructions, iv) level of clarity of presentation, v) level of difficulty in relation to the concerned level of the student, vi) extent of availability of graphic presentation, colour and sound, vii) level of ability to motivate students.

After editing the developed content, a preliminary administration (Pilot study) was carried out by the investigator on the target students consisting of randomly selected 30 students in order to check whether the CALL programme would prove to be effective and to confirm its appropriateness for the level of understanding of the students. On the basis of the preliminary administration (pilot study), necessary
corrections, modifications, refinements, etc., were made in the final draft. The final draft of the DVD was applied to the experimental group. A copy of the newly developed CALL programme DVD is enclosed with this thesis. In the CALL programme, the write and delete permissions were denied and provisions for copy and print were given.

3.12 EVALUATION PHASE

Evaluation and approval of the CALL programme was done by the technical experts and subject experts to judge whether the treatment given to the subject is pedagogically valid. In the present investigation, once the entire content of the programme is developed, a test DVD was created. In order to eliminate errors and make the system accurate, efficient and valid before final implementation, the DVD was given to the various subject experts, teachers who were handling English subject at High school level, multimedia technical experts, educational technologists and educational psychologists, as content is the essence of the whole programme.

The programme was exposed to them and their suggestions were sought. They were requested to check the content accuracy, organization of the content, suitability of the illustrations, colour combinations, ease of use and other visual and design aspects of the CALL programme. On the basis of the recommendations and suggestions of the technical, educational, psychological and subject experts due corrections were made in the programme. The validity of the CALL programme was established by content validity. A list of the experts in computer programming at various levels is shown in Annexure.
3.13 IMPLEMENTATION PHASE

In the implementation phase, the experimental group students were availed for the CALL programme by the investigator. The CALL programme was stored in a main Server of LAN. Many users can access the server as client. The achievement test in English tenses developed by the investigator was used to measure the effect of the CALL programme particularly the mastery of content among the students.

3.14 IMPLEMENTATION OF TRADITIONAL METHOD TO THE CONTROL GROUP

The control group students of each school were taught for 2 periods a day for 5 days through traditional method of teaching.

3.15 IMPLEMENTATION OF CALL PROGRAMME TO THE EXPERIMENTAL GROUP

The experimental group students were divided according to the availability of computers and taught for 2 periods a day for 5 days in total, the duration of the treatment was finalized for 15 weeks to learn English tenses through CALL programme. At the end of the treatment, the post test for achievement in English tenses, was conducted for the experimental group.

3.16 STATISTICAL TECHNIQUES USED FOR DATA ANALYSIS

In the present study, the relevant data obtained from the assessment scores of 325 students on the pre-test, post-test on achievement in English tenses, implementation of CALL Programme, administration of Post test, and administration of Attitude
towards English test, administration of Academic Motivation test towards English, administration of Self-Concept test towards English have been analyzed.

3.16.1 RELIABILITY/ITEM ANALYSIS

The reliability of the scale items measuring attitude, academic motivation and self-concept of the respondents is ascertained using Reliability / item analysis. This analysis provides ‘item to total correlation’, ‘alpha if deleted’ values along with overall Cronbach’s alpha coefficient.

As a rule of thumb, any item with ‘item to total correlation’ of 0.30 and above is valid item in the measurement scale. Apart from ‘item to total correlation’ ‘alpha if deleted’ value is also considered for retaining an item in a scale. If ‘alpha if deleted’ of an item is less than overall Cronbach alpha, then the item is considered as appropriate item in the scale.

3.16.2 FACTOR ANALYSIS

The factor analysis based on the principle component method with varimax rotation is used to identify the dimensions underlying attitude, academic motivation and self-concept of the students. The factor analysis first produces eigenvalue, proportion of explained variance of underlying factors (underlying dimensions). Any factor extracted by the analysis is considered to be a valid factor if its eigenvalue is above one based on the most commonly used criterion, which is known as Kaiser’s criterion. The factor loadings (each item’s correlation with valid factors) obtained from factor analysis are used for identifying actual characteristics of the underlying
factors. Generally, an item belongs to one factor if its loading with that factor is 0.40 and above.

3.16.3 DESCRIPTIVE ANALYSIS

The descriptive analysis such as mean and standard deviation are used in the thesis to calculate the central tendency and dispersion of data used in the study. This descriptive analysis is used from the Respondents’ opinion about attitude, academic motivation and self-concept as well as academic achievement in English grammar before and after CALL method of teaching.

3.16.4 DIFFERENTIAL ANALYSIS

The degree of attitude, academic motivation and self-concept towards various facets of studying English language is evaluated based on the sample. Here an attempt is made to know whether there is any significant difference in the degree of attitude, academic motivation and self-concept towards English between control and experimental groups, between student groups in Government and private schools and between Boys and Girls. For this purpose, the mean opinion levels are compared across groups using t-test.

3.16.5 RELATIONAL ANALYSIS

Relational analysis aims at finding out the relationship among the variables: attitude, academic motivation and self-concept and also the relationship between the pre test and post scores of academic achievement in learning English grammar among high school students. The Co-efficient of correlation was used to find out the relationship among the variables.
3.17 CONCLUSION:

In this chapter, the research methodology followed in the study is explained in detail and The process of development of CALL programme is described.

The next chapter deals with the Analysis and Interpretation of data.