

# An Enhanced Web-based Multimedia Tutoring System for English Word Formation for Pupils

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**Abstract**— This research is aimed at developing instructional plans of multimedia English word formation to be used with children with low retention disabilities in Pupils. Giving the changes in the digital World over the last decades, Pupils of the current generation expect technology to be used in advancing their learning methodologies to an active multi-sensory experimental learning methodology. The research has helped the pupils have knowledge retention. The main focus of the tutor is on the pupils with disabilities in retention of words and to increase the interest of pupils in the use of computer assisted language instructor, especially in cases where the language taught is not the mother tongue of the children. It's also designed to help the children for easy learning in the word formation and word structure in English language, easily practice, and revise the key aspect of English morphology and knowledge retention by presenting this English word pictorially. The Object Oriented Methodology was used in development of the web-based application using Java, Netbean as developmental tool. The software performs an intelligent query processing system (IQPS) in translating the word into English format for ease understanding for the pupils.

**Keywords**— Computer Assisted Language; English Word Formation; Knowledge; Pupils.

## I. INTRODUCTION

Language is a system of communication in speech and writing that is used by people of a particular country or tribe group. Learning language and communication is a universal experience for children across different cultures. According to [1], stated communication is the operation which reproduces social system; it is the central specific operation for the definition and retention of the society. The research conducted by [2] shows that English is currently the accepted language for communication in most global markets, schools and general communication. The most spoken language in the World today is English, followed by French, Spanish, and Chinese. Languages can be expressed in both the audio-vocal (spoken) and vision-manual (sign) mode [3], languages are equally complex and fully grammatical linguistics systems.

Verbal communication is the use of sound and words to pass information whereas non verbal communication is the use of signs and symbols to pass information. Children use non-verbal and verbal communication to express their needs they cry, grunt and use body language. Considering language as a tool for communication and some vicissitude it has undergone with the elapsing of time. Since inception of human existence, language has always been the most vital tool of interaction between men. With time language needs to change in order to

meet with the requirement of the people. In [4] emphasize that it is necessary for learner to notice their pragmatic factors first, enabling them to begin to improve their competence. Nursery schools are formal academic setting where pupils are officially introduced to learning of English language by teachers. They usually start with introduction to English alphabet, word comprising of few letters and to complex one. In the course of learning process they are taught poem recitation, how words are formed (English word formation), how words are used make sentences and other aspect of the language as they go higher. Taking consideration of the capacity of the brain of the pupils, they tends to forget English words learnt easily than when they are taught verbally and represents the lesson with sounds, text, pictures and animation which are the building framework of multimedia application. In electronic teaching, [5] teachers may not always be there to teach them and even when they can become tired, the use of multimedia word formation tutor can go a long way in helping them to repeat and learn English words until they become conversant with them. Word formation is way or pattern of arranging a single unit of language which means something and can be spoken or written. It is act of creating new words and also the process by which new words are created or invented. English word formation is essential because it forms the basis for the construction of spoken and written sentences.

In general, it can be said that word formation is concerned process that expands the vocabulary of a language [6].

### A. Statement of the Problem

It is a known fact that the methodology employed in teaching of pupils in school in learning of English alphabet, word formation and construction of sentences and other aspect of the language make it difficult for pupils to learn at faster pace, understand and retain what they have learnt. Again, due to teaching is abstract; representing object may be properly presented, thereby making understanding and retention difficult. Another problem this paper takes into consideration is the limited time allotted for teaching; pupil find it difficult to grab or understand what is being taught in school because of the short period of time used in teaching. Finally, most of time, the pupil lack interest because of the techniques used in teaching especially English the classes tends to look boring and uninterested to pupils.

### B. Objectives of the Study

This research paper tends to achieve following objectives:

- i. To design a web based multimedia English word formation tutoring system for pupil in schools.
- ii. To introduce teaching technique that can help pupils learn and become proficient in English word formation and usage.
- iii. To arouse the interest and curiosity to learn by Pupils.
- iv. To develop a self dependent application from human tutor to computer aided instructor.

### C. Significant of the Study

The web based application will help pupils in several schools to solve problems associated with the inability to retain English words and use them effectively, efficiently and fluently for communication

## II. RELATED LITERATURE REVIEW

The fundamental hypothesis of the Cognitive Theory of Multimedia Learning proposed by [7] was that multimedia instructional messages that are designed in the light of how human mind works are more likely to lead to meaningful learning than those that are not. He established the multimedia principle that people learn more deeply from words and pictures than from words alone. Multimedia researchers generally define multimedia as the combination of text and pictures; and suggest that multimedia learning occurs when we build mental representations from these words and pictures. Important to this assumption is the fact that these —active verbal processes are more likely to occur when corresponding verbal and pictorial representations are in working memory at the same time. The words can be spoken or written; i.e. audio or text and the pictures can be in the form of graphical imagery including illustrations, photos, animation, or video streaming. Learners learn better when they engage in relevant cognitive processing such as attending to the relevant material in the lesson, mentally organizing the material into a coherent cognitive representation and mentally integrating the material with their existing knowledge. Therefore, simply adding pictures to words cannot produce an effective instructional design to achieve maximum multimedia learning. Thus, Multimedia instructional design utilizes the cognitive research to combine words and pictures in different ways to maximize learning.

### A. Word Formation Process

The terminology word formation or word building refers to the process of creating or forming words out of sequences of morphemes or words. In English, word formation has got a great importance because the resources of this language have been enriched by this phenomenon as well as borrowing from various other languages. New words have continued to be made from old ones and have thus added to the existing store of words. In general, it can be said that word formation is concerned with the process that expands the vocabulary of a language [7]. The processes that allow new words to enter the language are called word formation processes. Word formation processes are also the ways that each speaker has to treat complex words from simpler pieces. That is, the new word uses the words already present in the language to create

new word. Various processes of word formation have been at work in English, the chief of which are: compounding-derivation or affixation-conversion- blending-reduction, subtraction, or shortening-abbreviations and acronyms-reduction-making of proper names from the common ones of Coinage and root creation.

### B. Using Electronic Multimedia Resources for Teaching

Computer technology is becoming both more useful and more cost effective for many fields of teaching. Computers and related electronic resources have come to play a central role in education. Whatever your feelings about what some have called the digital revolution, you must accept that many, perhaps most, of your students are fully immersed in it. At the very simplest level, you will rarely receive a paper or other assignment from a student that has not been written with the help of a computer. Most of your students will have considerable experience with the Internet and will, whether you like it or not, make use of it for much of their academic work.

Many of them will be accustomed to using e-mail as a normal form of communication. But it is not just students who find electronic resources valuable. Teachers can benefit from these resources as well, by employing a series of useful tools. We stress the word "useful" because electronic resources complement, but seldom replace, more conventional teaching techniques. Electronic tools can make classes more efficient; lectures more compelling, informative, and varied; reading assignments more extensive, interesting, and accessible; discussions more free ranging and challenging; and students' papers more original and well researched. Only you, however can judge these techniques advance your own Teaching goals.

Despite several generations of harsh criticism, lecturing remains one of the most common, and often one of the most effective, means of teaching from [8], at its best, a lecture enlivens academic subjects with the instructor's energy and curiosity and with the persuasive nuances of human speech. Nevertheless, lecturing has its limits, most notably the reputed twelve-minute average human attention span, the difficulty of representing complex material verbally, and the awkwardness of presenting diverse, multimedia sources.

Technology provides students with multiple pathways to learning. As the number of computers increase in classrooms, students are provided with immense opportunities to engage in a variety of learning modalities (i.e., visual, auditory, and/or kinesthetic) during the learning process [8]. For computers to have an impact on children's learning, computer activities need to support overall educational goals. When technology is infused within the curriculum, young learners are provided a set of learning tools to assist them in achieving developmental academic goals across the curriculum.

### C. Computer-Assisted Instruction

Over the past three decades, educational researchers have investigated the effects of computer use on student achievement and attitudes. This area of research is expanding to include computer applications in support of the academic curriculum [8], [9]. Terms such as computer-based education

(CBE), computer-based instruction (CBI), and computer-assisted instruction (CAI) are commonly found in the literature. CBE and CBI often refer to the general use of computers in the classroom setting. Such use may involve many facets of instruction and can utilize a variety of computer technologies and applications (e.g., databases, drill and practice, Web quests). CAI is used when describing more specific applications such as drill-and-practice, tutorials, or simulation activities offered either as a stand-alone activity or supplemental activities to enhance teacher-directed instruction.

Some of the benefit of computer Aided Learning is that it makes interaction to learning was eloquently summarized by Confucius: “What I hear I forget. What I see I remember. What I do I remember always”. The nature of Computer Aided Learning lends itself to involving the pupil with the learning processes with tasks requiring actions and dependent on the actions the pupil may receive appropriate feedback leading to further tasks. This goal-action feedback cycle may be followed in a simple series of interactive questions, a complex case study or even a computer simulation of a clinical situation. Also, As the pupil interacts with a CAL exercise, it is possible to keep a record of each interaction on an identifiable log file. This provides a convenient option to check on pupil performance by checking on the correctness of response to the CAL exercise. Further by building up a profile of how a number of users interact with the system it is possible to identify weaknesses in the CAL exercise itself. The automatic logs can thus help decrease both the burdens on assessing pupils and validating CAL exercises. Again, Lecturers may benefit from the inclusion of audio-visual elements from a variety of projection systems driven by computers. There is a danger of allowing the technology to run away with itself, such as using computer-generated presentations with a bewildering array of transformation effects. Appropriate use of simple transformations may be effective especially if combined with appropriate short animations or video clips. There are logistic benefits and cost reductions in the ease with which lecture slides may be generated and altered with computer software. By linking the computer to a computer network, it becomes possible to use lecture materials stored elsewhere on the network. Not only could the lecture be presented in the lecture theatre, but also the lecture presentation could be made available elsewhere on the network with relevant accompanying information including narration and detailed text.

#### D. Intelligent Word Query Processing

The Intelligent Query Processing plays a vital role in computer interaction. It is a part of Artificial Intelligence (AI) which has information retrieval, Machine translation and Analysis [10]. The main aim of the IQP is to facilitate the novice user to interact database by avoiding the complex command and functions. This IQP will make the people easy to learn and use the computer as well. This will make the user to enter the text message as they would pass to the person. The interactive with computer is very essential and also more effective. The conventional database systems are responsible

for the storage and processing of huge amounts of information. The data stored in these database systems refers to information valid at present time. The conventional database does not provide models to support and process the past and future data.

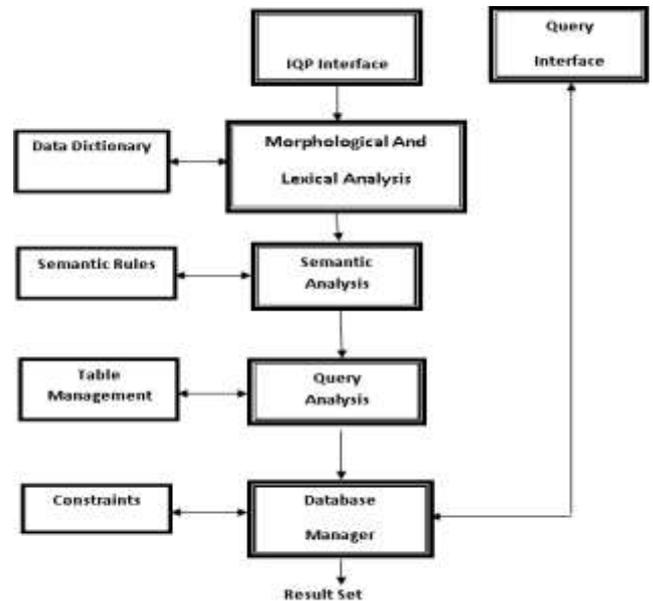


Fig. 1. Intelligent word query processing architecture.

In word formation, it involves translation of Natural Language Processing (NLP) interacting with the database in human language. Though the implementation of this application, the black box concept of various processes performed using intelligent query that will transformed every word to the end user. In fig. 1; Intelligent Query Processing Interface: It enables the users to interact the database in their native language. It accepts the question in English and forward to the SQL query translation, then SQL statement interact the database and produce the result set; Query Interface: In this interface, directly gets the SQL query and then interacts with the database and produce the result set.

*Morphological and lexical analyzer:* The given input text is broken into several tokens and assigned the respective types with help of dictionary. Every token will be assigned their type such as noun, verb etc., with help of data dictionary.

*Query analyzer:* It takes input as the token list from RTL analyzer. In this process the actual meaning of the sentence should be identified. According to the ranked list, the transformation of domain specific is performed. The relational operators are replaced by the particular operators. As the last steps the classifications are used for framing appropriate SQL query.

### III. METHODOLOGY

Data was collected via primary or secondary sources, for the case of this research, the primary source of data collection was chosen. Primary source of data collection are information or data gotten on first hand basis through interviews, questionnaire or observation from various schools in Imo State, Owerri, Nigeria and responses was obtain from pupils

and teachers. The following data collection methods were used to collect data for this research.

*Structured Interview*

This played a leading role in the conduct of this research it involved the interviewing of the teachers in the school to obtain the necessary information as regards to how they teach pupils in their school and also the procedure that is followed in doing so. In fact, it provided a lot of information which would not have been available if observation method was the only one used without supporting it with some interview.

*Observation*

This also helped in gathering information on first hand basis as an opportunity to personally witness how English language classes are handled by teachers in this school proved useful to me. Although the conventional method of teaching was used for pre-nursery pupils, it was gathered that the method is the same for levels in the school as a whole was poor and bored in receiving lectures and not well understood by the pupils.

*Data Preparation*

At this stage all the data collected through Interview and observation were used to develop this system in order to solve problems associated with the old system. Some of these data include English alphabets, English words like apple, ball, cat etc. This has to do with the type of data required in the design of the program.

However, the analysis of data collected was then used as a tool in integrating it into the design of the web based application. The application was developed using an Object Oriented Analysis and Design approach. Java programming language, Netbean and CSS as a development kits in designing the web application. The choice of programming language is very important factor to consider when developing system, with the knowledge of the problem encountered some application, once the algorithm specifying the necessary operation to accomplish a given task has been developed, by the program using an appropriate language to represent them in an encoded sequence of instructions for computer execution. This intelligent word query processing algorithm interacts with the machine in translating word to human language of words.

Algorithm for intelligent Word Querying Processing

- a. Scan the given Input string from left to right,
- b. While scanning spell check will be processed simultaneously,
- c. Break the sentence into several tokens by eliminating the delimiters by which the meanings of symbols will be defined by the grammar,
- d. Make interrelated token list,
- e. Assign rank value for the tokens,
- f. Create parsed syntax tree,
- g. convert the leaves of tree to particular SQL,
- h. Dependency structure used to accumulate information,
- i. Split the query and extract patterns,
- j. Look for sentence connectors,
- k. Split query on the basis of connectors,

- l. Specify the conditions in query by using the criteria,
- m. Find attribute and values,
- n. Check for validity of the data.
- o. Translate into SQL Query.

Map values with respective tables.

This was chosen because of its user friendly interface in executing word translation.

IV. SYSTEM IMPLEMENTATION AND RESULT

This is the highest level of detail in software development the coding achieved using a programming language to communicate or transform the design into executable software of the computer, which will now solve the desired problem. The below is Java programming source in developing the web-based stand alone application.

Program Source Code

```
* To change this license header, choose License Headers in
Project Properties.
* To change this template file, choose Tools | Templates
* and open the template in the editor.
*/
import java.awt.BorderLayout;
import java.awt.Color;
import java.awt.Font;
import java.awt.GridLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.BorderFactory;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JPanel;
import javax.swing.JTextArea;
import javax.swing.border.BevelBorder;
import com.iprosft.technologies.view.*;
import javax.swing.ImageIcon;

/**
 *
 * @author NJOKU DONATUS
 */
public class ComparativeWords extends JFrame{
    private JPanel
npanel,cpanel,spanel,cpanel1,cpanel2,pan1,pan2,prentenseP
anel;
    private JButton
butt1,butt2,butt3,butt4,butt5,butt6,butt7,butt8,butt9,butt10,wor
ds1,words2,words3,back;
    private JLabel title1,title2,title3;
    private JTextArea screen1,screen2;
    ComparativeWords(){
        setSize(1200,700);
        setLayout(new BorderLayout());
        setLocationRelativeTo(null);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        prentensePanel= new JPanel(new GridLayout(10,1));
```

```

npanel= new JPanel(new BorderLayout());
spanel= new JPanel();
pan1= new JPanel(new BorderLayout());
pan2= new JPanel(new BorderLayout());
cpanel1= new JPanel(new BorderLayout());
cpanel2= new JPanel(new GridLayout(2,1,10,10));
cpanel= new JPanel(new GridLayout(1,2,10,10));

cpanel.setBackground(new Color(255,255,255));
//pan1.setBackground(new Color(255,255,255));
//pan2.setBackground(new Color(255,255,255));
cpanel2.setBackground(new Color(255,255,255));

title1=new JLabel("POSITIVE");
title2=new JLabel("COMPARATIVE");
title3=new JLabel("SUPERLATIVE");

title1.setHorizontalAlignment(JLabel.CENTER);
title2.setHorizontalAlignment(JLabel.CENTER);
title3.setHorizontalAlignment(JLabel.CENTER);
title1.setBorder(BorderFactory.createBevelBorder(BevelBorder.RAISED));

title2.setBorder(BorderFactory.createBevelBorder(BevelBorder.RAISED));

title3.setBorder(BorderFactory.createBevelBorder(BevelBorder.RAISED));
    butt1=new JButton("BIG");
    butt2=new JButton("SMALL");
    butt3=new JButton("BAD");
    butt4=new JButton("GOOD");
    butt5=new JButton("STRONG");
    butt6=new JButton("WEAK");
    butt7=new JButton("LATE");
    butt8=new JButton("POOR");
    butt9=new JButton("RICH");
    butt10=new JButton("MUCH");
    back=new JButton("Back-Home",new ImageIcon(getClass().getResource("/bk.png")));

    words1=new JButton("WORDS AND OPPOSITE");
    words2=new JButton("SINGULAR AND PLURAL");
    words3=new JButton("POSITIVE/COMPARATIVE AND SUPERLATIVE");

words1.setBorder(BorderFactory.createBevelBorder(BevelBorder.RAISED));

words3.setBorder(BorderFactory.createBevelBorder(BevelBorder.RAISED));
    words2.setBorder(BorderFactory.createLineBorder(new Color(255,255,255), 5, rootPaneCheckingEnabled));

    butt1.setBorderPainted(false);
    butt1.setContentAreaFilled(false);
    butt2.setBorderPainted(false);
    butt2.setContentAreaFilled(false);

    butt3.setBorderPainted(false);
    butt3.setContentAreaFilled(false);
    butt4.setBorderPainted(false);
    butt4.setContentAreaFilled(false);
    butt5.setBorderPainted(false);
    butt5.setContentAreaFilled(false);
    butt6.setBorderPainted(false);
    butt6.setContentAreaFilled(false);
    butt7.setBorderPainted(false);
    butt7.setContentAreaFilled(false);
    butt8.setBorderPainted(false);
    butt8.setContentAreaFilled(false);
    butt9.setBorderPainted(false);
    butt9.setContentAreaFilled(false);
    butt10.setBorderPainted(false);
    butt10.setContentAreaFilled(false);
    back.setBorderPainted(false);
    back.setContentAreaFilled(false);
    presenttensePanel.setBackground(new Color(255,255,255));
    cpanel.setBackground(new Color(204,204,255));
    cpanel2.setBackground(new Color(204,204,255));
    words1.setBackground(new Color(204,204,255));
    words2.setBackground(new Color(204,204,255));
    words3.setBackground(new Color(204,204,255));
    spanel.setBackground(new Color(204,204,255));

    title1.setHorizontalAlignment(JLabel.CENTER);
    title2.setHorizontalAlignment(JLabel.CENTER);
    title3.setHorizontalAlignment(JLabel.CENTER);

    title1.setFont(new Font(Font.SANS_SERIF,Font.BOLD,20));
    title2.setFont(new Font(Font.SANS_SERIF,Font.BOLD,20));
    title3.setFont(new Font(Font.SANS_SERIF,Font.BOLD,20));

    screen1= new JTextArea();
    screen2= new JTextArea();

    screen1.setEditable(false);
    screen2.setEditable(false);
    screen1.setFont(new Font(Font.SANS_SERIF,Font.BOLD,40));
    screen2.setFont(new Font(Font.SANS_SERIF,Font.BOLD,40));

    add(npanel,BorderLayout.NORTH);
    add(cpanel,BorderLayout.CENTER);
    add(spanel,BorderLayout.SOUTH);
    cpanel.add(cpanel1);
    cpanel.add(cpanel2);
    cpanel2.add(pan1);
    cpanel2.add(pan2);
    cpanel1.add(title1,BorderLayout.NORTH);
    cpanel1.add(presenttensePanel,BorderLayout.CENTER);
    pan1.add(title2,BorderLayout.NORTH);

```

```

pan2.add(title3, BorderLayout.NORTH);
pan1.add(screen1, BorderLayout.CENTER);
pan2.add(screen2, BorderLayout.CENTER);
presenttensePanel.add(butt1);
presenttensePanel.add(butt2);
presenttensePanel.add(butt3);
presenttensePanel.add(butt4);
presenttensePanel.add(butt5);
presenttensePanel.add(butt6);
presenttensePanel.add(butt7);
presenttensePanel.add(butt8);
presenttensePanel.add(butt9);
presenttensePanel.add(butt10);
npanel.add(words1, BorderLayout.EAST);
npanel.add(words2, BorderLayout.CENTER);
npanel.add(words3, BorderLayout.WEST);
spanel.add(back);
butt1.addActionListener(new ActionListener(){
    public void actionPerformed(ActionEvent ae){
        String presents,past,pastpast;
        presents="BIG";
        past="BIGGER";
        pastpast="BIGGEST";
        screen1.setText(past);
        screen2.setText(pastpast);
        screen1.setSelectedTextColor(Color.red);
        screen2.setSelectedTextColor(Color.red);
    }
});

```

/\*

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\* To change this template file, choose Tools | Templates and open the template in the editor.

\*/

```

import java.awt.BorderLayout;
import java.awt.Color;
import java.awt.Font;
import java.awt.GridLayout;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.BorderFactory;
import javax.swing.ImageIcon;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JPanel;
import javax.swing.JTextArea;
import javax.swing.border.BevelBorder;
import com.ioprosoft.technologies.view.*;

```

/\*\*

\*

\*/

```

public class EnglishStructure extends JFrame{
    private JPanel npanel,cpanel,spanel,wpanel,epanel;
    private JLabel title,subtitle1,subtitle2,ioprosoft;

```

```

private JButton
back,noun,article,adjective,pronoun,verb,adverb,preposition;
private JTextArea screen,screen1;

```

```

EnglishStructure(){
    setSize(1200,600);
    setLayout(new BorderLayout());
    setLocationRelativeTo(null);
    setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

```

```

npanel=new JPanel();
spanel=new JPanel();
cpanel=new JPanel(new BorderLayout());
epanel=new JPanel(new BorderLayout());
wpanel=new JPanel(new GridLayout(7,1));

```

```

add(npanel, BorderLayout.NORTH);
add(spanel, BorderLayout.SOUTH);
add(cpanel, BorderLayout.CENTER);
add(wpanel, BorderLayout.WEST);
add(epanel, BorderLayout.EAST);

```

```

back = new JButton("Back",new
ImageIcon(getClass().getResource("/bk.png")));
noun=new JButton("Noun");
article=new JButton("Article");
adjective=new JButton("Adjective");
pronoun=new JButton("Pronoun");
verb=new JButton("Verb");
adverb=new JButton("Adverb");

```

Sample of Program Output



Fig. 2. Home page.



Fig. 3. Learning ABCD-Z with image slide.

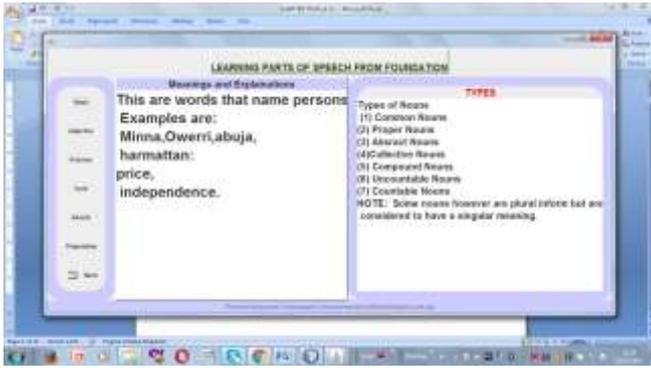


Fig. 4. Learning parts of speech.



Fig. 8. Words and opposite.

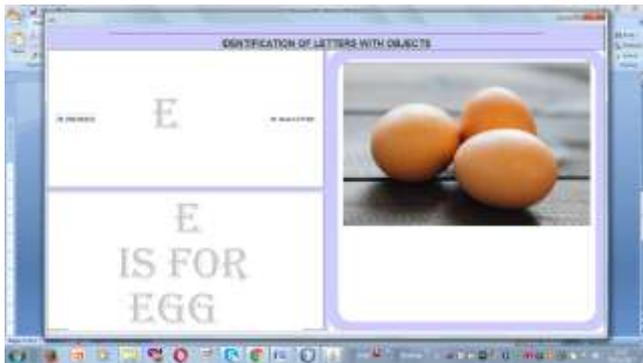


Fig. 5. Identification of letters.



Fig. 9. Singular and plural.

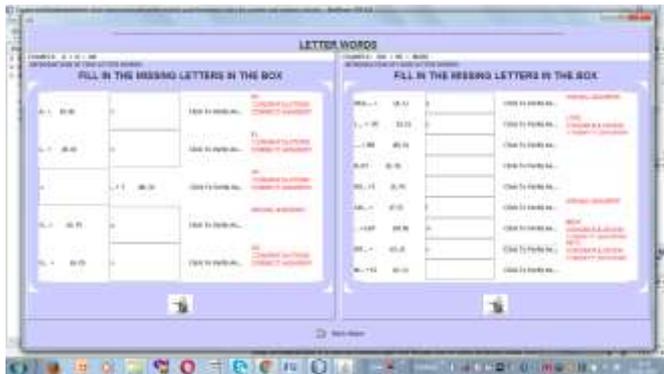


Fig. 6. Filling missing letter.



Fig. 10. Comparative and superlative.

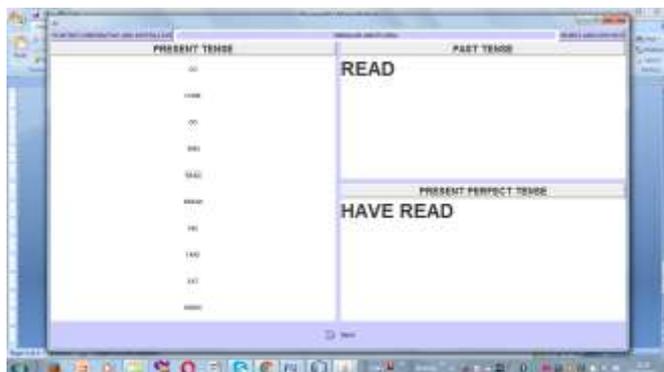


Fig. 7. Present tense, past tense and present perfect tense.

### V. OTHER RECOMMENDATIONS

The following recommendations based on this research paper finding are being made as follows:

- i. The management of schools should install the software in computer systems in the school and use it to teach pupils the basics of English language.
- ii. It is also recommended that parents should install the application to enable their children to cover other introductory aspects of English language that the research has provided.

### VI. CONCLUSION

This research study adopted several activities and all other associated means by which an Electronic tutor for teaching kiddies English language could be developed and implemented. Despite all odds, this paper achieved its objectives which is to convert the manual processes associated

with teaching and learning English in Nursery and Primary School to automated process. The research work followed a systematic approach through careful studies, analysis, design, and code. It finally implemented an electronic learning aid system for teaching pupils in school.

#### ACKNOWLEDGMENT

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