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THE TEACHING OF GRAMMAR

THROUGH COMPUTER LANGUAGE GAMES:

A CASE STUDY OF THE JHS 1 PUPILS

OF

ST. AUGUSTINE’S BASIC SCHOOL

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DEDICATION

This thesis is dedicated to Professor Nana Aba Amfo for allowing me to select this topic even though she was not sure she would find me a supervisor with a background in the field. I am very grateful for the efforts she made in finding me a supervisor who has been so helpful in shaping my ideas and directing me to sources that have enriched my experiences.

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To my supervisor, Dr. J. T. Agor for his support I dedicate the work.

To my brother and friends who have given me encouragement to help me finish the work.
Declaration

I hereby declare that this thesis is an original work and that it has never been presented in part or whole for the award of any degree elsewhere. No other person’s work has been used in this thesis without acknowledgement. I am solely liable for any breach of any copyright law.

Joseph Narh Padi ..............................................................................................................

Date.................................................................................................................................
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ABSTRACT

Computer-aided language learning is becoming a promising supplement to traditional classroom learning as well as potentially enabling learners to explore new opportunities to gain autonomy in their practice sessions. One aspect of this way of language learning that has been acclaimed to have been successful is the use of digital games for language study. Many language teachers all over the world have found use for games in the classroom and several studies have been carried out. In order to consider this technology for adoption in Ghanaian schools, the researcher began investigations to gather information to test its efficacy. This thesis therefore aimed at finding out which of the two methods of practising grammar (the use of language games and the traditional way of revising notes) is more effective. A quasi-experimental design was used and 26 students sampled from the JHS 1 class of St Augustine’s Basic School were assigned to an experimental (13) group and a control (13) group. Both groups were exposed to the same grammar lessons for 80 minutes a week over a period of six weeks. Beside the lessons, the experimental group practised with games while the control group practised the traditional way by reading notes and textbooks. It turned out that even though the experimental group outperformed the control group, the difference was not statistically significant. Yet, the gains made by the experimental group has prompted the researcher to recommend their application in the classroom as well as initiating further studies in using other games for the learning of grammar.
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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter introduces the motivation, concepts, aims and objectives, theories and the scope of the study.

1.1 Motivation and Background to the Research

There have been a lot of complaints about students’ loss of interest in language study including students’ inability to study, students’ lack of interest in reading, and the falling standard of English attributed to students’ unwillingness to learn, yet I have found students spending hours, days, and probably weeks and months playing one computer game or the other either on their phones or at game centres and have never been tired of doing so. There have been complaints of students shifting their attention from their books to the electronic media including the computer, the mobile phone, the iPod, the MP3/MP4 player, the Internet, and the like, hence devoting their valuable time which should have been used for revising their notes and practicing their language skills to engaging with these devices.

Students’ addiction to modern communication technology, especially the electronic media, has led to the prohibition of some electronic gadgets that promote the use of the media in our second cycle schools. In my bid to find people’s justifications for the ban of phones in the senior high schools, I came across a student’s response to an interview with The Junior Graphic reporter, Wilda Evans, which appeared in the 28 August 2013
issue. She claimed among other things that if their phone usage was not supervised, students would spend all their study time playing games on their phones. This indicates that the students themselves were aware of the fact that they were addicted to playing games. It is not only the senior high school (SHS) students who were engaged with the electronic media; the junior high school (JHS) students were equally engaged in these practices and their teachers had been calling for a ban to be placed on their phone usage. Andrew Andoh, the assistant headteacher (academic) of St. Patrick’s JHS was reported to have revealed to the Ghana News Agency (GNA) in Sunyani on Tuesday, 19th July 2011, that the usage of mobile phones by students on campuses and in classrooms was affecting learning. This was so serious that even when the authorities seized the phones, the students acquired new ones the next day (GNA, 2011).

The proceeding developments are indications that the digital communication medium is taking the minds of our children away from their books and we must investigate it in order to find ways of solving the problem. How then can we make the children do what we want them to do the way they want it to be done and still yield positive results? If we can apply teaching and learning methods that utilise the media the children use and what the children like doing best and keep up with technology of this age, we may get our children to be interested in learning. Teachers may spend a lot of time in teaching their students, but it takes student’s continuous practice to acquire what is learnt. As Nyikos and Oxford (1993: 11) put it, “learning begins with the learner”. We must therefore get them to practice the lessons in their own way through what they know how to do best. Since they are already addicted to the electronic media and like playing games, one will
suggest that games may be one of the best ways of presenting language skills to them if the games are found to be effective.

A number of researches have been carried out into the use of games in teaching language. According to Liu (2002: 5-6) “Educators were particularly interested in technology’s interactive capabilities, such as providing immediate feedback and increasing learner autonomy in addition to stimulating real-world situations via audio, video, and graphics (Chun & Brandl, 1992; Hoffman, 1995/96; Jones, 1991; Legenhausen & Wolff, 1990)” during the establishment of the Computer Assisted Language Learning (CALL) activities. Language games both computer-based and non-computer based have featured prominently in the literature in this direction. A number of research findings reported the potential of computer language games to make a significant impact on language learning and proposed or encouraged their use both in and out of the classroom (Barab et al, 2005 ; Betz, 1995; Gee, 2003; Kafai, 1995; Malone, 1981; Rieber, 1996; Squire, 2003; Aldrich, 2004; Prensky, 2001; Vui, 2010:2). This is because computer games have been found to be able to engage learners, (Malone, 1981; Rieber,1996; Vui, 2010:2), provide immediate feedback, increase learner autonomy and stimulate real world situations via audio, video, and graphics (Liu, 2002:5). They also provide excellent ways of encouraging learning. Computer games appeal to students and help to break the monotony of typical lesson formats as well as challenging students’ expectations and encouraging them to be active, involved and entertained (Kinder, 2006). Computers also “provide an opportunity for learners to try their newly acquired competence in a context where they feel psychologically secured” (Greenall, 1984). These benefits ensure that learners learn in a relaxed environment free
from external interruptions including excessive corrections and unnecessary punishments for getting things wrong. This is why many researchers believe it is important to combine both lesson and practice within the game to make it autonomous just as textbooks and teaching notes given to learners have examples to guide learners in case they forget what is taught. The importance of using game stories to present educational concepts including language skills have also been advocated (Vui, 2010:2). This suggests that computer language games are one of the modern tools for language learning that our educational system might consider adopting.

1.2 Definition of Computer Language Game

Sorensen and Meyer (2007) define “Serious Games” as “digital games and equipment with an agenda of educational background and beyond entertainment”. Their amplification of the concept brings to the fore the keyword “learning” as the main purpose of creating these games as opposed to the games created solely for the purpose of entertainment and includes among others learning games, educational games, training games, business games and games promoting physical play which cross a variety of topics, target groups and contexts. Since Serious Games are for educational purposes they are based on the theories of educational design which are defined “as theories on and reflections concerning objective, content, planning, organization and evaluation of teaching and learning” (Schnack, 2000; Him & Hippe, 1997; Hopman & Riguarts, 1995). It will be seen from the above that Computer Language Games are a subset of Serious Games and therefore are based on the theory of educational design.
Language Games have two components, the game used as a medium for presenting the ideas and the ideas in the form of the materials to be presented. For the purpose of this study, grammar has been chosen as the content presented and three topics from grammar have been selected. These include nouns, verbs and subject-verb concord. These topics form part of the grammar topics of the syllabus of the Ghanaian JHS 1 for the academic year, the period within which this research has taken place.

According to Chomsky (1964), the grammar of a language is “a description of the ideal speaker-hearer’s intrinsic competence”. Yu (2005:10) also observes that “grammar is not only a set of grammatical forms, but it also includes grammatical meaning and use as a whole” (Ishtawi, 2011:19). The online version of the Merriam-Webster Dictionary also defines grammar as “the study of the classes of words, their inflections, and their functions and relations in the sentence” and also as “a study of what is to be preferred and what should be avoided in inflection and syntax”. The above definitions are summarised in Yu’s definition which states that grammar has three components namely, rules, meaning and use. Chomsky’s definition clearly emphasises meaning and use since it indicates that whatever is realised from the rules must conform to what the native speaker regards as acceptable. Acceptability depends on whether the form is usable in the language, and this also borders on the meaning (semantics) of the structure and its conformity to the native speaker’s internalised rules. The first definition from Merriam-Webster Dictionary, however, reiterates grammar basically as the study of rules; that is, how words function and relate to each other in a given grammatical construct. The second definition, on the other hand, though re-echoing Chomsky’s point of view, differs slightly since its emphasis is on the externalised aspect. However,
grammar, whether internalised or externalised is governed by rules which prescribe the forms that are meaningful and acceptable for use.

1.3 Research Problem

Every year, at forums and workshops, speeches are made about the falling standard of English and the need to find measures to address the situation, but it seems that either nothing is done after those workshops or that we have not been able to put our finger on the actual causes of the falling standard. In an interview granted the Ghana News Agency by Nana Ebo Koomson, President of Western Region Ghana Association of Teachers of English (GATE) and Head of Languages Department of Sekondi Methodist Senior High School during the Silver Jubilee anniversary celebrations of the school, he attributed the causes of the falling standard of the English Language to students’ inability to utilise libraries for extensive studies especially reading and their addiction to video and the use of electronic gadgets like mobile phones (Ghana News Agency, 2012). Reporting on the Ninth Annual National Conference of Ghana Association of Teachers of English (GATE) held in Bolgatanga in 2006, Akagre quoted Mr. Matthew Doh, the then secretary of GATE, as saying among other things that the [English] Language is further corrupted in an age of technological development. The paradox of the situation is that technological advancement has introduced more dangers into language competence. Today, the use of mobile phone has introduced the sending of text messages most of which have their own self-developed contraction, language items and phraseology. Unfortunately these do not conform to conventional grammatical and language rules.
The Deputy General Secretary of the Ghana National Association of Teachers (GNAT), John Nyoagbe, was quoted by the Daily Graphic as asking parents to stop buying pastries and bread for their children and instead buy supplementary readers for their children to read side by side with their text book (2008). The above revelations point to the fact that we are losing control of getting our students to do what we expect of them when it comes to the learning of the English language. The basic problem is that their attention is distracted by the bombardment of modern technology and they are no more able to concentrate on conventional methods of learning and practicing what is learnt.

Claims have been made by Prensky (2001: 01-06) that learners who become addicted to playing video games find it difficult to absorb “conventional instructions” (Vui, 2010: 4). This should cause concern for stakeholders in education in the country since children these days are becoming addicted to the use of the electronic media.

Fortunately enough, research has revealed that the electronic media has the potential to support language teaching and learning. One of these media, computer games, has been tested and proven to have potentials for supporting the presentation and practising of language skills (McGrath, 2004; Ishtawi, 2011; Gu, 2011; Liu, 2002; Povjakalova, 2012; Pietarinen, 2007c; Qteefan, 2012; Sorensen & Meyer, 2007; Xu, 2012; Yu, 2005; Vui, 2010; Misirli, 2007:3).

The literature abounds with reports of the effectiveness of games in the acquisition of language skills, but as Bohn and Schreiter (1994), Cortex (1974), Gardner (1987) and Shie (2003) pointed out, some of these discussions were not based on empirical evidence while some of those backed by empirical evidence were not focused on the acquisition of language skills but rather on the examination of the ability of games to motivate
learners, develop affective skills, engage learners or induce behaviour change, which 
they claimed would end up in encouraging learners to get engaged with the content and 
result in the acquisition of the language skills involved. They argued that once the 
learner was motivated and engaged he or she would continue to study and advance in the 
studies (Asher, 2000; McGrath, 2004). Moreover, some researchers pointed out the 
subjectivity in the assessment of these elements coupled with the data collection 
methodology - self-reporting – (through interviews and response to questionnaire by 
students) which they claimed might be exaggerated (Ranalli, 2008). This makes it 
difficult for educators to rely on such findings to introduce language games in the 
classroom.

Also, even though most comparative research findings involving the use of games for 
language study and the conventional system favour game methods of study (Meizaliana, 
2009; Paris & Yussof, 2012; Qteefan, 2012; Ishtawi, 2011; Ashraf et al, 2014; Aghlara 
&Tamjid, 2011; Segers & Verhoeven, 2003; Kim, 2010; Suh et al, 2010; Ranalli, 2008), 
there are some that favour the conventional method (Boocock et al, 1967; Garvey & 
Seiler, 1966; Johnson & Euler, 1972). Moreover, a lot of the comparative results ended 
inconclusively. This revelation calls for further investigations taking care of some of the 
shortcomings of the others to find if there will be any differences in the outcome.

The government of Ghana and PTAs are making efforts to provide schools with 
computers. Secondly, almost every child of school going age has access to a computer or 
owns a phone. These developments may prompt stakeholders in education to consider 
the claimed advantages and recommend the introduction of games into the curriculum. 
However, this will also need research to assess the claims and make available
information on these research findings so that curriculum planners may be informed to decide whether to integrate them into the teaching and learning process. Moreover, computer games are regarded by some parents and educationists as enemies of academic work. Therefore, in order to convince policy makers to accept such a concept into the school curriculum, it must be proven to have a positive impact on learning.

1.4 Objectives

This research therefore is aimed at:

i. assessing which of the media for grammar practice is more effective: computer language games or traditional grammar practising methods of studying from notes, doing practice exercises and textbooks;

ii. finding out which of the two methods favour which gender group;

iii. determining the accuracy of claims that interventions favour lower achievers than they do higher achievers (Miller et al, 2006; Berns et al, 2013; Qteefan, 2012; Yu, 2005);

iv. ascertaining the veracity of this assertion and also find out which of the two methods supports the claim that interventions favour lower achievers than they do higher achievers.
1.5 Research Questions

The major questions asked are:

i. Is there a significant difference between the performance of the experimental group (the group that practises with language-learning games) and the control group (the group that practises with the traditional method) in the acquisition of English grammar skills as a result of the methods applied in the practice sessions?

ii. Does the use of computer grammar games or the use of the traditional method of learning grammar favour either of the genders?

iii. Does the intervention of computer grammar games or the traditional method of learning grammar favour lower achievers or higher achievers?

1.6 The Scope of the research

The research includes the assessment of the efficacy of two methods of practising grammar to ascertain which of them can best benefit the learner. It also involves the presentation of grammar lessons based on the basic school syllabus and the creation of grammar games for use as a medium for practising and revising these lessons. The games therefore serve as a platform for the learner to practice the skills acquired.

The grammar lessons will focus on the written and not oral competence since the games do not support voice input from the learner. However, audio versions of the text will be included.
It is a comparative study which employs both inter and intra-group comparison of the effectiveness of the two methods of practising grammar and their effect on participants.

1.7 Theoretical framework

1.7.1 Theory of Educational Design

As mentioned earlier, the research is rooted in the Theory of Educational Design which as defined earlier is “theories on and reflections concerning purpose, objective, content, planning, organization and evaluation of teaching and learning” (Schnack, 2000; Him & Hippe, 1997; Hopman & Riguarts, 1995; Sørensen & Meyer, 2007: 559). Two approaches that have been identified include a practical approach comprising planning and organisation of teaching and learning (Nielsen, 1998). This research will make use of both the theoretical and practical aspects of the design. The theoretical aspect includes justification for inclusion of the materials to be included as well as the methods for presentation, analysis and their appropriateness to the given levels while the practical aspect deals with the placement of the teaching and learning in context to make it easier for the learner to assimilate.

1.7.2 Theories of Language Learning

Three of the hypotheses of Krashen’s theory of Principles and Practice of Second Language Acquisition (the natural order, the input and the affective hypothesis) will be employed as theories of learning. The Natural Order Hypothesis will be employed in the preparation of lessons so that in the teaching of nouns, for example, the names will first be taught before their plurals. Also, in conformity with the findings of Brown (1973) and de Villiers and de Villiers (1973) about the natural order of the acquisition of first
language, plural markers will first be taught before the third person singular markers. The Natural Order Hypothesis proposes that “acquisition of grammatical structures (rule) proceeds in a predictable order” (Gass & Selinker, 1994: 145). They argue that “the natural order was determined by a synthesis of the results of the morpheme order studies and are a result of the acquired system, without interference from the learned system” (ibid). Krashen (1982) gives an example “that many advanced students in English will still not be able to apply the rule for the third person singular verb, where an ‘-s’ has to be added to the verb, when speaking quickly”, which typifies this assertion (Admin, 2011).

According to the input hypothesis of Krashen (1982), language is acquired when the learner understands expressions that are beyond his or her current level of competence. This he denoted with the expression (i + 1). Comprehension, he claimed, is attained through the use of “context or extra-linguistic information” (p 21). He pointed out that once there is sufficient input and it is understood, communication takes place and i + 1 will be provided automatically (p 21). This implies that the comprehensibility of input is essential for the acquisition of language skills to take place. The input hypothesis will also guide the preparation of materials considering the fact that acquisition cannot take place without sufficient meaningful input. The materials will made more comprehensible for the learners to help effective acquisition.

The affective hypothesis indicates the relationship between the affective variables such as motivation, self-confidence and anxiety and second language acquisition. It states among other things that learners of second language who have negative attitude towards learning will raise their affective filters which will prevent the input from getting to the
acquisition device (Krashen, 1982; Stevick, 1976; Selinker, 1972; Dulay & Burt, 1977).

On the other hand, if a conducive environment is created for the learner, the learner’s affective filters may be lowered making it possible for acquisition to take place.

1.7.3 Theories of Play

Spencer and Sheller considering play propose the theory of “Increasing Power” based on the assumption that play is to get rid of the increasing potential power of a human’s body which is considered as a biological operation that serves the living being (Qteefan, 2012:23). Here the activity involving play is meant to relieve the person from tension and put him/her in a relaxed mood. This may be useful in two ways. First, it follows that difficult tasks may be accomplished through play as employed by fishermen pulling a net. Each man in the team puts his weight at pulling the rope that holds the net at a given signal amidst the performance of music. This gets the work done without them realising they are tired. The second is for play to be used as relaxation after work. In this view, play activities are placed right after or just before difficult tasks are performed.

Gross proposed that play is a biological operation that prepares people for future activities (Qteefan, 2012:24). This is based on the realisation that adulthood which is a stage for work and responsibility is preceded by childhood, a stage full of play. Viewed from this angle, play must be placed in between work activities.

Qattami (1991) and Crystal (1996) also see play as a new strategy for learning things that makes the learner practice in a playful way unlike the traditional methods where the learner has to cram concepts into memory. The research will make use of the concept of
play in the language games to facilitate seemingly difficult tasks to be performed with ease and also as a means of making abstract ideas more concrete.

1.8 Outline of the study

The thesis consists of six chapters. The first chapter introduces the concepts, aims and objectives, motivation, significance, theories and the scope of the study while the second chapter discusses previous research findings and their implications and relevance to the study. Chapter three discusses the methods of the intervention, the methods of data collection, the methods of analysis and their implications. Chapter four describes the philosophy, methods and principles, materials, designs and the application of the games. Chapter five presents the analysis and discussion of the data collected while chapter six summarises the discussions and gives recommendations.
CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This literature review is aimed at assessing studies that evaluate digital games in language study with a view to discerning the current state of research on the effectiveness or otherwise of language games in the acquisition of language skills, especially grammar and whether there is the need for further study in the area. Theories underlying games in language study are reviewed focusing on their relevance to the development of game materials and the application of games to research and classroom situations. Issues and concerns raised by stakeholders in education and researchers regarding the introduction of games in the classroom are also discussed.

2.1 The evolution of Digital Game-Based Language Learning (DGBLL)

2.1.0 Introduction

Computer game-based language learning, also known as digital game-based language learning (DGBLL), is an intersection of two fields of study; language learning and digital game technology. An offshoot of language study known as computer assisted language learning (CALL) has taken advantage of developments in the game industry to make the teaching and learning of language in the classroom more interactive while experts in digital game-based learning (DGBL) seeing the advantages that would accrue in terms of the expansion of their clientele tried to impress on educators the benefits of exploiting the advantages of games in the classroom. This has drawn the attention of
educators to research into the efficacy of games in the formal educational sector, and language study is no exception.

Conscious efforts had been made to integrate games into serious business for a very long time in the history of civilisation of mankind. According to Smith (2009), records of the use of games for serious business dated back as early as 40,000BC when fortunetellers in India and Africa used sheep’s knuckle bones to tell fortune. He noted that in the past people regarded these human endeavours as serious business and that the seriousness of an issue was determined by a generation (15). He traced the use of games for various purposes in every age and civilization from Africa through Asia to Europe and the various types of games used. Board games, some of which were played on the bare ground, featured most. Prominent among these serious games were war strategy games, Wei Hai (meaning encirclement) and the Japanese Go which were found as early as 3000BC and 2300BC respectively (18). He showed how the military in every generation had developed and expanded games for the purpose of training and how they had incorporated games into military schools. The next most featured were games for business training, real estate and banking, developed around 1883 (23). The first recorded and surviving serious game for language, the word building game, Scrabble, was created in 1938 by Alfred Mosher Butts.

The advent of the computer saw the computerisation of these games. The invention of video games in 1961 (though other earlier dates have given by different authors) and developments in the video game industry were explored to expand and improve serious games and now video games have become the norm. The first recorded language video game was Reader Rabbit created in 1986 by The Learning Company (62). Currently
games are used in training and education in almost every human endeavour. The introduction of CALL in the 1960s saw digital language games entering into the language classrooms.

2.1.1 COMPUTER ASSISTED LANGUAGE LEARNING (CALL)

Computer Assisted Language Learning (CALL) is defined by Levy (1997:1) as “the search for and study of applications of the computer in language teaching and learning”. This noble business of search and study began in the 1960s when universities began to be equipped with computers (Davies et al., 2012). From a humble beginning of the “traditional” drill-and-practice programmes popularly referred to in recent years as drill-and-kill programmes, CALL programmes have been expanded to include a variety of information and communication technology applications and approaches to teaching and learning foreign languages. It also extends to the use of “corpora and concordancers, interactive whiteboards, computer-mediated communication (CMC), language learning in virtual worlds, and Mobile-assisted language learning (MALL)”.

PLATO (Programmed Logic for Automatic Teaching Operations) was one of the earliest computer-assisted instructional systems (CAI) which was introduced in 1960 and was run on the mainframe computers in the University of Illinois (Woolley, 1994; Hart, 1995; Sanders, 1995), was the most successful among the programmes so that by late 1970s it had developed concepts used in modern computing including multiplayer games. Listed among the teaching programmes of PLATO was “Language Instruction” meant to “teach reading and writing of major European languages” beginning with “reading skills in French” (Lyman, 1966:2).
Davies & Higgins (1985) produced one of the classifications of CALL programmes in existence in the 1980s which included programmes that used game principles and one programme that was labelled “games”. In their discussion of materials included in their Internet programmes, they listed Chat rooms, Multi-user domain (MUDs), Multi-user domain object oriented (MOOs) and multi-user virtual environment (MUVEs) and described them as the “so-called virtual worlds in which the participants adopt different characters and interact with one another” (Module 1.4: Section 7.9). They stated that these Internet facilities, though begun as games, are currently for educational purposes and a section headed SECOND LIFE which they say is expanding rapidly is added (Module 1.5, Section 14.2.1). All these programmes were adaptations of commercial games and commercial game techniques and principles of language teaching.

The theoretical foundations of CALL programmes are derived from language learning theories, socio-cultural theories and the field of psychology. As a result, CALL courseware has witnessed transformation throughout its history. Warschauer (1996) and Warschauer & Healey’s (1998) review of the transformation attributed it to changes in language learning and socio-cultural theories. They put the development into three categories corresponding to the influence of the behaviourists’ theory, the cognitive constructionists’ theory and the socio-cultural constructionists’ theory labelled behaviouristic CALL (which began with the advent of CALL envisaged in the 1950s, implemented in the 1960s and declined in the late 1970s); Communicative CALL (which began in the late 1970s and declined in the late 1980s) and integrative CALL (which began in the late 1980s) (Warschauer & Healey, 1998: 57). The usual drilling approaches of behaviourism often labelled “drill and kill” characterised Behaviouristic
CALL (Warschauer & Healey, 1998: 57; Ahmad et al, 1985) while communicative CALL emphasised the use of forms rather than teaching the forms explicitly and explicit grammar was deemphasised in favour of implicit grammar which encouraged extensive use of the language under study (Warschauer & Healey, 1998: 57; Jones & Fortescue, 1987; Phillips, 1987; Underwood, 1984). With integrative CALL, the computer was used to present language in authentic social contexts with tutorials being “tasked based, project-based, and content-based” integrated into an environment that exposed the learner to the use of the various communicative skills (listening, speaking, reading and writing) (Warschauer & Healey, 1998: 58). These characteristics apply to all CALL programmes including language games.

2.1.2 Research in digital game based language learning DGBLL

Studies in the field of DGBLL were championed by students and researchers whose aims were to prove the efficacy or otherwise of DGBLL procedures and kits on one hand and evaluators of DGBLL interventions and implementations in the classroom. Whereas the first group of studies ended up proving the efficacy or otherwise of the of the game interventions, the second always had positive results favouring the use of games in the classroom but cautioned against hook and line swallowing of the claims that games are very effective in the acquisition of academic knowledge.

Many writers have trumpeted the efficacy of games in their learning mainstream media, language teaching publications (Mawer & Stanley, 2011), general academic publications such as dedicated volumes (Reinders, 2012), journal articles and book chapters (Cobb & Horst, 2011; Sykes & Holden, 2011; Thomas, 2011; Thorne, 2012; Prensky, 2001a,
The claims include the assertion that games facilitate the learning of skills including those referred to as 21st century skills, skills believed to be crucial to development in the 21st century and as such are expected to be in high demand in the job market in the century. Learners learn how to collaborate, innovate, produce, and design in addition to extensive technology use, extensive problem solving, and complex communication as a result of experiences gained from intensive game play (Levy & Murnane, 2004; Barab & Dede, 2007; Gee, 2003, 2005; Jenkins et al, 2006; Gee & Shaffer, 2010; McClarty et al, 2012; Spires et al, 2011). These skills, they claimed could be learnt through the playing of expertly developed games and professional programmers have put in a lot to accomplish such tasks (Rupp et al, 2010). They argued that the skills required to play the games and the context of the games were capable of developing creativity, critical thinking and problem solving skills in the technological world (Gee, 2003; Spires, 2008). Researchers such as Kolovou and Heuvel-Panhuizen (2010), Liu et al (2011), Spires et al (2011), Chuang and Chen (2009), Ya-Ting (2012) and Miller and Robertson (2011) explored the impact of games on specific 21st century skill sets such as problem solving or critical thinking and predicted that players were capable of acquiring and transferring such skills from the game environment to real life applications. But some researchers questioned the bases of some of the claims and refuted them (Costikyan, 2008). McClarty et al (2012), in a report of the evaluation of the theoretical and empirical evidence behind five key claims about the use of digital games in education, in agreement with McFarlane et al (2002), concluded that these 21st skills had not been
accepted by teachers in the classroom because they were not subjected to rigorous test and were not valued in the formal educational system.

There were other claims of much importance to this study and these include the ability of games to motivate learners, engage learners and develop affective skills (Annetta et al, 2009; Fengfeng, 2008a; Kebritchi et al, 2010; Liu et al, 2011; Papastergiou, 2009; Schaaf, 2012; Vos et al, 2011; Ya-Ting, 2012), induce behaviour change, develop perceptual and cognitive skills, and most of all help learners acquire knowledge and content materials (Chuang & Chen, 2009; Delacruz, 2011; Kebritchi et al, 2010; Miller and Robertson, 2011; Brom et al, 2011; Huizenga et al, 2009; Papastergiou, 2009; Annetta et al, 2009; Fengfeng, 2008b; Spires et al, 2011; Ya-Ting, 2012; Connolly et al, 2012; Perrotta et al, 2013). The military and the business world have taken the front line (Prensky, 2001), but currently many teachers and researchers in the classroom have been very active in research into DGBLL and various articles and books have been turned out to report these successes. Research reviews have shown that so far these claims have not been absolutely confirmed even though most of them are in favour of games. For example, in a meta-analysis of studies on games for learning by Perrotta et al (2013), it was found that even though five of the nine studies that examine the academic achievement of the participants favoured games players, the remaining four did not find any impact made by games while six found games motivating and two turn otherwise. Coupled with this is the frequent assertion that some of the reports were speculative, others had medium level empirical evidence owing to the less rigorous nature of their methodology while only a few had high level of evidence based on the rigorous nature
of their methodology (Perrotta et al, 2013). These observations cast doubts on the popular claims.

Research evaluating the application of games in the classroom seems to confirm the efficacy of games in learning except in some few cases but cautioned against the wholesale acceptance of these claims since in their view very little research had been carried out on the relationship between games and academic performance (McClarty, 2012; Ke, 2009; O’Neil et al, 2005). An investigation conducted by European Schoolnet, a network of ministries responsible for education and modernization using information and communication technologies, on behalf of ISFE (Interactive Software Federation of Europe) sought to find out how teachers used digital games in their classroom and their outcomes. The six case studies and a review of the scientific literature revealed that teachers used digital games to support pupils in difficulty, to modernise the learning methods, to develop advanced skills, and to prepare citizens for the future. The results confirmed that digital games made positive impact in the classroom, but they observed that the coverage of the usage remained small in number and more in-depth analysis were needed (Felicia, 2009). Ulicsak and Wright (2010) providing an overview of the current use of digital games and research around their usage in different situations found that the military and the business world were in the lead while formal education took the back seat. Referring to the study of Squire (2005), Ulicsak and Wright (2010) asserted that games favoured low achievers and also that games that support the curriculum appeared to be widely accepted since the formal education system required the acquisition of knowledge and procedures required for external exams within stipulated time frame.
The story is not different in the field of language study; the literature abounds with reports of the effectiveness of games in the acquisition of language skills, but as Bohn and Schreiter (1994), Cortex (1974), Gardner (1987) and Shie (2003) pointed out, some of these discussions were not based on empirical evidence while some of those backed by empirical evidence were not focused on the acquisition of language skills but rather on the examination of the ability of games to motivate learners, develop affective skills, engaged learners or induced behaviour change, which they claimed would end up in encouraging learners to get engaged with the content and result in the acquisition of the language skills involved. They argued that once the learner was motivated and engaged he or she would continue to study and advance in the studies (Asher, 2000; McGrath, 2004). But some researchers pointed out the subjectivity in the assessment of these elements coupled with the data collection methodology - self-reporting – (through interviews and response to questionnaire by students) which they claimed might be exaggerated (Ranalli, 2008). This makes it difficult for educators to rely on such findings to introduce language games in the classroom.

Comparative studies of the use of language games and the traditional method of teaching had featured considerably in the research field (sixteen out of over thirty reviewed), but there seems to have been a break between the years 2000 and 2009. Only three (Meizaliana, 2009; Segers & Verhoeven, 2003; Yu, 2005) of the sixteen studies reviewed that compare traditional methods with game based learning fall between the years 2000 and 2009 while twelve (Turgut & Irgin, 2009; Rankin et al, 2006; Anderson et al, 2009; McGrath, 2004; Surface et al, 2007; Surface et al, 2006; Johnson, 2007; Thorne, 2008; Coleman, 2002; Toyoda & Harrison, 2002; Von Der Emde et al, 2001;
Kötter, 2003) of the thirteen studies that do not use experimental design are within this year group. Probably this was the result of calls by experienced researchers of CALL in the late 1990s on researchers to be circumspect in their zeal to compare traditional methods of language teaching with game based language learning. An example of these calls is that by Warschauer and Healey (1998) who compared the situation with attempts to prove the efficacy of books in the classroom; “A graduate student who set out to show the effectiveness of books in the classroom would quickly be counselled to refine the topic in order to make it meaningful, and the same advice would be given to someone trying to measure computer effectiveness in the classroom” (3). To members of CALL the computer is like a textbook in which learning experiences are presented. But the necessity of this comparison was felt after 2009 and the number of these increased in the Asian countries probably because they had just introduced games into language study. Seven of the fourteen studies that employ comparative studies were from Asian countries of Palestine, Malaysia, Iran, Indonesia and Japan (Suh et al, 2010; Ashraf et al, 2014; Aghlara & Tamjid, 2011; Meizaliana, 2009; Paris & Yussof, 2012; Qteefan, 2012; Ishtawi, 2011). Even in the advanced countries of America, Netherland and Germany comparative studies continued (Yu, 2005; Bullard & Anderson, 2014).

Apart from comparing traditional methods with games, researchers also compared various treatment levels (Miller et al, 2006; deHaan, 2010), players and viewers of the game played (deHaan, 2010) as well as high achievers and low achievers (Miller et al, 2006; Berns et al, 2013; Qteefan, 2012 and Yu, 2005). It was reported that highly interactive programmes increase cognitive load hence reducing the ability of learners to concentrate on the content so that viewers of the game-play tend to perform better than
the players while lower achievers gain more in their posttests than higher achievers after they both have game for learning treatment. Under non experimental conditions, researchers sought to find out the margin of output gained after treatments had been delivered.

There were studies in almost every aspect of language learning on the efficacy of games in acquiring language skills such as speaking, listening, writing and reading. Vocabulary study, grammar, social interaction and communication were reported to have been the focus of most studies in the field. Most of the research findings that concentrated on vocabulary acquisition argued that vocabulary acquisition was either difficult or boring (Turgut & İrgin, 2009) and that if learners could acquire vocabulary through games, they should be able to do so for any aspect of the language.

A summary of a meta-analysis of CALL game research findings examined by Reinhardt (2014) gives an idea of what pertains in the field.

Fig 2.1 A pie chart of segments representing aspects of language in the summary of a meta-analysis of CALL game research findings examined by Reinhardt (2014)
It would be realised that not many studies in the given analysis focused on the effects of games in studying grammar. Reading, vocabulary, interaction and speaking were on top of the list while grammar and pragmatics lay at the bottom. This is not a reflection of the claims made by the other researchers. Moreover, some of these games are non-digital. Of over thirty research results reviewed for this section, nine examined the acquisition of grammar but only four of them (Miller et al, 2006; Paris & Yussof, 2012; Qteefan, 2012; Bullard & Anderson, 2014) were digital, the remaining three five non-digital (Ishtawi, 2011; Meizaliana, 2009; Yu, 2005; Safitri, 2015; Paris & Yussof, 2012). This may be the result of the outright rejection of the teaching of explicit grammar from the 1970s through the 1980s in America and some parts of the world (Stathis & Gotsch, 2013). Also, the current trend of research that emphasises social interaction and vocabulary acquisition neglects pedagogy that addresses issues on grammar and accurate presentation of grammatical structures.

Though most of the results of the research reviewed favoured game based language study (Meizaliana, 2009; Paris & Yussof, 2012; Qteefan, 2012; Ishtawi, 2011; Ashraf et al, 2014; Aghlara & Tamjid, 2011; Segers & Verhoeven, 2003; Kim, 2010; Suh et al, 2010; Ranalli, 2008), there were some which went in favour of the traditional method (Pierfy, 1977; Yu, 2005: 30) while others were inconclusive (Bullard & Anderson, 2014; Pierfy, 1977; Gardner, 1987; Miller, 1992; Yu, 2005). Even of the seven studies that compare the use of games and traditional method in acquiring grammar, two of them (Bullard & Anderson, 2014; Yu, 2005) did not find any significant difference between the two results.
In Pierfy’s (1977) meta-analysis of the effectiveness of the results of twenty-two simulation-based training game studies, twenty-one studies collect data through written tests. Three of them reported their results favoured the effectiveness of conventional teaching over games, three results favoured the effectiveness of games over conventional teaching, and the remaining fifteen found no significant differences. Moreover, of the eleven studies that tested retention of learning, eight indicated that retention was superior for game-based training; the remaining three yielded no significant differences. Neither did Yu (2005) nor Bullard & Anderson (2014) find any significant differences between the achievements of game tutored and traditionally tutored students.

As would be seen from the above analysis, the findings of the studies dealing with the use of games and the traditional classroom presentation for teaching grammar have not been conclusive. While some produced positive results in favour of games, others did not produce any significant results casting doubts on the generalisation of the effectiveness of games in teaching grammar.

Meizaliana (2009) compared the use of games and conventional method of teaching grammar in a study of the third grade Students of Madrasyah Aliyah Negeri 1 Kepahiang in Bengkulu. The aims were to find out the effectiveness of teaching grammar through games and whether there was any statistically significant difference in the performances of students who were taught grammar through games and those taught through the use of the traditional method. An experimental design was used and the sample of 77 students were put into an experimental group of 39 students consisting of thirteen girls and 26 boys, and a control group of 38 students consisting of nine girls and
29 boys. Both groups were taken through 45 minutes once a week of grammar lessons for sixteen weeks. Thirteen topics including present tense, past tense, conditional sentences, future tense, present continuous, and others were covered. While the experimental group studied the grammar topics using games, the control group used the traditional classroom presentation with the use of the board and exercise books. The pretest conducted to ascertain the comparability of the two groups confirmed they were while the posttest indicated a significant statistical difference between them in favour of the experimental group. The experimental group significantly outperformed the control group in all the 13 topics while the t-test produced a significant result with the t value of 4.281, giving a significant probability (sig) of 0.000 with α = 0.05 and df = n-1 = 77-1= 76. The researcher indicated that the selection of the correct media (here implying the appropriate games) was a factor in the success of this kind of study.

In a study to examine the effectiveness of games in teaching grammar (the use of the simple present tense and simple past tense) to 56 Form One students of SMK Damai Jaya, Skudai and also to gain insights into students’ and teachers’ responses towards the use of games in teaching and learning grammar items, Hamzah and Dourado (2010) assigned the sample to two research groups, the experimental (31) and the control (25) groups. The selection was based on the participants’ membership of one of the two classes of Form One used in the study (one class became the experimental group and the other the control group). The experimental group used games to learn the grammar while no treatment was given to the control group. The researchers conducted both pre- and post-tests and had semi-structured interviews as well as classroom observation to collect data. The duration is not stated. The researchers indicated that the analysis of the pretest
data confirmed the comparability of the groups, but the analysis of the posttest showed that the games had positive effect on the performance of the experimental group as well as serving as motivation for them although the researchers did not present the quantitative results they claimed to have been derived from the analysis.

Safitri (2015) investigated the effectiveness of using Climbing Grammar Mountain Game in teaching simple past tense. He sampled 74 second grade students from classes VIII D and VIII E of MTs. Yaspia Ngroto. Class VIII D had 38 students made up of 24 males and 14 females while there were 40 students in class VIII E, which consisted of 27 males and 13 females. This research used Experimental Design and the members of class VIII E were assigned to the experimental group while those in class VIII D were in the control group. The main objective of the research was to find out which of the two method of teaching grammar, the Climbing Grammar Mountain game and the lecture method, was effective in teaching grammar (to be precise past tense) to the students of MTs. Yaspia Ngroto Gubug Grobogan. When the data collected through per-test and post-test were analysed, the result of the pretest confirmed the comparability of the two groups. However, the posttest result refuted the hypothesis that the two groups were comparable and asserts the competency of the participants in the experimental group over those in the control group. The statistical means of the scores of the pretest and posttest for the control group (39.89189 and 63.13514) and the experimental group (40.97297 and 81.83784) showed that the experimental group outperformed the control group in the posttest. The analysis produced a significant difference far below the alpha level (0.000 which is far less than 0.05) using the t-test analysis.
Pathan and Aldersi (2014) also set out to verify the effectiveness of the use of games as a technique of teaching grammar to English as Foreign Language (EFL) learners in two primary schools in Sebha. They also found out the perceptions and attitudes of the Libyan EFL learners toward the use of games for teaching grammar in their classrooms. The study used the two grammar games *The Alien* and *Spelling the Plurals*. The participants first went through the lesson without the games and then later played the games. Data was collected through observation and tests. The researchers found that during the lecture method lessons, some participants were sleeping but when the games were introduced, all of them participated and their performances increased. They suggested the use of games to motivate young learners to study grammar.

Ishtawi (2011) assessed the effects of game strategy on the learning of English grammar for the Twelfth Grade students using the experimental approach. Eighty (80) students from Palestinian Secondary School in West Gaza, were used, forty (40) each in the experimental and control groups. The researcher applied educational game strategy to the experimental group and traditional teaching methods to the control group over one term and one month. Achievement tests (pre- and post-tests) were administered, first to ascertain the comparability of the groups and then to establish the efficiency of the methods used in teaching the grammar lessons. It was reported that the results favoured the experimental group considerably and therefore a recommendation for the use of the educational games in teaching grammar was made. The researcher also recommended research into other aspects of the English language (123-125).

However, it was not all the studies that end up in favour of the experimental group. As mentioned earlier, Pierfy’s (1977) meta-analysis presented three findings that were in
favour of the conventional method. Yu (2005) investigated the effects of game based instruction on the acquisition of grammatical features in German as a second language and how game based instruction motivated students and created favourable classroom atmosphere. 93 participants were drawn from two beginners’ classes at the secondary level in Taiwan. The experimental design was used and the 93 participants were assigned to a control group (47 students made up of 7 boys and 40 girls) and an experimental group (46 students made up of 6 boys and 40 girls). They were exposed to the same grammar lessons for 90 periods over eighteen weeks; one group used games to practice while the other used the traditional methods of practicing grammar. It came out that there was significant improvement in students’ motivation and classroom atmosphere. However, there was no significant improvement in the experimental group’s performance over that of the control group in both the pre- and posttests which assessed their ability to master the grammatical skills. The researcher was of the view that the improvement in motivation, peer interaction and teacher –learner relationship would, in the long run, improve the actual learning since learners would develop positive attitude towards the subject and continue to practice. He recommended further research to be undertaken in this area since this research finding was contrary to earlier ones that suggested that language games improved learning skills considerably. The researcher observed that the activities and methods of presentation might be a factor and must be looked at when other studies were undertaken. (210-221).

Miller (1992) also conducted a research using two game groups and a traditional classroom presentation for four semesters. In the study, three sets of American students were taught the Japanese language with two of the groups using interactive games. Data
was collected using tests and interviews and for three semesters no significant differences were found among the groups; it was only in the fourth semester that the two game groups outperformed the control group.

These finding show that a lot of research work need to be done in the areas of the types of game, the types of activities, the method of presentation and the like in order to establish the efficacy of games in teaching grammar.

On the findings that suggested that lower performers in pretests tend to gain more in their posttest than higher performers, researchers attributed it partly to what they referred to as ceiling effect (Qteefan, 2012; Berns et al, 2013); the fact that the higher performers would have very little room left to obtain the maximum score. Others also suggested that performance of the participants in the higher achievers group might have been affected by their lack of skills in operating the computer (Toyoda & Harrison, 2002). It appears that the duration of a study and the sample size might also have effect on the results. The longer the duration the better it favours learning with games (Miller, 1992). Miller (1992) obtained significant improvement result only in the fourth semester of the experiment to find if interactive game playing was effective for acquiring the Japanese language in an experimental study (experimental and control group) that compared the efficiency of the traditional and game methods used by American students. Studies that used large number of participants had statistically significant differences even when the mean differences were marginal. Also, apart from vocabulary acquisition which yielded positive result for learning with games within shorter durations, language tasks such as communication (Gardner, 1987) and grammar (Ishtawi, 2011) which were more involving tended to favour game based learning the longer the duration.
Since theoretical concerns in DGBLL were informed by theoretical developments in psychology and language study, developments in DGBLL had been in constant change beginning with the behaviourists’ approach to language teaching in the 1950s and the 60s which had induced the production of drill exercises. Language games were created to drill aspects of language under study. Even after the fall of behaviourism its influence still remained. Current programmes produced by big firms such as Rosetta Stone are based on picture-word matching which are forms of stimulus-response drill and some mini games used in research are based on the drill procedures (Qteefan, 2012; Anderson et al, 2009).

The advent of the cognitivists’ approach to language study with emphasis placed on meaning, knowing, understanding and cognition, computer-based learning, including games tend to focus on communicative approaches increasingly using forms rather than focusing on the learning of the forms themselves and encouraging students to generate original utterances instead of just manipulating prefabricated language (Ang & Zaphiris, 2008). But the trend changed with the adoption of Vygotsky’s (1962, 1973, 1978, 1986) work on cognitive development which asserted that “Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)” (cited in Cherry 2011: 1). The new theoretical framework, termed the sociocultural theory or cognitive sociocultural theory, is concerned with the importance of contributions society, including adults, peers, cultural beliefs and attitudes make to individual development as a whole and cognitive development in particular.
Hence, research in the field of DGBLL focused on two main perspectives: computer games as a virtual environment that supported language learning on its own and computer games as a tool or medium to facilitate collaborative learning (Ang & Zaphiris, 2008). The first which follows the cognitivists’ approach concentrates on activities in the game and it is through the game-play alone that participants learn language skills. However, the second, based on the cognitive socioculturalists’ approach includes collaborative tasks (Garcia-Carbonell et al, 2001) which require interaction with other players and tools such as chat, text messaging and digital dictionaries as well as external resources that participants may consult to help them accomplish tasks in a social context within the game (Crookall et al, 1990; Noel et al, 1987) thereby giving them the opportunity to learn from many sources and use the language. They interact with their capable peers who are sometimes native speakers of the target language or more advanced second language learners (referred to as scaffolding), their adult guides who prepare the games and simulations and provide the necessary interactive media, their instructors, the game environment and avatars (Donato & McCormick, 1994; Meskill, 1999). The cognitivists’ approach uses both mini and web-based games while the socioculturalists’ approach makes use of multiplayer web-based games such as MOOs and MMORPGs which enable players to collaborate with others during game play as well as outside (between and after) the game play.

Various categories of games and simulations were used in CALL game research literature. They ranged from specific or general purpose language games to commercial off the shelf and web based entertainment games. These included board games, matching games, puzzle games; stand alone and web based video games such as shooter
games, role-playing games and simulations (some of which are MOOs or MMORPGs), sports games and strategy games. Another game in CALL research worth noting is the Tactical Language and Culture Training Systems (TLCTS) developed for training in less popular foreign languages. The game has been found to be effective for training in language acquisition. Several investigations were conducted using TLCTS (2003) an advanced game and simulation technology (Johnson, 2007) that includes “3D game engines, natural language processing, speech recognition and artificial intelligence agents to provide interactive lessons and quizzes based on communicative tasks” (Peterson, 2010: 85) while including avenues for “users to engage in real-time TL dialogue with non-player characters” in the game context (ibid).

Technological advancement in the game world and development in the theories of learning have made the use of games in education more attractive to educators and various types of features have been introduced into CALL games towing the line of commercial games (Gee, 2003; Prensky, 2000; Steinkuehler, 2005).

Development in the game and simulation industry adds to researchers’ advantage and so Artificial Intelligence (AI) in manipulating avatars, speech recognition devices and the use of real time communicative tools for players to communicate with avatars in real time during game play are added to research games. Game authoring tools are also provided by experts to researchers and novice authors to create prototypes for the language classroom (Peterson 2010: 73; Li & Topolewski, 2002; Mich et al, 2004; Sørensen & Meyer, 2007; Stubbs, 2003). The researcher therefore has at his or her disposal a variety of game genres to choose from. Recent trends in research have been to adapt professionally prepared off-the-shelf and web based commercial games and
simulations to be used either directly or modified for the purpose of language study (Li & Topolewski, 2002; Mich et al, 2004; Sørensen & Meyer, 2007; Stubbs, 2003). Since a majority of these commercial games are meant for entertainment, researchers who adapted them combined them with specially designed support materials before they were applied in the study situation (Miller & Hegelheimer, 2006).

With the focus now on MOO and MMORPGs and other commercial entertainment games for research in language study, mini games with their added advantage of being easily created to suit specific aspects of language study are now being relegated to the background creating vacuum in the provision of language specific games in the system. Users of multiplayer commercial games in research, informed by the use of cognitive socio-cultural theory which emphasised collaborative efforts and negotiation of meaning, tend to focus on performance and proficiency in the use of the target language and vocabulary acquisition to the detriment of other aspects such as grammar. Researchers focused on aggregate messages generated and vocabularies learnt as well as efforts made in understanding messages received from other game players in the case of MOOS, MMORPGs and other web based games. But in situations where specific curricula are to be followed in the classroom, specific games need to be created. Researchers, educators and authors in DGBLL, who believe that not all games are suitable for every situation, advocate that teachers should develop their own games to suit their students and environments (Hong, 2002; Yu, 2005: 30).

Various grammar games are in use. These include commercial and amateur ones created by teachers and educators in the field. The games may be manual or digital. Digital grammar games found on the Internet are mostly sentences with blank spaces to be filled
by players. The blank spaces contain drop-down menus with multiple choice answers from which the player selects the correct option. In such cases the grammatical points are given in separate lessons or that the rules are provided on the same web page as a reminder. A variation of these fill-in-the-blank games is the drag-and-drop or click-to-identify-a-given-grammatical-item games. These are in the form of sentences or tables that display grammatical items such as types of given word-classes or randomised items of the various word-classes to be arranged in columns created for such purposes. There are games for almost every aspect of grammar. Here are examples of such games.

The British Council website LearnEnglish Kids, for example, provides such games including games for Nouns - Countable and Uncountable, Modals – Must and Mustn’t, Will – Future Prediction, Present Simple and Continuous, Comparatives and Superlatives, Past Simple Endings, etc. Summaries of lessons on each of the topics are provided as a reminder. Questions are then asked and multiple choice answers provided. The player is expected to select the correct answer by either dragging and dropping or clicking on it. Various ESL websites have published similar games while some have made available the apps for free download. The Grammar Ninja, for example, consists of questions requiring players to identify the class of words in a sentence by clicking on the words that belong to the given class. (It can be downloaded from kwarp.com) (See the appendix for samples and addresses).

More advanced games are also published on the Internet. These include sentence forming and sentence correcting games such as Bubble (a sentence forming game) and Falling Clouds (sentence correcting game). The most advanced forms are created for commercial purposes. Examples are Rosetta Stone ® games that include videos and
matching words with pictures. The games begin with simple fill-in exercises and graduating to more advanced ones. The AvatorGeneration website which publishes several grammar games including Funbrain – Grammar Gorillas, Maggie’s Learning Adventures, Arcademic Skill Builders, Grammar Bytes, Eduplace (Grammar Blast) is another commercial website. Others can be found at Teaching English Games (2006-2015).

There are thousands of none digital grammar games published on the Internet including grammar review games such as Shoot for Points (a game for reviewing past simple and past participle of irregular verbs), Tic Tac Toe (a fun game adapted for revising a wide range of grammar topics), Snakes and Ladders, Football and Jeopardy are just but a few (These 6 Super ESL Games for Grammar Review). British Council has published a lot at their website TeachEnglish including those in their Young Learners Activity Book (British Council 2012). Others are the famous Climbing Grammar Mountain (Gunn and McCallum 2005), a sentence correcting game and the article, “Teaching Grammar with Games in the ESL Classroom” (Teaching English Games © 2006-2015).

Despite the noise made about the promising benefits that may accrue from the use of games in general and digital games in particular in facilitating the acquisition of language skills including grammar, it is surprising to note that not a single mention is made of games in the activity column of the 2007 JHS 1 syllabus of the Ghanaian basic schools. In Germany, as reported by Yu (2005), course books and teaching resource books on language studies incorporate language games while professional courses that focus on the use of games in the language classroom are organised for German language teachers. It is therefore clear that there is the need for this research to be carried out in
order to find out if the much trumpeted potential benefits of using games for practising grammar are applicable in this case and to make available games that may be used in practising grammatical concepts.

2.1.3 Research on gender in game-play

The major issue that sparks off every research on gender in digital game-play stems from the fact that there are claims that more boys than girls play digital games. Researchers have attributed this phenomenon to several factors including claims that girls lack spatial skills, the characterization of digital games as gender stereotyped and skewed towards boys (Dill & Dill, 1998; Bryce & Rutter, 2002; Noble et al, 2003), the perception of game environments as not appealing to girls, digital games perceived to portray violence which makes it unattractive to girls and the fact that themes in digital games are reported to express violence in the world of fantasy instead of real world situations of problem solving, love and family issues that appeal to girls (Subrahmanyam & Greenfield, 2000; Bryce & Rutter, 2002). One or many of these factors may be the issue for a given research.

The perceived low patronage of games by females has engaged the attention of the game industry and attempts have been made to win female players. Research has been in two directions; to find out ways of making games attractive to females and to monitor the progress made by monitoring the percentage of girls involved in digital game playing each year. This is so because both the commercial and digital game based learning (DGBL) communities have big stakes in the population involved in game playing; the commercial companies need it to increase sales while the DGBL community also want
to reach out to a greater number of the population. The entertainment software association (ESA) has been at the forefront of research in the direction of finding the percentage of males and females in game play and presents a report every year since 2008. Though there has been a general rise in the female participation in games, it has not been consistent; it rises and falls and leaps forward and so on. In America, the 2008 report found out that 65% of American households play computer and video games and 40% of these were women while 60% were men and by 2014, the constitution of game players in America was 48% females and 52% males (ESA, 2008 – 2014). The Canadian report in 2008 showed that 64% of Canadians played video and computer games and of this number 49% were females while 51% were males. By 2014, 54% of Canadians were gamers of which 48% were females and 52% males. This looked like a fall in the percentage, but the female percentage went down to 34.9 % before it rose steadily to 48 (ESAC, 2008 – 2014). In 2005, 76% of Australian households were found to engage in game play and 38% of these gamers were females and the average age was 24 while 62% were males while by 2012, 92% of households were involved, 47% of these gamers were females and the average age was 32 and 53% males. The rise in the average age indicated that the women gamers continued their game play in their old age.

Other sources also provided statistics to that effect earlier than 2008. Kubey and Larson (1990) reported in their survey that 80% of game players between the ages of 9 and 15 years were males. Funk (1993) reported that 75% of females and 90% males played games at home. In a survey conducted by Colwell et al (2000) 88% of girls aged 12-14 were found to play games on regular basis. The Interactive Digital Software Association (IDSA) 2001 reported that 43% of US gamers were females, but online the females
closed the gaps to about 50/50. Noble et al (2003: 9) observed that 30 percent of all digital game players were females.

The statistics have shown clearly that a large number of women are engaged in gaming activities, yet there have been cries over females’ lack of involvement in gaming (Bryce & Rutter, 2002). Some hardcore gamers challenged the figures and called for further details. For example, a post at the GameBeat website raised a lot of questions over the ESA 2013 report that 45% of gamers were females (gamesbeatxmlrpc, 2013: 1). To the writer it did not make sense for commercial game producers to target boys if they agreed that a large number of girls were also involved in game play. They also believed that the games females play were not what good gamers would regard as games and that real games were still the preserve of males. Some also claimed that the figures were cooked for marketing purposes. But whatever arguments were preferred against the statistics, it has revealed that females’ game activities have been on the rise and that something must have been done to get this far.

Research into why females shy away from game-play reveals among other things that gaming is branded male activity (Bryce & Rutter, 2002) and also that males and females have different preferences for game environments and game contents. Bryce and Rutter (2002) found that females shy away from playing games because of popular stereotype of computer game players as antisocial male teenagers. They also pointed out that females were not represented in gaming circles. They stated that even though the statistics showed that females were highly involved in game activities and even were almost at par with males online, they were still relegated to the background in terms of game characters and other representations of interests in the game environment.
Many researchers have investigated the differences in female and male preferences in game environment and content and their preference for particular game typologies. The Canadian report, for example, included the game preferences of males and females. The report indicated that women preferred family oriented games, kid role playing games, puzzles, word games, card games, sports games, educational games, challenge games, music-based games, and strategy games while males would go for shooter games, adventure games, flight and action games, challenge games, card games, puzzle, sports games, arcade or word games. The order in which the given game genres appear indicates the preferred choice of the given sex involved in that game genre (ESAC, 2008 – 2014).

Other studies also confirmed the claim that girls prefer violence free, role playing games and games with feminine environments (Subrahmanyam & Greenfield, 2000; Commission on Technology, Gender and Teacher Education CTGTE, 2000). Girls are also noted to have strong preference for sports games (Tan 2008; Hayes 2007 in Ong & Tzuo, 2011) and real life situations where they can sort things in their own ways (AAUW, 2000; Bennett et al, 2006; Cunningham, 2008; Dickey, 2006; Kafai, 1996; Kafai, 1998; Miller et al, 1996; Subrahmanyam & Greenfield, 2000; Turkle, 1984). They are also found to prefer diversification of context favouring domestic context that involve friends and families and partners (Griffiths, 1995).

On the differences between males and females in game playing, Noble et al (2003) were of the view that the innovations in the game world towards capturing players were not directed towards balancing gender concerns which to them needed to be urgently
addressed. They asserted that the creation of the game, the playing style and the tools were all male oriented and needed urgent reversal. They claimed that the differences in female and male game play stemmed from differences in aptitudes, play style and motivational preferences (10-11). On play style, Goy and McEwen (1980) and Omark and Edelman (1973) observed that males prefer “rough-and-trouble play” as against females who tried to avoid such struggles and engage in role playing and avoiding large group formation.

On the differences in motivations and preferences, some behaviours were observed in both sexes to be pointers to these differences. They included Omark and Edelman’s (1973) findings that “males pursue status by competing with linearly arranged dominance hierarchies while females pursue status within complex nonlinear affinity networks” (Noble et al, 2003). Omark and Edelman (1973) demonstrated this in a kindergarten classroom to show that females in kindergarten could describe complex relations which their male counterparts could not do while the males were found to be more competent in linear description.

The characterization of the game industry as being highly dominated by a few male gamers referred to as *hardcore gamers* and the technical knowhow and the cultural values and beliefs in the game world tailored to suit this overriding group (Rollings & Adams, 2003; Noble et al, 2003; Buchanam & Funk, 1996; Griffiths, 1995; Greenfield, 1994, Maeda et al, 1990; Spence, 1993; Dietzl, 1998; Colwell et al, 2000; Kafai, 1996) were claimed to be the bane of girls’ dislike for digital games. The reasons as mentioned earlier ranged from gender stereotyping of characters in favour of males to violence in games (CTGTE, 2000; Hartmann & Klimmt, 2006), but other researchers had results on
the contrary. For example, Hayes (2007), Delamere and Shaw (2008) and Bertozzi (2003) found that it was lack of exposure that made girls think they did not enjoy playing violent games because when girls were exposed to violent games over time, their appreciation for violent games improved. Ong and Tzuo (2011) also found that females preferred both feminine and masculine oriented games; the female-oriented games were fantasy, romantic and cooking games while the masculine games involved battling games.

In response to concerns of stakeholders over the lack of interest or exclusion of females in game-play, measures were taken to rectify these anomalies. Attempts were made to programme games for girls (Kinder, 1996) making use of what were discovered to be preferences for females while others considered programming games that would appeal to both sexes and the concern was what the qualities of such games would be. Some doubt if this would be possible because of the differences in male and female worlds and resources including time needed to be invested in gaming.

It will be seen that there has been steady rise in the percentage of females that play digital games. We have also seen that even though both males and females play digital games, their preferences for game typologies are different. These observations are very significant if games are to be adapted in the school curriculum because the classroom is made up of both males and females and each sex must be taken care of. The steady rise in the female participation in digital game activities means that efforts directed at attracting females to game playing are yielding results and these measures may therefore be noted and taken advantage of by curriculum planners for their adaptation for use in
the classroom. Knowing the differences in their preferences also guides us to select or
design games that will appeal to both sexes.
CHAPTER 3

METHODOLOGY

3.0 Introduction

This section describes the research design, data collection and data analysis procedures. These include the outline of the experimental design, the location, sample, sampling methods and methods of analysis. The research instruments and their validations are also presented.

3.1 Research Design

The research employed a quasi-experimental design which made use of both qualitative and quantitative methods of data analysis. An experimental group that practised with digital games was compared with a controlled group which practised in the traditional way of by reading notes and summaries after the normal class teaching was done. A pretest and post-test were administered to collect data with a view to finding if there were any significant differences between the two groups. The tests were validated and their reliability ascertained. Random sampling procedure had been followed in the distribution of the participants into the groups. Two questionnaires were also administered (one at the before the experiment and the other after the experiment).

The following are the statistical treatments used.

Statistical means, standard deviations, t-test, ANOVA test and frequencies were used to determine the significance differences or otherwise between the achievement of the control and the experimental groups. The Pearson Correlation Coefficient was employed to compute the validity of the pretest and posttest by computing the internal consistency.
of the tests while the split half technique and the Cronbach Alpha were used to determine the reliability of the test items in the achievement test.

3.2 Variables

3.2.1 Controlled variables

In order to guarantee comparability between the two groups, efforts were made to control some variables that might influence the outcome of the study. These include the teacher, the participants, the classroom instruction, the materials and the measuring instruments. Each of these was controlled in that the same teacher taught both groups while the students from the same ability class and of similar ages were randomly distributed into the experimental and the control groups. To further check for any significant differences in the abilities of students distributed into the groups, statistical tests were performed on their pretest scores to determine their comparability.

3.2.2 Independent variables

The independent variables include the two methods of practice employed in the study (the game and the traditional way of revising) which were the discriminating factors. They were the only variables that were not applied each to both groups. Each of the other variables was applied to both groups.

3.2.3 Dependent variables

The students’ response from questionnaires, the results of the pretest and the posttest constituted the dependent variables.
Two questionnaires were prepared for participants in both groups. The first questionnaire was administered to collect data on students’ age former, school, residence, computer literacy, computer game experience and interest in grammar while the second sought to find out their impression about the intervention and some difficulties encountered.

### 3.3 The sample

Junior high students were the target population while the Cape Coast Metropolis was chosen for the sake of convenience. The St. Augustine’s Junior High School (JHS) was selected for the study owing to its proximity to the working place of the researcher since the researcher teaches at St Augustine’s College and it was convenient to arrange times to visit the school for the exercise. Moreover, the proximity of the selected school to the workplace of the researcher made it possible for the college computer laboratory to be used for the practice sessions since the JHS is not too far from the college campus.

A JHS student in Ghana is expected to have studied English language for six years (only the study of English language in the primary school from class one to class six is considered since whatever is done in the nursery and kindergarten is regarded as preparatory) and is in the seventh year of English language study. St. Augustine’s JHS is on the western part of the St. Augustine’s College. It is situated on the trunk road that links the Cape Coast township with the western gate of the University of Cape Coast between the Fosu Lagoon and Ola township. Students come from various parts of the town, some as far as from Elmina.
St. Augustine JHS has two JHS 1 classes, A and B, based on ability. The JHS 1A class, a class of twenty six students consisting of fifteen boys and eleven girls, was chosen. The A class consists of students with high ability and at the end of every term students who perform well in the B class are transferred to the A class while those who do not perform well in the A class are sent to the B class. Both classes were initially selected but logistic constraints prompted the researcher to restrict the sample to the A class. The JHS 1 class was preferred because it comprised students with varied academic backgrounds. Even though the St. Francis Primary School serves as the major source of student intake into the JHS, children and relatives of masters of St. Augustine’s College as well as those of the teachers of the JHS and primary school and others who have not attended the St. Francis Primary are admitted into the JHS either in the first or second year, but majority of the new entrants come to the first year.

The class was divided into two groups (the experimental group and the control group), each having thirteen students. The students were first separated into males and females before subsequently randomly distributed to the groups. Each participant was asked to pick a piece of folded paper with either ‘E’ denoting ‘experimental’ or ‘C’ denoting ‘control’ written on it. Six of each letter and a blank folded sheet were provided for both the boys and the girls. The bowl was shaken after each piece of paper was picked. The boy and the girl who picked the blank sheets were asked to pick a folded E or C for them to be assigned to either the experimental group or control group respectively. In the end eight boys and five girls and seven boys and six girls were assigned to the experimental and control groups respectively.
The two groups were taught in the same classroom and given notes and class exercises, but in addition to the notes, exercises and the use of their textbooks, the traditional group was given a printout of the materials used in preparing the games. They were also given assignments to help them study while the experimental group had practice sessions using the computer games. The practice session for the experimental group was held in the computer laboratory of St. Augustine’s College. Students’ attendance was taken for two purposes (though this is not made known to the participants in other that it may not influence their attendance); as an indirect way of assessing students’ motivation and to find out why students do not attend practice sessions and as a way of preventing students in the controlled group from sneaking into the practice sessions.

Participants were put into achievement groups based on their performance in their first two end-of-term examination and the outcome of the pre-test. The mean of their end of term scores were found and added to the pre-test score to determine the achievement levels. The range of the scores was divided into three. Participants within the top bracket were labelled High Achievers; those in the middle bracket were labelled Middle Achievers while those in the lower bracket were labelled Low Achievers.

3.4 Data collection

Students’ achievement in the grammar tests before and after the experiment constituted one set of data for analyses. Students wrote achievement tests before and after the experiment. The test items were based on the materials taught. Another set of data was two questionnaires administered at the beginning and the end of the experiment. The first questionnaire was used to collect data on the demographics of the participants and
to find out their skills in game-play while the second was used to eliciting information about students’ impression about the intervention and the practice sessions. The responses were graded using the Likert scale. For example,

The practice session is very interesting.

1. I strongly agree. 2. I agree 3. I somehow agree. 4. I disagree. 5. I strongly disagree

3.4.1 The Test

The achievement test was meant to measure participants’ knowledge of the selected grammatical items. It was first administered as a pretest to assess participants’ knowledge before the beginning of the study to ascertain the comparability of the two groups by finding out if the two groups were equivalent in their knowledge of the selected items. Used as posttest, it was meant to capture the improvement and any possible differences that might arise out of the intervention.

Prior to the beginning of the experiment, the test was piloted at the St Nicholas Anglican JHS to a sample of 20 JHS 1 students. The St Nicholas Anglican JHS is the JHS on the Adisadel College campus (just as St. Augustine’s Junior High School is on the campus of St. Augustine’s College) and has five streams of over 200 students. The backgrounds of the St Nicholas Anglican JHS 1 students are similar to that of St. Augustine’s JHS in that they are made up of students from the primary school on the compound and most of these students come from the Cape Coast Municipality within the same cultural and environmental setting. Some of the students who are admitted into the JHS from other schools are children and family members of teachers of Adisadel College, St Nicholas Anglican JHS and the primary school. They therefore have similar characteristics as the
target group. Twenty-one students were randomly sampled for the purpose of the pilot and the test was taken in one of their examination rooms. Their ages ranged from twelve to fifteen years with the mean of 13.14 years and the standard deviation 0.79 similar to that of target school mean 13.2692 and standard deviation 0.60383. A $t$ test was calculated using SPSS software. The $t$ test indicated that there were no significant differences between their ages both at the 0.05 and 0.01 levels (The $p$ value 0.54 is greater than 0.01 and 0.05 as well).

<table>
<thead>
<tr>
<th>Table 3.1</th>
<th>Statistics of the ages of the pilot group and the main participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TARGET GROUP</td>
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<td>N Valid</td>
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</tr>
<tr>
<td>Missing</td>
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</tr>
<tr>
<td>Mean</td>
<td>13.2692</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.60383</td>
</tr>
<tr>
<td>Minimum</td>
<td>12.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>15.00</td>
</tr>
</tbody>
</table>

Participants were allowed to complete the test before submission; no specific time was given for the test. The first person (who happened to be one of the two participants that got the highest mark) completed in thirty minutes while the last person took approximately one hour. The highest mark was 34/50 and the lowest mark was 11/50. The statistical analysis to find out if there were significant differences in their performance showed they had similar abilities. (Mean: Pilot group 25.5, Target group 22.3; standard deviation Pilot group 6.04, Target group 5.54 and $p = 0.064$ which implies that $p > 0.05$)
Table 3.2 Statistics of the marks obtained by the pilot group and the main participants

<table>
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<tr>
<th></th>
<th>Pilot group</th>
<th>Target group</th>
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<td>N Valid</td>
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<td>26</td>
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<tr>
<td>Missing</td>
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<tr>
<td>Mean</td>
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<td>22.3077</td>
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<tr>
<td>Std. Deviation</td>
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<td>5.54090</td>
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<tr>
<td>Minimum</td>
<td>11.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>34.00</td>
<td>31.00</td>
</tr>
</tbody>
</table>

3.5.1.1 Validation of the Test

Validity measure evaluates the extent to which the conclusions made from a test are justified and accurate (Wells & Wollack, 20003). Content validity and referee validity were employed in ensuring that the scores truly represented a measure of the materials taught and errors in the test items were minimized if not eradicated.

3.4.1.1.1 Content Validity

The content validation of a test aimed at assessing whether the test measured knowledge of the content domain of which it was designed to measure. In other words, content validity was primarily concerned with how adequate and representative the test items had sampled the content area to be measured. Content validity relies mostly on expert judgement and not statistics. It ensures that the scores accurately measure the domain of interest (Wells & Wollack, 20003).

After analysing the content and exercises at the “language in action” column in the Unit 2, 3 and 6 of the JHS 1 textbook, the researcher prepared a content analysis table based on the emphasis the writers placed on each of the grammatical items selected. A table of specification was then prepared to ensure that every grammatical item in the content domain was adequately represented in the questions.
<table>
<thead>
<tr>
<th>Topics</th>
<th>Weight</th>
<th>No of questions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Plurals (1 countable/ no plural form and 1 uncountable)</td>
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<td>10</td>
<td>20%</td>
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<td>20%</td>
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<td>Subject verb concord (number and person)</td>
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<tr>
<td>Totals</td>
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<td>100%</td>
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<td>Percentage</td>
<td>100%</td>
<td>100%</td>
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Table 3.4 Table of specification

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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Sub Total</th>
<th>Total</th>
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<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Same form</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Concord</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third person singular</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Others (first person, second person, number)</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Totals</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>10</th>
<th>50</th>
<th>50</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentages</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

55
3.4.1.2 Referee Validity

The supervisors and experienced teachers on the staff of St. Augustine’s College read through the test items and made various corrections and recommendations and modifications were made to the draft before the final test was printed.

3.4.1.2 Reliability of the Test

The reliability of the test was tested using the Split Half (KR-20) and the Cronbach Alpha reliability methods in SPSS analysis. Reliability refers to the consistency of a measure. Test reliability therefore refers to the consistency of scores students would receive on alternate forms of the same test (Wells & Wollack 2003). Alternate forms include alternate time (test-retest reliability) and alternate test items (internal consistency). Wells and Wollack (2003) gave two reasons for test administrators to be concerned with the reliability of a test. The first reason is that reliability ensures that the test scores reflect something more than just the random errors which may be caused by factors such as motivation, concentration, fatigue, boredom, memory lapses, carelessness in the ticking of answers, guessing luck, ambiguity, etc. that affect the examinee in the cause of taking the test. The second reason is concerned with the relationship between validity and reliability indicating that reliability is the antecedent of validity and that the validity of a test may be in question if its reliability suffers.

Evaluating the Split Half reliability of a test implies finding out the consistency of the test items in the construct. It involves the splitting of the test items into any random halves and obtaining the correlation between these two total scores. Two formulae employed to calculate Split Half reliability are the Spearman- Brown formula and the
Kuder-Richardson-20 (KR-20) formula of reliability. While the Spearman-Brown formula is employed for Likert Scale, the KR-20 is used for multiple choice tests.

The KR-20 formula for manual calculation is presented below.

$$r_{KR20} = \left(\frac{k}{k-1}\right) \left(1 - \frac{\Sigma pq}{\sigma^2}\right)$$

Where

- $r_{KR20}$ is the Kuder-Richardson formula 20
- $k$ is the total number of test items
- $\Sigma$ indicates summation
- $P$ is the proportion of the test takers who pass an item
- $Q$ is the proportion of the test takers who fail an item
- $\sigma^2$ is the variation of the entire test

The Cronbach Alpha (Cronbach, 1951) is equivalent to the average of all Split-Half correlations that could be generated for the scale $2N$ items long, where $N$ equals the number of indicants (Novick & Lewis, 1967) and where each item is scored on more than two points (Nunnally, 1978). It is the most frequently preferred measure of internal consistency for both Likert Scales and multiple choice tests. The value of Alpha ranges from 0 to 1 and the higher the value the more consistent the internal consistency. A 0 value implies no inter-item correlations while a value of 1 suggests a perfect correlation among the items. Many researchers consider an alpha coefficient of at least 0.070 or more to be adequate for the scale (Nunnally, 1978). The formula according to Carmines and Zeller (1979) is given by

$$\alpha = \frac{a}{(a-1)} \left[1 - \frac{(a/2b)}{\left(1 - (a/2b)\right)}\right]$$

Where

- $a$ = the number of items or variables in the composite score and
\[ b = \sum_{i=1}^{n} r_{yi} = \text{The sum of the correlations among the items in the composite score,} \]

\[ y_i = i^{th} \text{ items correlation} \]

It may also be calculated using other methods depending on the state of the data available. These include the weighted standard deviations and means.

\[ \alpha = \frac{p}{(p-1)} \left[ 1 - \frac{\sum_{i=1}^{n} \sigma_i^2}{\sigma_T^2} \right], \]

Where \( p \) is the number of items in the scale,

\( \sigma_i \) is the standard deviation of the \( i^{th} \) item,

\( i=1, 2, 3… p \) and

\( \sigma_T = \text{Standard deviation of the entire test or general standard deviation} \)

\[ = \sqrt{\sum_{i=1}^{n} \sigma_i^2 + \sum_{i \neq j} \sigma_{ij}}. \]


The correlation mean

\[ \alpha = \frac{p \bar{\rho}}{1 + (n-1) \bar{\rho}} \]

(Carmines & Zeller, 1983; Ozdamar, 1999a)

And the variance-co variance mean

\[ \alpha = \frac{p \bar{\sigma}_{TT} / \bar{\sigma}_T}{1 + (p-1) \bar{\sigma}_{TT} / \bar{\sigma}_T}. \]

(Ozdamar, 1999a).
Calculating the Split Half Reliability Coefficient using the KR-20 gives a coefficient of 0.82 while the Cronbach Alpha reliability coefficient is 0.79. Both statistics indicate that the test items are internally reliable.

3.4.2 The questionnaire

The first questionnaire was administered in the first week to find out participants’ demographics including age, former school, place of residences, computer literacy, experience in computer games and interest in reading and grammar while the second which concentrated on participants’ impression about the intervention is administered at the end of the intervention to find out participants’ impression about the intervention. The impression of both the control and the experimental groups were solicited on the materials they had used, how useful the materials had been to them and any help they had received.

3.5 Methods of data analysis

Statistical methods were employed for the analysis of data collected. These include tables, bar charts, means, percentages, standard deviations, \( t \)-test, and one way ANOVA test using \( p \)-values. The SPSS statistical package was used but the formulae and the implications of the analysis are provided below.

The \( p \)-value is a statistical measure that helps to determine whether or not given hypotheses are to be accepted or rejected. It helps to determine the significance of the results of the experiment and the margin of error in accepting the hypotheses. The \( p \)-value is between 0 and 1 and a value smaller than 0.05 (the widely used 95% confidence level) or 0.01 (99% confidence level used under critical conditions such as medicine), indicates that the researcher has lower probability of error of rejecting the result of the
experiment as not by chance while a higher value indicates a higher probability of committing an error of rejecting the fact that the result is by chance (StatSoft Inc., 2015). In other words, a value of p less than 0.05 indicates that the difference between the two means is statistically significant while a higher value shows that the difference is statistically insignificant hence the two means are similar. P-values may be calculated using other statistical values such as the t-value from the t-test and the f-value from the one way ANOVA test.

The t-test is a statistical model used for determining if the mean performances of two groups are significantly different. The t-value is the difference between the two sample means when we take into consideration the standard error of the means and it compares the two means by taking into account intra group variations and the size of each of the two groups. The statistical hypothesis prior to the test is that there is no significant difference between the achievements of the two groups. Given the alpha level of 0.05 or 0.01, the greater the t-value produced the more likely it is that the null hypothesis will be rejected, which implies that the difference between the means of the two groups is significantly different while the closer the t-value is to zero, the more likely it is that the null hypothesis will be accepted implying that there is no significant difference between the two means. It is assumed that the data is from a normally distributed population, the sample is randomly selected and the data collected is at least ordinal in nature. Key (1997).
\[ p - \text{value} = P\left(t^{n-1} < t^R\right) \]

where \( t^R \) represents the realized value of \( t \) calculated from your data and

\[
t = \frac{\bar{X} - \mu_0}{\sqrt{s/n}}
\]

where \( s \) represents the sample variance \( s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{X})^2}{n-1}} \).

\( t \) may also be calculated using the formula

\[
t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}
\]

Where

\( \bar{x}_1 \) is the mean of first data set
\( \bar{x}_2 \) is the mean of first data set
\( S_1^2 \) is the standard deviation of first data set
\( S_2^2 \) is the standard deviation of first data set
\( N_1 \) is the number of elements in the first data set
\( N_2 \) is the number of elements in the first data set
On the other hand, even though the one way ANOVA statistical model may be used to calculate the mean difference of two groups, it is mainly used for determining whether any significant differences exist between three or more independent groups. ANOVA calculates the ratio of the variance of treatment given to the samples and the variance due to error. The ratio F is what we are interested in. The mathematical model \( Y_{ij} = \mu + \tau_i + \epsilon_{ij} \), gives the relationship between the response obtained from the observations (in this case the test scores) and the treatment given to the participants whose data are used for the one-way ANOVA test.

\( Y_{ij} \) represents the number of observations \((j=1,2,\ldots,n_i)\) on the number of treatments \((i=1,2,\ldots,k\text{ levels})\).

\( \mu \) represents the common effect for the whole experiment,

\( \tau_i \) is the number of treatment effects,

while \( \epsilon_{ij} \) gives the random error present in the observations on the treatments.

\[ F = \frac{\text{MST}}{\text{MSE}} \]

MST is the mean square of treatments represented by

\[ \text{MST} = \frac{\text{SST}}{\text{DFT}} \]

Where SST is the treatment sum of squares and DFT = \( k-1 \) is the degrees of freedom for treatments.

And MSE is the mean square of error represented by

\[ \text{MSE} = \frac{\text{SSE}}{\text{DFE}} \]

Where SSE is the error sum of squares, DFE = \( N-k \) is the degrees of freedom for error.

\( N \) is the total number of observations and \( k \) is the number of treatments.
An ANOVA table from SPSS is therefore represented as follows:

**Table 3.5  Representation in an ANOVA table**

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>i</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatments</td>
<td>SST</td>
<td>k−1</td>
<td>(1) SST/(k−1)</td>
<td>(3) MST/MSE</td>
<td>(4) p-value</td>
</tr>
<tr>
<td>Error</td>
<td>SSE</td>
<td>N−k</td>
<td>(2) SSE/(N−k)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Engineering Statistics Handbook)

**Table 3.6  Example of the ANOVA table**

<table>
<thead>
<tr>
<th>weight</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>502.867</td>
<td>2</td>
<td>251.433</td>
<td>3.743</td>
<td>.028</td>
</tr>
<tr>
<td>Within Groups</td>
<td>5844.733</td>
<td>87</td>
<td>67.181</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6347.600</td>
<td>89</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproduced from SPSS One-Way ANOVA, An SPSS Tutorial by Ruben Geert van den Berg on September 16, 2014

The F-test is used to obtain the value of p which indicates whether the differences in the variances are significant or not and therefore null hypothesis should be rejected or upheld. But if the groups are more than two then an alpha value obtained that indicates a significant difference will not be able to tell us which of the pair of groups produces the significant result and therefore the result must further be clarified. A TUKEY table (representing “Honestly significant difference”) is used to further clarify which pair of
groups produces the significant difference in the result (MacFarland, 1998). The larger the value of F the closer the p – value is to zero (0).

It is assumed that the population from which the sample is taken is normally or approximately normally distributed, the samples are independent and the variance of the populations is equal. It is also assumed that the responses are independent of each other, the data collected are normally distributed and the variances of the data are identical.

3.6 Analysis of the Questionnaire

At the beginning of the research, one of the questionnaires was issued to participants to ascertain their experiences and interests in the technology and the subject of study. The questionnaire sought to establish the participants' computer literacy, digital game experience and interest in reading and grammar-skills which are crucial to effective participation in the project.

Almost all the participants (96.2%) indicated that they were computer literates and that they could use the mouse and the keyboard with ease. Although some participants did not have access to a computer at home (61.5%), 96.2% of them had been using the computer for more than one year. Access to computer at home favoured the males in that 45.5% of the girls indicated that even though there were computers in their homes, they were not allowed to use them compared to only one boy (6.7%) who had a computer at home and was not allowed to use it. 23.1% of the participants used a computer for more than four years (since age eight years), 7.7% had used one for more than six years (since age six years) while the bulk of the participants (73.1%) had used a computer for up to four years. 42.3% of the participants were inexperienced since they had used a computer for one year or less. Considering the fact that the participants came
from various suburbs of the metropolis and other parts of the country, it gives a fair idea of how Ghanaian school children are becoming computer-literate. Half of the participants had used mobile phones before for different purposes including making calls, playing games and browsing the Internet.

Apart from one participant (3.8%) who indicated that she had never played any computer game before, the rest had varied degrees of experience in game playing. However, whereas all the boys had played digital games both on computers and phones, 36.4% of the girls had played only on phones. All the girls in the experimental group had some experience in game playing, but none of them had more than one year’s experience, which put them in a disadvantaged position at the beginning of the practice session. On the other hand, 62.5% of the boys in the experimental group had more than two years’ experience in game playing with 25% having played games both on computers and phones for more than five years. This rich experience put the boys ahead of the girls, though some of the boys were as inexperienced as the girls. On time spent playing games, it turned out that most of the girls spent less time on games (80% of them spent an average of about fifteen minutes on each game while none of them spent more than an average of two hours a day on games) as compared to the boys 75% of whom spent between thirty minutes and one hour on one game with 50% of them spending between four hours and over eight hours on games in a single day.

All the participants, before the project began, indicated that they liked grammar and liked reading as well. 57.7% of them ranked themselves as very good readers while the remaining 42.3% said they were good readers, but a real assessment showed that those who ranked themselves as very good readers were just average readers while those who
ranked themselves as good were below average. 28.6% of the boys in the control group ranked themselves as very good readers compared to 83.3% of their female counterparts who ranked themselves as very good. In the experimental group, 80% of the girls and 50% of the boys ranked themselves as very good readers. Participants gave the impression that they had very good study habits including listing a lot of English books they owned and read at home (about 46% of them listed over fifteen English books they owned and read at home).

It turned out that even though all the participants had some experience in the use of the computer and the playing of games, the boys were more skilled than the girls. Hence, it was predicted that the girls would have problem with the handling of the input devices and the skills in playing the games, which was why one week was spent on preparing them for the practice sessions. It was also observed that the games played by most of the boys were different from those played by the girls and the time spent playing the games also varied. Participants also seemed to have good study habits.

3.7 Overview of the study

- Wk 1 The sampling of students, administering of first questionnaire and pretest/preparatory practice session
- Wk2 The teaching of nouns classification; proper and common, countable and uncountable/beginning of the practice session (Introduction of Sort Me Out game)
- Wk3 The teaching of plurals of nouns/Introduction of Grammar Wizard in addition to the Sort Me Out
- Wk4 The teaching of simple present/Introduction of the English Scholar
- Wk5 The teaching of simple past regular
- Wk6 The teaching of simple past irregular
- Wk7 The teaching of subject-verb concord (considering number and person)
- Wk 8 revision and the administration of the posttest

3.7.1 Classroom Presentation

Participants were taught grammar for 40 minutes twice a week for six weeks. The topics taught were nouns (proper and common nouns, countable and uncountable nouns, plurals of countable nouns), simple present (with emphasis on the third person singular), simple past (regular and irregular) and concord (with emphasis on the third person singular in addition to the others such as the first person and second person singular and plural). The topics were selected from the JHS 1 English language syllabus (2007) and the corresponding sections in their textbook (New Gateway to English for Junior High Schools 2012). These grammatical items seemed to be the most frequently encountered aspects of any language.

The lessons consisted of a combination of explicit and implicit (form-focused and use) presentation of the grammatical items. In line with current practices of combining form-focused with meaning-focused instructions, a deductive approach was adapted so that the explicit rules were first taught, and then participants were asked to use the structures in context. For example, the rules for the inflection of the various forms of the simple present tense (Ending consonants such as /tʃ/ and /dʒ/ required <es> to form the third person singular in the simple present) were taught after which participants were asked to tell the class what they do at the weekends, what their parents do every day or imagine one of their parents in a given profession and tell the class what that parent does every
day. Participants’ attention was drawn to the rules and a summary was given to participants as notes. Students wrote class exercises which were marked but the results were not included in the analysis.

The lessons were taught on Mondays and Thursdays. Mondays were used to introduce the rules while students practised using these rules to form words or write structures. On Thursdays, participants did both verbal and written exercises as revision. The classification of nouns into proper and common nouns, countable and uncountable nouns was taught in the first week. The objective of the lesson was to make participants become conscious of the various categories of nouns to be aware which groups of nouns can be inflected and which of them cannot. For example, proper and uncountable nouns do not take the plural forming morphemes while countable nouns take the plural forming morphemes. Participants were asked to give names of things, places and people and tell the class whether the given name was a name given to any particular thing, place or person or it refers to many different things that have similar features. Examples were first given by the researcher. For example, there is only one river called “River Volta”, but there are many water bodies called “river” therefore “River Volta” is a proper noun while “river” is a common noun.

Plurals of nouns were taught in the third week. First, the participants were asked to give names of some things. The names were classified into proper, countable and uncountable nouns. It was explained to the participants that since proper nouns are unique, they do not have plural forms while it was also not possible to count uncountable nouns so they have no plural forms. It was also explained to participants that there are some nouns that we can count but they also have no plural forms. A few of
these were mentioned. These include sheep, fish, money, salmon, etc. Participants were guided through question and answer to classify the countable nouns by their ending, for example, nouns that end with “a vowel + y”, “consonants + y”, “the sounds /ʃ/, /tʃ/ and /dʒ/”. The inflectional rules for the formation of plurals according to the endings were elicited from participants through questions and answers. For example, nouns that end with “vowel + y” need an addition of the plural forming morpheme <s> (boy => boys, tray => trays, etc) while those that end with “consonant + y” have the <y> replaced with <i> and the addition of the plural forming morpheme <es> making it <ies> (community => communities, baby => babies, worry => worries, etc).

During the fourth week the simple present tense was taught. The emphasis was on the third person singular which has three inflectional morphemes based on the endings (the sounds such as /ʃ/ - sh, /tʃ/ - ch and s, ss, x, o, z or zz take the morpheme <es>, those with consonants + y have the <y> turned to <i> and the addition of <es> and the addition of <s> to other consonants such as b, c, d, f, g, k, l, m, n, p, r, t or w, ending <e> and a vowel + y). The rules were first presented, after which participants were given a list of verbs in their base form and asked to mention a verb and its third person singular form. Participants were asked to tell the class two things they do or what their parents do every day or at the weekend. They were asked to write five sentences on the topic. The control group was given the print out of the materials and assignments on the topic.

In the fifth week, the simple past tense of regular verbs was taught while the irregular version was taught in the sixth week. Rules were formulated for the regular verbs based on the endings and participants applied those rules to ranges of verbs with these endings. Such rules include the adding of <ed> to verbs that have two or more vowels following
each other and end in a consonant, verbs that end with a double consonant, verbs that end in a vowel + ‘x’, ‘w’ or ‘y’; the doubling of the ending consonant and adding <ed> to one syllabic words that have only one vowel and ending in the following consonants - b, d, f, g, l, m, n, p, r, t; adding <d> to verbs that end with <e>; changing the <y> to <i> and adding <ed> to verbs that end with a consonant + y. The irregular verbs include verbs such as cast, hurt, beat etc. that do not change their form for the simple past (there are no rules and they are not many so participants were required to learn them by root) and others that have no rules which participants were taken through and were given the list to learn. After applying the rules, participants were asked to tell the class two things they did the previous day; after which they were asked to write five sentences about what happened in the past.

Subject-verb concord (considering number and person) was taught in the seventh week. The lesson on the third person singular was revised and participants’ attention was drawn to persons and number represented in the subject of the sample sentences they gave. For example, in the sentence “Adjoa goes to school every day” (“Adjoa” is only one person – singular. When I - first person - talk to you - second person - about another person, that person becomes the third person), “Adjoa” is a third person singular noun. Participants wrote sentences using given subjects while they later transformed simple passages using given subjects.

An example is: Use he, she, or any name to replace “I” and rewrite the sentences.

- I swear I’ve heard the buzzing of a bee. I turn again to look for the source of the sound.
- I feel something very soft on my head so I turn round to see. Thousands of bees rush to greet me.
The next time I open my eyes, it is already 9 am and I don’t know where I am lying.
My head aches and my face swells
I manage to get on my feet and continue my search for my friends.
At last, I come to the bank of the lake; the place where we agree to meet and cross to the island.

Answer

She swears she’s heard the buzzing of a bee. She turns again to look for the source of the sound.
She feels something very soft on her head so she turns round to see. Thousands of bees rush to greet her.
The next time she opens her eyes, it is already 9 am and she doesn’t know where she is lying.
Her head aches and her face swells.
She manages to get on her feet and continues her search for her friends.
At last, she comes to the bank of the lake; the place where they agree to meet and cross to the island.

3.7.2 The Practice Session

The practice sessions for the experimental group were held in the computer laboratory of St Augustine’s College. This consists of the playing of games for an average of 45 minutes a day for 6 weeks. The first out of the eight weeks was used for the introduction of students to the game-play. In the first week, students were shown how to play two Microsoft (PC) games (Spider Solitaire and FreeCell) similar to the first game they were going to play. This was to help the students who had very little experience in game-play and computer-usage to get acquainted with the devices.

During the actual game sessions, the games were played both in pairs in accordance with the socio-cultural theory of collaborative efforts and individually under the watch of the researcher. The role of the researcher was to introduce the students to the procedures
involved and to show them how each game was played. The researcher also made sure no participant in the control group got into the computer room. Ideally, the experimental group should have been given the games to be taken home to find out if they would practise, but this would have resulted in the possibility of participants in the control group having access to the games while some of the member of the experimental group might not have computers at home. Of course, the participants in the experimental group might as well have had access to the printed materials, but since my argument is that they will not make good use of them, I assume that access to the printed material will have insignificant effect on their performance.

Three games were used including the sorting game (Sort Me Out), the inflectional morpheme game (Grammar Wizard) and sentence construction game (The English Scholar). The game Sort Me Out was played in the second week (Details of the games are provided in CHAPTER FOUR). Nouns were sorted into Proper, Countable and Uncountable nouns. Five cards of the same kind were packed one on the other in the section where the cards are dealt and sent to the appropriate category. Participants had to sort all the cards until nothing was left. There are 60 cards arranged in five columns. 100 marks are awarded at the beginning of the game and every move made has a mark deducted while successfully adding a pack of five gives a player 50 additional marks. The aim was to reinforce participants’ awareness of the categories of nouns.

The Grammar Wizard was introduced in the third week for participants to revise the plural forms of regular nouns. The various inflectional morphemes are arranged on top of the thirty words arranged in five columns. When a player clicks on a plural forming morpheme and clicks on the correct noun, the noun turns into its plural form.
Participants, especially the low achievers, marvelled how a click could turn words into plural forms. They began to copy the answers and were using trial and error in playing the game which made most of them end up getting negative points. The game was played in addition to the Sort Me Out used the previous week. The participants played the games both in pairs and as individuals. In pairs they played in turns but received help from one another; they were free to consult others from other pairings.

The Grammar Wizard was also used for the third person singular of verbs in the fourth week while both the Sort Me Out and the Grammar Wizard were used for the classification of verbs into regular, irregular, only one form and two past tense forms and the past forms of verbs in the fifth week. In addition to these, the sentence forming game, English Scholar, was introduced. Participants clicked successive phrases and words to form a sentence. A correct sentence attracted marks based on the elements of the sentence included and the length of the sentence. A wrong sentence did not attract any mark. Generally, the experienced game players among the participants spent very few minutes on each game (between five and ten minutes) while inexperienced players spent more time hence playing fewer games each day.
The play session: A and B collaborative effort; C individual play

Fig. 3.1 Top: Participants engaged in game play/Bottom: The interface of Grammar Wizard
On the other hand, participants in the control group who were also paired were given copies of the materials used in the games and given exercises to help them revise. The exercises were collected and marked but the results were not included in the analysis since the purpose was to assist them to learn as it was done in the traditional way and not to assess their performance since other people might have influenced the result.

In the second week they were given a printout of classified nouns and were asked to classify some given nouns into proper, countable and uncountable nouns. In the third week, they were given a printout of nouns and their plural forms categorised according to their endings and were asked to write the plural forms of given nouns. They were given a list of the base form of verbs and asked to change selected verbs into their third person singular forms in the fourth week. In the following week, the fifth week, a list of regular verbs and their simple past forms was given to the control group and they were asked to transform selected regular verbs into their simple past tense form. After the simple past had been covered, irregular verbs were taught in the sixth week. They were given a list of irregular verbs and their past forms and irregular verbs to be transformed. Series of contextual pieces written on topics selected from the JHS 1 textbook were given to them and they were asked to re-write some using given subjects. In the example given below, participants were asked to rewrite the sentences using different subjects, for example, my sister, my mother, I, you, etc. The underlined words appeared with their meanings in a glossary printed and added to it.
SETTING A DINNER TABLE FOR ONE PERSON (Rewrite the following sentences using the following subjects:” I, My mother, Ama, Kofi, The fishmonger or The girls)

- First, place the dinner plate on the table.
- Place the napkin at the centre of the dinner plate or roll it up and place it in a wine glass.
- Place the forks on the left side of the dinner plate (salad fork, meal/dinner fork, and fish fork if it is to be used).
- Place the dessert fork on the right side of the plate and the dessert spoon behind the plate, on the left side.
- Place the dinner knife on the right side of the plate and the butter knife beside it.
- Place a soup spoon next to the butter knife if you have soup. Any teaspoons to be used are placed between the butter knife and the soup spoon.
- Finally, if you have a cocktail fork, place it next to the spoons, at the outermost edge.

Adapted from WikiHow (Edited by Lori, Flickety, Martyn P, Maluniu and 5 others) and modified for the purpose of the game.

[In the game the meaning of each of the underlined words appears when the word is right clicked and meaning is selected from the resultant menu.]

The sentences also appeared in a shuffled form and participants were asked to arrange them in the order in which they should occur. Each week, in addition to all the exercises, participants in the control group were asked to write five sentences on the given topic in context. For example, after the lesson on the third person singular was covered participants were asked to write five sentences on what either of their parents or siblings does at the weekends. All the materials and exercises were given after the Monday lessons. Examples of the list of verbs and exercises will be found in appendix B.
CHAPTER 4

THE DIGITAL LANGUAGE GAMES

4.0 Introduction

In this chapter the design and purpose of the digital language games are discussed. Also presented are the materials used for the games, their sources and methods of presentation. In order to have an insight into the context or the language teaching policies within which the games are designed, a brief background of the language teaching theories adopted in the public schools in the country is given since grammar is not taught in isolation but within a given language teaching policy. The place of grammar in the language teaching process as practised in the country is also briefly given.

4.1 The Teaching of Grammar in Ghanaian Schools

The teaching of language in Ghanaian schools, just as in any second language classroom is guided by theories and methods of second language acquisition. The major theories considered include the Behaviourist Theory, the Innatist/Cognitive Theory and the Interactionist Theory. Cape Coast University, the accrediting institution for the main teacher training institutions in the country upholds these theories and this has been the basis for the language-teaching methodologies in the public teacher-training institutions (colleges of education) in the country. For example, the unit devoted to structure (grammar) in the methodology book for training colleges provided by the Teacher Education Division of the Ghana Education Service, published in 2001 (Ministry of Education) begins with a lesson on language learning theories aimed at informing the
student about the principles underlying the teaching of language in general. However, by
using it as the introduction to the “Structure” session it indicates that it is intended
purposely for application to grammar. In that lesson, two language theories, the
behaviourist and the cognitivists theories, are treated with emphasis on their influence on
teaching methods. The lesson indicates that that the behaviourist theory leads to
“……the grammar approach to teaching language” with emphasis on the teaching of
rules and the use of repetitions and drills while that of the cognitivist leads to the
“communicative approach” to language teaching. At the end of the lesson, the teacher
trainee is admonished to apply the theories on language teaching in the classroom
without indicating which of them should be applied.

The English language study methodology book for the Diploma in Basic Education
course of the College of Education, University of Cape Coast, a college established for
distance education in various programmes including teacher training, discusses the three
learning theories and their implications (the Behaviourist Theory, the Innatist/Cognitive
Theory and the Interactionist Theory) and then cautions the student not to rely solely on
any one of them since “each may help to explain a different aspect of children’s
language development” (College of Education, UCC, Gogovi et. al 2015). In this book,
the writers, in justifying the teaching of grammar, give some reasons for teaching it.
These include to forestall errors, for correcting errors and to summarise ideas taught.
The major methods suggested in the book are the inductive method and the use of
language games. They define language games as “any learning activity usually with
rules, competitors, winners and losers” and give examples as Role Play, Simulations,
Riddles, Drama and Music, and Mime. They also suggest the adaptation of local games
This emphasises the importance of games in the teaching of grammar. However, the designers of the language teaching syllabus for the basic schools do not emphasise this in their suggested activities for the teaching of grammar. As mentioned earlier, not a single mention is made of the word *game* or its synonyms in the 2007 syllabus for the first year junior high class.

Two approaches to the teaching of grammar have been adopted in the methodology book of the public colleges of education. These are the structural and the communicative/interactive approaches. Grammar lessons are divided into three: introduction, controlled practice and free practice sessions. Activities in the controlled practice sessions are basically drills led by the teacher while those in the free practice sessions are activities among students either through pairing or group work. Among the techniques for teaching the language is the mention of *games* which are defined as “… activities which the teacher introduces into the classroom to make pupils learn through play”. In the *structure* lesson, an example is given in which the teacher, in the process of teaching the structures “What is/have/has ….?” and “It is a ……”, displays items, teaches their names, picks one up, hides it and asks the students to name what he/she has picked up. The teacher uses the structure “What have I picked [up]?” and the student is supposed to use the structure “It is a pen.” This drill is later practised among students in groups. In this and other methodology books, drills and repetitions are recommended for teaching grammar. This is probably because grammatical skills are expected to be memorised by the student to be recalled voluntarily with ease whenever the need arises.

In the basic schools grammar is treated in a form-focused approach using a structural syllabus that lists the various structures of the English language to be covered. These
include reading, writing and grammar (sometimes referred to as structure or language in action in the textbooks). The grammar section also lists the topics including nouns, verbs (their tenses and aspects), adjectives, adverbs and sentence types. However, one of the main English language textbooks in the basic school organizes the learning experiences in an integrated approach with each unit seeking to integrate several language skills into a topic selected for the unit. There are seven sections in each unit and one is devoted to the teaching of grammar (referred to as language in action) and it is strictly form-focused treating various structures of the language such as nouns, verbs (present tense, past tense, future, etc), sentence structures and formulas for these structures. Exercises include the writing of sentences from substitution tables, filling in blank spaces in simple sentences and passages (cloze) and writing sentences with given words. The lessons include summaries in note form. In this and other textbooks, repetitions and drills are emphasized.

4.2 Principles in designing learning games

In practice, there are two main ways of using language in games. One principle uses language as a means of communication in the game while the other focuses on language as the main content of the game. In the first instance, the language becomes the medium of instruction and communication between avatars in the game and between avatars and players. In the case of the second, on the other hand, apart from the language used as instruction, the content or focus of the game is on linguistic features. Educational game-based environments are expected to focus on specific learning outcomes, tasks, and local communities in order to benefit the learner. Unlike the games that merely use language to communicate, the target of the content of the language learning games is to meet the
learning objectives so that the gameplay serves as learning and assessment tool. The learner is expected to master the materials of the game as the game progresses. This is the primary concern of language games.

GameDesigning (2014), a website for tutorials on educational games and game designing, proposes three main principles to be considered by the game designer. First, the designer is advised to “build [the game] around a core game mechanic”. This involves building games around “fun [and] captivating game mechanics” so that even if the player repeats it over and over again, he or she will feel the fun in it without getting bored. Secondly, the game must be “easy to learn and be fun to master”. This means the designer must ensure that the rules are simple and easy to understand. The player must not find it difficult to understand the rules or navigate through the game. Thirdly, the player must be rewarded. Every human being is “motivated” through “positive reinforcement” in the form of “praise, cheers”, scores, congratulatory messages and recognition. These help create confidence and pleasure in the player. Allowing healthy competitions by keeping records of players so that other players can compare their performances with or compare their own performances at different times encourages players to try and get their names at the top of the lists of the statistical data.

Sykes and Reinhardt (2012) identify five principles common to both digital game design and second language acquisition principles. These include setting goals or having goal-oriented games; having games that ensure interaction between the learner and the learning materials as well as between the leaner and other learners; the learner getting feedback as quickly as possible to ensure that he or she is able to assess his or her abilities and to be able to learn through the mistakes made; the placing of the
materials in context; and ensuring motivation derived from the feedback, interactions and the experience of learning something new.

Reinhardt (2011) identifies the framework activities in a game design to include exploring, examining and extending. The exploratory activities includes ways in which the player may learn to play the game through observation of how the game is played and finding data to help in the gameplay. These may include instructions, tutorials and game materials that teach the concept in the game. The examining actives help focus on the game play and how the game will stimulate the player to play critically and analyse the game to uncover tactics and solutions to problems posed in the game. However, the extended activities involve the creation and participation in game discourses by students either by teaching the student to create new games or extend existing games.
For the purposes of this study, apart from the teaching in the classroom which gives the initial concepts of the content of the games, instructions, clues, help and bale outs are included to assist the player to navigate his or her way through the game. The game tactics ensure the player’s engagement with the material before any meaningful scores may be obtained. The player does not use trial and error to obtain scores but becomes involved in the gameplay by being critical and observant in order to get any reward.
4.3 The games

Five games were originally designed for the experiment, but only three of these were programmed before the experiment is carried out; the fourth one was partially completed after the research was carried out while the fifth one was not completed. The three games used in the experiment included the sorting game (Sort Me Out), morpheme transforming game (Grammar Wizard) and the sentence forming game (The English Scholar). The topics were selected from the JHS 1 section of the 2007 syllabus for junior high schools and the corresponding units in the JHS 1 book of the New Gateway to English for Junior High Schools series (units 2, 3, 5 and 6). They were categories of nouns, the simple present and past of verbs and subject verb concord. Section D of unit two of the JHS 1 Gateway book treats the two main type of nouns, proper (capitalisation of first letters) and common nouns (singular and plural form) while section E of unit three treats the simple present tense and the inflection of verbs for the third person singular. In section D of unit five, types of common nouns (countable and uncountable nouns) are discussed while unit six discusses the simple past tense both regular and irregular. Each topic was treated in a form-focused manner with rules and notes on the rules. These rules were included in the programming of the games though additional relevant ones have been added. The topics were selected because the researcher believes they are the basic form of the treatment of each of the grammatical units.

4.3.1 Sort Me Out

*Sort Me Out* is a game for sorting grammatical items into various categories. The game has two options, namely, the sorting of nouns into proper, countable and uncountable
nouns and the sorting of verbs into regular (verbs that form simple past tense with “d, ed, ied” morphemes), irregular (verbs with simple past tense forms other than the regular ones), only one form (verbs whose past tense forms are the same as their base forms) and two past tense forms verbs. It is an adaptation of the rules and design of two Microsoft personal computer games (the rules of *Spider Solitaire* and the design of *FreeCell* card games). The purpose of the game is to create awareness in the participants of the various types of each of the grammatical items presented in order that they will be conscious of the words in each category and associate the appropriate inflectional rules with them.

The interface of the game consists of a playing area which is divided into three, namely, the section where the cards are dealt, the section for arranging the cards into the various categories and the section for temporarily holding cards that need to give way for needed cards. The dealing area takes sixty (60) cards arranged in five (5) columns of twelve (12) cards each, the area for arranging the cards has three spaces for nouns (with headings Proper Nouns, Countable Nouns and Uncountable Nouns each holding 20 cards) and four spaces for verbs (with headings Irregular Verbs, Only One Form Verbs, Regular Verbs And Two Past Tense Form Verbs each holding 15 cards) while the area for holding cards temporarily has three spaces holding a card each at any given time.

There are three buttons – *Help*, *Clue* and *Bale-out*. *Help* gives you all the words in each category of the word-class you are dealing with, *Clue* gives you a hint for the answers, and *Bale-out* gives you the answer for the task. Playing in the *clue* or *bale-out* mode does not attract scores. The score board is also included in the interface. It displays the scores obtained by the player and it increases whenever the player successfully carries
out a given task. Also displayed is the word-class which the player is dealing with. There is a drop-down menu for access to a new game if you want to restart the game and access the options of the game.

The materials for this game comprise a list of verbs and nouns in their base form classified into typologies based on their past tense formation characteristics. The typologies include Regular Verbs, Irregular Verbs, Only One Form Verbs and Two Past Tense Form Verbs for the nouns and Proper Nouns, Countable Nouns and Uncountable Nouns for that of the nouns. Each word is written on a card. The cards of each word-class are put in a pool, randomised and dealt out for the player to sort into the various categories. The first letters of the proper nouns are capitalised to create awareness in the players of the necessity or obligation to make them capital letters. Attached to each word is its lexical meaning to help disambiguate homonyms and homophones. When in doubt, the player can access the meaning by right-clicking the card and selecting “meaning” from the options. Also included in the game is the audio version of each of the words. This is one of the options in the menu that pops up when the player right-clicks the card.

When the game is started, sixty cards, twenty cards from each category, are arranged in five columns face up and 100 marks are awarded for the player to begin the game. Fifty marks are awarded for the completion of one set of five cards placed in the column. One mark is deducted for every card moved until the next set of five is placed in a column to attract another fifty marks to be added to what is left from the previous one. The aim of asking the player to pack five cards in the same category before sending them to the given category is to reinforce participants’ awareness of the words in each category through constant interaction with the words and getting the player engaged with the
words. The player, aware of the fact that his/her score goes down if he/she moves cards
thoughtlessly, studies the game critically before moving a card making player resort to
drawing on the characteristics of the items in each category to help them identify them.

Sorting is done by either dragging a card to its destination or clicking the card and
clicking its destination. Cards which have been attempted for more than once are
returned in the next dealing. A third of the cards dealt in the previous play, whether they
are correctly sorted or not are added to the current cards to be dealt. This means only
two-thirds new cards will be included in the new set of cards to be dealt. The new cards
and the old ones are randomized and dealt. The advantage of dealing already dealt cards
is to let players become more familiar with the words.

When the player gets six hundred to seven hundred (600 -700) marks, the player is
declared a GOLD MEDALIST and a golden cup and fireworks are splashed all over the
screen with a shout of H-U-R-R-A-Y amidst clapping. Five hundred marks to five
hundred and ninety-nine give a silver medal and fireworks while anything below five
hundred marks attract a bronze medal and fireworks. Reward is very important in games
and this boosts the morale of the player. The identity of each player, games attempted,
result of each play, number of words successfully attempted once, twice, thrice etc. and
those answered by BALE-OUT or CLUE for each play session, the current highest score
and the highest score for all those who have played that game displayed on the screen.
These statistics are to challenge the player to aspire to get to the top of all the statistical
data displayed.
Fig 4.2 The Sort Me Out game interface
4.3.2 Grammar Wizard

The Grammar Wizard is a game that inflects verbs for the third person singular (<s> and <es> forms) and the simple past tense as well as inflecting nouns for their plural forms. The interface consists of a window that allows the player to enter his/her name and then select which of the three options he/she is going to play. The play window has a playing area divided into two sections. One section holds the tiles on which the words are written while the other holds the morphemes. Thirty tiles of words are arranged in six rows of five tiles each and above this are the inflectional morphemes for the nouns or verbs arranged horizontally. There are seven morphemes for the simple past form of the verbs (<ed>, zero morpheme for verbs that have zero morphemes, irregular for irregular verbs, <d>, <ied> for verbs that end with a consonant and <y> and double the consonant
+ <ed> for one syllabic words that have only one vowel and end with the consonants b, d, f, g, l, m, n, p, r, and t and verbs that have two past tense forms), three morphemes for the simple present form of the verb (<s>, <es> and <ies>) and six morphemes for the plural forms of the nouns <s>, <es>, <ies>, <ves>, zero and irregular). Above the morphemes are the help, clue and bale-out buttons. Also at the top of the window is the word-class option selected by the player.

The game is played by the player clicking on the appropriate morpheme and then clicking on the corresponding word. If the correct word is clicked, the word is then transformed into its third person, simple past or the plural form by the programme and an audio version reads the original word and its transformed version in a given formula.

For example, if the word is to be inflected for the simple past the formula is “Transformed word is the category of the original word” so that the programme will read the inflection of “do” as “Did is the past tense of do”. In case of the third person singular forms, the audio reads a concord statement such as “he goes’, ‘she goes’, ‘Ama goes’, ‘Kofi goes’”. For nouns the audio reads “the plural form of ‘table’ is ‘tables’.

Irregular and zero morpheme verbs and noun, the verbs that need the doubling of the end consonant and the verbs that have two forms for the past are played the same way as those with morphemes but with slight difference. ‘Irregular’ is used as the morpheme for the irregular verbs and nouns. When the irregular verb or noun is clicked after the “irregular” tile is clicked, a dialogue box pops up with a text area for the player to type in the correct inflectional form of the given word. For example, “go” + ‘irregular’ =

The player then types the word “went” into the box. For the words that need the
doubling of the ending consonants, “double the consonant” is used as the morpheme while “two form verbs” is used for the verbs that have two past tense forms. When the player clicks “double the consonant” tile and clicks the appropriate word, a text area window pops up for the player to provide one of the past tense forms while the programme provides the other. Blank cards are used as the morpheme for the zero morpheme verbs and nouns and the result is the same as the original word.

Each group of words corresponding to the morphemes provided is proportionately represented each time the words appear on the screen. This means words from groups that have fewer members will be repeated very often. The player is not expected to memorise all the words in each group but to be able to associate the rules with the characteristics of the group. For example, the player remembers that he or she must use the morpheme <ies> or <ied> for words that end with a consonant followed by <y>. The best way to play and derive maximum benefit from the game is to play one group of words that have the same characteristics before moving to another group. In this way the player easily associates the morpheme with the group characteristics.

The player is awarded five marks for each correct answer obtained at the first attempt. Each attempt at a word that produces a wrong answer reduces the marks by one until the marks reduce to one. Subsequent attempts do not reduce the mark any longer. One is awarded if the player gets it right after that. The player has the option of clicking the BALE-OUT button and pointing the cursor to the given word for the correct answer to pop up (when the player is forming simple past tense and the cursor is pointed to a verb card while the game is in bale-out mode the simple past of the verb shows). No mark is awarded when the answer is got through BALE-OUT.
When the player gets one hundred and eleven marks and above, he/she is ranked a gold medalist. Gold medals and fireworks are splashed all over the screen with a shout of H-U-R-R-A-Y amidst clapping. Marks from seventy six to one hundred and ten the player is ranked a silver medal and fireworks are splashed on the screen while anything below that gives a bronze medal and fireworks.

The identity of each player, games attempted, result of each play, number of words successfully attempted once, twice, trice etc. and those answered by the help of BALE-OUT or CLUE for each play session, the current highest score and the highest score for all those who have played that game before, and time used in the completion of the game are tracked and displayed for the player to see after every round of play.

The materials comprise a list of verbs categorised into regular verbs (which are subdivided into d, ed and ied inflectional morpheme verbs), irregular verbs, verbs whose past tense forms are the same as their base forms (zero morphemes), verbs that require the doubling of the final consonant before the inflectional morpheme is added, and verbs which have two past tense forms for the past tense option. For the third person singular verbs option, there are three (3) main categories corresponding to the three inflectional morphemes <s>, <es> and <ies> while the plurals of nouns option has six (6) categories corresponding to the inflectional morphemes <s>, <es>, <ie>s, <ves>, zero morpheme, and irregular nouns. Each word in the group has its meaning attached to it. The meaning is accessed by right-clicking and choosing the option “meaning” from the pop up menu. This is to disambiguate homonyms and homographs and also help the player to become familiar with their meaning. The categorisation is meant for the purpose of the application of the inflectional rules. As mentioned somewhere else in this work, the
player is not expected to memorise all the words in the list but to be able to associate the rules with each category of words with the help of the characteristics of the words in each group to help easy recall of the rules.

The rules and example from each category are presented below.

Third person singular verbs

1. For verbs that end in consonants such as b, c, d, f, g, k, l, m, n, p, r, t or w add <s>.
   
   Examples are: beat – beats, bid – bids, ring – rings

2. For verbs that end in a vowel + y add <s>
   
   Examples are: play – plays, delay – delays, buy – buys, obey – obeys

3. For verbs that end in <e> add <s>
   
   Example are: weave – weaves, prepare – prepares, close – closes, save – saves, squeeze – squeezes

4. For verbs that end in s, ss, ch, sh, x, o, z or zz add <es>
   
   Examples are: do – does, dress – dresses, touch – touches, brush – brushes, fix – fixes

5. For verbs that end in a consonant + <y>, change the y to <i> and add <es>

Past tense forms of verbs
1. Irregular verbs have no common rules for the past tense inflection hence the player types in the correct form after clicking on irregular and clicking on the base form of the verb.

Examples are: arise – arose, become – became, bleed – bled, eat – ate, foretell – foretold.

2. Since the verbs that maintain their base forms as past tense form have no morpheme to form the rule, a blank tile is used as the morpheme (zero morphemes).


3. Regular verbs have different versions. These are:

3.1. Adding <ed> to words that end with double consonants


3.2. For regular verbs that have two or more successive vowels and end with a consonant add <ed>.

Examples are: heat – heated, cook – cooked, wait – waited, question – questioned, peel – peeled.

3.3 For regular verbs that end with a vowel + x, w, or y add <ed>.

Examples are: fix – fixed, play – played, show – showed, saw – sawed.
3.4 For regular verbs that end with <e> add <d>

Examples are: close – closed, prove – proved, squeeze – squeezed, prepare – prepared.

3.5 For verbs that end with a consonant followed by <y>, change the <y> to <i> and add <ed>.


4. For one syllabic verbs that have only one vowel and end with the following consonants b, d, f, g, l, m, n, p, r, and t, double the consonant and add <ed>.


The plural forms of nouns apply to only countable nouns. They are as follows:

1. Add <s> to countable nouns that end in a vowel + <y>.

Examples are: boy – boys, monkey – monkeys, day – days, toy – toys, guy – guys.

2. Add <s> to countable nouns that end in <e> if it is not <fe>.

Examples are: shoe – shoes, house – houses, suitcase – suitcases, eye – eyes.

3. Add <s> to countable nouns that end in a vowel + <o>.

Examples are: patio – patios, kangaroo – kangaroos, video – videos, zoo – zoos.

4. Add <s> to countable nouns that end in <o> and are musical terms.

5. Add <s> to countable nouns that end in consonants such as b, d, g, k, l, m, n, p, r, t, w, ng (ŋ) or th (θ, ð).

Examples are: violin – violins, path – paths, group – groups, building – buildings.

6. Add <es> to countable nouns that end in ch, o, sh, ss, s, x, z or zz.


7. Take away <f> or <fe> and add <ves> to countable nouns that end in <f> or <fe>.

Examples are: life – lives, hoof – hooves, shelf – shelves, calf – calves.

8. Change <y> to <i> and add <es> to countable nouns that end in a consonant + <y>.

Examples are: company – companies, history – histories, lady – ladies, and lottery – lotteries.

9. There are countable nouns that do not inflect for the plural (zero inflectional morpheme)


10. The morpheme representation for irregular nouns is the tile with inscription “irregular” since the words in each set are few. The player is required to click the irregular tile and click the noun and type in the text area provided in the pop up window.
Examples are non-English words with endings such as <ouse> which becomes <ice> as in mouse - mice, <ix> or <ex> which becomes <ices> as in matrix – matrices and vertex - vertices, <um> or <on> which becomes <a> as in datum – data and criterion - criteria, <is> which becomes <es> basis - bases, <us> which becomes <i> as in focus - foci and words which have vowels that are transformed to form plurals. Examples are <a> which becomes <e> as in man - men, <oo> which becomes <ee> as in foot - feet.

4.3.3 English Scholar

The English Scholar is an adaptation of the word forming game Bookworm Deluxe. The English Scholar is a sentence construction game in which the player constructs sentences by clicking words and phrases on adjacent tiles until a sentence is constructed and marks are awarded for the sentence. Words and phrases are randomized on the screen so that the player combines them to form a sentence.

The interface comprises the window for the player to enter his or her name and select the option of the game to be played. Another window offers the player options for the selection of the game level and then the main window is the play window. There are three options (simple past tense, third person singular verbs and plurals on nouns) and four levels for each option (very easy, easy, difficult, and very difficult). Once the parameters are selected, the player is taken to the play window. The play window is made up of the play area, the control buttons and the score board. The play area displays sixty tiles with words and phrases on them and the player is expected to clicks adjacent tiles so that the tiles follow a syntactic order of the sentence the player is constructing.
Only a tile that shares boundaries with a clicked tile may be permitted to be clicked subsequently. An arrow shows the order in which the clicking is done. The words and phrases clicked appear at the left corner of the screen in the order in which they are clicked. Whenever the player is satisfied with the sentence formed, he/she right-clicks the last tile and submits the sentence (it disappears and the tiles above the given tiles take their place) and the mark is recorded. The accumulated marks are displayed at the top left hand corner of the screen. Only correct sentences are scored. The scoreboard which consists of the sentence constructed, the score attached to it and the total score is on the top left while below it are the indicator of the number of phrases used, the clue and the bale-out buttons and the name of the player.

The game begins with nouns, noun phrases and verbs meant to be used in forming sentences of the structure subject-verb-object (SVO). Adjectives, adjectival phrases (Adje), adverbs and adverbial phrases (Adv) also appear on separate tiles. At the very easy level, they are arranged on the screen in a manner that makes it easier for the player to connect to form a sentence. Some even follow each other. As the levels get higher the words and phrases are separated so that the player has to be more critical and study the arrangement of the words and phrases in order to get the sentences constructed. Verbs that do not agree with the subject are scattered on the screen as distracters so that the player determines which verb best forms concord with the given subject selected. The sentence is scored once a correct SVO structure is formed through the clicking: the longer the sentence the higher the score.

The materials of the game are derived from substitution tables which have the elements of a sentence marked. Thus, we have the subject, verb, object, complement, adjectival
and adverbial. Some of the elements are broken down into smaller units; for example, some of the components of the subject are broken down into articles and nouns. A sentence is deemed correct if it forms one of the sentence structures (SVO, SVOA, SVA, SVOAA, ASVO, ASVAOA, etc). Consideration is given to the mobile nature of the adverb and the adverbial phrases so that the position of the adverb is not fixed; it follows the rules of places and order of adverbs in a sentence. Generally, adverbs appear at the end of a sentence right after the intransitive verb, after the object or complement. Frequency and manner adverbs may come before the main verb which means that they can come right after the subject or the auxiliary verb. Time, manner and frequency adverbs may also come at the beginning of the sentence. The general order of adverbs in a sentence is manner, place, frequency, time and purpose though the flexibility of adverbs allows other combinations. Since it will be difficult to use all the combinations and in order to simplify issues for the target group for the purposes of this work, the materials have been restricted to include mostly place and time adverbs.
Table 4.1 An example of the substitution table

<table>
<thead>
<tr>
<th>Subject</th>
<th>Verb</th>
<th>Adverbial (i)</th>
<th>Adverbial (ii)</th>
<th>Adverbial (iii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Articles</td>
<td>2 Nouns</td>
<td>3 Verb</td>
<td>4 Prepositions</td>
<td>5 Nouns</td>
</tr>
<tr>
<td>The teacher farmer boy woman man</td>
<td>travels (a)</td>
<td>to (a)</td>
<td>Accra Kumasi Cape Coast</td>
<td>from</td>
</tr>
<tr>
<td>Joseph Grace John Alice</td>
<td>from (b)</td>
<td>Accra Kumasi Cape Coast</td>
<td>to</td>
<td></td>
</tr>
<tr>
<td>Mr. Joseph Obi Felix Teye</td>
<td>hails (b)</td>
<td>from</td>
<td>Accra Kumasi Cape Coast</td>
<td>in (c)</td>
</tr>
<tr>
<td>Miss Alice Addo Mary Ojo</td>
<td></td>
<td>Lagos Ibadan Jos</td>
<td>in</td>
<td></td>
</tr>
</tbody>
</table>

From the above table, it will be seen that the sentences that can be formed are of the structure SVAAA and its combinations such as A(iii)SVA(i)A(ii). Preposition (b) when combined with the verb (a) can begin a sentence so that we have A(ib)SVA(iia)A(iii), A(iib)SVA(i)aA(iii), etc. in order to simplify this owing to the time limit for the programmer, the prepositions have been attached to the adverbs in the game itself.

There are restrictions place on the combination of words and phrases in both the table and the programme to ensure that no incorrect sentence is accepted as correct. The vertical and horizontal lines in the table bar some combinations of words or group of words. For example, the verb “hails” cannot go with the preposition “to” while “travel” can go with both “to” and “form”. The problem of semantics has also warranted the
restriction of some of the combinations. If we allow all nouns to be used in constructing
the subject, object, complement and adverbial, we will have sentences such as "*Kumasi
travels from Joseph to Togo every day". The restrictions have caused many semantically
correct sentences to be rejected, but it has ensured that no incorrect sentence is accepted
as correct.

Records are kept of the player’s name, number of sessions played and best sentence for
each session (when the game is started and quitted), the level reached before quitting and
the number of sentences correctly formed in any given session, the total marks scored
for each session and the best total mark so far. The records are displayed on the screen at
the end of a session. This is to motivate and challenge the player to get his or her name
to the top of the statistical board.

Fig 4.3 The English Scholar interface
What Level of Difficulty Do you want to Play?

- Very Easy
- Easy
- Difficult
- Very Difficult

Game Levels

CLOSE
4.4 Chapter Summary

English language teaching in Ghanaian public schools is based on the behaviourists and the cognitivists theories with attempts at integrating the two hence the teaching of grammatical concepts is basically form-focused with emphasis on repetition and drills. In order to conform to the normal presentation in the classroom, the game materials have been presented using the form-focused approach to reinforce the notes provided in the textbooks, which are mainly rules on the grammatical items treated. Practice exercises of sentence construction to revise the concepts have also been included in the games.

Each of the three games used in the study focuses on a specific concept to be acquired. The Sort Me Out game focuses on differentiating among the types of nouns and verbs with the view of attributing the unique characteristics of each category to it in order to create awareness of the differences. The Grammar Wizard also focuses on the mastery of the inflection of verbs for the third person singular, the inflection of verbs for the past tense and the inflection of nouns for the plural forms. However, the English Scholar is a sentence construction game meant to serve as practice exercises for the participants.

Included in the games are game design principles that ensure the player explores the games, the player is engaged with the materials, the games are not too difficult to play and not too easy to play and the player is motivated to play and get rewarded.
CHAPTER 5
ANALYSIS

5.0  Introduction

This chapter discusses the test results (both pre- and post-test) and the responses to the questionnaires as related to the issues investigated. The result was discussed on the bases of the general achievement of the two groups (the experimental and control groups), topics covered, sections into which the test is segmented, achievement levels of the participants and gender. The analyses include summaries and a discussion of the summaries.

5.1  The Pretest Analysis

The hypothesis that the two groups (the experimental and control groups) were homogeneous at the commencement of the project was tested with the $t$-test and the One Way ANOVA test using the percentage scores of their performance in the pretest. Both the $t$-test and the One Way ANOVA test confirmed the homogeneity of the two groups, in their pretest performance. That was to say that the two groups were comparable in terms of their performance in the pretest. Table 5.1 shows the means of the pretest scores in percentage, the standard deviations, the $t$ value and the $p$ value. Using an alpha level of 0.05, the independent-samples $t$-test for the pretest indicated that the control group ($M = 46.3$, $SD = 9.79$), did not differ in any significant way from the experimental group ($M = 44.5$, $SD = 11.86$), $t (24.0) = -0.433$, $p > .05 = 0.669$. Similarly, the One Way Analysis of Variance (ANOVA) test confirmed the insignificance of the differences between the pretest mean scores of the groups, $F (1, 24) = 0.187$, $p > .05 = 0.669$, accepting the Hypothesis that the two groups were homogeneous.
Table 5.1  Means, Standard deviations, t- and p- values of the analysis of the pretest scores of the two groups

<table>
<thead>
<tr>
<th></th>
<th>Mean %</th>
<th>N</th>
<th>Std. Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>44.5</td>
<td>13</td>
<td>11.86</td>
<td>-0.433</td>
<td>0.669</td>
</tr>
<tr>
<td>Control Group</td>
<td>46.3</td>
<td>13</td>
<td>9.79</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There were further probes to ascertain the strengths and weaknesses of each group. This is to enable us to unearth any variation that might occur in their posttest performances during the posttest analysis. Consequently, a gender-based, topic-by-topic, achievement group, and section-by-section analyses had been undertaken.

The gender-based analysis indicated that the boys in the control group performed creditably well (Mean 52.00%) and that they were the strength of the control group. The standard deviations of the control subgroups (boys 9.17 and girls 5.57) also pointed to the fact that, compared to the experimental group, the scores of each control subgroup was spread over narrower range than those of the experimental subgroups. However, it can be seen that the girls in the control group did not perform that well. They were 5.71% points below the general average of 45.38%, the least of the average scores, while their male counterparts were 6.62% points above. On the other hand, the experimental subgroups which had wide spread scores indicated by their standard deviations (boys 11.10% and girls 13.61%) had their mean scores closer to the general mean (boys 46.50%:- 1.12% above the general mean while the girls had 41.20%:- 4. 18% below the general mean). It can be seen that the scores were approximately normally distributed with the control subgroups at the extreme ends and the experimental subgroups were closer to the general mean. In both groups, the boys were stronger than the girls, but
while the boys in the control group were stronger than those in the experimental group, the girls in the experimental group out-performed their control group counterparts.

Table 5.2  The means and standard deviations of the pretest scores according to gender

<table>
<thead>
<tr>
<th>Male and Female Experimental &amp; Control Groups</th>
<th>Mean %</th>
<th>N</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys Experimental Group</td>
<td>46.50</td>
<td>8</td>
<td>11.10</td>
</tr>
<tr>
<td>Girls Experimental Group</td>
<td>41.20</td>
<td>5</td>
<td>13.61</td>
</tr>
<tr>
<td>Boys Control Group</td>
<td>52.00</td>
<td>7</td>
<td>9.17</td>
</tr>
<tr>
<td>Girls Control Group</td>
<td>39.67</td>
<td>6</td>
<td>5.57</td>
</tr>
</tbody>
</table>

It was obvious from the achievement group analysis that the marginal gain obtained by the control group over the experimental group was a direct result of the performance of the Low Achievers of the control group over the Low Achievers of the experimental group since all the other corresponding groups had the same mean scores. Apart from this obvious revelation, other interesting issues were revealed. Whereas the scores of the Low Achievers in the control group spread over a narrower area (4.0), those of their counterparts in the experimental group were the largest of all (14.0). It was also the standard deviation of the Low Achievers in the control group that brought down the standard deviation of the control group drastically. It is therefore clear that but for the slightly higher performance of the Low Achievers in the control group over that of their experimental group counterparts, the two groups (the control group and the experimental group) would have had virtually the same mean scores.
Table 5.3 The means, standard deviations and ranges of the pretest scores by achievement levels

<table>
<thead>
<tr>
<th>Achievement Grouping</th>
<th>Mean</th>
<th>N</th>
<th>Std. Dev</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Achievers Experimental Group</td>
<td>58.0</td>
<td>4</td>
<td>4.3</td>
<td>10.0</td>
</tr>
<tr>
<td>Middle Achievers Experimental Group</td>
<td>45.5</td>
<td>4</td>
<td>5.3</td>
<td>10.0</td>
</tr>
<tr>
<td>Low Achievers Experimental Group</td>
<td>32.8</td>
<td>5</td>
<td>5.8</td>
<td>14.0</td>
</tr>
<tr>
<td>High Achievers Control Group</td>
<td>58.0</td>
<td>4</td>
<td>4.9</td>
<td>10.0</td>
</tr>
<tr>
<td>Middle Achievers Control Group</td>
<td>45.2</td>
<td>5</td>
<td>4.8</td>
<td>10.0</td>
</tr>
<tr>
<td>Low Achievers Control Group</td>
<td>36.0</td>
<td>4</td>
<td>1.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Total</td>
<td>45.4</td>
<td>26</td>
<td>10.7</td>
<td>38.0</td>
</tr>
</tbody>
</table>

From the \( p \) values of the ANOVA test (Table 5.4), it is clear that apart from the mean scores of the corresponding achievement levels of the two groups which were confirmed to be consistent, the mean score of the Low Achievers in the control group was also affirmed to be homogeneous with those of the two Middle Level Achievers. All other relationships were judged to be heterogeneous. It is therefore significant that five out of the fifteen relationships were homogeneous and that it was only the mean score of the Low Achievers in the control group that was a lower score that produced a statistically insignificant difference with a higher achiever’s score.

Table 5.4 Table of the \( p \)-values of the pretest ANOVA test for the achievers’ groups

<table>
<thead>
<tr>
<th></th>
<th>High Achievers</th>
<th>Middle Achievers</th>
<th>Low Achievers</th>
<th>High Achievers</th>
<th>Middle Achievers</th>
<th>Low Achievers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exp Group</td>
<td>Exp Group</td>
<td>Exp Group</td>
<td>Cont Group</td>
<td>Cont Group</td>
<td>Cont Group</td>
</tr>
<tr>
<td>High Achievers Exp Group</td>
<td>0.014</td>
<td>0.008</td>
<td>1.000</td>
<td>0.007</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Middle Achievers Exp Group</td>
<td>0.014</td>
<td>0.000</td>
<td>0.014</td>
<td>1.000</td>
<td>0.909</td>
<td></td>
</tr>
<tr>
<td>Low Achievers Exp Group</td>
<td>0.000</td>
<td>0.008</td>
<td>0.000</td>
<td>0.006</td>
<td>0.909</td>
<td></td>
</tr>
<tr>
<td>High Achievers Cont Group</td>
<td>1.000</td>
<td>0.014</td>
<td>0.000</td>
<td>0.007</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Middle Achievers Cont Group</td>
<td>0.007</td>
<td>1.000</td>
<td>0.006</td>
<td>0.007</td>
<td>0.080</td>
<td></td>
</tr>
<tr>
<td>Low Achievers Cont Group</td>
<td>0.000</td>
<td>0.090</td>
<td>0.909</td>
<td>0.000</td>
<td>0.080</td>
<td></td>
</tr>
</tbody>
</table>
The table below (Table 5.5) indicates that it was only in subject-verb concord that a mean score above 50% was obtained. Both groups obtained a score above 50%. However, the control group topped in four topics (capitalization of nouns, regular and irregular forms of past tense verbs and subject verb-concord) out of the six areas covered. The experimental group led in two, namely, the plural of nouns and the present tense of verbs.

<table>
<thead>
<tr>
<th>GROUPING BY TOPICS</th>
<th>EXP GROUP</th>
<th>CNTL GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noun Plural</td>
<td>Mean 40.8</td>
<td>36.2</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 27.8</td>
<td>22.6</td>
</tr>
<tr>
<td>Noun Capital</td>
<td>Mean 32.3</td>
<td>40.0</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 24.0</td>
<td>23.4</td>
</tr>
<tr>
<td>Verb Present</td>
<td>Mean 42.3</td>
<td>39.2</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 25.4</td>
<td>28.4</td>
</tr>
<tr>
<td>Verb Past Regular</td>
<td>Mean 38.5</td>
<td>44.6</td>
</tr>
<tr>
<td></td>
<td>N 5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 29.3</td>
<td>31.9</td>
</tr>
<tr>
<td>Past Irregular</td>
<td>Mean 32.1</td>
<td>35.9</td>
</tr>
<tr>
<td></td>
<td>N 6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 25.9</td>
<td>42.9</td>
</tr>
<tr>
<td>Subject-Verb Concord</td>
<td>Mean 68.5</td>
<td>72.2</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 28.1</td>
<td>18.6</td>
</tr>
<tr>
<td>Total</td>
<td>Mean 43.6</td>
<td>45.4</td>
</tr>
<tr>
<td></td>
<td>N 51</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 28.5</td>
<td>29.1</td>
</tr>
</tbody>
</table>

Further explanations of the above trend were sought through the gender analysis and it turned out that in the case of the plural nouns, both gender subgroups in the experimental group were ahead of their corresponding control group counterparts, but it
was the boys in the experimental group who performed well enough to take the lead in the present tense of verbs since their girls were the lowest performers. On the other hand, the boys in the control group propelled their group to the lead since they come first in three (capitalization of nouns, regular forms of past tense and concord) out of the remaining four topics in which their group topped and even though the girls in the experimental group were ahead in the irregular forms of past tense verbs, the boys in the control group contributed to their group leading in the topic. Their girls seemed not to have done well in almost all the topics.

Table 5.6 The performance of the gender subgroups in the various topics covered

<table>
<thead>
<tr>
<th>Grouping By Topics</th>
<th>EXP BOYS</th>
<th>EXP GIRLS</th>
<th>CNT BOYS</th>
<th>CNT GIRLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noun Plural Mean</td>
<td>43.8</td>
<td>36.0</td>
<td>41.4</td>
<td>30.0</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>30.2</td>
<td>32.4</td>
<td>34.0</td>
<td>15.3</td>
</tr>
<tr>
<td>Noun Capital Mean</td>
<td>38.8</td>
<td>22.0</td>
<td>55.7</td>
<td>21.7</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>27.3</td>
<td>23.9</td>
<td>26.5</td>
<td>26.1</td>
</tr>
<tr>
<td>Verb Present Mean</td>
<td>48.8</td>
<td>32.0</td>
<td>37.2</td>
<td>41.7</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>26.0</td>
<td>27.0</td>
<td>29.5</td>
<td>34.5</td>
</tr>
<tr>
<td>Verb Past Regular Mean</td>
<td>37.5</td>
<td>40.0</td>
<td>60.1</td>
<td>26.7</td>
</tr>
<tr>
<td>N</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>30.6</td>
<td>28.3</td>
<td>36.9</td>
<td>32.3</td>
</tr>
<tr>
<td>Past Irregular Mean</td>
<td>25.0</td>
<td>43.3</td>
<td>31.0</td>
<td>41.7</td>
</tr>
<tr>
<td>N</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>32.6</td>
<td>34.4</td>
<td>39.8</td>
<td>49.2</td>
</tr>
<tr>
<td>Subject-Verb Concord Mean</td>
<td>67.5</td>
<td>70.0</td>
<td>77.1</td>
<td>66.7</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>28.4</td>
<td>33.0</td>
<td>24.5</td>
<td>20.8</td>
</tr>
<tr>
<td>Total Mean</td>
<td>45.6</td>
<td>40.4</td>
<td>51.0</td>
<td>38.9</td>
</tr>
<tr>
<td>N</td>
<td>51</td>
<td>51</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>30.2</td>
<td>32.6</td>
<td>33.5</td>
<td>32.1</td>
</tr>
</tbody>
</table>
It is clear that performances in the first two sections were very high. This was because they involved single sentences and multiple choice questions. The third section, which was a cloze test with multiple choice answers, also witnessed a better performance. However, in the last two sections where participants were expected to look for wrong forms of words in the passage and correct them, performance went very low with only one above 20%. This suggests that either the participants were not able to identify the wrong word forms or that because multiple choice answers were not provided they were unable to figure out the correct forms of the words identified.

Of the five sections of the test, four of them (sections A, B, C and E) were taken by the control group while the experimental group led in only one section, section D.

<table>
<thead>
<tr>
<th>SECTIONAL GROUPINGS</th>
<th>EXP GROUP</th>
<th>CNTL GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION A</td>
<td>Mean 72.3</td>
<td>76.1</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 13.2</td>
<td>17.2</td>
</tr>
<tr>
<td>SECTION B</td>
<td>Mean 64.6</td>
<td>66.8</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 18.5</td>
<td>19.9</td>
</tr>
<tr>
<td>SECTION C</td>
<td>Mean 46.9</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 27.9</td>
<td>21.0</td>
</tr>
<tr>
<td>SECTION D</td>
<td>Mean 18.5</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>N 10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 13.7</td>
<td>8.9</td>
</tr>
<tr>
<td>SECTION E</td>
<td>Mean 18.2</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>N 11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 9.9</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>Mean 43.6</td>
<td>45.4</td>
</tr>
<tr>
<td></td>
<td>N 51</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 28.5</td>
<td>29.2</td>
</tr>
</tbody>
</table>
The gender analysis confirmed the superiority of the boys in the control group over all the others; they topped three out of the five sections (section A, B and E) while their female counterparts topped one (section C) and the remaining one (section D), which happened to be the one the experimental group showed superiority in, was taken by the boys in the experimental group. It also turned out that apart from sections C and D, where the differences between the males and the females in the experimental group exceeded 10%, the two subgroups had scores close to each other while the scores of the subgroups in the control group, except in sections C and D, were far apart (ranging between 8% and 30%). This signifies that the performance of the control group was powered by the high performance of the boys.

Table 5.8 The performance of the gender subgroups in the various sections

<table>
<thead>
<tr>
<th>SECTIONAL GROUPINGS</th>
<th>EXP BOYS</th>
<th>EXP GIRLS</th>
<th>CNT BOYS</th>
<th>CNT GIRLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION A</td>
<td>Mean</td>
<td>71.3</td>
<td>74.0</td>
<td>80.0</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>17.7</td>
<td>26.7</td>
<td>18.1</td>
</tr>
<tr>
<td>SECTION B</td>
<td>Mean</td>
<td>65.0</td>
<td>64.0</td>
<td>77.1</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>20.2</td>
<td>24.6</td>
<td>28.0</td>
</tr>
<tr>
<td>SECTION C</td>
<td>Mean</td>
<td>51.2</td>
<td>40.0</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>34.0</td>
<td>25.0</td>
<td>32.4</td>
</tr>
<tr>
<td>SECTION D</td>
<td>Mean</td>
<td>25.0</td>
<td>8.0</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>18.6</td>
<td>10.3</td>
<td>10.6</td>
</tr>
<tr>
<td>SECTION E</td>
<td>Mean</td>
<td>18.2</td>
<td>18.2</td>
<td>35.1</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>15.2</td>
<td>14.01</td>
<td>22.4</td>
</tr>
<tr>
<td>Total</td>
<td>Mean</td>
<td>45.6</td>
<td>40.4</td>
<td>51.0</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>51</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Std. Dev</td>
<td>30.2</td>
<td>32.6</td>
<td>33.5</td>
</tr>
</tbody>
</table>
5.2 Summary of the Pretest Analysis

It was hypothesised that the control and the experimental groups, were homogeneous at the commencement of the project. This assertion has been confirmed by both the $t$-test and the One Way ANOVA test results of the pretest analysis. However, the results reveal that the performance of the control group is slightly above that of the experimental group. Further investigation has disclosed that while the boys in the control group powered the lead performance of the control group, the two gender groups of the experimental group were close together with a difference of 5.30% between their means (whereas the difference between those in the control group is 12.33%).

It has also been revealed that it is the Low Achievers in the control group who outperform their counterparts to help the control group to have a slight edge over the experimental group. The ANOVA test has also shown that apart from the corresponding achievers groups in the experimental and control groups that are confirmed to be homogeneous, the low achievers of the of the control group are the only group that are proved to be homogeneous with other groups (i.e. the two Middle Achievers groups). All the other group relationships are heterogeneous. This indicates that apart from the mean score of the Low Achievers in the control group which is comparable to those of the two Middle Achievers’ groups, all other remaining group relationships are not comparable.

It has also been established that of the six topics tested, the control group showed strength in four while the experimental group led in only two. The general performance of the groups in terms of their mean scores is below 50% except in subject-verb concord.
The strength of the control group is also manifested in their superiority in four out of the five sections of the pretest.

Gender-wise, the males have outperformed their respective female counterparts and except in section C where the girls in the control group had an upper hand over all the subgroups, the males have dominated their groups. Comparing group on a gender basis, the girls in the experimental group seemed to be more comparable to their male counterparts than those in the control group (experimental group boys 46.50%, girls 41.20%; control group boys 52.00%, girls 39.67%). Out of the six topics assessed, the girls in the experimental group shared equally the lead position with their male counterparts (girls: past tense of regular and irregular verbs and subject-verb concord; boys: plural forms and capitalisation of nouns and the present tense of verbs). However, it was only in section A that they outperformed the boys. The boys were on top in four out of the five sections. On the other hand, the girls in the control group outperformed their male counterparts in only two out of the six topics and in only one section (section C).

5.3 The Posttest Analysis

In trying to ascertain whether there were statistically significant differences at the 0.05 level between the performance of the experimental group (students who practised English grammar using educational computer games) and the control group (those who practised English grammar through the traditional method), both t-test and ANOVA analyses were used. The general analyses of both tests have established that even though the experimental group outperformed the control group in the posttest, the margin by which they outperformed them was not statistically significant. In other words, the statistical tests confirmed the hypothesis that the two groups remained homogeneous.
after the posttest. Table 5.9 shows the Independent Samples Test analysis of the pretest and posttest scores. Using an alpha level of 0.05 and equal variance assumed, the independent-samples $t$-test for the posttest indicates that the control group ($M = 50.62$, $SD = 8.99$), does not differ in any significant way from the experimental group ($M = 55.23$, $SD = 11.09$), $t(24.0) = 1.16$, $p > 0.05 = 0.255$. Similarly, the One Way Analysis of Variance (ANOVA) test confirms the insignificance of the differences between the posttest mean scores of the groups, $F(1, 24) = 1.35$, $p > .05 = 0.255$, accepting the Hypothesis that the two groups are still homogeneous after the posttest.

<table>
<thead>
<tr>
<th>Table 5.9 Independent Samples Test for the Pretest and Posttest Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene's Test for Equality of Variances</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>Pretest</td>
</tr>
<tr>
<td>Posttest</td>
</tr>
</tbody>
</table>

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However, further analysis reveals that the experimental group made significant gains over their pretest score. The mean score shot from 44.46% to 55.23%, an increase of 10.77% whereas the control group added only 4.31% to their pretest mean, a difference of 6.46%. Both the t-tests and ANOVA test conducted on the net scores gained proved statistically significant. Still using an alpha level of 0.05 and equal variance assumed, the independent-samples t-test for the net scores gained indicates that the control group (M = 4.3, SD = 7.4), differs significantly from the experimental group (M = 10.8, SD = 8.3), t (24.0) = 2.1, p < 0.05 = 0.047. Similarly, the One Way Analysis of Variance (ANOVA) test confirms the significance of the differences between the means of the net scores gain of the groups, $F (1, 24) = 4.37, p < .05 = 0.047$, rejecting the Hypothesis that the two groups are still homogeneous after the posttest on the bases of their net scores gained. Since the net scores gained in the posttest are considered the direct result of the treatment and chance, statistically significant gain difference is credible enough to say that the game practice has helped the experimental group to have a significantly larger net gain above that of the control group.
Table 5.10 One Way Analysis of Variance (ANOVA) test for pretest and posttest

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups (Combined)</td>
<td>22.15</td>
<td>1</td>
<td>22.15</td>
<td>.187</td>
<td>.669</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2840.00</td>
<td>24</td>
<td>118.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2862.15</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups (Combined)</td>
<td>138.46</td>
<td>1</td>
<td>138.46</td>
<td>1.35</td>
<td>.255</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2447.38</td>
<td>24</td>
<td>101.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5.11 t-test for the net scores gained

<table>
<thead>
<tr>
<th>Net Scores Gained</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td><strong>NET</strong></td>
<td>.691</td>
<td>.414</td>
</tr>
<tr>
<td><strong>SCORES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GAINED</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5.12 Group pretest and posttest scores compared using mean difference

<table>
<thead>
<tr>
<th>Experimental And Control Groups</th>
<th>Pretest Scores</th>
<th>Posttest Scores</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>44.46</td>
<td>55.23</td>
<td>10.77</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Std. Dev</td>
<td>11.86</td>
<td>11.09</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>38.00</td>
<td>34.00</td>
<td></td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>46.31</td>
<td>50.62</td>
<td>4.31</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Std. Dev</td>
<td>9.79</td>
<td>8.99</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>28.00</td>
<td>30.00</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>45.38</td>
<td>52.92</td>
<td>7.54</td>
</tr>
<tr>
<td>N</td>
<td>26</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Std. Dev</td>
<td>10.69</td>
<td>10.17</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>38.00</td>
<td>40.00</td>
<td></td>
</tr>
</tbody>
</table>

The net gains by individual participants and the implication of the losses and gains on the general performance and consistency of the group members were discussed. The aim was to find out which of the groups was more consistent in maintaining the pretest scores. The researcher hypothesised that losing too many scores obtained in the pretest may be due to the participant guessing extensively in the pretest and probably in the posttest or getting confused by the treatment. If the participant, during the pretest,
actually knew the correct answer before choosing it, then losing it during the posttest might be attributed to two things: forgetting it owing to lack of revision (Even though the treatment was purported to revise any learnt concept, the time between the instruction in the classroom of each topic and the test at the end of the research period was long enough to make any participant who did not revise the concepts forget them.) or getting confused by the instructions. On the other hand, consistency may be explained as the participant knowing the correct answer during the pretest and revising to consolidate it or the participant guessing during the pretest, but getting it right through the treatment and revision. There may be other considerations which we might not have thought about, but the data is discussed based on these premises.

The table below (Table 5.14) shows that the girls in the experimental group gained the highest “new” mean score in the posttest gaining 20.0% while their male counterparts came next with 19.8%. The girls in the control group followed with 18.0% while their male counterparts come last with 14.0%. Conversely, the magnitude of scores lost does not correspond to those gained. The second highest group (the boys in the experimental group) lost the lowest mean score, 7.5%, while the boys in the control group that gained the lowest lost 10.9%, the next highest loser above the boys in the experimental group. This indicates that whereas the girls in each group gained more than the boys, they lost the heaviest. The two female groups (those in the control and the experimental group) lost 12.3 % and 11.6 % respectively (the two heaviest losses). The boys in the experimental group have shown the highest consistency gain, 19.8%, and the lowest loss, 7.5%, on the average. This may be attributed to their constant practice with the game. It is clear from the table that the boys were the most regular at practice among
participants in the experimental group and it is not surprising that they gained the highest mean score and lost the lowest among the subgroups. Even if there had been some guessed choices during the pretest, the constant practice might have consolidated these and added additional scores gained as a result of the practice which made them retain the concepts taught in class. All the other groups lost heavily. It clear from the table that the boys in the control group were the participants that practice least; they therefore gained less and lost heavily.

Some of the girls in the control group seemed to have exaggerated their practice and study habits or were not able to convert their studies into acquiring the grammatical skills learnt just as some of the boys in the experimental group who were regular at the practice session were not able to convert their practice into acquiring the skills. These girls might be meeting regularly. However, they might not able to comprehend the text on their own after the classroom instruction. They might have forgotten what had been taught and did not understand the text they were reading or that they were exaggerating the number of times they met or read the materials with the view to impress the researcher. For those who practised with the games, some were overwhelmed by the “magic” of the game while others took the games for granted (regarding them as too easy to complete) and after completing play it with less enthusiasm. The first case happened to the most inexperienced ones while the later applied to the more experienced video game players. It is worth noting that some of the video game players did not score high marks while other did. However, some less experience players who picked up the playing strategies after using trial-and-error tactics also scored high marks. It is clear therefore that even though constant practice had produced results in both groups (the
boys in the experimental group and the girls in the control group), the game practice produced higher results than the traditional practice. On the whole, the net effect of the two practice strategies has shown that practising with the games had yielded higher results than that of the traditional method (for the experimental group lost 9.1%, gained 19.8% and the net gain was 10.8% while the control group lost 11.5%, gained 15.8% and had a net gain of 4.3%).

Table 5.14 Analysis of the net gain and participant involvement in the practice session.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Lost</th>
<th>Gained</th>
<th>Net Gain</th>
<th>Attendance</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXB1</td>
<td>38.0</td>
<td>62.0</td>
<td>2.0</td>
<td>26.0</td>
<td>24.0</td>
<td>100%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXB2</td>
<td>58.0</td>
<td>64.0</td>
<td>12.0</td>
<td>16.0</td>
<td>4.0</td>
<td>100%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXB3</td>
<td>60.0</td>
<td>68.0</td>
<td>8.0</td>
<td>16.0</td>
<td>8.0</td>
<td>55%</td>
<td>Not so regular</td>
</tr>
<tr>
<td>EXB4</td>
<td>50.0</td>
<td>50.0</td>
<td>14.0</td>
<td>14.0</td>
<td>0.0</td>
<td>100%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXB5</td>
<td>50.0</td>
<td>58.0</td>
<td>4.0</td>
<td>12.0</td>
<td>8.0</td>
<td>95%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXB6</td>
<td>52.0</td>
<td>68.0</td>
<td>12.0</td>
<td>28.0</td>
<td>16.0</td>
<td>100%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXB7</td>
<td>32.0</td>
<td>48.0</td>
<td>2.0</td>
<td>18.0</td>
<td>16.0</td>
<td>40%</td>
<td>Not regular</td>
</tr>
<tr>
<td>EXB8</td>
<td>32.0</td>
<td>52.0</td>
<td>6.0</td>
<td>26.0</td>
<td>20.0</td>
<td>65%</td>
<td>Quite regular</td>
</tr>
<tr>
<td>Mean</td>
<td>46.5</td>
<td>58.8</td>
<td>7.5</td>
<td>19.8</td>
<td>12.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXG1</td>
<td>62.0</td>
<td>74.0</td>
<td>12.0</td>
<td>24.0</td>
<td>12.0</td>
<td>86%</td>
<td>Regular</td>
</tr>
<tr>
<td>EXG2</td>
<td>40.0</td>
<td>46.0</td>
<td>12.0</td>
<td>18.0</td>
<td>6.0</td>
<td>46%</td>
<td>Not regular</td>
</tr>
<tr>
<td>EXG3</td>
<td>38.0</td>
<td>42.0</td>
<td>12.0</td>
<td>16.0</td>
<td>4.0</td>
<td>30%</td>
<td>Not regular</td>
</tr>
<tr>
<td>EXG4</td>
<td>42.0</td>
<td>40.0</td>
<td>18.0</td>
<td>16.0</td>
<td>-2.0</td>
<td>32%</td>
<td>Not regular</td>
</tr>
<tr>
<td>EXG5</td>
<td>24.0</td>
<td>46.0</td>
<td>4.0</td>
<td>26.0</td>
<td>22.0</td>
<td>48%</td>
<td>Not regular</td>
</tr>
<tr>
<td>Mean</td>
<td>41.2</td>
<td>49.6</td>
<td>11.6</td>
<td>20.0</td>
<td>8.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental Group Mean</td>
<td>9.1</td>
<td>19.8</td>
<td>10.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Control Group

<table>
<thead>
<tr>
<th>Control Group Mean</th>
<th>Times met per week</th>
<th>Times per week reading material</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNB1</td>
<td>48.0 50.0 10.0 12.0 2.0</td>
<td>2 2</td>
</tr>
<tr>
<td>CNB2</td>
<td>36.0 42.0 14.0 20.0 6.0</td>
<td>0 3</td>
</tr>
<tr>
<td>CNB3</td>
<td>52.0 60.0 14.0 22.0 8.0</td>
<td>1 3</td>
</tr>
<tr>
<td>CNB4</td>
<td>56.0 60.0 8.0 12.0 4.0</td>
<td>0 2</td>
</tr>
<tr>
<td>CNB5</td>
<td>62.0 64.0 6.0 8.0 2.0</td>
<td>1 2</td>
</tr>
<tr>
<td>CNB6</td>
<td>62.0 54.0 12.0 4.0 -8.0</td>
<td>1 2</td>
</tr>
<tr>
<td>CNB7</td>
<td>48.0 56.0 12.0 20.0 8.0</td>
<td>0 3</td>
</tr>
</tbody>
</table>

Mean: 52.0 55.1 10.9 14.0 3.1

<table>
<thead>
<tr>
<th>Control Group Mean</th>
<th>Times met per week</th>
<th>Times per week reading material</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNG1</td>
<td>36.0 40.0 14.0 18.0 4.0</td>
<td>5 6</td>
</tr>
<tr>
<td>CNG2</td>
<td>34.0 48.0 4.0 18.0 14.0</td>
<td>2 3</td>
</tr>
<tr>
<td>CNG3</td>
<td>50.0 44.0 18.0 12.0 -6.0</td>
<td>6 6</td>
</tr>
<tr>
<td>CNG4</td>
<td>38.0 34.0 20.0 16.0 -4.0</td>
<td>6 6</td>
</tr>
<tr>
<td>CNG5</td>
<td>40.0 58.0 8.0 26.0 18.0</td>
<td>4 5</td>
</tr>
<tr>
<td>CNG6</td>
<td>40.0 48.0 10.0 18.0 8.0</td>
<td>0 5</td>
</tr>
</tbody>
</table>

Mean: 39.7 45.3 12.3 18.0 5.7

EXB1 Boy number one in the experimental group

EXG1 Girl number one in the experimental group

CNB1 Boy number one in the control group

CNG1 Girl number one in the control group

The gender analysis reveals that both the boys and girls in the experimental group gained more from the intervention than did the two gender subgroups of the control group. The boys in the experimental group gained the highest score in the posttest over their pretest score (12.25%) to emerge the overall leaders in the posttest (58.75%), beating the first placed boys in the control group to second place (55.14% with the least gain 3.14%). However, even though the girls in the experimental group gained the
second highest mean score in the posttest (8.40%), it was only enough to help them maintain their third position in the posttest while their counterparts in the control group gained the third highest (5.66%) to maintain their last position in the posttest. This shows that both the boys and the girls in the experimental group contributed immensely to the rise in their posttest score, but the boys contributed more than the girls while their control group counterparts contributed scantily to their posttest by adding very little to their pretest.

Table 5.15 Pretest-Posttest Gender scores compared

<table>
<thead>
<tr>
<th>Gender Groups</th>
<th>Pretest Scores%</th>
<th>Posttest Scores%</th>
<th>Mean Difference</th>
</tr>
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<td>Mean 41.20</td>
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<td>8.40</td>
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<td>Std. Dev</td>
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<td>8.16</td>
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Table 5.16 below reveals that the experimental group not only outperformed the control group in almost all the topics examined, but also gained higher scores in all the topics than did the control group. Even in topics which the control group had outperformed the experimental group in the pretest, the experimental group overturned the table and outperformed the control group in the posttest (Verb Past Regular pretest: experimental group 38.46%, control group 44.62%, a difference of 6.16% in favour of the control
group overturned in the posttest: experimental group 55.40%, control group 46.16%, a difference of 9.24% in favour of the experimental group; Past Irregular Verbs pretest: experimental group 32.05%, control group 35.90% a difference of 3.85% in favour of the control group overturned in the posttest: experimental group 42.30%, control group 41.02% a difference of 1.28% in favour of the experimental group and Subject-Verb Concord pretest: experimental group 68.45%, control group 72.21% a difference of 3.76% in favour of the control group later overturned in the posttest: experimental group 66.16%, control group 64.60% a difference of 1.56% in favour of the experimental group). Besides, even in the case where the control group still maintained the lead in the posttest (Capitalisation of Nouns), the experimental group gained more scores in the posttest over their pretest performance than did the control group (pretest: experimental group 32.32%, control group 40.01% a difference of 7.69% in favour of the control group; posttest: experimental group 62.21%, control group 63.83% a difference of 1.62% in favour of the control group, but in terms of gains experimental group 29.89%, control group 23.82%). Moreover, whereas the experimental group lost some pretest mean scores in only one topic (Subject-Verb Concord: pretest 68.45%, posttest 66.16% loss 2.29%) in the posttest, the control group lost scores in two topics (Verb Present: pretest 39.23%, posttest 38.46% loss 0.77% and Subject-Verb Concord: pretest 72.21%, posttest 64.60% loss 7.61%). Of great significance is the issue of both groups losing mean scores in the subject – verb concord, the topic in which they had both performed best during the pretest. This needs further investigation. Three posttest mean scores in the experimental group and two in the control group were above 50% as against one each from both sides in the pretest while they both had net gains in these topics. This shows that both sides have seen considerable improvement in the posttest. However,
considering the high gains of the experimental group, we can conclude that the intervention benefited the experimental group more than it did the control group.

Table 5.16 Pretest – posttest means of the experimental and control groups according to topics examined

<table>
<thead>
<tr>
<th>Grouping By Topics</th>
<th>Pretest Scores of Exp Group</th>
<th>Posttest Scores of Exp Group</th>
<th>Mean Dif</th>
<th>Pretest Scores of Cntl Group</th>
<th>Posttest Scores of Cntl Group</th>
<th>Mean Dif</th>
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</thead>
<tbody>
<tr>
<td>Noun Plural Mean</td>
<td>40.78</td>
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<td>3.94</td>
<td>36.15</td>
<td>38.46</td>
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<tr>
<td>Std. Dev</td>
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<tr>
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<td>29.89</td>
<td>40.01</td>
<td>63.83</td>
<td>23.82</td>
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<td></td>
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<tr>
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<td>33.68</td>
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<td>23.42</td>
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<tr>
<td>Verb Present Mean</td>
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<td>38.46</td>
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<tr>
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<td>46.16</td>
<td>1.54</td>
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<td>-7.61</td>
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<td>18.65</td>
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<td>30.52</td>
<td></td>
<td>29.14</td>
<td>31.19</td>
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</tr>
</tbody>
</table>

The table below (Table 5.17) makes it clear that the worse performance of the boys in the experimental group was maintaining their pretest score (Subject-Verb Concord: posttest 67.5%); they never lost any mean score while all the other gender subgroups lost mean scores in at least one topic. They (boys in the experimental group) came first in
four out of the 6 topics (Plurals of Nouns 47.5%, Capitalisation of Nouns 72.5%, Verb Present 51.3%, Verb Past Regular 60.0%), their female counterparts in one (Verb Past Regular 43.3%) and the boys in the control group took the remaining one (Subject-Verb Concord: posttest 71.4%). The girls in the experimental group and the boys in the control group lost 6% and 8.7% respectively in one topic each (girls in the experimental group: Subject-Verb Concord 70.0% to 64.0%; boys in the control group Past Tense of Verbs Regular 60.1% to 51.4%), but the girls in the control group lost in 3 out the 6 topics (Verb Present 41.7% to 33.3% a loss of 8.4%, Verb Past Irregular 41.7% to 38.9% a loss of 2.8% and Subject-Verb Concord 66.7% to 56.7% a loss of 10.0%) contributing to their group’s low performance in almost all the topics. Even though the girls in the control group did not lead in the capitalisation of nouns, they gained the highest mean score. This means that they benefit most from the intervention in this topic. Again, despite the fact that they did not performed well in all the other topics, the boys in the control were the only subgroup that gained in the subject-verb concord (0.3%) when all the others lost and the best performing subgroup, the experimental group, could only manage to maintain the pretest score. It is clear that the good performance of the experimental group in all the topics was aided mainly by the creditable performance of the boys in the group. However, the creditable gain in the mean score of the girls in the control group in the capitalization of nouns (36.6%) did not translate into a net higher mean score for their group though it had helped their group to take the first position, whereas their continual loss of scores had contributed to the low performance of their group.
Table 5.17  Pretest – posttest means according to topics examined by gender

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<td>67.5</td>
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<td>57.6</td>
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<td>33.3</td>
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</table>

In trying to ascertain whether there have been any significant differences at the 0.05 level in the relationship between the paired achievers groups and all the other relationships established in the pretest analysis, we employed differences in means, ANOVA and t-test analyses. The result shows both significant and insignificant differences.
The table of achievement level below (Table 5.18) indicates that the High Achievers in the control group gained the least mean score (1.5%) in the posttest while their experimental group counterparts obtained the second highest increase (10.5%). However, it is the Low Achievers in the experimental group who had the highest additional mean score (17.2%) to become Middle Achievers. They therefore became homogeneous with all the other subgroups except the High Achievers in the experimental group. The Middle Achievers in the experimental group, on the other hand, were the second from the bottom in terms of the scores gained, adding only 3.0%, which saw them fall from their third position to the last but one position (5th position). In the experimental group, the intervention favoured the Low (gain 17.2%) and the High (gain 10.5%) Achievers while in the control group it benefited the Low (gain 6.0%) and the Middle (gain 5.0%) Achievers. It is also clear also that the margins by which the achievers in the experimental group increased were far higher than those of the control group.
Table 5.18 Analysis of the posttest according to achievement levels in the pretest

<table>
<thead>
<tr>
<th>Achievement Grouping</th>
<th>Pretest Scores</th>
<th>Posttest Scores</th>
<th>Mean Difference</th>
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</thead>
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<tr>
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The summary of the $p$-values of the posttest ANOVA analysis of the achievement levels indicates that of the fifteen paired relationships in the analysis, only five are heterogeneous after the posttest, the direct opposite of the situation for the pretest analysis (ten were heterogeneous). Of the five that are heterogeneous, four are relationships with the High Achievers in the experimental group which have been maintained intact owing to their creditable performance. In other words, the High
Achievers in the experimental group were the only higher rank that had maintained all their relationships with the other groups. The creditable performance of the Low Achievers in the experimental group had brought them on par with the higher levels of achievers except the High Achievers in the experimental group, making the Low Achievers in the experimental group homogeneous with all those groups.

Table 5.19 Table of the $p$-values of the posttest ANOVA test for the achievers’ groups

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<th>Low Achievers Exp Group</th>
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<th>Middle Achievers Cont Group</th>
<th>Low Achievers Cont Group</th>
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<tr>
<td>Middle Achievers Cont Group</td>
<td>0.005</td>
<td>0.984</td>
<td>1.000</td>
<td>0.357</td>
<td>0.170</td>
<td></td>
</tr>
<tr>
<td>Low Achievers Cont Group</td>
<td>0.000</td>
<td>0.519</td>
<td>0.277</td>
<td>0.004</td>
<td>0.170</td>
<td></td>
</tr>
</tbody>
</table>

However, even though the ANOVA analysis did not prove the difference between the mean scores of any of the paired levels statistically significant, a t-test carried out on the same data proved the difference between that of the pair of High Achievers to be statistically significant. The High Achievers in the experimental group ($M = 68.5$, $SD = 4.1$), differs significantly from the High Achievers in the control group ($M = 59.5$, $SD = 4.1$), $t(6) = 3.1$, $p < 0.05 = 0.021$. The addition of this has rendered all relationships with the High Achievers in the experimental group heterogeneous. On the other hand, even though the difference between the mean scores of the pair of Low Achievers was the same as that of the High Achievers, the larger standard deviation of the Low Achievers of the experimental group had rendered the test statistically insignificant. The test
therefore indicated that the Low Achievers in the experimental group (M = 50.0, SD = 7.6), does not differ from the Low Achievers in the control group (M = 41.0, SD = 5.8), t(7) = 1.95, p > 0.05 = 0.092. This means that the range of the scores of the Low Achievers in the experimental group was wider than that of the control group.

Table 5.20 Group Statistics for the Posttest Scores of the pair of High Achievers

<table>
<thead>
<tr>
<th>Achievement Grouping</th>
<th>N</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Achievers Experimental Group</td>
<td>4</td>
<td>68.5</td>
<td>4.1</td>
<td>2.1</td>
</tr>
<tr>
<td>High Achievers Control Group</td>
<td>4</td>
<td>59.5</td>
<td>4.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Table 5.21 Independent Samples Test for the Posttest Scores of the pair of High Achievers

<table>
<thead>
<tr>
<th>Posttest Scores</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances assumed</td>
<td>F</td>
<td>0.000</td>
<td>1.0</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>F</td>
<td>3.1</td>
<td>6.0</td>
</tr>
</tbody>
</table>
The posttest analysis of scores by sections saw no significant change in the trend of the achievement in each section except that some of the groups increased their performances while others did not. Apart from section A where both groups had the same mean score (even though the experimental group gained while the control group lost); the experimental group topped all the other sections. The experimental group had not seen a decrease in mean score in any section; rather, it increased the mean in section E (one of the sections where participants were required to look out for incorrect forms of words and correct them) by more than 20%, the highest increase in any given section. On the other hand, the control group lost 2.3% mean marks in section A and increased the mean in section E by 12.3%. In each section (apart from A), the experimental group beat the control group in both the aggregate mean scores and the net mean scores gained. This shows that the experimental group benefited more from the intervention than the control group considering the fact that the control group topped four out of the five sections during the pretest.
Table 5.22 pretest-posttest scores compared by sections.

<table>
<thead>
<tr>
<th>Sectional Groupings</th>
<th>Pretest Scores of Exp</th>
<th>Posttest Scores of Exp</th>
<th>Pretest Scores of Cntl</th>
<th>Posttest Scores of Cntl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>72.3</td>
<td>73.8</td>
<td>76.1</td>
<td>73.8</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>13.2</td>
<td>18.5</td>
<td>17.2</td>
<td>18.9</td>
</tr>
<tr>
<td>Section B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>64.6</td>
<td>80.0</td>
<td>66.8</td>
<td>72.3</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>18.5</td>
<td>16.7</td>
<td>19.9</td>
<td>21.8</td>
</tr>
<tr>
<td>Section C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>46.9</td>
<td>59.2</td>
<td>50.0</td>
<td>54.6</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>27.9</td>
<td>25.4</td>
<td>20.9</td>
<td>25.5</td>
</tr>
<tr>
<td>Section D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>18.5</td>
<td>19.2</td>
<td>15.4</td>
<td>16.9</td>
</tr>
<tr>
<td>N</td>
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<td>10</td>
<td>10</td>
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<tr>
<td>Std. Dev</td>
<td>13.7</td>
<td>15.9</td>
<td>8.9</td>
<td>17.7</td>
</tr>
<tr>
<td>Section E</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>19.3</td>
<td>43.0</td>
<td>23.1</td>
<td>35.4</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>9.8</td>
<td>26.8</td>
<td>12.0</td>
<td>25.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>44.3</td>
<td>55.0</td>
<td>46.3</td>
<td>50.6</td>
</tr>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>28.3</td>
<td>30.1</td>
<td>28.7</td>
<td>30.7</td>
</tr>
</tbody>
</table>

The analysis of the groups on gender-bases was to find out the contribution each gender made to the success or failure of the group and where each gender excelled or failed. The general trend of performance for all the participants had not changed much. The first two sections (A and B), which are isolated sentences with multiple choice answers, recorded the highest scores while the third, a cloze with multiple choice answers, recorded average scores. However, performances in the last two sections were not encouraging and of the two, section D, a passage in the present tense, recorded the worst performance. This explained the low performance recorded for the present tense in which only one mean mark was above 50%.
While all the other subgroups lost mean scores in only one section (the boys in the control group – section A, the girls in the experimental group – section A, the boys in the experimental group – section D), the girls in the control group lost in two sections (section C and section D), maintained their score in one (section A) and increased their scores in two sections (sections B and E). In section E where they had performed worst in the pretest, they increased their score by 21.7% while in section B they did so by 10%. Even though they did not perform in three sections, their net increase (5.6%) exceeded that of their male counterparts (3.1%).

From the above discussions and the table below (Table 5.23) we may say that even though the girls in the control group had contributed more than the boys, their losses contributed to their inability to overtake the experimental group in any of the sections. On the other hand, the strategic performance of both gender subgroups in the experimental group helped them to lead in all the sections. For example, in section A, the girls lost some mean scores but the boys did well to cover the group up. Again, in section C where the scores of both gender subgroups in the control group were above that of the girls in the experimental group, their boys performed well enough to enable them to take the lead. Besides, when the boys lost scores in section D, the girls added enough to help them come first.
### Table 5.23 pretest – posttest scores compared by sections according to gender

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Section A</td>
<td>Mean 71.3</td>
<td>76.3</td>
<td>74.0</td>
<td>70.0</td>
<td>80.0</td>
<td>75.7</td>
<td>71.7</td>
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<td>10</td>
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<td></td>
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<td>17.1</td>
<td>26.7</td>
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<td>18.1</td>
<td>20.3</td>
<td>27.3</td>
<td>23.6</td>
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<tr>
<td>Section B</td>
<td>Mean 65.0</td>
<td>81.3</td>
<td>64.0</td>
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<td>77.1</td>
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<td>27.9</td>
<td>22.6</td>
<td>22.3</td>
<td>25.4</td>
</tr>
<tr>
<td>Section C</td>
<td>Mean 51.3</td>
<td>62.5</td>
<td>40.0</td>
<td>54.0</td>
<td>48.6</td>
<td>58.6</td>
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<td>50.0</td>
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<td>10</td>
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<tr>
<td></td>
<td>Std. Dev 34.1</td>
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<td>24.9</td>
<td>26.7</td>
<td>32.4</td>
<td>31.9</td>
<td>21.4</td>
<td>26.1</td>
</tr>
<tr>
<td>Section D</td>
<td>Mean 25.0</td>
<td>21.3</td>
<td>8.0</td>
<td>16.0</td>
<td>15.7</td>
<td>20.0</td>
<td>15.0</td>
<td>13.4</td>
</tr>
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</tr>
<tr>
<td></td>
<td>Std. Dev 18.6</td>
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<td>10.6</td>
<td>19.3</td>
<td>14.6</td>
<td>20.5</td>
</tr>
<tr>
<td>Section E</td>
<td>Mean 18.8</td>
<td>52.5</td>
<td>20.0</td>
<td>28.0</td>
<td>38.6</td>
<td>42.9</td>
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<td>10</td>
</tr>
<tr>
<td></td>
<td>Std. Dev 15.9</td>
<td>29.9</td>
<td>13.3</td>
<td>26.9</td>
<td>20.2</td>
<td>28.6</td>
<td>8.1</td>
<td>26.3</td>
</tr>
<tr>
<td>Total</td>
<td>Mean 46.3</td>
<td>58.8</td>
<td>41.2</td>
<td>49.2</td>
<td>52.0</td>
<td>55.1</td>
<td>39.7</td>
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</tr>
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</tr>
<tr>
<td></td>
<td>Std. Dev 30.1</td>
<td>30.1</td>
<td>32.4</td>
<td>33.4</td>
<td>32.9</td>
<td>32.5</td>
<td>31.9</td>
<td>32.5</td>
</tr>
</tbody>
</table>

### 5.4 Discussion based on Gender

This section discusses the gender issues arising from the analysis.

From the discussion, it turned out that whereas the boys in the experimental group benefited more from the intervention than their female counterparts, the boys in the control group were overtaken by their female counterparts (though their absolute mean...
score was higher than that of the girls). The trend was reflected in the mean difference comparison in Table 5.15. even though the absolute values of the scores in the analysis of the topics in Table 5.17 did not reflect this, a look at the differences between their pretest and posttest scores showed that the girls in the control group gained more in the posttest than their male counterparts while the boys in the experimental group also gained more than their female counterparts. In the experimental group, the boys overtook the girls in four out of the six topics assessed and apart from the subject-verb concord where the boys did not add anything to their score (even here they beat them by 6%), the boys beat the girls with mean scores ranging from 9% to about 17% while the girls beat them with 0.3% and 13.5%. On the other hand, the two gender subgroups in the control group shared the honours between themselves, but the girls gained more than the boys (they beat the boys by 5.0% in plurals of nouns, 23.7% in noun capitalisation and 22% in regular form of past tense of verbs while the boy beat them by 14.1% in present form of verbs, 14.7% in past irregular and 13% in subject – verb concord).

If we consider the gains made again, the trend is not different in the sectional analysis from the previous ones (Table 5.23). The boys in the experimental group beat the girls in three out of the five sections (A, B and E) in the mean gained made in the posttest. Their gains in section E was the most creditable performance of the boys (gaining 33.7% mean). The interesting thing that emerged in the sectional analysis was that the girls in the control group mirrored the pattern created by the boys in the experimental group. The girls in the control group excelled in sections A, B and E with E being their best mean gained in all the sections (21.7%). Their next best gain was in section B which happened to be the next best of the boys in the experimental group. The reverse also
holds for the boys in the control group (their best performance was in section C – 10% gain) and the girls in the experimental group (their best performance was in section C – 14% gain).

The significance of the large gains in section E was that the boys in the experimental group and the girls in the control group found more words and corrected them in the posttest than they did in the pretest. The section E passage was written in the past tense while section D where all the groups perform worst was written in the present tense. The section C in which the girls in the experimental group and the boys in the control group perform well was the cloze test written in the present tense. The two subgroups (the girls in the experimental group and the boys in the control group) also performed slightly better than their counterparts in section D which was also written in the present tense. All the three sections (A, B and E) in which the girls in the control group and the boys in the experimental group gained more scores also contained the correction of nouns (both capitalization and plurals). This is a reflection of the creditable performance of both groups in the capitalisation of nouns and past regular verbs.

We can therefore conclude that when we consider gains made in the posttest, the boys in the experimental group and the girls in the control group were leaders in their groups with creditable performances in the capitalisation of nouns and the past tense form of regular verbs, which is reflected in their performance in sections B and E. However, the other two gender groups also performed fairly well in the present tense of verbs reflected in sections C and D.
5.5.0 Analysis of Post-experiment Questionnaire

At the end of the experiment, a set of questionnaire was administered. It aimed at finding out participants’ disposition towards the treatments and the problems they faced.

5.5.1 The Control Group

The analysis looked at participants’ disposition towards the materials used for the study and how useful they were to them in the study of grammar. They all agreed that they enjoyed reading the materials given them. The English Scholar materials seemed to gain wider popularity among participants in the control group (six participants (46.2%) out of thirteen selected it as their preferred material) followed by the Sort Me Out (three participants (23.1%) chose it as their favourite while seven (53.8%) think it was their second best) while the Grammar Wizard became the least preferred (three (23.1%) selected it as their best, five – 38.5% as their second choice, five – 38.5% as their third choice). On gender-bases, the preference of both the boys and the girls followed the trend of the overall preferences. The English Scholar materials came first (three (23.1%) from each group) then Sort Me Out and the Grammar Wizard. This may be owing to the nature of the materials. The English Scholar materials consist of substitution tables from which participants were to write sentences. This may be easier to do than sorting a large number of nouns into the various categories. But this even may be less difficult to do than learning the plurals of a list of nouns and the third person and the past tense forms of a list of verbs.

Asked how many times they read the materials, the girls showed that they were more serious than the boys in the reading, but whether the girls were telling the truth was another thing to unravel. 50% of the girls said they studied on the average, six times a
week, 33.3% studied five times a week while 16.7% read three times a week on the average. On the other hand, their male counterparts did not seem to show that seriousness (57.0% read twice a week while 43.0 % read thrice a week). All the six girls said the materials helped them very much while four of the boys (57%) also said so and the remaining three (43%) said it helped them. Asked how many times the study pairs met, four of them, one girl and three boys (two pairs) said they never met, three boys in a group said they met only once in a week, a boy and a girl in a group said they met twice a week on the average while two girls said they met six times a week, but two girls disagreed on the number of times a week they met; whereas one said they met four times, the other said they met five times. The difference was not so much and this was not a serious problem. Eleven (84.6%) of the control group sought help in studying the materials while the rest did not. Seven (53.8%) sought help from their brothers, two from their parents and one each from their sister and a neighbour.

Even though both the boys and the girls indicated that the materials were helpful to them, those who made very good use of them state that they had been of great help to them while those who did not make the best use of them did not think the help was that significant. Since we cannot verify the “truth” of the information provided in the questionnaire (The girls may be exaggerating), we will come to a conclusion that the girls put in more effort in studying than the boys; the girls devoted much time to reading and meeting with their partners to study and they also sought help to help them digest the materials. The boys, on the other hand, put in less effort including not meeting their partners or meeting them fewer times to study as well as not seeking help to help them study the materials well. This was reflected in their performances such that the girls
gained more scores in the posttest than the boys did. The English Scholar materials also came out as the preferred material followed by the Sort Me Out and then the Grammar Wizard.

5.5.2 The Experimental Group

The rating of the games by the experimental group however followed a different trend. The Grammar Wizard was the most preferred (seven participants in the experimental group - 53.8% - chose it as best) followed by the English scholar (three participants – 23.1% - selected it as their preferred while five – 38.5% - had it as their second best) and then the Sort Me Out (three – 23.1% - chose it as their best, but only three – 23.1% - of them select it as their second best). The girls followed the general trend of preference. However, the boys preferred Sort Me Out to English Scholar (25% chose Sort Me Out as their best while only 12.5% thought the English Scholar was their best).

As asked whether the game helped them in their study of grammar, they all agreed that it helped them, but when asked what they would prefer using to study grammar (a book or a game), 38.5% of them chose a book (60% of the girls and 25% of the boys) while the remaining 61.5% chose a game (40% of the girls and 75% of the boys).

Even though five participants in the experimental group (38.5%) opted for books for studying grammar, all of them expressed interest in using either the games used for the project or the games they played before and felt comfortable using or both in studying grammar. 46.2% of them preferred using only the games used in the research, 46.2% would like to use both the games and other games they played before whereas only 7.6% (a boy) would like to use only games other than those used in the research. When asked to name the other games they would like to use, various games were named, but they
were grouped into two major groups of video games and board games. The boys named video games including racing games, football games and shooting games while the girls selected word games such as puzzles and other games mostly found on mobile phones. This accounted for why more girls than boys found it difficult playing some of the games especially the sorting game which needed the tactics of reading words on cards, planning the arrangement and determining the movement of which card would give advantage before the player moves the card. Most of the girls and some of the boys did not plan the movement before picking a card; they kept using trial and error and so they got stack after just some few movements and had to restart the game all over.

Nine (69.2%) of the participants of the experimental group said they had no problem with the games while 31.8% of them said they had problems. Of the 31.8% who said they had problems, 15.4% said they could not hold the mouse properly while 15.4% said they found the game difficult and were not able to play. Each participant would like to have copies of the games at home to help them study. Asked why, they responded that it would help them learn (It will help me learn grammar. It helps me to study English. It makes me intelligent. etc.). Two boys (25%) and four girls (80%) indicated they were not regular and gave two main reasons. The two boys and two of the girls said they were engaged at home most of the time (doing house chores) while the remaining two girls said they were not able to play the game well. The remaining seven (53.8%), comprising 75% of the boys and 20% of the girls who were regular said they did so because the games helped them to learn. But one of them said the games made him happy; that is to say, he enjoyed playing the games.
From the analysis, it is clear that all participants regarded the language games to be helpful in learning grammar and would like to own them to help them study, but some of them (more girls than boys) had problems either with the playing of the games, skills in playing the games or time to attend the practice session. These problems were likely to affect their output. On how comfortable participants were with the games, the Grammar Wizard is the most preferred among all the participants followed by the Sort Me Out among the boys and English Scholar among the girls. As to whether they had produced results commensurate with their ratings, we would find out in the subsequent discussion. It has also turned out that the preferences of games types for learning of the boys and the girls differ based on the skills and experiences in game-play. While the girls went in for games that were easy to play including board games and other non-video games, the boys went in for both board and video games.

5.6.1 Discussion (General Performance)

The analysis above reveals that even though the experimental group outperformed the control group, the difference between the mean scores was not statistically significant. This agrees with the findings of Bullard, et al (2014), Pierfy (1977), Yu (2005), Miller (1992) and Gardner (1987). This does not support the widely acclaimed view that game based grammar practice produces a higher result than the traditional way of practising by learning from notes and text books (Qteefan, 2012; Kangas, 2010; Suh et.al, 2010; Paraskeva et.al, 2010; Falloon, 2010; Chuang et.al, 2009; Kim et.al, 2009; Judge, 2005; Cameron & Dwyer, 2005; Donmus, 2010; Deesri 2002; GarciaCarbonell, et al 2001; Gaudart, 1999; Hong, 2002; Shie, 2003; Cortes, 1974; Issacs 1979; Wruckle-Nelson,
1992), nor does it support the assertion that the traditional form of practice is superior to game practice (Pierfy, 1977).

Just as Bullard, et al (2014) who attributed the insignificance of the mean difference ($p = .66$; mean difference 1.37%) to the small sample size of the group (The sample size was 92 put into control group 47 and experimental group 45), but unlike Qteefan (2012) whose sample size and mean differences were large (sample size 140; each group having 70 participants each and diff 23.0%) and whose results are significant, the sample size of this study has been very small, even less than that of Bullard, et al (2014) (sample = 26 with each group having 13 participants) owning to logistics problems. As mentioned earlier, the sample size affects the significance of the differences in the result. As such this outcome may be attributed partially to the small size of the sample.

However, when the mean of the net scores gained (the mean of the scores obtained above the pretest scores) were compared, the result was statistically significant at the 0.05 level for both the t-test and the ANOVA test. The researcher therefore believes that the treatment of practising grammar through the medium of games produces better result than the traditional way of practising through the reading of notes. Moreover, the boys in the experimental group, who were regular at the practice session, were the only participants that were consistent with their scores (they were the second highest in terms of mean scores gained (19.8%) and the lowest in mean scores lost (7.5%) and came out with the highest net mean score gained of 12.3%) compared to the girls in the control group who report they have been committed to their studies of the materials (They have the third highest gain of 18.0% but the highest loss of 12.3% with the third highest net mean scores gained of 5.7%).
In addition, the experimental group outperformed the control group in all but one topic treated (which happened to be the capitalisation of nouns) even though the control group outperformed them in four (capitalisation of nouns, regular and irregular past tense and subject-verb concord) out of the six topics during the pretest. The experimental group also outperformed them in four out of the five sections including all the sections involving the finding of wrong forms of words in given passages and correcting them while both groups had same mark in the remaining section. This shows that the participants in the experimental group became more conscious of the forms of the words than did those in the control group. This was the result of the playing of the Grammar Wizard game which turned out to be the preferred game among all the participants in the experimental group.

An issue that came up was the inability of some experienced game players who were regular at the practice session to translate their practice into acquiring the grammatical skills. My observation at the practice session revealed that these participants did not play one game for a long time hence they did not benefit from their engagement with the materials in the game. They quickly finished one game and moved on to another game (even to unrelated PC games on the computers) without repeating the games several times even though they were instructed to do so and were several times reminded to do so. However, those with lesser skills who played each game over and over again were engaged with the content and they made great progress. The experienced game players found the games so simple and unfortunately the various levels needed to cater for such participants were not programmed.
The control group did not perform well because some of them, especially the boys did not show commitment to studying the materials given to them and even the girls who reported that they were committed to the study were not able to translate their studies into the acquisition of the grammatical skills. One of the reasons may be that since the materials were bulky (some running over 30 pages), they could hardly go through all of them on their own and they were not able to select the important things to study. Some were engaged in running their house chores and might not even open the manuals but would want to impress the researcher and so indicated they were studying.

5.6.2 Achievement levels

The result of the achievement level analysis has confirmed the assertion that Low Achievers tend to benefit more from interventions than the other achievement groups (Berns et al 2013; Qteefan, 2012; Ulicsak and Wright 2010; Miller et al 2006; Squire 2005 and Yu, 2005). It also supports Gaudart’s (1999) suggestion that games have the potential to benefit students of lower academic prowess and answers the call of Shie, (2003) for further investigation into the benefits weaker students may derive from the use of game in studying grammar while it serves as empirical evidence that it indeed has the potential. Even though the Low Achievers in both groups benefited from their treatment, those in the experimental group benefit more than those in the control group. Though the difference in their means was not proven statistically significant, a mean difference of 9% is large enough to say that those in the experimental group performed better than those in the control group.
However, it was not only the Low Achievers in the experimental group that benefited from the practise with game, but also the High Achievers. This corroborates the findings of Qteefan (2012) who found that both the low Achievers and the High Achievers in the experimental group significantly outperformed their control group counterparts. However in the current study, it is only the difference between the High Achievers that is statistically significant. One of the reasons given by previous researchers for the High Achievers not gaining much from game treatment was the ceiling effect. This is the situation where the High Achievers have very little room left to reach the ceiling after the pretest. They therefore have very limited opportunity to gain more scores in the posttest. In this research the High Achievers had so much room which they were not able to fill even after the posttest hence their ability to add more to their scores.

In the control group, the intervention benefited the Middle Achievers and the Low Achievers more than the High Achievers unlike those in the experimental group whose High Achievers rather than their Middle Achievers benefit. The result in the control group rather agrees with Yu (2005) whose Low and Middle Achievers in the experimental group gained more than their High Achievers.

5.6.3 Discussion of the Groups on Gender Bases

Gender-wise, in general terms, the males performed better than the females in both groups both in the pretest and the posttest. This suggests that the boys were superior in the study of grammar to the girls unlike Qteefan (2012) who found that the girls rather performed better because they could concentrate. The failure of the girls to perform better than the boys might be attributed to the lack of time for the girls to
revise probably because they were engaged in house chores after school. In the experimental group, the girls absented themselves from the practice sessions most of the time such that some days no girl reported for the practice session.

However, it must be noted that this is a class brought together from different backgrounds and they had been together for less than one year before the pretest. The posttest revealed that the boys were still superior (apart from one girl who performed creditably in both the pre- and the posttest), but when looked at from other angles reasons can be assigned. The girls gained more new scores in the posttest than the boys in each group but lost heaviest. This may be the result of lack of revision or that their scores are founded largely on guess work. A look at the last two sections involving the finding and correction of word forms in given passages showed that the girls had a weak base in reading and this might have been the cause of their inability to translate their studies into acquisition. The girls in the experimental group did not have the materials to study at home hence their inability to attend the practice sessions heavily affected their performance since they relied solely on what was taught in the class and lack of revision and disuse would make them forget.

It has also turned out that more boys than girls (40% of the girls and 75% of the boys) preferred the use of game in studying grammar to the use of books and, left on their own, the boys would choose to play the games without supervision while the girls would prefer reading the materials. As it turned out in the experimental group, the boys had higher turnout than the girls while the girls in the control group seemed to show more commitment to reading the materials than their male counterparts. In
agreement with both Qteefan (2012) and Harb (2007) who state that girls can concentrate better than boys, helping them to perform better than the boys in grammar lessons, I seek to explain the preference of the girls for the use of book in terms of their ability to concentrate on the reading of the text. Even though only one girl in the experimental group was able to rub shoulders with the high performing boys and none of the girls’ groups was able to match up to those of the boys, the trend in the gains made in the control group pointed to the probability that the girls might be reading more than the boys.

In terms of skills in playing games and how games can help both boys and girls to study grammar, it is clear that both the boys and the girls enjoyed playing the games and would like to have them at home. This is a clear sign that games can be used to enhance the studies of both boys and girls but it has been pointed out that the level of skills and experiences of the boys and the girls and the differences in their skills and experiences have effect on their disposition towards the games and consequently affecting their performance. The girls, for example, found the card game difficult because they did not have experience in playing such games (the ability to study the arrangement of the words before moving any card) and they most of the time got stacked and could not continue the game and had to restart.

The timing of the practice session has also not favoured the girls since most of them were engaged in performing house chores after school. If probably the practice sessions had been included in the school hours they might have been able to take active part in it and their performance enhanced.
CHAPTER 6
CONCLUSION

6.0 Introduction

In this chapter the limitations, conclusion, pedagogical implications and recommendations for further studies are presented. The limitations discuss the challenges that have directly or indirectly affected the study while the conclusion outlines the objectives, methods and outcomes of the study. It is also important that the result of the study is given a practical application in educational circles. This has been presented in the pedagogical implications section. Recommendations are included to guide both the researcher and others who may read this work to help them to do further research. This is to enable them to determine unexploited areas and any challenges they are likely to face.

6.1 Limitations

This project was not without challenges. It was affected by numerous challenges, both directly and indirectly. First, there was a change in the closing time of the school selected for the research which led to a reduction in the practice time of the experimental group to about 30 minutes since it took them about half an hour to come to the computer lab and settle down for the practice session to begin.

As if these were not enough, there was nationwide rationing of electricity at the time of the project, which affected the practice sessions tremendously. The frequent power outages reduced the practice days to a maximum of three days per week while even on the days when power was restored the sessions could unexpectedly be disrupted by a
sudden outage. Even though the power outages would also affect the control group in their night studies, they could use the day light to their advantage.

Indeed these challenges affected the outcome in one way or another. However, they had not taken away the essence of the research and the experience gained from it. Moreover, the available time was utilised, which is what produced this result. Probably if these problems were controlled or brought to a minimum, the result would have favoured the experimental group in that they would have had enough time to practice and could have performed better.

6. 2 Conclusion
The major preoccupation of this study was to find out which of the two methods (the use of games or the use of traditional methods of learning from notes and textbooks) is more effective in practising grammar skills. This was carried out through an intervention in which the experimental group practised with digital language games while the control group practised the traditional ways of learning from notes and textbooks. Data collected from the two achievement tests written by the two groups were analysed using the t- and the ANOVA tests. In order to have insight through various angles of their performance in the tests, not only were the general achievements compared, but also the achievements at three different levels (Higher achievers, middle achievers and low achievers), the achievements in each of the topics treated, and the achievement in the various sections of the tests were also compared. Other issues discussed are the achievement and the favourability of the methods of practising grammar by the gender sub-groups in both groups. This
includes their performances in each of the groups and their disposition towards the materials used for the practice.

The analysis of the pretest shows that the two groups were comparable at the commencement of the study even though the control group was slightly ahead of the experimental group. It was found that it was the low achievers in the control group that made the difference. Gender wise, the boys in the control group were slightly ahead of their counterparts in the experimental group while the females in the experimental group also had a slight edge over their counterparts, but generally, the experimental group was not in any way different from the control group.

The comparisons were made at the 0.05 level of significance using both the t- and ANOVA tests. The analysis was done for the absolute scores obtained and the net scores gained above the pretest scores by each group of participants. The results were presented in statistical tables and graphs.

The analysis of the results of the general performance in the posttest showed that even though the experimental group outperformed the control group, the difference between the mean scores of the two groups was statistically insignificant. However, when the net scores gained in the posttest above those obtained in the pretest were considered, the difference became statistically significant in favour of the experimental group.

When other parameters analysed were considered, the experimental group outperformed the control group. The experimental group outperformed the control group in 83% of the topics treated and 80% of the sections into which the test were divided and shows superiority in sections involving finding and correcting wrong word forms in a passage.
This may be considered as proof of how the game on form (Grammar Wizard) had sharpened their ability to detect wrong words in a given passage. In considering which achievement subgroup benefited more from the performance, we find that the Low and High Achievers in the experimental group came out on top.

The experimental group also seemed to be more consistent in consolidating their pretest scores in the posttest than the control group. The analysis reveals that the participants in the experimental group obtained more scores from questions they got wrong in the pretest and lost fewer scores from the questions they got right in the pretest while their counterparts in the control group obtained less (compared with that of the experimental group) and lost more.

Regarding the analysis on gender, the corresponding gender sub-groups in the experimental group outperformed their control group counterparts while the males outperformed the females in the general performance, but when the net gains were considered, the males in the experimental group outperformed their female counterparts while the females in the control group outperformed their male counterparts.

The consistency in the performance of the experimental group indicates that notwithstanding the challenges the practice session had faced, the digital language game practice had a positive impact on the experimental group. We may therefore include that even though there is no significant difference in the mean scores of the general performance, the digital language game practice benefited the experimental group more than the traditional practice did for the control group.
Participants in the experimental group indicated that the digital games for practicing grammar had been beneficial to them and had expressed interest in owning one to enable them to practise the skills at home. They also suggested the inclusion of other games, especially video games, in the language games. However, some of the participants in the experimental group (most of whom are girls) would prefer using the traditional method of learning from notes and textbooks. This is so because they found some of the games difficult to play.

It was found that even though some participants in the experimental group had not translated their active participation in the practice session into the acquisition of the skills, generally, the boys who had taken an active part in the practice performed more creditably than the girls who had not been consistent in their participation in the practice sessions. On the other hand, even though most of the participants in the control group reported studying regularly, this did not reflect in their performance scores. We therefore conclude that they might either have been lying about their studies or that their studies might not have been effective.

Despite the challenges this study encountered, we can confidently say that it was successful in that it has given an insight into how effective digital language games can be in practising grammar. It has also revealed the attitudes and expectations of the participants towards the use of games in practising grammar. These will go a long way to help reshape the current experience of the researcher and anyone who may use this study to prepare for further studies in the use of digital language games for studying grammar in order to improve on both the materials and the strategies for handling any unresolved issues that arise in this study.
6. 3 Pedagogical Implications

In view of the little gain accruing from the use of digital games in this research, it is the view of the present researcher that digital games should be integrated into the language curriculum. We have seen that the boys who practised regularly had good results. This observation points to the fact that regular practice of concepts with games is likely to produce good results. Hence, making language games available on social media, mobile phones and computers in schools is likely to increase students’ interaction with grammatical skills and also help them to acquire more of the concepts.

Even though in principle games are supposed to be integrated into the curriculum, we have seen that the word ‘game’ is not even mentioned in the language section of the syllabus of the junior secondary schools (2007). With the introduction of desktop computers, tablets and laptops in schools, this process may be facilitated gradually as each school acquires a set on which the games are installed for use by the students. Students have also been found to possess digital gadgets on which these games may be installed. The games may be distributed to the students or put on the Internet for the students to access as in the case of Indian rural folks (Kam et al, (2009)). Already, the students have been playing games on their phones and computers (some of which are downloaded from the Internet) and at game centers. Games are addictive and well-prepared games can sustain the interest of the player over time by which the language concept or skill will have been acquired.

As part of efforts to improve teaching resources, the Ghana Education Service might initiate further research into specific language games and possibly produce them for
distribution to schools. These games which would be distributed to students who have computers at home, installed on computers in schools that have computers and integrated into the Internet, posting on social media could help students to practise and master specific grammatical skills. Considering the fact that the government of Ghana is championing the distribution of computers, laptops and tablets to schools and to students, the public outcry over students’ neglect of their books and the resultant abysmal performance in their final examinations will be minimized if not completely eliminated while students’ interest in the use of digital media will be directed into learning resources that will help improve their performance in the target language.

There are various games that can be adapted and modified for effective language teaching and learning. These include Scrabbles, girls games such as Fashion Girl and Makeup Spa, football games, racing games, just to mention a few. Scrabbles can be adapted such that instead of the letters of the tiles, words may be used so that it becomes a sentence construction game with pronunciations, illustrations and usage (sample sentences with animated illustrations) included. The girls’ games which basically require players to dress up a lady, can be adapted and modified to include other tasks to be performed, the names and descriptions of the materials and accessories used and commands and requests given out to help the player learn how to use these commands and request in context. Games involving other activities such as cooking, shopping and driving may also be created for the specific needs of the learner.

Non-digital games may also be digitised while new games may also be created for specific purposes to meet the aspirations and capabilities of the learners. Ghanaian games such as Oware, Ampe, draughts, Antowakyire and Pumpunuu and others such as
Ludo and Snakes and Ladders may as well be adapted, modified and digitised to suit the aspect of grammar to be learnt. The game of Ludo may be created to include tasks to be performed by the player. The instructions for tasks to be performed could be written on the squares in the pathways while the tasks such as directing somebody to a given destination, buying something from a given shop and others may be included in the game and may pop up as soon as the player ends the count in a given square.

Games may be programmed to reinforce concepts taught while new contexts are created for the use of the same ideas. New concepts that flow from what has already been treated as well as tasks that seek to connect concepts from different topics and areas of study may be included in such games created. As the research revealed, when the participants in the experimental group are allowed to compete, they begin to focus and find strategies to earn more points instead of the trial-and-error approach adopted by some of them at the beginning of the practice session. It is important therefore that records are kept for the learner to compare his or her performance with others. This challenges the learner to practice more and get focused in order to master the game and overtake those in the lead. In so doing, the player’s interaction with the materials to be learnt is increased; thus aiding the ability to acquire the language concepts.

The digital language games will come to nothing in the schools if the teachers are not involved. The games would not be meant to replace the role of the teacher. Rather, they would supplement the work of the teacher who would supervise the students’ activities. Teachers must therefore be conversant with both the importance and the operation of the game. Teacher-trainees could be trained in how to use games in teaching language and the importance of integrating language games in their lessons. Workshops on how to use
games in teaching grammar and language as a whole may be organised for teachers in the field.

Textbook writers have a major role to play in disseminating information on both teaching and learning. They provide teachers with information on teaching methods and strategies as well as materials and content of what is planned in the curriculum. Therefore, their involvement in the propagation of information on digital language games will help to make them successful. Textbook writers may explore and recommend language games (both digital and non-digital for the teaching of grammar) and include brief tutorials on their usage and importance to the study of language and how they can be constructed by teachers.

6.4 Recommendations for future research

Despite the challenges this research faced, we are sure that some useful lessons have been learnt on the effectiveness of games for practising grammar skills. Since this study is inconclusive, further research needs to be conducted putting in place measures to rectify the anomalies that brought about these challenges. In addition, other areas of language study and other types of games need to be exploited.

One major challenge is the delay in the preparation and programming of the games. This was caused by the fact that the games were prepared within the one year granted for conducting the research. Experience has shown that a single game may take six months to write and programme (not to mention the unforeseeable problems that may arise in the back and forth involved in the of course the programming). Hence, it would be prudent to have the games ready before the beginning of the research years. This will
allow for the testing of the games and the necessary corrections to be made before the commencement of the experiment.

Also, there was a loss of time owing to the movement of participants from their school to the computer centre. It would therefore be prudent to select a school which has a computer laboratory for the study to help minimize the time lost between closing and the arrival of the participants at the practice centre. It may even facilitate the integration of the practice period into the normal class hours.

The games must have levels that treat the same materials with different strategies and difficulties to make room for unskilled game players including the girls. This would encourage the skilled game players to move ahead while still learning the same materials as those at the lower levels, and at the same time prevent them from looking elsewhere for satisfaction of their quest for variety and excellence.

Other areas of grammar may be looked at while other aspects of the English language study such as reading, writing, listening and speaking may also be explored.
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APPENDIX A

DATA COLLECTION INSTRUMENTS

i. Post Experiment Questionnaire

Questionnaire on participants' interest in the Interventions Control Group

1. Do you like the reading materials on grammar given to you?
   a. Yes
   b. No

2. How do you rate the materials?
   a. They are very good
   b. They are good
   c. They are neither good nor bad
   d. They are bad
   e. They are very bad

3. How many times per week on the average have you read the materials?
   a. I have not read
   b. Once
   c. Twice
   d. Thrice
   e. Four times
   f. Five times
   g. Six times
   h. Seven times

4. Has it helped you to learn grammar?
   a. Yes
   b. No

5. How will you rate the help it has given to you in the learning of grammar?
   a. They helped me very much
   b. They helped me
   c. I do not know their usefulness
   d. They did not help me
   e. They did not help me at all

6. How many times in a week did you meet with your partners to study the materials?
   a. We never met
   b. We met once
   c. We met twice
   d. We met thrice
   e. We met four times
   f. We met five times
   g. We met six times
   h. We met seven times

7. Did you ask someone else to help you to learn the materials?
   a. Yes
   b. No

8. If yes, who?
   a. My brother
   b. My parents
   c. My sister
   d. A neighbour
ii. Pre-Experiment Questionnaire for the Control Group

1. Name: ____________________________
2. Which class are you? JHS 1 A ☑ JHS 1B
3. How old are you? 13
4. What is the name of your former school? Hanover Park Primary School
   Name of Town: QL A
5. For how long have you been in St Augustine’s Basic school? 1 year
6. Where do you stay? Amma Amma

**COMPUTER LITERACY**
7. Have you used the computer before? A. Yes ☑ B. No
8. Can you use the mouse? A. Yes ☑ B. No
9. Can you use the keyboard? A. Yes ☑ B. No
10. Do you have a computer at home? A. Yes ☑ B. No
11. Do you use computer at home? A. Yes ☑ B. No
12. Do you study ICT at school? A. Yes ☑ B. No
13. Does your school have an ICT laboratory? A. Yes ☑ B. No
14. For how long have you been using the computer? 2 yr
15. Does your former school have computers in the school? A. Yes ☑ B. No
16. Did you use computer in your former school? A. Yes ☑ B. No
17. Do you have a phone? A. Yes ☑ B. No
18. What do you use your phone for? Internet

**COMPUTER GAME EXPERIENCE**
19. Have you played any computer game before? A. Yes ☑ B. No
20. For how long have you been playing the computer game (years/mounths)? 9 months
21. Do you play games on your phone? A. Yes ☑ B. No
22. Do you play games on any other phone? A. Yes ☑ B. No
23. How long does it take you to finish a single game? 15 minutes
24. How much time do you spend playing a computer game at any given day? 2 hours

**INTEREST IN GRAMMAR**
25. Do you like reading? A. Yes ☑ B. No
26. How do you rate your ability to read? A. very good B. good C. neither good nor bad D. bad E. Very bad
27. How many English books do you have? 10 books
28. Do you like grammar? A. Yes ☑ B. No
iii. Post-Experiment Questionnaire for the Experimental Group

Questionnaire on participants’ interest in the interventions Experimental Group

1. Do you like the games which you played during the practice session?
   a. Yes
   b. No

2. Which of the games do you like most? (put 1 for the one you like most, 2, 3, 4 and 5 for the one you don’t like much)
   a. What do you know?
   b. What can you do?
   c. Grammar wizard
   d. Sort me out
   e. The English Scholar

3. Write down one thing you like about the game you like best?
   If help me to speak good english and spell words.

4. Which of the following will you like to use in learning your English grammar?
   a. Books
   b. Games

5. How will you say the games have helped you to learn the grammar concepts?
   a. They have helped me very much
   b. They have helped me
   c. I can’t tell
   d. They have not helped me
   e. They have not helped me at all

6. Would you like to use the games you have played in this programme to learn grammar or you would like other types of games?
   a. I will like to use the games I have played in this programme
   b. I will like to use the games I have played in this programme and other games
   c. I will like to use other games but not those I played in the programme

7. If you prefer other games name the types of games you will like to use.
   Grand Theft Auto 5

Football
iv. Questions for the Pre-test and Post-test

Choose from the words or group of words lettered a to c the one that best completes each of the following sentences.

Q1. Some .................. broke into our neighbours house.
   a. thieves
   b. thives
   c. thiefs

Q2. My brother found all our ........ in his bag.
   a. toothbrush
   b. toothbrushes
   c. toothbrushes

Q3. Will the Form 3 students attend the ......................?
   a. Aboakyr festival
   b. Aboakyr Festival
   c. aboakyr festival

Q4. The Yape Queen ....................... both the passengers and the vehicles across the Lake Volta at Senkye.
   a. ferrys
   b. ferry
   c. ferries

Q5. Every 6th March, students from all over the country gather at the Independence Square and ...................... to celebrate the day Ghana gains independence from colonial rule.
   a. march
   b. marches
   c. marchs

Q6. He ...................... the car into the ditch last night.
   a. drive
   b. drove
   c. drived

Q7. The teacher ..................... the students who were late to school this morning.
   a. beat
   b. beaten
   c. beatened
Questions

Choose from the words or group of words lettered a to e the one that best completes each of the following sentences.

Q1. Some ....................... broke into our neighbours house.
   a. thieves
   b. thievies
   c. thieves

Q2. My brother found all our ............... in his bag.
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   b. toothbrushes

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   a. ferrys
   b. ferry
   d. ferries

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   a. march
   b. marches
   c. marches

Q6. He .......................the car into the ditch last night.
   a. drive
   b. drove

Q7. The teacher ....................... the students who were late to school this morning.
   a. beat
   b. beaten
   c. beaten
APPENDIX B
SAMPLES OF THE LEARNING MATERIALS

i. TYPES OF NOUNS CLASSIFIED (FOR CARD game)

Proper Nouns

Proper Nouns name specific people, places, or things.

Proper nouns

(XXXXX are proper nouns so they must always begin with capital letter)

<table>
<thead>
<tr>
<th>Proper Nouns</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Mr. Addo</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Miss Anku</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Joyce</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Ama</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Rev. Ocanta</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Mrs. Padi</td>
<td>the name of a person</td>
</tr>
<tr>
<td>President John Evans Atta Mills</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Dr. Kwame Nkrumah</td>
<td>the name of a person</td>
</tr>
<tr>
<td>President Obama</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Chief Ayatola</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Nene Padi Keteku Aklebeto</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Otumfo Opoku Ware</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Yaa Asantewaa</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Sister Rose</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Aunty Adjoa</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Auntie</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Aunty</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Uncle Ben</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Mum</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Mummy</td>
<td>the name of a person</td>
</tr>
<tr>
<td>Daddy</td>
<td>the name of a person</td>
</tr>
</tbody>
</table>

Common Nouns

Common Nouns name people, places or things that are not specific.
Common nouns may be COUNTABLE OR UNCOUNTABLE

Countable Nouns

Countable Nouns name nouns that you can count.
(XXXXX are countable nouns and they have plural forms)

aunt the sister of your father or mother, or the wife of your uncle
brother a male related to you through one of your parents, not through an aunt or uncle
sister a female related to you through one of your parents, not through an aunt or uncle
nephew a son of your sister or brother or a son of the sister or brother of your husband or wife
uncle the brother of your mother or father, or the husband of your aunt
grandmother the mother of your father or mother
grandfather the father of your mother or father
cousin the child of your aunt or uncle, or, more generally, a distant relative
niece the daughter of your brother or sister, or the daughter of your husband’s or wife’s brother or sister
sibling your brother or sister
husband the man to whom a woman is married:
wife a married woman
grandson the male child of your son or daughter
granddaughter the female child of your son or daughter
twin two children born to the same mother on the same day

Uncountable Nouns
Uncountable Nouns name nouns that you can't count.
(XXXXX are uncountable nouns and they don’t have plural forms)
air the mixture of gases which surrounds the earth and which we breathe
cotton a soft white downy fiber that grows in seed pods
water clear liquid, without colour or taste, which falls from the sky as rain and is necessary for animal and plant life
petrol a liquid used as a fuel for cars, aircraft and other vehicles:
blood the red liquid that is sent around the body by the heart
sand a substance that is found on beaches and in deserts, which is made from very small grains of rock

ii. CLASSIFICATION OF VERBS
Base Forms of Verbs and their meanings (for card game)
Irregular verbs

(You must not add d or ed to XXXX when forming the simple past tense)
abide to accept or obey an agreement, decision or rule
alight  to get out of a vehicle, especially a train or bus  
arise  to get out of bed  
awake  to stop sleeping / or not sleeping  
be  to say a person, thing or state, has a permanent or temporary quality, state, etc  
bear  to accept, tolerate or endure especially something unpleasant  
become  to start to be  

Verbs that do not change their form when forming the simple past tense

(You must not add *d* or *ed* to XXXXX when forming the *simple past tense* because they have *the same form* for the *simple past tense.*)

beat  to hit somebody or something with repeated heavy blows  
bet  to promise to give money or receive money if something happens (for example, if a team wins)  
bid  to offer money for something which is for sale and compete against other people to buy it  
burst  to split open suddenly  
bust  to break something/ spoil something to make it stop working  
cast  to throw somebody or something somewhere  
cost  the money you require to pay for something you want to buy  
cut  to divide something by using a sharp tool
APPENDIX C

GAMES USED

I. SORT ME OUT

New Game selection window

Player: MUFIUT

- Continue a previous game?
- Start a New Game?

- Sorting Card Game for Nouns
- Sorting Card Game for Verbs

Game Interface window

SORT ME OUT

Game Interface window
II. Grammar Wizard

Game Interface window

New Game selection window
III. English Scholar

New Game selection window

English Scholar

Game Interface window
APPENDIX D
PRESENTATION AND PRACTICE SESSIONS
A. Participants learning in class during the class presentation session.
C. The end of a game showing the score board and the congratulatory fireworks.
B, D –I and K The experimental group in the practice session.
J. Participants writing the post-test.
M. The Grammar Wizard Game
APPENDIX E

SOURCES OF GRAMMAR GAMES

I. Avatar Generation
(http://www.avatargeneration.com/2012/07/top-5-grammar-game-websites/)

By Sam on 07/16/2012 Top 5 Grammar Game Websites Learning Games,

Top App List

i. Maggie’s Learning Adventures,
ii. Funbrain – Grammar Gorillas,
iii. Arcademic Skill Builders,
iv. Grammar Bytes,
v. Eduplace (Grammar Blast.),

Avatar Generation

Top 8 Grammar Games Apps for Kids

i. Speech with Milo
ii. Jumbled Sentence 4
iii. Sentence Ninja
iv. Pronoun Heroes
v. Ipractice Verbs
vi. Grammar Jammers
vii. Grammarman
viii. Fun English

II. British Council Website Games


III. Games to Learn English

Grammar Bubbles     Falling Clouds

For constructing sentences   For constructing sentences

www.moddownload.com
Compare       Slow Click
For practising making comparative sentences       For practising English language

IV. 6 Super ESL Games for Grammar Review BusyTeacher.org
https://store.busyteacher.org/products/entire-busyteacher-library?variant=10762239297

i. Shoot for points.
ii. Grammar Revision Board Game

iii. Tic Tac Toe
iv. Snakes and Ladders
v. Football
vi. Jeopardy
V. Grammar Ninja download from kwarp.com

VI. Rosetta Stone

Gaming your way to a new language 2013 (www.rosettastone.com/world-faqs

www.rosettastone.com/blog/gaming-your-way-to-a-new-language/