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**AN INVESTIGATION INTO THE SPELLING AND
GRAMMAR SKILLS OF STUDENTS WHO USE
INDIVIDUAL LAPTOP COMPUTERS IN A YEAR 6
CLASSROOM**

Aaron Johnston

**Thesis submitted in partial fulfilment of the requirements of the
degree of
Bachelor of Education (Primary) Honours**

**Faculty of Education
Avondale College**

November 2008

STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not been submitted previously for a degree or diploma at any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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DEDICATION

To all the students of today and tomorrow, I pray that this information and research would allow you to have the best education possible.

ABSTRACT

This thesis constitutes a case study of a single Grammar School in the State of New South Wales, Australia during the year 2008. This particular study takes on a qualitative approach to research, adopting a case study methodology taking data from lesson observations, student and staff interviews and individual student testing. The case study seeks to investigate the long term effect (positive, neutral or negative) that individual laptop computer use has on the spelling and grammar skills of students in a Year 6 classroom. The results from the data gathered have identified several areas of concern regarding the effective development and maintenance of students' spelling and grammar skills in paperless computer-based classroom. Consequently, a list of recommendations has been formulated to ensure the effective development and maintenance of students' spelling and grammar skills in a paperless computer-based classroom.

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CHAPTER 1

INTRODUCTION

In this thesis, the effects of using individual laptops in the classroom are examined. It may appear reasonable to think intuitively that the introduction of computer technologies into the classroom will enhance the achievement of student outcomes in writing; however, this may not be true. This thesis reports on the process and findings of a case study investigation relating to the influence of computer technology on the writing outcomes of a classroom where individual laptops are used by students. This first chapter provides an overview of the background to the study, purpose of the study, significance, theoretical framework, limitations and delimitations and an outline of the thesis structure.

Background to Study

Life in the 21st century is expecting students and teachers to become more proficient in the use of technology, particularly computers, but should technology replace traditional methods of teaching? According to Winch, Johnston, Holliday, Ljungdahl and March (2001, p. 33), “the computer will sit beside the book in the future...so will the computer act as both a supplement and complement to the book?” The new Labor government in Australia seems to have responded to this question affirmatively. It has proposed a digital revolution in education, but further research will need to determine whether this

digital revolution will actually make a positive difference to the achievement of student outcomes.

In some schools the computer has completely replaced the book. It is yet to be determined, however, whether the use of computers within the classroom will benefit the development of students' literacy skills or have a negative impact on students' literacy development. According to Viadero (2007, p. 30), research has developed many computers and technologies for use in the classroom, but little research has been done to discover whether their innovations improve overall literacy, and more particularly spelling and grammar skills.

Purpose of this Study

The purpose of this study is to investigate the ongoing effects (positive, negative or neutral) that the compulsory use of computers has on spelling and grammar skills in a Year 6 computer-based classroom, where individual laptop computers are compulsory and have replaced the use of pen and paper. The case study aimed to highlight whether or not the use of laptop computers in the classroom improved student writing, with specific examination of spelling and grammar in writing. Results from this study were used to formulate a series of recommendations for the maintenance and further development of spelling and grammar skills in a computer-based classroom where individual laptops have superseded pencils and paper. It was anticipated that this study would identify the issues that teachers needed to consider regarding the teaching and maintenance of spelling and grammar skills before embarking on a paperless classroom.

Significance of the Study

Paperless classrooms are becoming more common in Australia and there is limited available research to help teachers make an informed decision regarding this latest trend in the individual use of laptop computers to complete all written assignments. While there is extensive research into the use of computers in the classroom to motivate students, less research has been done to assess how computers help students to achieve outcomes. As there appears to be little research into the advantages of using the computer to meet student learning outcomes, this study provides a range of results and recommendations that may be helpful to any teacher or school considering the shift towards a paperless classroom. It is anticipated that this research will aid in filling partially the gap in current research that is available regarding the sole use of personal laptops in the classroom when teaching literacy.

Theoretical Framework

Proficiency in spelling and grammar is important to the development of literacy skills for future learning. The underlying knowledge that is needed for constructing texts comes through being able to write proficiently with the use of sound spelling and grammar skills. Templeton (2004, p. 58) supports this statement, writing: “We know that much of the knowledge that underlies the construction of a memo or a poem arises not only from reading examples of these genres but from exercising knowledge of these genres through writing”.

In recent times, spelling and grammar have been taught in different ways within the paper-based classroom. The first involved an implicit teaching model and was also known as the whole language approach. Goodman (as cited in Hempenstall, 1997, p. 400) defines the whole language approach as: “A philosophy rather than a series of prescribed activities”. The whole language approach involves the creation of an environment which will encourage students to develop their [spelling and grammar] skills at their own developmentally appropriate pace (Hempenstall, 1997, p. 400).

Spelling and grammar have also been taught using an explicit approach. This strategy is commonly known as phonics or phonetics and involves the explicit teaching of the alphabet and how to use it in reading and writing (Burke, Fiene, Young & Meyer, 2008, p. 169). This explicit approach to reading and writing helps students to: change graphemes into morphemes, decode unknown words, have clues provided to help identify unfamiliar words and build a set of knowledge and skills to help develop reading and writing (Burke et al., 2008, p. 169).

Research over recent years has found the explicit teaching model to be far more effective. Chall (as cited in Hempenstall, 1997, p. 408) found by conducting her own research that: “the systematic teaching of phonics tended to produce better word recognition, spelling, vocabulary and comprehension in all children”. Templeton (2004, p.59) also emphasises the need for the explicit teaching of spelling and grammar skills, stating: “A reasonable prediction, however, is that this practice [the deliberate use of misspellings] will not negatively impact our students' spelling and writing in general if

we: explicitly address, discuss, and explore with students the various requirements and conventions of different genres and their different contexts and purposes”.

Perhaps the biggest problem when teaching writing is actually motivating students to write. For many students the task of writing has become a meaningless chore that provides very little incentive. However, many teachers will agree that the greatest exercise to improve the writing skills of students is practice (Schmelzer, 2004, p. 34). So students need to be motivated to write. Research has found that there is a wealth of motivation when students use computers for writing. Schmelzer (2004, p. 35) confirms this after having extensive experience with computer-based writing, He states, “Even those students who do not have strong touch typing skills are willing to compose more (and better) on the computer with computer-based writing”.

Questions have been raised as to the effectiveness of computers for improving overall literacy skills in general, and spelling and grammar skills in particular. The role of the computer when looking at teaching should be to enhance the learning of students, rather than replace old methods (Lloyd as cited by O Keeffe (2008, p. 10). However, currently there is little, if any, research aimed at answering these questions. Viadero (2006, p. 30) supports this need for further research, by noting that: “Looking back, experts say the case for educational technology could have been much stronger by now if researchers had spent more time assessing learning gains and less time innovating”.

There are a number of negative implications that need to be considered when using computers within the classroom. Templeton (2004, p.59) raises concerns about the use of computers within the classroom by stating, “Using technology, such as e-mail and instant messaging-actually motivates students to write using mutually acceptable abbreviations and misspellings”. Clearly the use of such misspellings creates problems for students when completing formal writing tasks. The constant use of misspellings and lexicons when writing informally, he goes on to point out, not only effects student’s abilities to correctly use spelling and grammar, but it also hampers their ability to express themselves in other writing tasks and in other contexts (Templeton, 2004, p. 59).

Although not specifically mentioned in the literature, another concern would be ensuring students do not form an over-reliance on the automated electronic tools within the computer’s software to edit writing. Over-usage of such tools can contribute to the degradation of spelling and grammar skills of students at any level.

Teachers must also consider the role that these automated tool play when constructing texts. Using a computer as the sole means to formulate and construct texts does hold the potential to mask and hide areas of weakness within students’ writing ability and, in particular, spelling and grammar skills.

The use of computers in writing needs to be meaningful. Computer technologies need to become an active part of the learning process if they hope to provide an advantage for students. The emphasis needs to be on developing more effective learning practices

when using technologies in order to support students writing development (Lankshear & Knobel, 2003).

Research Questions

As indicated in the foregoing discussion, while there is abundant research evidence highlighting the importance of explicit teaching of spelling and grammar skills for overall student literacy development, there is little or no evidence as to the efficacy of computer technologies in teaching these skills.

The general purpose of this study, therefore is to examine the effectiveness of computer instruction for improving spelling and grammar skills in a Year 6 computer-based classroom.

The research questions to be addressed in this case study are:

1. Are spelling and grammar skills seen as important aspects of writing within the Year 6 paperless classrooms where individual laptops are used?
2. How are spelling and grammar being taught in this computer-based classroom where individual laptop computers are used?
3. How are individual laptop computers used as a medium of instruction and learning during spelling and grammar lessons?

4. Are students within this computer-based classroom achieving benchmarks for spelling and grammar?

5. How has the use of laptop computers affected the achievement of these benchmarks?

The findings from this study may be such that they provoke additional and more in depth research to be undertaken in the future.

Limitations/Delimitations

This particular study is a case study of one school and was based on one group sample that was limited to a single case and is not a comparative study comparing a computer based classroom to a non-computer based classroom. This study brought with it all the limitations of a single case study research, including a non-transferability and short time-frame. As a result of this, the results are specific to the single group sample that was studied.

Thesis Outline

Chapter One has provided a brief overview of the background, purpose and the significance of this case study. In addition, it has provided a theoretical framework employed within this thesis. Chapter Two provides a review of current literature related to the topic of discussion and the move towards a digital education revolution. The

literature review highlights various areas of concern and issues associated with this shift towards a digital age in education.

Chapter Three provides an overview of and describes the research methodology used within this case study. This chapter also discusses the various data collection techniques, data analysis and reporting procedures that were adopted during the course of this study. Chapter Four presents the findings from the data which were collected during the study and provides the basis for discussions and conclusions to be formulated as part of the study.

Chapter Five discusses the results and findings from the data collection and identifies a number of areas for development when teaching spelling and grammar in a computer based classroom where individual laptops are used. This chapter also provides a series of recommendations for teachers who are developing and maintaining the spelling and grammar skills in a classroom where the use of individual laptops is mandated. Chapter Six brings all of the arguments and findings from the study together. This chapter also summarises the major findings from the case study and delivers the implications for teaching in the classroom. This concluding chapter also provides future areas for research regarding the use of individual laptops in the classroom.

CHAPTER 2

LITERATURE REVIEW

A Paradigm Shift in the Use of Computers in the Classroom

The newly elected Labor government in Australia has promised an educational revolution to the people of Australia, where every child in Years 9 to 12 will be issued with a personal computer (O’Grady, 2008, p. 22). This is a significant mandated shift and change in the way teaching and learning are delivered both inside and outside the classroom. For many teachers, it is a challenging move forwards into a new way of learning for which many of them may feel unprepared.

The new government’s digital education revolution will certainly increase student access to computers, but having a computer will not solve any problems if there is not a purpose for the computer (O’Keefe, 2008, p.10). O’Grady (2008, p. 22) asks a pertinent question: “...will a million computers in Australian schools make any difference to learning outcomes?” It is possible that this education revolution promised by the government may not be the answer to the current issues in education, such as how to make education more relevant and effective in the 21st century.

It is essential to understand the implications of this change regarding the mandated use of computers in the classroom. These issues include:

1. The current status of computers in the classroom
2. New expectations required of teachers, such as:

- Access to the necessary and essential training of teachers
 - Availability of computers for all children
 - Syllabus requirements
3. Research concerning computers and their use in the classroom

The Current Status of Computers in the Classroom

Currently the New South Wales Department of Education and Training (DET) is the leading user of Information and Communication Technologies (ICT) throughout Australia, with current statistics showing that it already maintains 195,000 computers in 2,400 different locations (Parker, 2008, para 5). The NSW Department of Education and Training (2008, para 1) lists the current number of students enrolled in public schools at around 741,000. From this information it can be calculated that within NSW public schools there is approximately one computer for every four students. However, it is not clear exactly how these computers are distributed amongst the public school system.

Parker (2008, para 10) outlines that the NSW Department of Education and Training spends over \$208 million each year on computers in schools, excluding professional development, electricity and additional costs. From these available statistics it would appear that there is a gap between the number of students and the availability of computers within the classroom.

Classroom computer use and contribution to the educational experience of students are largely dependent on a teacher's knowledge, skills and interest. For many teachers the idea of an education revolution and a mandated shift in the use of computers in the

classroom are worrying (Head, 2008, p. 1). *The Australian IT* (Education revolution worries teachers, 2008, para. 4) cites that, in a survey conducted by education.au, many teachers identified limited confidence and expertise in using computer technology as a barrier to making the change.

It would appear that a teacher's lack of confidence in their ability and skill level to use the current computer tools is an obstacle that needs to be addressed before making computers more accessible in the classroom. This lack of confidence by some teachers is partially offset by teachers' willingness "to embrace new technologies to enhance their teaching and professional development" (Black, 2008, para. 5).

All teachers need to feel comfortable and relaxed about the new expectations and requirements, if there is to be a change in the way computers are used in the classroom. Consequently, the issue now involves the effective and efficient skilling of all teachers (Patterson 2006, p. 6; Prestridge, 2008, p.8).

The Training of Teachers

For many teachers today the prospect of completely doing away with traditional means of education and embracing a computer-based classroom is quite daunting. This is highlighted by Head (2008, p.1): "in most schools the digital immigrants [teachers] are educating the digital natives [students] and many are ill equipped for the task". Patterson (2006, p. 67) believes that: "in order for teachers to make this shift they must realise that

they need to accept the notion that the electronic technology age is among us” and Hartley (as cited in Torrance, Van Waes & Galbraith, 2007, p. 305) supports this by saying: “I don’t think it takes much arguing to agree that our children’s way of writing (and reading) are going to change and that new technology will play a prominent role here...” In order to use the computer effectively as a means of instruction in and for education, thorough and comprehensive training of those facilitating the learning is essential. Lloyd (2008) as cited by O Keeffe (2008, p. 10) comments: “...the installation of computers in schools...needs to be combined with professional development”. This means that simply training teachers in the basics of using computers will no longer suffice. Treloar (n.d.) supports this idea and is cited by Rosenthal (2008, p 17) as arguing that:

With all this investment being made in the training of teachers I just hope it’s in the right area. I hope it’s not in turning computers on. We should be further down the track in the very creative use of these tools across the curriculum.

Thus a key issue when moving towards a computer-based classroom is to ensure that all teachers have appropriate and thorough preparation regarding the contribution and implementation of the computer as a learning tool. This is supported by Kress (as cited in Faulstich, Orellana & Morrell, 2006, p. 1): “The technologies are here to stay, but as educators interested in literacy education, how we make meaning and use of these technologies is up to us.”

Patterson (2002, p. 41) elaborates on this: “The power of computer technology in a language arts classroom cannot be realised if we continue to practice the same old tasks with new tools”. Therefore teachers need to prepare themselves for a new way of

thinking as supported by Patterson, (2006, p.68), Treloar (n.d.), Rosenthal (2008, p.17) and Prestridge (2008, p. 8). However, incorporating computer-based technologies into the classroom does not need to be complex. Heinze (2006, p. 58) suggests that: “All it takes are some simple tweaks to what's already in your plan book.” The notion that the teacher simply having a computer and knowing how to turn it on is not going to enable students to meet the outcomes required in a computer based classroom.” Lloyd (2008) as cited by O Keeffe (2008, p. 10) agrees with this, stating that: “...the technology is there and used to amplify the learning taking place”. Therefore the issue of professional development, according to Prestridge (2008, p.8), involves shifting the focus from competency to pedagogy, with teachers being given explicit skills needed to use new technologies effectively in the classroom

Effective pedagogy is necessary before teachers can be adequately trained to use new technologies most effectively. For example, Lloyd (in O Keeffe, 2008, p. 10) posits the question: “...are teachers currently using technology to maximise learning opportunities – incorporating it into their teaching methods...?” It seems that, in order for this to occur, a shift in teaching methods needs to occur also (Head, 2008, p.1, 16). O’Grady (2008, p.23) believes that a new model of teaching is needed where: “pedagogy is innovative and explorative, and includes new technologies in classroom learning spaces”. Pegg (n.d.) also supported this notion (as cited in Head 2008, p.14): “The tools many teachers are using are not pedagogically rich – they are using computers for just show-and-tell or Googling”. However, making these tools pedagogically rich is a challenge that many teachers face today

Time and support will be required to allow professional development to meet the challenging goal of effectively using computers when teaching. How to train teachers in these areas looks to be a massive undertaking; however the answer could be as simple as investigation and sharing. Prestridge (2008, p.8) suggests that: "ICT professional development means engaging teachers in professional learning activities of investigation, reflection and constructive dialogue over a substantial period of time."

In this teachers would design and implement their own personal classroom based enquiry. The enquiry would aim to examine teaching and learning with ICT. The teachers would then actively engage in verbal reflection and discussion with school leaders and colleagues (Prestridge, 2008, p.8).

Pegg (2008) as cited in Head (2008, p. 1) believes that without the effective training of teachers there will be a profound gap between what is hoped placing computers in schools will do and what is actually achieved in the classroom by students

The Availability of Individual Computers to All Children

The availability of computers to all students is one issue that needs great consideration before embarking on this mandated shift in the use of computers in the classroom and setting up a paperless classroom. The feasibility of every child having a computer with Internet access is questionable. The federal government has pledged \$1 billion dollars to finance the scheme through purchasing laptops for students. This, however, may not be

adequate. Parker (2008, para 3) claims that: "...to make the federal plan work, the state needs to spend another \$3 for every \$1 of federal funds injected".

The then treasurer of New South Wales, Michael Costa, identified that an additional \$245 million will be needed to cover a range of costs relating to the installation of the project. These costs include: Internet connections, power switches, cables and electricity bills (Advertiser editorial: The states behave like Oliver Twist, 2008, para 5). Parker (2008, para 11) and Head (2008, p.6) also support this need for additional funding and also identify that there are a variety of other costs that will be involved in accomplishing the shift towards the mandated use of individual laptop computers in the classroom. Parker (2008 para 11) lists these costs as including: wireless infrastructure, professional development, security and other costs.

In order for every child in NSW from Years 9 to 12 to receive a computer, the total number of computers in public schools across NSW would have to double to roughly 395,000 (Parker, 2008, para 7). Catering for a network this large will naturally incur additional costs. However, Parker (2008, para 8) does set out to argue that the option of students being given laptops provides a cheaper alternative for the Government. This is due to the fact that money does not need to be spent on additional classrooms and space to accommodate this increase in the number of computers (Parker, 2008, para 8).

The availability of making computers available to all students and associated costs needs to be looked at carefully and is one issue of great importance to see this paradigm shift

in the use of computers in the classroom come into being. NSW Teachers' Federation deputy president Bob Lipscombe (in Head, 2008, p.6) states: "...the government has bought into the digital revolution in a spectacular fashion...without proper infrastructure and training the program will fail to live up to expectations."

Syllabus Requirements

Syllabus requirements are another major issue that needs to be considered. Today, English syllabus documents stipulate the use of computers as part of the teaching and learning process, and they contain very specific and detailed requirements for computer use. Within the English syllabus documents, computer technology sits alongside handwriting as a basic skill that all students should possess (Board of Studies, 1998, p. 19). Basic word processing skills are now being programmed into the syllabus outcomes (Winch, Johnston, Holliday, Ljungdahl & March, 2001, p. 31). The Board of Studies (1998, p.43) states the following outcome in its NSW English K-6 syllabus as part of the skills and strategies for writing at stage 3: Outcome "WS3.12 Produces texts in a fluent and legible style and uses computer technology to present these effectively in a variety of ways". The syllabus document also outlines specific tasks for outcome indicators that students should be able to complete when using computer technology.

In accordance with the Board of Studies (1998, p. 43) students will demonstrate that they have met the outcome listed above for using computers when they can complete the following tasks:

- Use computer software programs and associated technology to format texts:

- Locate and use a thesaurus;
- Vary font and layout to suit a particular audience and purpose;
- Choose appropriate graphics to accompany texts;
- Design and organize information for web pages;
- Locate and use columns or borders;
- Add graphics, change spacing and style when publishing;
- Use word processing programs to design school/ class newspapers, importing graphics and written texts from a variety of sources;
- Use multimedia authoring software to create published works incorporating text, graphics, sound and animation;
- Create texts that incorporate graphics or tables when appropriate.

To achieve this particular outcome, students must be able to demonstrate a high level of competency when using computers. However, nowhere does it state that when using computer technology students need to present their written texts with correct spelling, grammar and punctuation. As a result, it seems that computers have added an entirely new dimension to the learning of literacy and literacy skills (Winch, et al., 2001, p. 32).

Thus, the questions still remains for many classroom teachers, “How can the computer be effectively used within the classroom? Should the computer be used as part of the writing process or merely as a means for publishing?”

Research and Computers in the Classroom

Very little information could be found in current research regarding the compulsory use of computer-based education in the classroom. This means that at present there is a gap in educational research relating to the effective use of computers in the classroom. This gap in research is noted by Viadero (2006, p. 30), who states that: “Looking back, experts say the case for educational technology could have been much stronger by now if researchers had spent more time assessing learning gains and less time innovating”. This gap in current research is also highlighted by Hartley (in Torrance et al, 2007, p. 305) noting: “Most of the studies reviewed, of course, were done some years ago, and things have moved on...and none have worked yet with children who have been using new technology since birth, as it were.”

Research has found that there is a wealth of motivation when students use computers for writing. For many students the task of writing has become a meaningless chore that provides very little incentive. However, many teachers might agree that the greatest exercise to improve the writing skills of students is practice (Schmelzer, 2004, p. 34). For many teachers the problem is looking at ways they can motivate students to write. Schmelzer (2004, p. 35), who has extensive experience with teaching with computer-based writing, states: “Even those students who do not have strong touch typing skills are willing to compose more (and better) on the computer with computer-based writing”.

Other research has also highlighted the benefits of using computers as a means of producing written texts. Schmelzer’s ideas are supported by Patterson (2006, p. 66), who

writes that, “The research indicates that students tend to write longer pieces and revise them more readily when they compose at a computer”.

Clearly the use of computers as a medium for writing provides a great deal of motivation and excitement for students when completing writing tasks, but Patterson (2006, p. 68) also states that:

...the research also strongly indicates that simply asking students to compose at a computer is not enough to heighten their engagement. Students must be involved in meaningful learning.

So simply using the computer as a tool for writing is not enough. There needs to be a purpose behind the use of the computer as a medium of text construction.

Despite the lack of specific research into the effectiveness of computer technologies for teaching writing skills, there are a number of important implications. First, the use of computers in writing needs to be meaningful. Computer technologies need to become an active part of the learning process if they hope to provide an advantage for students. The emphasis needs to be on developing more effective learning practices when using technologies in order to support students’ writing development (Lankshear & Knobel, 2003).

Second, before they make the move to a paperless classroom, teachers need to recognise the role of traditional methods that have been employed in literacy to teach reading and writing. To use computers effectively one needs the ability to read and write. No person can effectively use computers without being able to read and write correctly (Winch, et

al., 2001, p. 32). Templeton supports this idea and gives an example by stating: “If they [students] are composing in a word processing program, then spell-check is indeed available, but students must have enough underlying spelling knowledge to recognize the correct choice” (2004, p.58). Simple skills such as being proficient in the use of spelling and grammar are essential to be able to use computers effectively. For teachers of literacy, effectively teaching and developing student’s writing skills becomes a great balancing act between the use of traditional methods and more modern technological and computer-based tools.

Third, teachers need to understand that the basic skills of spelling and grammar for writing will remain just as important as we advance further into the technological age.

Beckham and Hirsch (2005) paint a picture of this by stating:

Opening up a dictionary used to be an elementary school exercise, though many now choose to type a word into their computer and ask their digital dictionary. But one does not have to know the spelling to find a word in a paper dictionary. (p. 65)

Here Beckham and Hirsch (2005) actually allude to the importance of having the basic skills of spelling and grammar in the technological age of writing. They claim that without these basic skills adequate use of computer technology is not possible, especially when performing basic tasks such as word searches.

The implication is that the use of computer technology when teaching writing should act to complement the more traditional means of writing. This was demonstrated by a recent trial by Charles Darwin University in Australia, they aimed to assess the effectiveness of an online education tool known as “Abracadabra”. The software aims to improve the

literacy skills of students who are struggling to read and write. The software was found to be successful in motivating students and achieving outcomes as it complements the existing National Accelerated Literacy Program (Gilling, 2008, p. 17).

When all these factors are taken into consideration, it is important for teachers to assess all computer-based technologies that are currently being used within the classroom. Teachers need to look specifically at the educational benefits and advantages of using such technological innovations as part of the literacy program to help teach and develop students' spelling and grammar skills. It is preferable to include computers and other computer-based technologies as part of the teaching program, but teachers need to ensure that the technologies they have in use are the ones that will achieve the best results for their students.

Conclusion

As can be seen from the preceding information, it is reasonable to assume that the book will remain an essential part of the teaching and learning process along with the use of computer-based technologies. Oppenheimer (2003) notes that: "Traditional literacy skills will continue to be necessary, but we must integrate new literacies into the classroom if we intend to prepare students for the 21st century". The need for a balanced approach to developing writing skills with the use of both computer-based technologies and traditional writing instruments such as paper and pens within the classroom is supported also by Winch et al. (2001, p.33), who confirm this by stating that: "In no way does the new electronic age herald the death of the book".

The following chapter outlines the research design and ethical considerations for this particular case study. This case study is used to investigate the effect of individual laptop computer usage on the spelling and grammar skills of students in a Year 6 classroom. The chapter which follows also describes the research methodology of this study and gives specific information regarding the participants, instruments, procedures and analysis of the data during the data collection process.

CHAPTER 3

RESEARCH DESIGN & METHODOLOGY

This chapter outlines the research design and ethical considerations of this particular study. A case study was thought to be the most appropriate approach to investigate how the use of individual laptop computers affects the spelling and grammar skills of students in a Year 6 classroom. This chapter also outlines the research methodology that was employed during the course of this case study and provides specific information relating to the participants, instruments, procedures and analysis of data during and after the data collection stage of the study.

Research Design

This study follows a qualitative approach to research and utilises a case study methodology. The data gathered during this study came from lesson observations, interviews with staff and students and student testing. This study is structured to identify how spelling and grammar are taught in these particular classrooms, the attitudes behind the teaching of spelling and grammar and how well the outcomes for spelling and grammar are being achieved in these classrooms.

Ethical Considerations of this Study

Owing to the nature of this case study and the involvement of human participants during the data collection stage of research, approval was sought from the Human Research

Ethics Committee at Avondale College. This involved informing and seeking permission from all participants in the case study and the development of documents relating to the techniques being employed during the data collection. Following the formulation of these documents and permission being granted from all those participating in the study the research study was approved by the Human Research Ethics Committee at Avondale College.

Participants

Participants for this study included 84 Year 6 students attending a school where individual laptop computer use was mandated by the school in stage 3 of the primary school. The study also included the 3 teaching staff for Year 6, as well as various administration and executive staff within the school. (Involvement in the study was automatically assumed and any students not participating in the study were advised by parents.) To protect the identities of all participants each student and teacher was given a number to replace their name during the study.

Instruments

There were a number of different instruments used as part of this study. The first involved the observations of students and staff during the teaching of spelling and grammar lessons (see Appendix A for the observation schedule). This was a timed observation and recorded specific teaching and learning experiences during spelling and grammar lessons. These lesson observations helped to draw conclusions and to provide recommendations regarding the teaching of spelling and grammar in a classroom where

individual laptop computers are used. The students were also observed during the writing tasks.

Interviews with staff and students regarding the teaching of spelling and grammar were conducted and these interviews are the second instrument (see Appendix B for a copy of the interview questions). These interviews highlighted the attitudes towards the teaching and learning of spelling and grammar.

The third instrument required students to complete a standardised spelling test during class time. The test was used to formulate each child's spelling age and this result was compared with the student's chronological age. The data from these spelling tests were then used to highlight the spelling abilities of students in Year 6.

The fourth instrument involved students completing two writing samples during class time. The two writing samples were identical tasks. One was handwritten and the second was produced using the student's personal laptop computer. These tasks were used to compare the two mediums and the differences in the results of each for individual students.

The Year 5 Benchmarks for the Spelling and Grammar were the final instrument (see Appendix C for Benchmarks) and were used during the marking of the student writing tasks. These benchmarks helped to identify the writing skills that all students in Year 6 should be able to demonstrate within their writing in both mediums.

Procedures

The research project began with a series of observations of students and teachers during spelling and grammar lessons. These observations included: how spelling and grammar are taught, the lesson activities used to develop and maintain spelling and grammar skills and how computers are used during these lessons.

Once these observations were completed, a series of interviews was conducted to gain information relating to the teaching of spelling and grammar skills within the school from staff and student perspectives. The underlying attitudes towards the teaching and learning of spelling and grammar were noted.

Following this, all students in Year 6 completed the South Australian Spelling Test (SAST) during class time. The test incorporated a range of words that aim to identify the student's individual spelling age. These spelling ages were then compared to the individual student's chronological age to gain an understanding of each student's individual spelling ability and development.

The next stage of research involved two writing samples being produced by each student during class time. The students completed two identical writing tasks using different stimulus pictures. One writing sample was handwritten and the second was produced using the student's personal laptop computer. The students had a total of 30 minutes to complete each writing sample and were given at least a 30 minute break between the two tasks. The writing samples were then marked using the Year 5 writing benchmarks. The

number of errors was recorded for each of the benchmarks to determine individual strengths and weaknesses in spelling and grammar and to identify areas of spelling and grammar that needed to be focused on during class time.

The results from the two writing samples were compared using the number of recorded errors. The results from the writing samples indicated whether or not the use of the computer has a positive, neutral or negative effect on students' spelling and grammar skills. These results helped to determine ultimately whether or not the use of laptop computers in the classroom masks the errors of students.

The conclusion of the study included a number of recommendations being formulated with regard to the teaching of effective spelling and grammar in computer-based schools where individual laptops are used. It is intended that the results of this study will contribute towards the development of literate students who can correctly use spelling and grammar in their writing and also help ensure that the use of computers does not have any unintended adverse effects on spelling and grammar development and maintenance.

Analysis of data

Data organisation

The data for this study were organised in a variety of ways:

Observations and interviews were recorded visually through video recording and in written format and stored as hard copies and electronic copies. Also transcripts of audio recordings were recorded and stored as hard copies. The findings from these observations and interviews were then entered into a word processor as transcripts.

Spelling tests from approximately 84 students were recorded on hard copy. All students' results were entered into spreadsheets and used to calculate the spelling age of each individual student. These spelling ages were then compared to the student's chronological age within the same spreadsheet.

Student writing samples from approximately 80 students were recorded on hard copy. All student results from the two writing samples were transferred into spreadsheets to record students' results as compared to writing benchmarks.

Procedures

The data collection procedures were as follows:

Observations were conducted during literacy lessons in class time during the first 3 weeks of the research project. The observations looked at how spelling and grammar are taught, the lesson activities incorporated in the lesson and how computers are used as part of these lessons.

Interviews were conducted during the next 3 weeks of the research project. These interviews aimed to gain specific information from students and teachers regarding the methods used to teach writing skills, specifically spelling and grammar. Teachers and students were asked to provide information regarding how spelling and grammar are currently being taught in the classroom and their thoughts and opinions about the methods being used to teach these skills. Staff members were also asked to give personal recommendations for the teaching of writing skills in a computer based classroom.

The South Australian Spelling Test (SAST) was then conducted during class time. The results from these tests were then entered into spreadsheets and used to calculate an individual student's spelling age. The spelling age was then compared to the chronological age of each individual student.

After this, students completed two writing samples using stimulus material within a given text type and time frame. These writing samples examined spelling, punctuation

and basic grammar. After these writing samples were conducted the number of errors in the writing was recorded in spreadsheets to identify areas of weakness in spelling and grammar when compared with the Year 5 writing benchmarks.

The data from the research project were then used to formulate a list of recommendations regarding the teaching of spelling and grammar in a paperless computer-based classroom where individual laptops are used.

The hard copy data materials are all stored in filing cabinets that are protected by lock and key to ensure that individual identities will be protected. All electronic material has been stored on password protected computers and has not used specific names of any individual who took part in the study in order to protect his or her identity.

This chapter has given an overview of the research design and methodology of the study. The following chapter presents the results from the data that were collected during the course of this case study.

CHAPTER 4

RESULTS

This chapter displays the results from the data collection stage of the case study. The results presented below have been used to formulate recommendations and highlight areas of concern relating to the teaching of spelling and grammar in a paperless classroom where individual laptop computers are used.

Lesson Observations

Timed lesson observations were recorded and written as a transcript, identifying the teaching and learning experiences with spelling and grammar lessons throughout the week across the three classes. These observations were recorded as transcripts of lessons and are found in Table 5.1. The researcher found it interesting to note the similarities and differences in the teaching of spelling and grammar amongst the three teachers of Year 6.

Table 5.1 – Teacher Observation Records

Teacher: Teacher 1

Date: 2/6/08

Lesson Topic: English - Spelling

Time	Activity
8:55am	<ul style="list-style-type: none">• Directs students to set up writing books for weekly spelling pre-test
8:56am	<ul style="list-style-type: none">• Informs students of 'silent l' rule for words this week & students are asked to name words with 'silent l'
8:58am	<ul style="list-style-type: none">• Begins spelling pre-test – says word, gives sentence, repeats word
9:06am	<ul style="list-style-type: none">• Directs students to mark words that have 'silent l' by asterix and check with partner to see if any words have been missed
9:07am	<ul style="list-style-type: none">• Students are selected to write 'silent l' words from test on the whiteboard
9:10am	<ul style="list-style-type: none">• Begins theme words spelling list – says word, gives sentence, repeats word
9:12am	<ul style="list-style-type: none">• Marks spelling theme words with students and directs students to rewrite any misspelt words
9:15am	<ul style="list-style-type: none">• Directs students to correct pre-test words from the projector screen.• Students are given clear instructions and expectations

9:17am	<ul style="list-style-type: none"> Students are directed to formulate their own personal word list using misspellings from pre-test and theme word list as well as any other words they can find
9:20am	<ul style="list-style-type: none"> Students have personal words checked by teacher and begin entering words into their weekly spreadsheet
9:21am	<ul style="list-style-type: none"> Students are directed to download spelling activity sheets from the school server to complete for homework this week Students are also directed to begin working on these sheets using their laptops when their personal words have been checked
9:22am	<ul style="list-style-type: none"> Teacher monitors students as they complete their spelling activity sheets on their laptops
9:39am	<ul style="list-style-type: none"> Teacher displays and explains activities to students and completes a demonstration on the board.
9:40am	<ul style="list-style-type: none"> Teacher monitors students as they complete remaining spelling activities from sheet on laptops
9:50am	<ul style="list-style-type: none"> Teacher directs students to continue with spelling activities for the final minutes of the lesson and monitors students as they do so
9:55am	<ul style="list-style-type: none"> Teacher directs students to close all open programs and save any changes before packing up for next lesson.

Teacher: Teacher 2

Date: 31/3/08

Lesson Topic: English - Spelling

Time	Activity
9:05am	<ul style="list-style-type: none"> Teacher advises students of previous week's spelling results and records these marks with students.
9:08am	<ul style="list-style-type: none"> Demonstrates and explains to student the spelling sentence activities that they will complete for homework this week e.g. writing complex sentences, direct speech, etc.
9:10am	<ul style="list-style-type: none"> Students are directed to set up books for spelling pre-test Teacher monitors as students prepare for spelling pre-test
9:11am	<ul style="list-style-type: none"> Students are given clear instructions and directions for pre-test Teacher begins spelling pre-test – says word, gives sentence, repeats word Students are also given a caution by teacher to improve their handwriting when completing test Students are also advised to think of spelling rules when writing words
9:18am	<ul style="list-style-type: none"> Theme word list is complete – says word, gives sentence, repeats word These words are written into books by students
9:20am	<ul style="list-style-type: none"> Words are displayed to students on projector screen Teacher gives explanation of spelling for certain words with dual spellings e.g. waggon & wagon, realise & realize
9:22am	<ul style="list-style-type: none"> Teacher questions students regarding tricky spellings within list words for this week and discusses these with students Teacher informs and explains hints and tips to remember spellings for some words
9:24am	<ul style="list-style-type: none"> Teacher directs students to mark words and complete spelling activities for the week using their laptops Teacher writes theme words on whiteboard
9:25am	<ul style="list-style-type: none"> Teacher works one-to-one with special needs student and gives additional words and sounds for the week as well as individual activities
9:26am	<ul style="list-style-type: none"> Teacher monitors as students create their personal words list for the weeks and complete spelling activities Students use dictionaries to create personal words list as well as misspellings
9:30am	<ul style="list-style-type: none"> Teacher individually marks and approves students' personal word lists and monitors students as they complete activities

	<ul style="list-style-type: none"> Activities – simple sentence, reverse sentence, opposite sentences, possession, quotation, adverbial phrase, simile, metaphor, complex sentence
9:40am	<ul style="list-style-type: none"> Teacher gives students clear time restraint for completing work – “15 minutes to go. Use your time wisely”
9:45am	<ul style="list-style-type: none"> Teacher calls students having difficulty with writing direct speech to the floor (8 students) Teacher displays, demonstrates and explains how to punctuate speech correctly
9:49am	<ul style="list-style-type: none"> Teacher works one on one with special needs student Teacher assists student with word and sound recognition activities and marks work
9:51am	<ul style="list-style-type: none"> Teacher moves around the room and individually marks students’ writing of direct speech
9:55am	<ul style="list-style-type: none"> Students are directed to pack up all equipment Teacher instructs students how to save their work to their laptop.

Teacher: Teacher 2

Date: 13/5/08

Lesson Topic: English – Writing

Time	Activity
8:47am	<ul style="list-style-type: none"> Teacher directs students to take out their laptops and set them up for the lesson
8:48am	<ul style="list-style-type: none"> Teacher demonstrates where to find documents for the lesson on the school server
8:49am	<ul style="list-style-type: none"> Teacher outlines the day and lesson to students Teacher explains to students that they will be completing a creative writing task during the lesson
8:50am	<ul style="list-style-type: none"> Teacher discusses with students what creative writing and literal writing is Teacher explains what each is and the differences between these two forms of writing
8:55am	<ul style="list-style-type: none"> Teacher explains and displays to students the two visual stimuli for the writing task
8:58am	<ul style="list-style-type: none"> Teacher displays an example of a creative writing piece and narrates this to students
9:02am	<ul style="list-style-type: none"> The teacher discusses with students the important aspects of creative writing e.g. for entertainment, etc.
9:05am	<ul style="list-style-type: none"> Students are questioned about writing techniques they might find in creative writing The teacher explains these techniques and gives examples of each to students e.g. simile, metaphor, etc.
9:08am	<ul style="list-style-type: none"> Teacher directs students to begin writing task on their laptop using Microsoft Word
9:09am	<ul style="list-style-type: none"> Teacher walks around room and monitors students as they write Teacher also gives assistance to individual students
9:33am	<ul style="list-style-type: none"> Teacher informs students that they have 5 minutes remaining Students are given the choice to hand in writing for checking if desired and teacher gives directions for doing so
9:36am	<ul style="list-style-type: none"> Students are directed to begin packing up Teacher gives clear instructions and directions.

Teacher: Teacher 3

Date: 12/5/08

Lesson Topic: English – Spelling

Time	Activity
12:18pm	<ul style="list-style-type: none"> Students are directed to set up spelling book for weekly spelling pre-test Teacher monitors students as they do so
12:20pm	<ul style="list-style-type: none"> Teacher begins spelling pre-test – says word, gives sentence, repeats word
12:21pm	<ul style="list-style-type: none"> Teacher gives encouragement to students on handwriting from previous test Teacher continues with spelling pre-test
12:26pm	<ul style="list-style-type: none"> Teacher advises students who have done up to their level to continue with handwriting activities or

	<ul style="list-style-type: none"> silent reading Teacher continues with spelling test
12:29pm	<ul style="list-style-type: none"> Students are directed to prepare for theme words test Teacher gives verbal correction to students who are not on task Teacher begins theme words test – says word, gives sentence, repeats word
12:31pm	<ul style="list-style-type: none"> Teacher explains to students the marking procedure for the pre-test (peer correction) Teacher directs students to correct spelling test and begin to make their personal words list
12:35pm	<ul style="list-style-type: none"> The teacher monitors students and walks around the room as students complete activities
12:39pm	<ul style="list-style-type: none"> Teacher begins checking and correcting students' personal words lists Teacher directs finishers to prepare their homework activities
12:53pm	<ul style="list-style-type: none"> Students are directed to keep working and gives instructions for packing up and going to lunch when work is complete

Teacher: Teacher 3

Date: 13/5/08

Lesson Topic: English – Grammar

Time	Activity
11:26am	<ul style="list-style-type: none"> Students are directed to prepare for lesson Teacher gives clear instructions and directions: “no pens on desk”
11:28am	<ul style="list-style-type: none"> Teacher informs students of the lesson topic Teacher revises previous lesson on nouns, verbs, adjectives and pronouns
11:29am	<ul style="list-style-type: none"> Teacher questions students about verbs and asks for examples Teacher explains the concept of an adverb and gives examples to students
11:31am	<ul style="list-style-type: none"> A poster is displayed to students. The meaning of an adverb is read and examples are given by teacher Teacher questions students and asks for examples of other adverbs
11:33am	<ul style="list-style-type: none"> Teacher continues to give examples of adverbs and explains what comparative adverbs are
11:35am	<ul style="list-style-type: none"> Teacher displays an adverb worksheet to students Teacher explains how to complete the worksheet
11:36am	<ul style="list-style-type: none"> Students are directed to complete the adverb worksheet Teacher gives clear instructions, directions and expectations to students
11:37am	<ul style="list-style-type: none"> Teacher monitors students as they work and gives assistance when needed
11:39am	<ul style="list-style-type: none"> Teacher reinforces expectations for completing worksheet – no talking, clear and neat writing, writing in pen
11:40am	<ul style="list-style-type: none"> The teacher walks around the room and gives one on one assistance to students and answers student's questions
11:49am	<ul style="list-style-type: none"> Teacher reminds students what to do when they are finished Students are directed to move onto any unfinished work when their worksheet is complete
11:50am	<ul style="list-style-type: none"> Teacher continues to monitor students as they work and answers any student questions
11:55am	<ul style="list-style-type: none"> Teacher directs students to prepare to mark their worksheet Teacher gives clear instructions and directions for marking work Teacher begins marking worksheet with students
12:05pm	<ul style="list-style-type: none"> Students are directed to hand in their worksheet and begin packing up for the next lesson Teacher gives clear instructions, directions and expectations.

During the lesson observations several important aspects of spelling, grammar and writing lessons were noted. These observations regarding the teaching of spelling, grammar and writing are noted below.

Spelling Lessons

The spelling list words that are used from the spelling program were often random and contain no common spelling rules or spelling families. When spelling list words were used containing a spelling rule or spelling family, only a limited number of words in the list contained the common spelling rule or spelling family.

All students were required to formulate a personal spelling word list for the week at school. These lists were required to contain any misspellings when completing the earlier spelling pre-test, along with other words of the student's own choice. These words could come from books being read, dictionaries or any other source. In some cases students chose words that were random and were not necessarily common words. The students had these words checked by the classroom teacher and students used their laptop computer at home to practise these words.

Students were asked to complete a spelling worksheet for homework each week relating to the weekly spelling word list. The activities in these worksheets were completed using the students' personal laptop computers at home or during class time. When these activity sheets were examined it was noted that the activities contained in these worksheets assessed the lower order skills of students related to spelling. Some activities

in these worksheets included: unjumbling words, choosing correct homophones to complete sentences, matching words to pictures and drawing word clues. The students were not required to do further exploratory study or investigation regarding their current spelling word list.

The students also completed a spelling spreadsheet each night for homework. The spreadsheet contained a number of different activities that needed to be completed relating to the student's personal word list. Students were required to type their words each night as well as find word meanings, list synonyms, antonyms, etc. These spreadsheets were completed with the student's personal laptop computer at home. This meant that students very rarely wrote their list words by hand and did all of the spelling of their list words using the computer.

Grammar and Writing Lessons

When writing in class, students often examined a specific text type and wrote in accordance with the chosen text type for the lesson. In most cases these text types were factual texts with teachers noting that there was a lack of creative writing tasks during class time.

When writing in class the students used their individual laptop computer to complete the written task. Students were generally given a number of lessons in order to complete the written task and text type being studied. However, there was no handwritten drafting process included. All writing was done using the computer and drafts could be printed

for checking when students choose. From student interviews it became clear that the majority of students considered that the use of spell and grammar check on the computer's word processor provided sufficient assistance for editing written tasks.

When a grammar lesson was observed the students were looking at a specific aspect of grammar or grammar function/ rule. During the teaching and learning process throughout the grammar lesson, students completed a number of lower order activities such as filling in blank words in a cloze passage and selecting the grammar feature being studied from sentences. It was also noted that during writing lessons grammar was not explicitly taught to students and was treated as an entirely separate subject. However, when a teachable moment arose relating to grammar, it was in most cases discussed and explained.

Staff Interviews

Interviews with the staff were carried out over the course of the study to identify how individual teachers used computers in the classroom as well as to ascertain their views about the use of personal laptop computers in the classroom. Table 5.2 displays the transcripts of these interviews with the Year 6 classroom teaching staff.

Table 5.2 – Staff Interview Transcripts

Staff Interview Transcript

Teacher No. 1 Date: 2 June, 2008 Time 11:00am	
Interviewer	What is your personal philosophy for teaching spelling and grammar in general?

Teacher 1	It's got to be meaningful, relevant and interactive. There needs to be a purpose behind it. There is no point learning words that the students already know. That's why the students have personal words.
Interviewer	What is your personal philosophy for teaching spelling and grammar in a paperless classroom where individual laptops are used?
Teacher 1	It has to be interactive and related to what you're doing in isolated lessons. For example, language structure, types of words, websites, resources.

Interviewer	Are spelling and grammar skills explicitly taught in your classroom? How?
Teacher 1	Yes, as often as possible. I use quick activities on a rule and games relating to the focus. The students then put these into practice with follow-up activities at home and school.

Interviewer	How are computers used as part of the teaching of spelling and grammar?
Teacher 1	They are used all the time. They are great for students with a disability with being able to identify problems and go back. But they can be a problem at times and students can become lazy.

Interviewer	What are your personal views on the student use of personal laptops within the classroom?
Teacher 1	They are awesome! I love being able to use scope outside of books and the classroom. You're able to go worldwide. It also gives a big confidence boost to students who are untidy writers.

Interviewer	Do you believe the computer should be the sole means of instruction within the classroom? Why/ why not?
Teacher 1	No I don't. It should just be a tool to achieve goals and it is a great tool to do different things. If it isn't relevant to what I'm teaching I won't use it.

Interviewer	What recommendations would you give for teaching spelling and grammar (or any other subject) where students use personal laptops?
Teacher 1	Use it as a tool, not just using it because you have to. Make sure you look at the advantages for example, creativity and ease. Also look at the opportunities to use laptops and how to make it function.

Staff Interview Transcript

Teacher No. 2 Date: 19 May, 2008 Time: 10:05am	
Interviewer	What is your personal philosophy for teaching spelling and grammar in general?
Teacher 2	A spelling list doesn't teach kids how to spell, but they are a tool to show patterns and relationships in spelling to help build a skill set so that students can unlock spelling. This can be repeated in other areas, such as the writing process.

Interviewer	What is your personal philosophy for teaching spelling and grammar in a paperless classroom where individual laptops are used?
Teacher 2	I'm not sure yet. I'm still working that one out. You will have to get back to me.

Interviewer	Are spelling and grammar skills explicitly taught in your classroom? How?
Teacher 2	Yes, I would like it to be even more explicit where students have their own spelling list for different abilities. Ultimately I would have students spelling one year above their spelling age and the lists would be based on word families.

Interviewer	How are computers used as part of the teaching of spelling and grammar?
Teacher 2	They are used mainly for examples and activities, but not a lot. Using the computer during the lessons allows students to do things more efficiently.

Interviewer	What are your personal views on the student use of personal laptops within the classroom?
Teacher 2	I think the students can become disengaged from tuition when using the computer so you need to have strict rules when using them and demand the students' attention.

Interviewer	Do you believe the computer should be the sole means of instruction within the classroom? Why/ why not?
Teacher 2	No.

Interviewer	What recommendations would you give for teaching spelling and grammar (or any other subject) where students use personal laptops?
Teacher 2	You need to explicitly teach; otherwise you won't know what the students are getting and what they aren't.

Staff Interview Transcript

Teacher No. 3 Date: 19 May, 2008 Time: 9:30am	
Interviewer	What is your personal philosophy for teaching spelling and grammar in general?
Teacher 3	Trying to find relevance for skills and tailoring activities to individual levels. Incorporating spelling and grammar in normal reading and writing practice.
Interviewer	What is your personal philosophy for teaching spelling and grammar in a paperless classroom where individual laptops are used?

Teacher 3	There is a place and value for it. Value in means to provide variety. The computer needs to be used in moderation and can be useful for writing when creativity is assessed.
Interviewer	Are spelling and grammar skills explicitly taught in your classroom? How?
Teacher 3	Yes, occasionally when a particular type of language is encountered and in the course of practice activities.
Interviewer	How are computers used as part of the teaching of spelling and grammar?
Teacher 3	They are used for creating spelling lists, practice spelling tables, a way to find meanings etc, but they are only used occasionally.
Interviewer	What are your personal views on the student use of personal laptops within the classroom?
Teacher 3	It makes students confident and fluent with using technology. They are convenient for finding background information on topics for example in subjects like Human Society and It's Environment and Science. They can also be used for reinforcement and are a great tool for images, presentations and creative opportunities.
Interviewer	Do you believe the computer should be the sole means of instruction within the classroom? Why/why not?
Teacher 3	No, different students learn in different ways. There is a benefit in having variety in the classroom as well as not using any tools, such as the computer.
Interviewer	What recommendations would you give for teaching spelling and grammar (or any other subject) where students use personal laptops?
Teacher 3	Think carefully when using the computer and the percentage of time that it is used. It needs to be supported by activities away from the laptop and look into softwares that you can use in the classroom because there are some great ones out there.

Results from staff interviews revealed that each of the teachers from Year 6 understood the need for the explicit teaching of spelling and grammar skills when working in a paperless classroom involving the use of individual laptop computers. Each teacher also noted that the process of using computers to teach needs to be meaningful for students. They also commented that the computer should not be the sole means of instruction and pointed out the need for non-computer activities. Therefore it may be concluded that all of the teachers who taught students within the Year 6 cohort were committed to the

effective maintenance and development of spelling and grammar skills in a computer-based classroom where individual laptop computers were used.

Student Interviews

Individual interviews were conducted with 33 students, taken as a random sample, from all three classes during the course of the case study. The purpose was to gain an understanding of students' attitudes towards spelling and grammar and to ascertain how they perceive that these subjects were being taught in their paperless computer-based classroom. The questions asked and students' responses are shown below.

1. Do you think it is important to be able to use correct spelling and grammar consistently? Why/ why not?

When asked this question 32 of the 33 students, answered "Yes" with a variety of reasons for their choice. Student number 57 answered, "No", indicating that using correctly spelling and grammar is not important when drafting. All other students who answered, "Yes", indicated a variety of reasons such as:

"It will help you get a job", "It will help you in high schools with harder tests" and "If you don't use correct spelling and grammar people won't be able to understand what you're writing".

From these responses it may be concluded that the overall majority of students among the Year 6 cohort believe that it is important, when writing, to have the ability to use correct spelling and grammar consistently.

2. Do you have spelling and grammar lessons in your class?

When asked this question the majority of the students who replied answered “Yes”, to this question with, some students adding comments such as: “Sometimes”, “Very rarely”, “Yes, spelling, but not grammar”, “When we finish tests”, “Spelling, but not really grammar” and “I think so”. It may be concluded from these student’s responses that the teaching of spelling and grammar is in some cases explicit .but the responses of some of the children may indicate that they were not really sure what this question was actually asking.

3. How are computers used as part of spelling and grammar lessons in your classroom?

When asked about how computers were used as part of the spelling and grammar lessons in class the students named a number of different activities including, “We do a spelling homework spreadsheet”, “We do activity sheets”, “We can go online and use spell and grammar check”, “For typing out spelling words each night”, “We use Word for stories” and “We do grammar comprehension activities”. Only one student from the group that was interviewed commented: “They aren’t used a lot”. From the responses of these

students, it may be concluded that computer based activities form the base of spelling and grammar lessons in these paperless Year 6 classrooms where individual laptop computers are used.

4. Do you use spelling and grammar check on your computer when writing? How often?

In response to this question only one student answered, “No”, with all other students answering, “Yes” and commenting in addition that the frequency they used the spelling and grammar check was: “All the time”, “A lot”, “Most of the time”, “Sometimes”, “After every few sentences” and “When publishing”. It is clear from these responses that the overall majority of students use the spelling and grammar check on their computer when writing and that many students may have an over reliance on this tool when writing.

5. Do you believe that the computer should be used to do everything in class? Why?

When asked whether or not the computer should be used to do everything in class, 3 students answered, “Yes” and supported their belief by saying: “In 10 years’ time we might have laptops to write down notes”, “I really like computers” and “They are easy to use”. The remaining 30 students believed that computers shouldn’t be used for everything in class for a number of different reasons, such as: “They are annoying”,

“You still need handwriting in high school”, “You will lose your handwriting skills” and “Not everyone is good at using computers”. These student responses indicate that the majority of students within the Year 6 cohort believe that the skill of handwriting remains an important skill for the future.

6. Do you prefer using your laptop or paper and pen to complete your work in class? Why?

When given the choice between using pen and paper and using a laptop in class, 19 students from the interviewed group preferred to use their laptop, stating some of the reasons for their choice as: “They’re easy to use”, “They’re fun”, “I’m not good at handwriting” and “I can always check things easier”. 11 of the remaining students preferred using a paper and pen for the following reasons: “I can write faster than I type”, “I like writing”, “Laptops are annoying ‘cause they break and you lose work” and “We don’t get to use them much”. The remaining 3 students didn’t have a preference and liked using a variety of both pen and paper as well as their personal laptop computer in class for the following reasons: “It’s easy to do maths with pen and paper, but I prefer to type than write”, “I enjoy drawing and writing, but I like using the computer to do fancy things” and “I’m not too bad at using laptops and writing”. It can be concluded from these responses that for many students the use of the laptop is preferred. However, using a paper and pen is still preferred by some students in the Year 6 cohort.

Standardised Spelling Tests

Assessing students' achievement of spelling and grammar skills is imperative in ascertaining whether or not the computer-based style of teaching is actually benefiting students. To gain an understanding of the students' achievement of spelling outcomes, all students were given a standardised spelling test. The test that was used was the South Australian Spelling Test (SAST) and the results from these tests were used to calculate individual students' spelling ages. These spelling ages were then compared to the individual student's chronological age. Tables 5.2, 5.3 and 5.4 show the comparison between the spelling age and the chronological age of students from each of the three Year 6 classes. Figures 5.1, 5.2 & 5.3 show these results in graph form comparing the chronological age and spelling age of individual students in each of the three Year 6 classes.

Table 5.3 – Spelling test results of students from class 1

Student Number	Chronological Age (yrs)	Spelling Age (yrs)
10 (M)	11.1	9.6
11 (M)	11.9	9.5
15 (M)	11.1	9.5
7 (M)	12.01	9.5
24 (M)	11.4	10.2
2 (M)	11.4	10.5
22 (M)	12.5	10.5
5 (M)	12.01	10.9
19 (M)	11.7	10.9
3 (M)	11.4	13
16 (M)	11.3	13.8
1 (M)	11.1	14.2
27 (M)	11.4	15.5

6 (F)	11.1	10
26 (F)	12.01	10.5
13 (F)	11.3	10.7
28 (F)	11.8	10.9
4 (F)	11.2	11.4
14 (F)	11.1	11.7
23 (F)	11.11	12
9 (F)	12.1	12.2
21 (F)	11.2	14.2
12 (F)	11.7	15.5
17 (F)	12.2	15.5
18 (F)	11.7	15.5
20 (F)	11.9	15.5

Figure 5.1 – Spelling test results of students in class 1

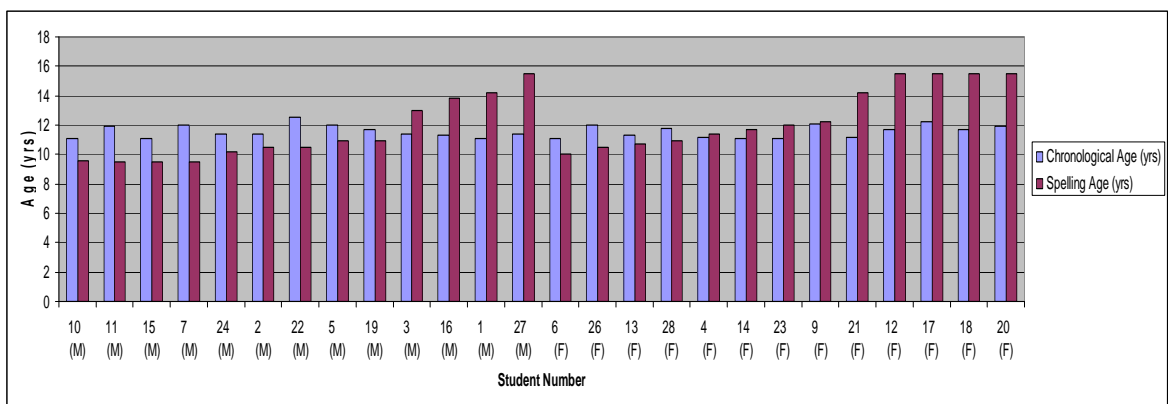


Table 5.4 - Spelling test results of students from class 2

Student Number	Chronological Age (yrs)	Spelling Age (yrs)
34 (M)	11.1	9.7
35 (M)	12.3	10
40 (M)	12.01	10.5
56 (M)	12.1	10.5
44 (M)	11.8	10.7
51 (M)	11.1	10.7
37 (M)	11.4	10.9
49 (M)	11.7	11.2
30 (M)	11.7	11.7
50 (M)	11.1	11.7
31 (M)	11.8	12
52 (M)	11.1	15.5
55 (M)	11.11	15.5
48 (M)	11.8	15.5
36 (M)	12.3	15.5

47 (F)	11.8	9.7
54 (F)	12.1	10.2
53 (F)	12	10.7
41 (F)	11.6	11.4
29 (F)	11.8	12.2
45 (F)	11.01	14.2
33 (F)	11.8	15.5
46 (F)	11.5	15.5
39 (F)	11.6	15.5
42 (F)	11.8	15.5
43 (F)	11.7	15.5

Figure 5.2 – Spelling test results of students in class 2

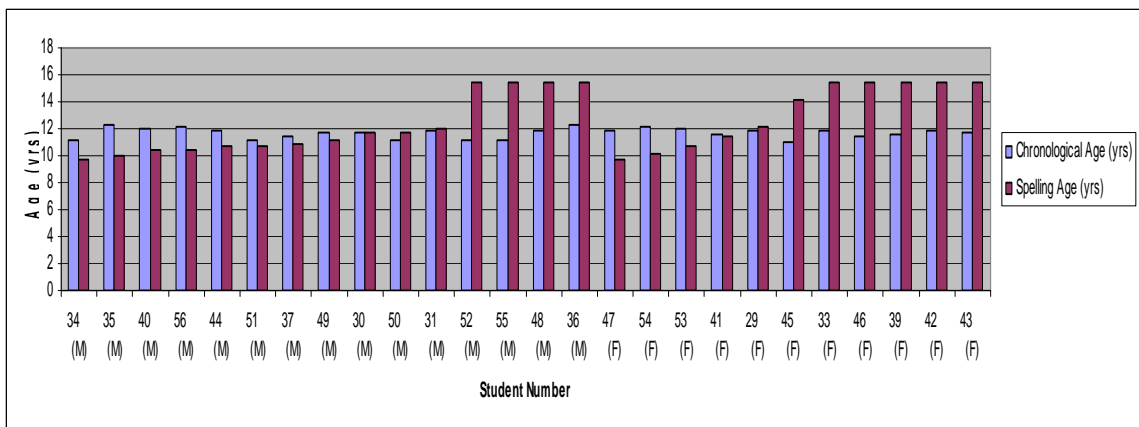
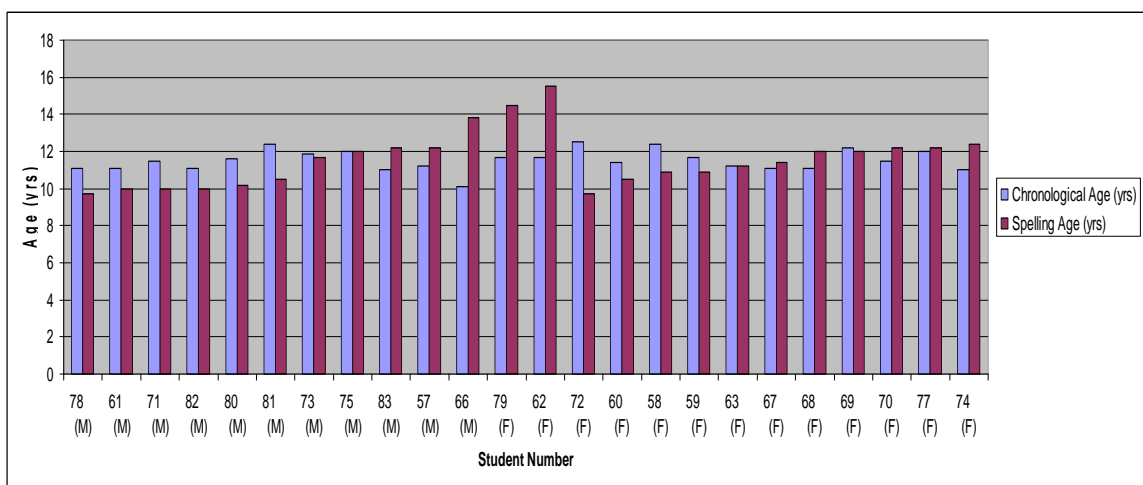


Table 5.5 - Spelling test results of students from class 3

Student Number	Chronological Age (yrs)	Spelling Age (yrs)
78 (M)	11.11	9.7
61 (M)	11.11	10
71 (M)	11.5	10
82 (M)	11.11	10
80 (M)	11.6	10.2
81 (M)	12.4	10.5
73 (M)	11.9	11.7
75 (M)	12	12
83 (M)	11.01	12.2
57 (M)	11.2	12.2
66 (M)	10.11	13.8

79 (F)	11.7	14.5
62 (F)	11.7	15.5
72 (F)	12.5	9.7
60 (F)	11.4	10.5
58 (F)	12.4	10.9
59 (F)	11.7	10.9
63 (F)	11.2	11.2
67 (F)	11.1	11.4
68 (F)	11.1	12
69 (F)	12.2	12
70 (F)	11.5	12.2
77 (F)	12	12.2
74 (F)	11	12.4

Figure 5.3 – Spelling test results of students in class 3



From the results of these tests, it appears that a large number of students within this Year 6 cohort were behind in their spelling age. It was also noted that, within each of the three Year 6 classes, close to 50% of students had a spelling age below their chronological age. On further inspection it appears that some of these students are significantly below their chronological age group and seem to be struggling to develop their spelling skills.

Student Writing Tasks

The student writing tasks consisted of two creative writing pieces: one handwritten piece and one computer generated piece where students were asked to write a narrative where direct speech was used from a stimulus photograph (see Appendix F). These tests were conducted over several days and during class time students were given 30 minutes to complete each task and there was a break of at least 30 minutes between both tasks.

These writing samples were marked using the Year 5 Benchmarks for writing (see Appendix C). All students within each of the Year 6 classes should be able to meet these benchmarks with very little difficulty. There were 7 benchmarks that were assessed in each piece of writing. They were as follows:

- Correctly uses capital letters, full stops, commas and question marks
- Correctly writes direct (quoted) speech
- Writes paragraphs that contain a main idea and elaboration of the main idea
- Uses appropriate verb tense (e.g., past and present tense in narrative) and correct verb form in past tense (e.g., caught instead of catch) most of the time

- Displays agreement between subject and verb (e.g., she is/they are, he was/we were) most of the time
- Writes correct simple sentences, and longer sentences using joining words like but, when, after, so
- Spells needed words correctly.

When each of these benchmarks was assessed for both of the writing samples, the number of errors made by students was recorded and compared in an endeavour to help determine areas of weakness displayed by the students when writing in both mediums.

Benchmark 1

The students' ability to use correctly full stops, capital letters, commas and question marks in sentences was assessed in benchmark 1. The number of errors recorded by students in this task was an accumulative score and related to the correct use of these basic forms of punctuation in sentences throughout the students' writing. Tables 5.6, 5.7, 5.8 and Figures 5.4, 5.5, 5.6 show the number of errors recorded by students when this benchmark was assessed in both mediums of writing.

Table 5.6 Benchmark 1 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	13	17
2 (M)	24	35
3 (M)	6	7
5 (M)	12	14
7 (M)	25	20
8 (M)	7	13
10 (M)	5	3
11 (M)	11	10
15 (M)	43	32
16 (M)	42	45
19 (M)	36	5
22 (M)	12	4
24 (M)	23	7
25 (M)	8	7
27 (M)	6	8

4 (F)	51	16
6 (F)	25	20
9 (F)	28	24
12 (F)	12	0
14 (F)	4	4
17 (F)	8	7
18 (F)	43	30
20 (F)	0	0
21 (F)	19	22
23 (F)	29	24
26 (F)	17	15
28 (F)	17	21

Figure 5.4 Benchmark 1 – Class 1 Student Results

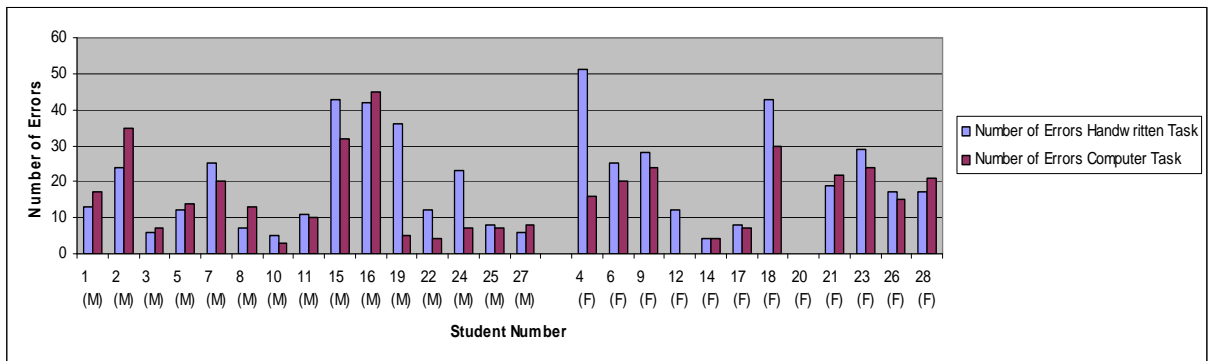


Table 5.7 Benchmark 1 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
29 (F)	18	7
30 (M)	5	5
34 (M)	47	42
36 (M)	3	8
37 (M)	17	24
40 (M)	42	12
44 (M)	12	6
48 (M)	16	22
49 (M)	13	18
50 (M)	33	14
52 (M)	10	14
56 (M)	32	7

38 (F)	47	26
41 (F)	15	13
42 (F)	2	0
43 (F)	3	2
45 (F)	0	3
47 (F)	16	33
53 (F)	8	5
54 (F)	20	15

Figure 5.5 Benchmark 1 – Class 2 Student Results

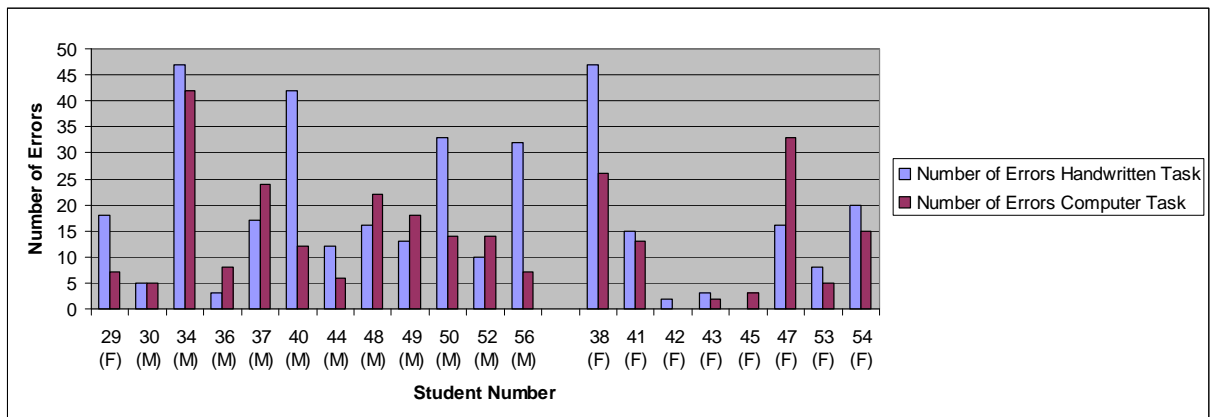
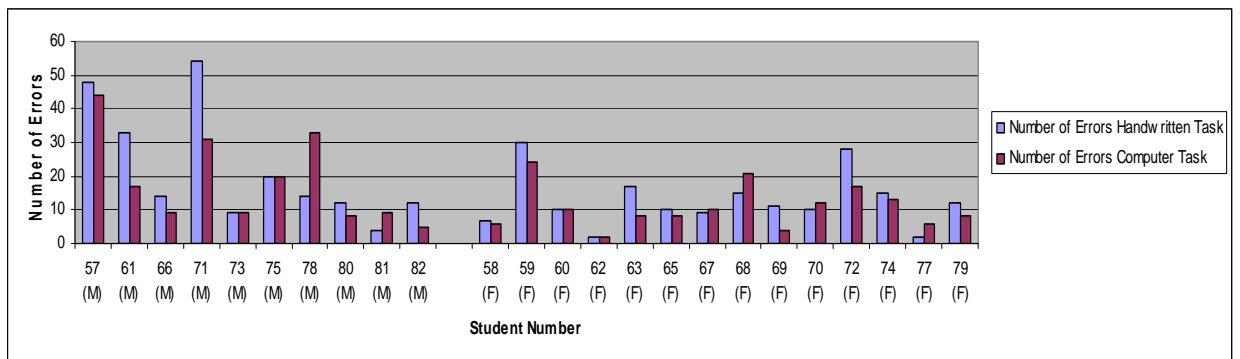


Table 5.8 Benchmark 1 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	48	44
61 (M)	33	17
66 (M)	14	9
71 (M)	54	31
73 (M)	9	9
75 (M)	20	20
78 (M)	14	33
80 (M)	12	8
81 (M)	4	9
82 (M)	12	5

58 (F)	7	6
59 (F)	30	24
60 (F)	10	10
62 (F)	2	2
63 (F)	17	8
65 (F)	10	8
67 (F)	9	10
68 (F)	15	21
69 (F)	11	4
70 (F)	10	12
72 (F)	28	17
74 (F)	15	13
77 (F)	2	6
79 (F)	12	8

Figure 5.6 Benchmark 1 – Class 3 Student Results



From these results it can be seen that 52% of students in the Year 6 cohort scored a greater number of errors in their handwritten task when compared with their computer generated task.

Benchmark 2

Benchmark 2 assessed the students' ability to punctuate correctly direct (quoted) speech in a written passage. This again was an accumulative score of errors with students being able to score a maximum of 4 errors. One error was recorded for each of the following:

- Incorrect use or absence of quotation marks
- Incorrect use or absence of commas, full stops, etc
- Incorrect use or absence of capital letters, and
- Incorrect use or absence of paragraphing.

Tables 5.9, 5.10, 5.11 and Figures 5.7, 5.8, 5.9 display students' results, comparing the number of errors scored when writing by hand and when writing using a laptop.

Table 5.9 Benchmark 2 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	4	2
2 (M)	3	4
3 (M)	4	4
5 (M)	3	2
7 (M)	3	2
8 (M)	4	2
10 (M)	4	4
11 (M)	3	3
15 (M)	4	4
16 (M)	3	4
19 (M)	2	1
22 (M)	3	3
24 (M)	4	4
25 (M)	4	3
27 (M)	4	4

4 (F)	2	2
6 (F)	4	3
9 (F)	3	2
12 (F)	4	4
14 (F)	3	3
17 (F)	3	3
18 (F)	2	3
20 (F)	1	1
21 (F)	3	3
23 (F)	3	3
26 (F)	2	1
28 (F)	2	2

Figure 5.7 Benchmark 2 – Class 1 Student Results

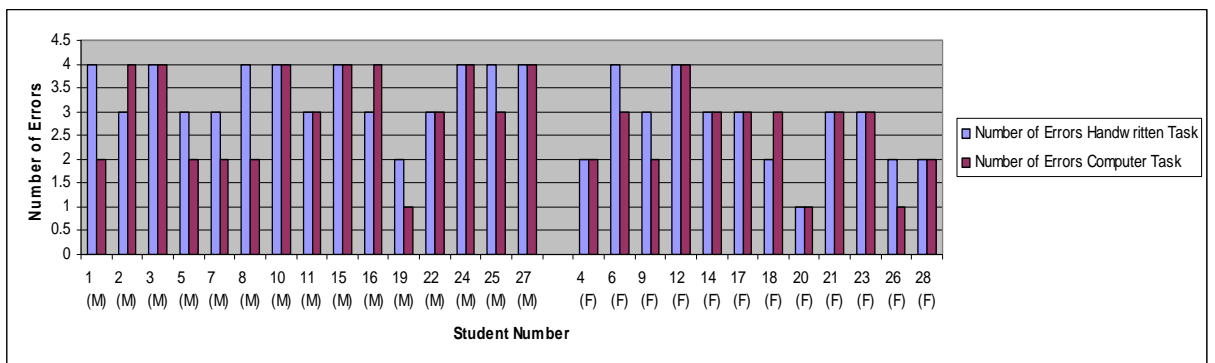


Table 5.10 Benchmark 2 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	1	1
34 (M)	4	4
36 (M)	3	1
37 (M)	2	1
40 (M)	3	3
44 (M)	3	3
48 (M)	3	3
49 (M)	3	3
50 (M)	3	2
52 (M)	3	2
56 (M)	3	3

29 (F)	4	1
38 (F)	4	3
41 (F)	2	2
42 (F)	2	1
43 (F)	2	1
45 (F)	2	1
47 (F)	3	3
53 (F)	3	3
54 (F)	2	1

Figure 5.8 Benchmark 2 – Class 2 Student Results

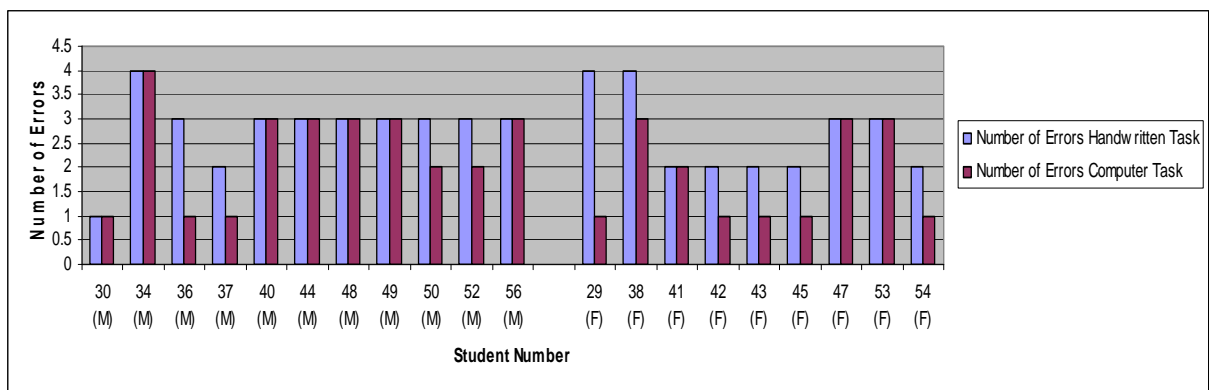
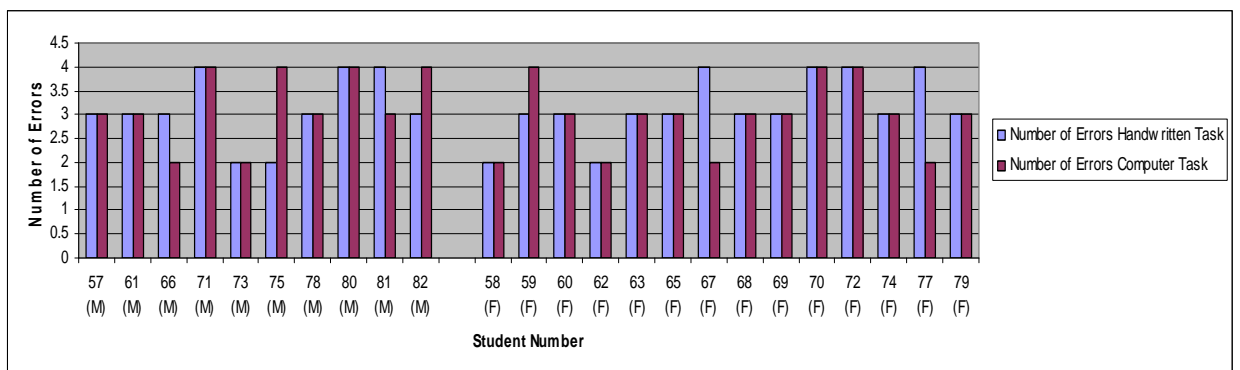


Table 5.11 Benchmark 2 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	3	3
61 (M)	3	3
66 (M)	3	2
71 (M)	4	4
73 (M)	2	2
75 (M)	2	4
78 (M)	3	3
80 (M)	4	4
81 (M)	4	3
82 (M)	3	4

58 (F)	2	2
59 (F)	3	4
60 (F)	3	3
62 (F)	2	2
63 (F)	3	3
65 (F)	3	3
67 (F)	4	2
68 (F)	3	3
69 (F)	3	3
70 (F)	4	4
72 (F)	4	4
74 (F)	3	3
77 (F)	4	2
79 (F)	3	3

Figure 5.9 Benchmark 2 – Class 3 Student Results



These results highlight that 27% of the cohort scored a higher number of errors when they were completing a handwritten passage than when completing a similar task on their laptop. These assessments have also highlighted that 100% of students in the Year 6 cohort recorded at least 1 error in each of the mediums. Another issue noted involves all students in the Year 6 cohort appearing to have difficulty demonstrating the required knowledge needed to write and punctuate correctly direct (quoted) speech when completing a written passage or when using a laptop computer.

Benchmark 3

The third benchmark was looking at an individual student's ability to write correctly paragraphs that contained a main idea and an elaboration of the main idea. The results were an accumulative score of the number of errors relating to correct paragraphing when writing by hand and then completing the same assessment but using an individual laptop computer. Tables 5.12, 5.13 and 5.14 and Figures 5.10, 5.11 and 5.12 display the number of errors recorded by students when writing by hand and when using the computer for this benchmark assessment.

Table 5.12 Benchmark 3 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	1	0
2 (M)	0	2
3 (M)	2	1
5 (M)	0	1
7 (M)	2	0
8 (M)	2	2
10 (M)	1	0
11 (M)	0	0
15 (M)	3	1
16 (M)	1	1
19 (M)	3	2
22 (M)	9	2
24 (M)	4	2
25 (M)	1	0
27 (M)	0	0

4 (F)	8	4
6 (F)	2	1
9 (F)	1	0
12 (F)	2	0
14 (F)	0	0
17 (F)	1	1
18 (F)	4	0
20 (F)	3	3
21 (F)	4	3
23 (F)	4	4
26 (F)	2	0
28 (F)	1	1

Figure 5.10 Benchmark 3 – Class 1 Student Results

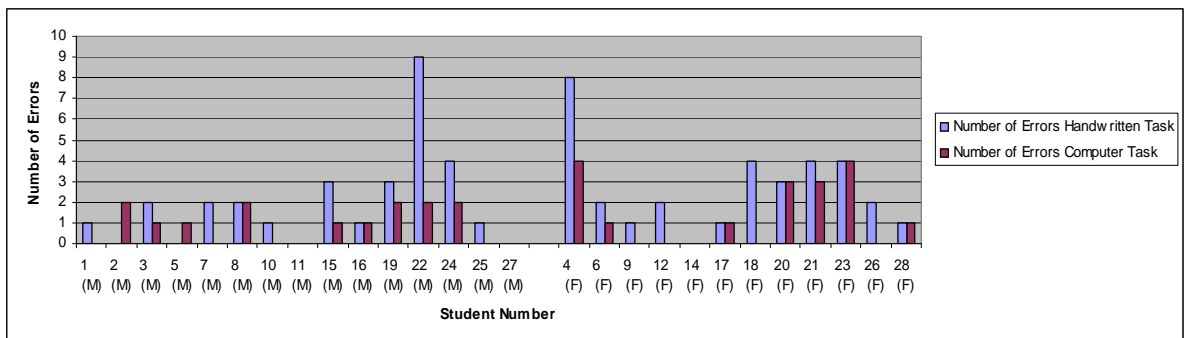


Table 5.13 Benchmark 3 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	3	0
34 (M)	0	0
36 (M)	0	0
37 (M)	2	1
40 (M)	0	0
44 (M)	4	1
48 (M)	4	3
49 (M)	1	3
50 (M)	3	3
52 (M)	1	1
56 (M)	3	1
29 (F)	2	2
38 (F)	3	3
41 (F)	1	0
42 (F)	0	0
43 (F)	1	0
45 (F)	2	0
47 (F)	1	2
53 (F)	4	1
54 (F)	3	3

Figure 5.11 Benchmark 3 – Class 2 Student Results

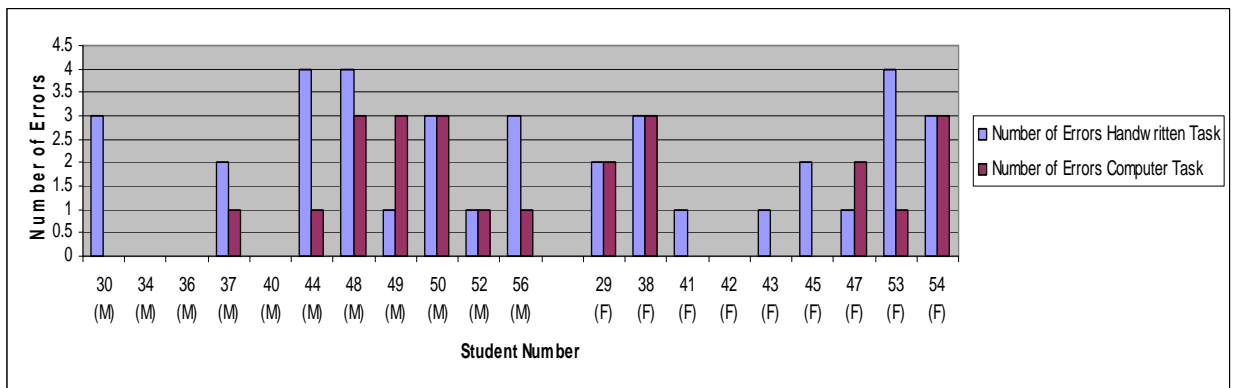
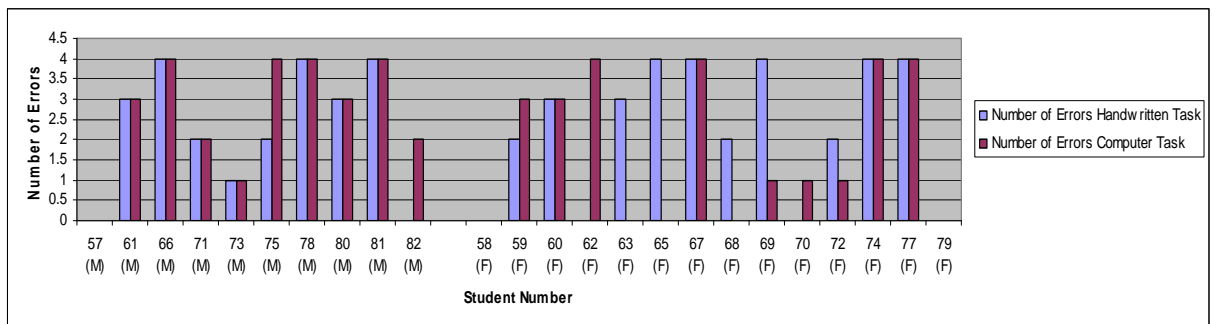


Table 5.14 Benchmark 3 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	0	0
61 (M)	3	3
66 (M)	4	4
71 (M)	2	2
73 (M)	1	1
75 (M)	2	4
78 (M)	4	4
80 (M)	3	3
81 (M)	4	4
82 (M)	0	2
58 (F)	0	0
59 (F)	2	3
60 (F)	3	3
62 (F)	0	4
63 (F)	3	0
65 (F)	4	0
67 (F)	4	4
68 (F)	2	0
69 (F)	4	1
70 (F)	0	1
72 (F)	2	1
74 (F)	4	4
77 (F)	4	4
79 (F)	0	0

Figure 5.12 Benchmark 3 – Class 3 Student Results



These results show that 31% of students in Year 6 scored a higher number of errors relating to correct paragraphing when writing by hand and 9% of students scored a higher number of errors when writing with their individual laptop. However, it is most interesting that this assessment revealed that only 8 students from the entire group demonstrated the correct use of paragraphing in both mediums, raising concerns about the ability of students to meet this benchmark and associated writing outcomes.

Benchmark 4

Benchmark 4 assessed the students' ability to use the verb tense (past/present in a narrative) and the correct verb form (caught instead of catched). When the students' writing samples were marked the number of errors was an accumulative score that assessed the use of correct verb tense and correct verb form to assist in giving the narrative meaning. The number of errors recorded by students when completing a handwritten passage as compared to when writing with the use of an individual laptop is displayed in Tables 5.15, 5.16 and 5.17 and Figures 5.13, 5.14 and 5.15 below.

Table 5.15 Benchmark 4 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	0	0
2 (M)	0	0
3 (M)	0	0
5 (M)	1	0
7 (M)	0	0
8 (M)	0	0
10 (M)	0	0
11 (M)	0	0
15 (M)	0	0
16 (M)	1	1
19 (M)	2	2
22 (M)	0	0
24 (M)	0	2
25 (M)	0	0
27 (M)	0	0

4 (F)	1	1
6 (F)	1	2
9 (F)	0	0
12 (F)	1	1
14 (F)	0	0
17 (F)	0	0
18 (F)	0	1
20 (F)	0	0
21 (F)	0	0
23 (F)	2	2
26 (F)	1	0
28 (F)	0	0

Figure 5.13 Benchmark 4 – Class 1 Student Results

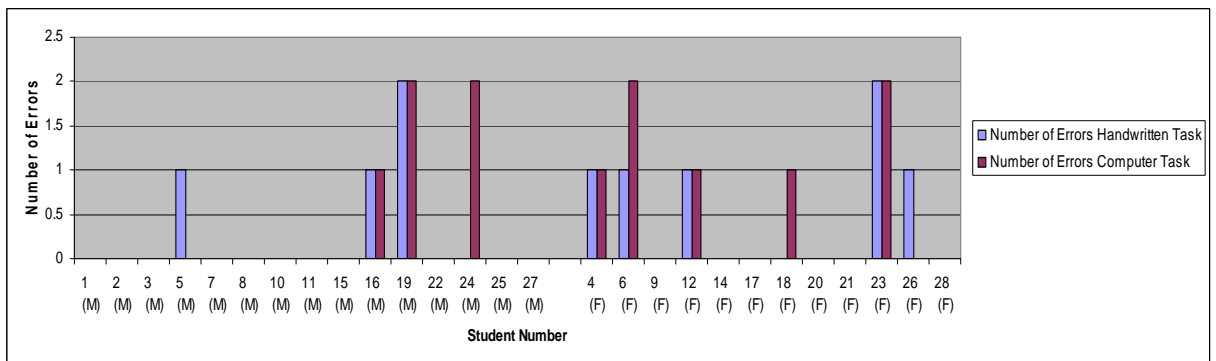


Table 5.16 Benchmark 4 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	0	0
34 (M)	0	0
36 (M)	0	2
37 (M)	1	0
40 (M)	1	1
44 (M)	0	0
48 (M)	0	0
49 (M)	0	1
50 (M)	3	1
52 (M)	0	0
56 (M)	0	0
29 (F)	0	0
38 (F)	0	0
41 (F)	0	3
42 (F)	0	0
43 (F)	0	0
45 (F)	0	2
47 (F)	0	0
53 (F)	0	0
54 (F)	1	1

Figure 5.14 Benchmark 4 – Class 2 Student Results

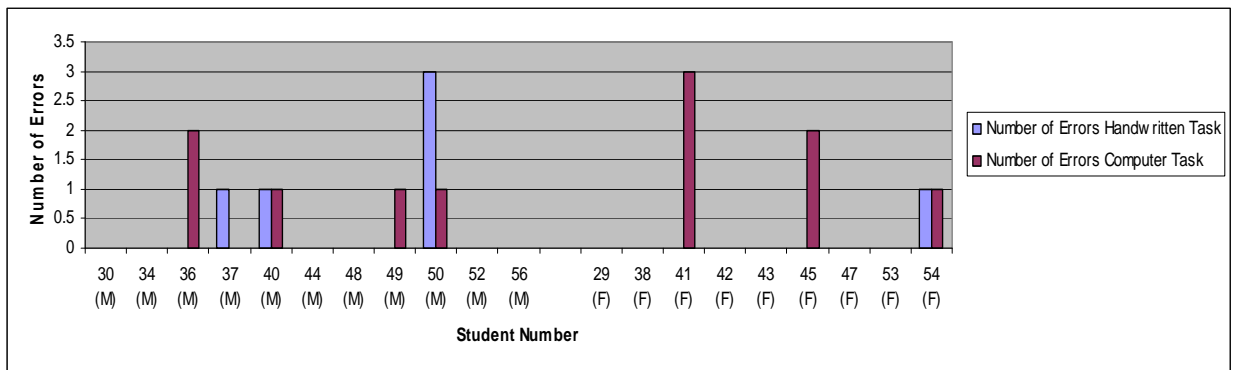
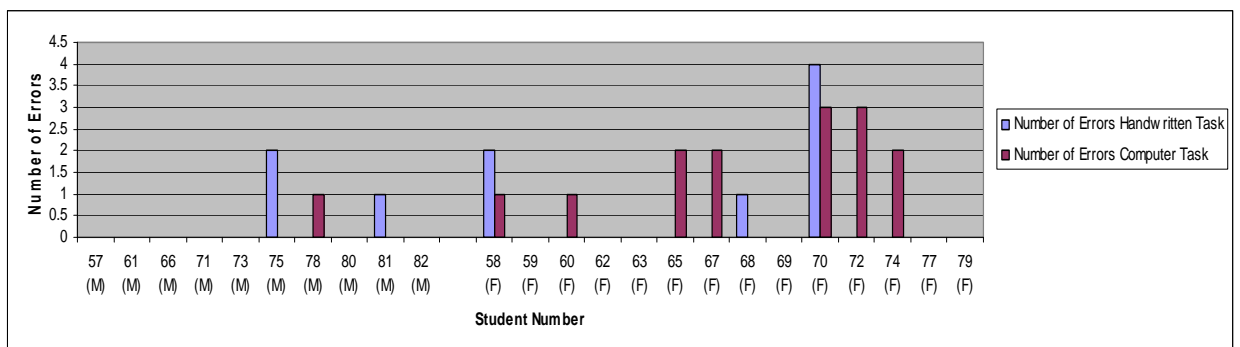


Table 5.17 Benchmark 4 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	0	0
61 (M)	0	0
66 (M)	0	0
71 (M)	0	0
73 (M)	0	0
75 (M)	2	0
78 (M)	0	1
80 (M)	0	0
81 (M)	1	0
82 (M)	0	0

58 (F)	2	1
59 (F)	0	0
60 (F)	0	1
62 (F)	0	0
63 (F)	0	0
65 (F)	0	2
67 (F)	0	2
68 (F)	1	0
69 (F)	0	0
70 (F)	4	3
72 (F)	0	3
74 (F)	0	2
77 (F)	0	0
79 (F)	0	0

Figure 5.15 Benchmark 4 – Class 3 Student Results



These results indicate that most students in the Year 6 cohort have a sound understanding of and ability to meet this writing benchmark, with 50% scoring no errors for this benchmark when writing by hand and with an individual laptop. From this assessment, it was found that 15% of students scored a higher number of errors when writing with their laptop compared to only 9% of students who scored a higher number of errors when writing by hand.

Benchmark 5

Writing benchmark 5 examined students' ability to display agreement between subject and verb for example, she/is, they/are, we/were. When this benchmark was assessed an accumulative score of errors were recorded for each student when writing by hand and when composing writing with a personal laptop computer. The results of students when assessing this writing benchmark are displayed in Tables 5.18, 5.19 and 5.20 as well as Figures 5.16, 5.17 and 5.18 below.

Table 5.18 Benchmark 5 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	0	0
2 (M)	1	0
3 (M)	0	1
5 (M)	0	0
7 (M)	0	0
8 (M)	0	0
10 (M)	1	0
11 (M)	0	0
15 (M)	0	0
16 (M)	1	0
19 (M)	2	4
22 (M)	0	0
24 (M)	0	0
25 (M)	0	0
27 (M)	0	0

4 (F)	0	0
6 (F)	1	0
9 (F)	1	0
12 (F)	1	0
14 (F)	0	0
17 (F)	0	0
18 (F)	0	1
20 (F)	1	0
21 (F)	0	0
23 (F)	1	0
26 (F)	0	0
28 (F)	2	1

Figure 5.16 Benchmark 5 – Class 1 Student Results

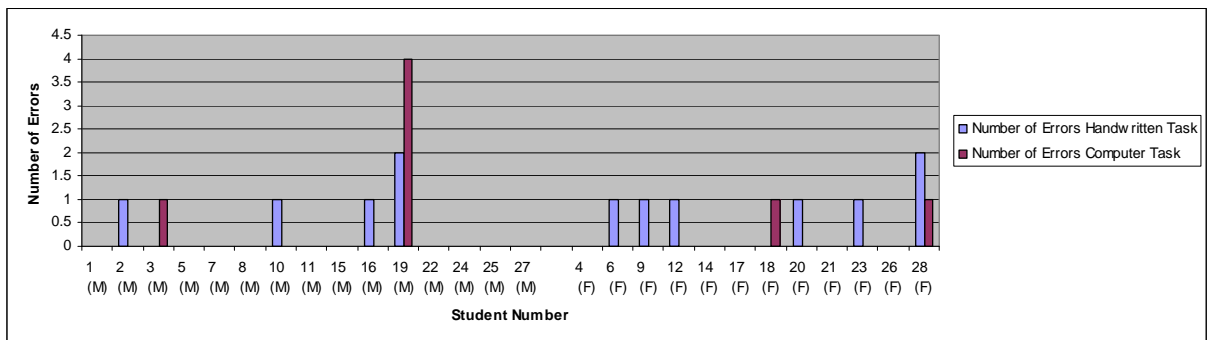


Table 5.19 Benchmark 5 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	0	0
34 (M)	0	0
36 (M)	0	0
37 (M)	0	0
40 (M)	1	1
44 (M)	1	0
48 (M)	1	0
49 (M)	0	0
50 (M)	0	0
52 (M)	1	0
56 (M)	1	0

29 (F)	0	0
38 (F)	0	0
41 (F)	2	0
42 (F)	0	0
43 (F)	0	0
45 (F)	1	0
47 (F)	0	0
53 (F)	0	0
54 (F)	0	1

Figure 5.17 Benchmark 5 – Class 2 Student Results

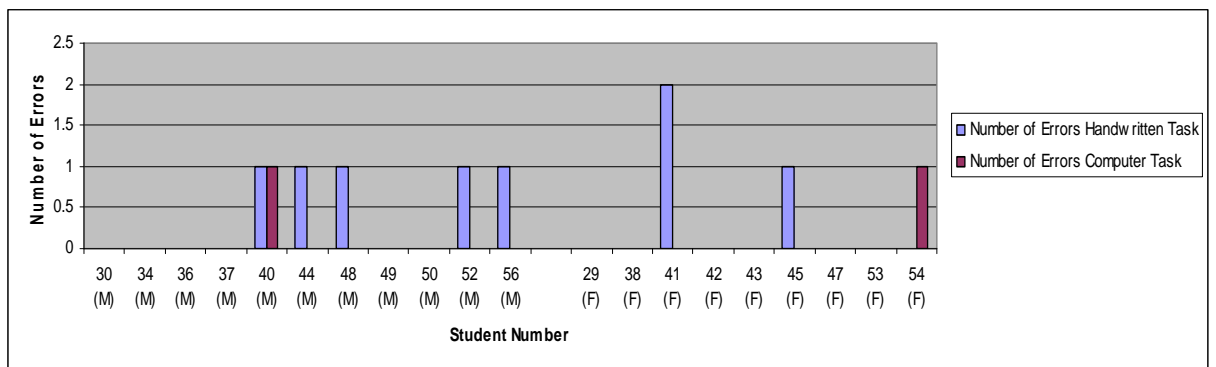
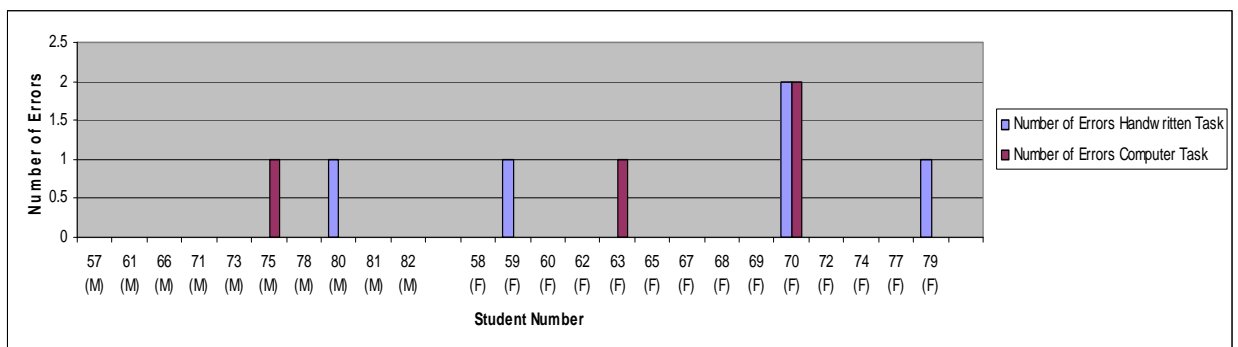


Table 5.20 Benchmark 5 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	0	0
61 (M)	0	0
66 (M)	0	0
71 (M)	0	0
73 (M)	0	0
75 (M)	0	1
78 (M)	0	0
80 (M)	1	0
81 (M)	0	0
82 (M)	0	0

58 (F)	0	0
59 (F)	1	0
60 (F)	0	0
62 (F)	0	0
63 (F)	0	1
65 (F)	0	0
67 (F)	0	0
68 (F)	0	0
69 (F)	0	0
70 (F)	2	2
72 (F)	0	0
74 (F)	0	0
77 (F)	0	0
79 (F)	1	0

Figure 5.18 Benchmark 5 – Class 3 Student Results



These results indicate that, across the Year 6 cohort, a total of 52% of students had a sound understanding of this concept and the ability to demonstrate this understanding in both mediums when writing. However, these results also reveal that 21% of students in the Year 6 cohort recorded a higher number of errors in their handwritten piece of writing when benchmark 5 was assessed, with the remaining students recording the same number of errors in both mediums of writing or a greater number of errors when writing with their personal laptop computer. The results do indicate that 48% of students amongst the Year 6 group do not always display a sound understanding or ability to demonstrate this writing skill when writing by hand or with their personal laptop computer.

Benchmark 6

The sixth benchmark that was assessed assesses students' ability to write correct simple sentences and longer sentences using joining words like but, when, after and so when writing by hand and when writing using their individual laptop computer. When this benchmark was assessed, an accumulative score of the number of errors made in both mediums was recorded and compared. Tables 5.21, 5.22 and 5.23 and Figures 5.19, 5.20 and 5.21 display the number of errors recorded for individual students within the Year 6 cohort comparing their handwritten and computer generated writing samples.

Table 5.21 Benchmark 6 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	6	5
2 (M)	17	21
3 (M)	6	3
5 (M)	6	3
7 (M)	12	17
8 (M)	8	8
10 (M)	6	3
11 (M)	6	12
15 (M)	33	14
16 (M)	11	35
19 (M)	5	3
22 (M)	6	2
24 (M)	12	4
25 (M)	5	5
27 (M)	4	9

4 (F)	13	12
6 (F)	15	9
9 (F)	13	10
12 (F)	10	5
14 (F)	7	7
17 (F)	4	2
18 (F)	28	21
20 (F)	2	1
21 (F)	14	13
23 (F)	14	14
26 (F)	10	10
28 (F)	10	6

Figure 5.19 Benchmark 6 – Class 1 Student Results

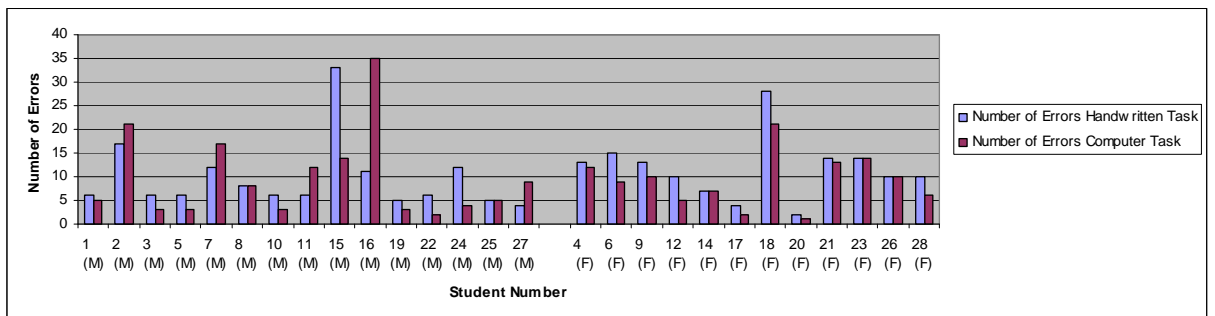


Table 5.22 Benchmark 6 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	1	0
34 (M)	20	14
36 (M)	1	0
37 (M)	10	12
40 (M)	17	7
44 (M)	5	3
48 (M)	3	1
49 (M)	6	6
50 (M)	6	6
52 (M)	4	1
56 (M)	9	3

29 (F)	3	1
38 (F)	17	9
41 (F)	6	2
42 (F)	2	1
43 (F)	2	1
45 (F)	0	0
47 (F)	10	8
53 (F)	3	3
54 (F)	3	6

Figure 5.20 Benchmark 6 – Class 2 Student Results

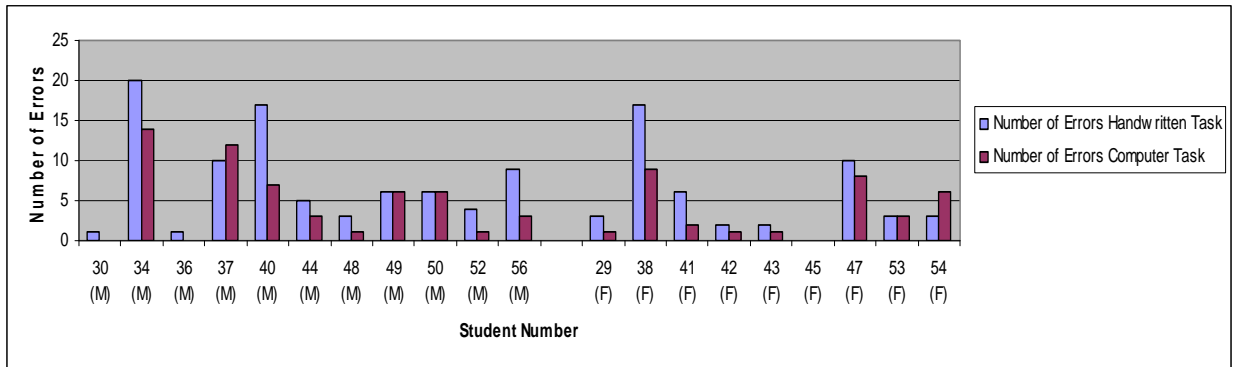
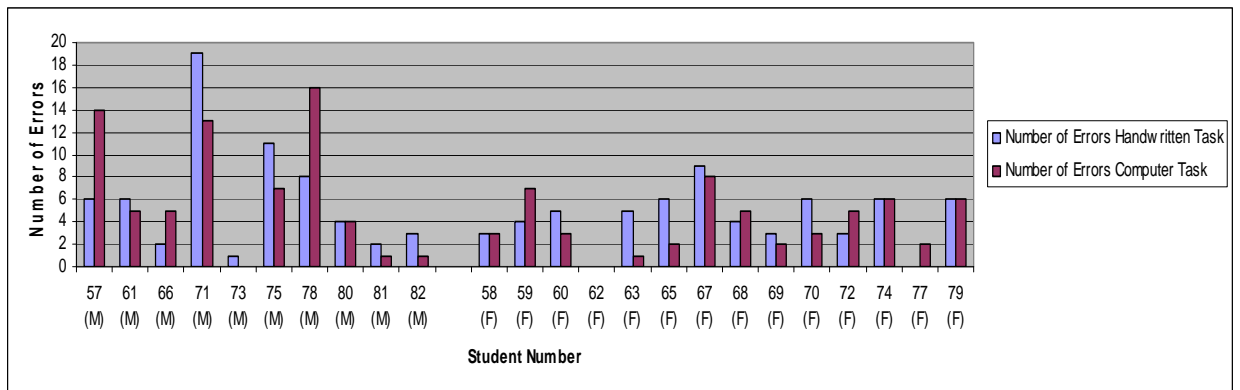


Table 5.23 Benchmark 6 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	6	14
61 (M)	6	5
66 (M)	2	5
71 (M)	19	13
73 (M)	1	0
75 (M)	11	7
78 (M)	8	16
80 (M)	4	4
81 (M)	2	1
82 (M)	3	1

58 (F)	3	3
59 (F)	4	7
60 (F)	5	3
62 (F)	0	0
63 (F)	5	1
65 (F)	6	2
67 (F)	9	8
68 (F)	4	5
69 (F)	3	2
70 (F)	6	3
72 (F)	3	5
74 (F)	6	6
77 (F)	0	2
79 (F)	6	6

Figure 5.21 Benchmark 6 – Class 3 Student Results



The tables and figures above demonstrate that when the students' ability to write simple and complex sentences correctly was assessed a total of 51% of Year 6 students make a greater number of errors when writing by hand as opposed to just 16% of student who recorded a greater number of errors when writing with their personal laptop computer. In addition to this, these results revealed that 15% of students amongst the Year 6 cohort made the same number of errors in both mediums, with only 2 students out of the entire group who made no errors at all in either medium. These results expose the fact that the majority of students in this Year 6 group have difficulty when writing simple and complex sentences.

Benchmark 7

The final benchmark is benchmark 7 and this benchmark assesses the students' ability to spell correctly needed words when writing by hand and with an individual laptop computer. The number of errors when writing by hand and with the computer was recorded in an accumulative fashion. These accumulative scores regarding the number of errors when spelling needed words in students' handwritten and computer generated writing samples are displayed in the following Tables 5.24, 5.25 and 5.26 and Figures 5.22, 5.23 and 5.24. The total number of words written by students when writing in both mediums was between 150 and 250 words.

Table 5.24 Benchmark 7 – Class 1 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
1 (M)	2	0
2 (M)	14	6
3 (M)	6	1
5 (M)	5	2
7 (M)	11	10
8 (M)	3	2
10 (M)	1	1
11 (M)	11	9
15 (M)	50	24
16 (M)	8	7
19 (M)	8	4
22 (M)	6	0
24 (M)	28	10
25 (M)	16	3
27 (M)	4	4

4 (F)	13	3
6 (F)	12	3
9 (F)	8	5
12 (F)	7	2
14 (F)	2	1
17 (F)	1	0
18 (F)	8	1
20 (F)	2	2
21 (F)	3	8
23 (F)	4	6
26 (F)	11	3
28 (F)	6	5

Figure 5.22 Benchmark 7 – Class 1 Student Results

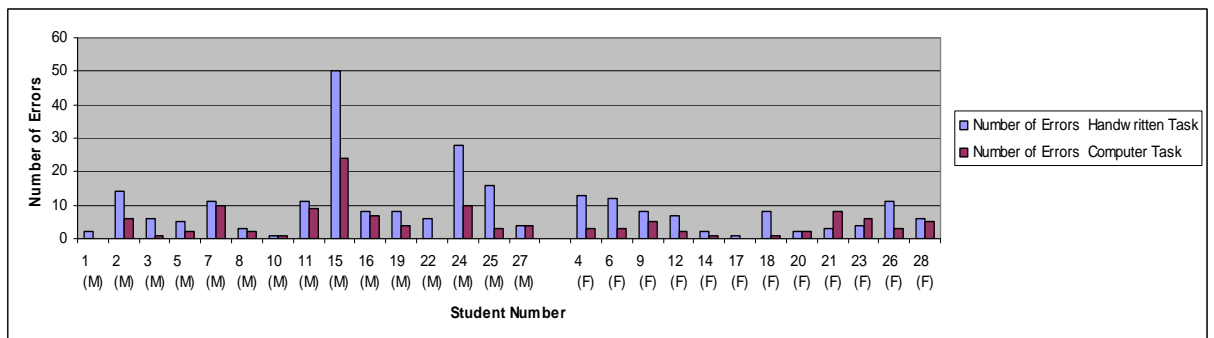


Table 5.25 Benchmark 7 – Class 2 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
30 (M)	1	1
34 (M)	15	6
36 (M)	7	1
37 (M)	3	1
40 (M)	8	12
44 (M)	16	1
48 (M)	1	3
49 (M)	3	7
50 (M)	6	5
52 (M)	10	3
56 (M)	28	5

29 (F)	2	0
38 (F)	19	7
41 (F)	12	3
42 (F)	7	0
43 (F)	1	2
45 (F)	2	0
47 (F)	10	3
53 (F)	7	1
54 (F)	20	7

Figure 5.23 Benchmark 7 – Class 2 Student Results

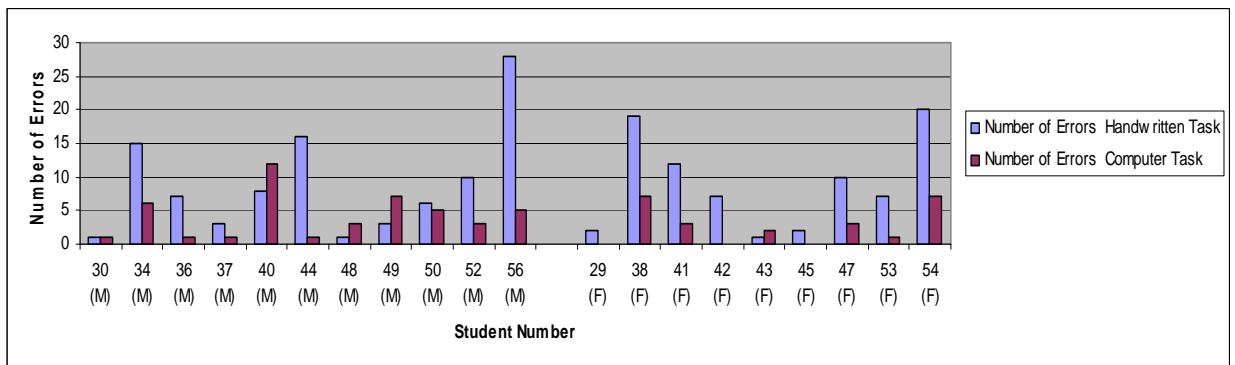
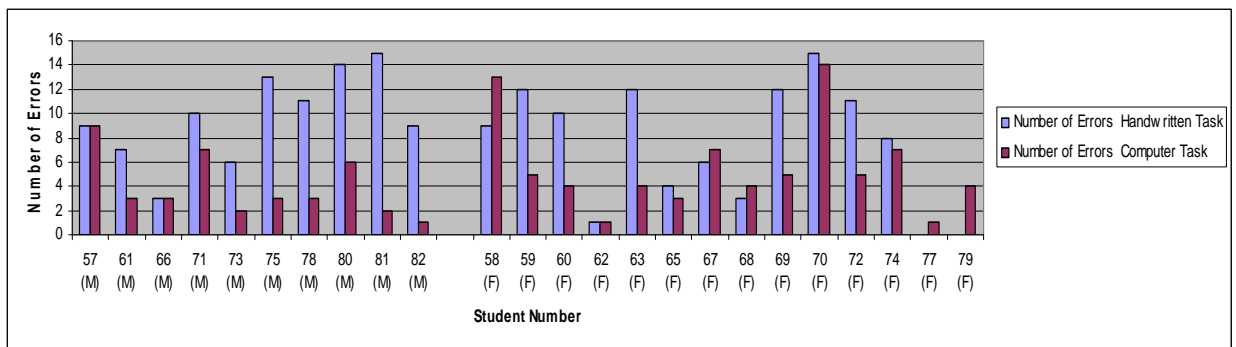


Table 5.26 Benchmark 7 – Class 3 Student Results

Student Number	Number of Errors	
	Handwritten Task	Computer Task
57 (M)	9	9
61 (M)	7	3
66 (M)	3	3
71 (M)	10	7
73 (M)	6	2
75 (M)	13	3
78 (M)	11	3
80 (M)	14	6
81 (M)	15	2
82 (M)	9	1
58 (F)	9	13
59 (F)	12	5
60 (F)	10	4
62 (F)	1	1
63 (F)	12	4
65 (F)	4	3
67 (F)	6	7
68 (F)	3	4
69 (F)	12	5
70 (F)	15	14
72 (F)	11	5
74 (F)	8	7
77 (F)	0	1
79 (F)		4

Figure 5.24 Benchmark 7 – Class 3 Student Results



When the number of errors recorded by students for this writing benchmark was analysed, it became clear that 64% of students in the Year 6 group recorded a greater number of misspellings when writing their handwritten passage, when compared to 12% of students who recorded a greater number of incorrectly spelt words when using their personal laptop computer to complete a written assignment. The remaining students from the Year 6 cohort scored the same number of misspellings in both mediums, with no student recording no misspellings in both mediums. The results displayed in the above tables and figures illustrate the spelling issues students confront when completing a handwritten passage as opposed to composing a piece of writing on their personal laptop computer.

The results of this section have revealed a number of different issues that need to be addressed. The lesson observations seem to indicate that in the spelling and grammar lessons there may be an over emphasis on computer-based activities.. Also, the results from student testing revealed that many students from the Year 6 cohort may have some difficulty meeting the spelling and grammar outcomes at the stage 3 level, Overall, the results seem to indicate that the use of the individual laptop computers for written assignments may mask many students' problems and difficulties associated with the skill of writing.

The following chapter discusses the major findings from this case study and answers some questions that were raised by the research study. The following chapter also presents a series of recommendations for the effective development and maintenance of

spelling and grammar skills in a paperless computer-based classroom where individual laptops are used.

CHAPTER 5

DISCUSSION

Major Findings

This study has aimed to examine and evaluate the effect personal laptop computer use has on the spelling and grammar skills of students in a Year 6 computer-based classroom. The study reveals that there are undeniable benefits associated with using laptop computers in the classroom, especially for writing tasks. However, from the results it is reasonable to argue that there are several important considerations that need to be taken into account in order to facilitate the effective development and maintenance of spelling and grammar skills.

As this case study was concerned with evaluating the effect that laptop computers have on the spelling and grammar skills of students in a Year 6 paperless classroom, the following research questions were explored during the course of the study.

1. Are spelling and grammar skills seen as important aspects of writing within the Year 6 paperless classrooms where individual laptops are used?

The study found that spelling and grammar skills were a highly significant part of writing for both students and teachers within the Year 6 paperless classrooms where individual laptop computers are used. The ability to use correct spelling and grammar in written assignments effectively is essential for both reader and author as

it provides meaning and direction to the text. In order to develop these skills effectively students need explicit teaching. Teacher 2 supported this idea and expressed the view that: “A spelling list doesn’t teach kids how to spell, but they are a tool to show patterns and relationships in spelling to help build a skill set so that students can unlock spelling”. Students within the Year 6 cohort who were interviewed also identified the need to use spelling and grammar skills effectively, with only 1 student claiming that skills in spelling and grammar were not necessary. The belief that spelling and grammar skills will remain an essential part of learning in any classroom, including a paperless computer-based classroom, is echoed by Winch et al (2001, p. 33), who claim that: “No person can effectively use computers without being able to read and write correctly”.

2. How are spelling and grammar being taught in this computer-based classroom where individual laptop computers are used?

The study found that when spelling and grammar were being taught in these computer-based classrooms and individual laptops were used there appeared to be a lack of explicit teaching of skills. This observation relates to the need for the explicit teaching of individual spelling and grammar skills that are involved in the writing process, if students are going to acquire the ability to write efficiently and effectively. The need for explicit teaching is supported by Templeton (2004, p.59) and Heinze (2008, p. 58), the latter of whom writes: “...students still need to practice their spelling words”. In most cases when lessons were observed the teaching of spelling revolved around the use of

spelling word lists taken from a programmed spelling book and topical theme lists, with little emphasis being placed on the spelling of word families, rules and explicit skills relating to the special spelling list for each week.. The students completed a number of lower order spelling activities during the week for homework, but rarely used the words being focused on during the week in other written assignments across the curriculum.

When grammar was taught students focused on particular grammar in an isolated situation outside text viewing and construction. In addition to this, it can be seen from the lesson observation records that when grammar was explicitly taught in the Year 6 classroom students were given a number of lower order skill activities where they were asked to identify the grammar function being taught, but not asked actually to apply the grammar function in their own writing. These lesson observations appear to have revealed a lack of explicit teaching in this area of writing.

When asked about spelling and grammar skills being explicitly taught in the Year 6 classroom, all 3 teachers indirectly indicated that there is more room for the explicit teaching of spelling and grammar skills in their classrooms. Teacher 3 highlighted the need for more explicit teaching by commenting that spelling and grammar skills were explicitly taught “occasionally when a particular type of language is encountered and in the course of practice activities”. Again the need for more explicit teaching was emphasised by Teacher 1, who commented that spelling and grammar skills were explicitly taught as often as possible and again by Teacher 3, who claimed they would like “to be more explicit” in their teaching.

3. How are individual laptop computers used as a medium of instruction and learning during spelling and grammar lessons?

The study revealed that when spelling and grammar skills are being taught there is a lack of handwritten activities employed. When making observations of spelling and grammar lessons within the Year 6 classrooms it was found in nearly all instances of a written assignment that students used their personal laptop computer. This observation was confirmed by Teacher 1, who commented that: “They [computers] are used all the time”. Oppenheimer (2003, p. 409) cautions teachers against the overuse of the computer, arguing “that an overemphasis on technology in the classroom has caused the educational system to forget essential learning elements”.

When it came to the teaching of spelling within the Year 6 computer-based classroom, the only contact students had with actually writing their spelling words by hand, in most cases, was when completing their spelling pre-test at the beginning of the week and their spelling post-test at the conclusion of the school week. The spelling activities used throughout the week to practise the students’ list words were completed using the laptop computer. Upon examination of the spelling activities completed by students during the week it was found that for most activities students rarely wrote their word lists and only lower order skills relating to the use of spelling words were assessed. Konza (2006, p. 127) suggests that teachers employ high levels of morphemic strategies when maintaining and developing students’ spelling skills. These strategies include: word

searches, word webs, find the base word activities, making compound word activities, using word staircases and using homonyms.

The high percentage of computer usage when completing spelling activities also gave rise to the possibility of students cheating when completing their spelling activities at home or in class. It was possible for students simply to utilise the inbuilt word processor tools to complete their spelling activities for example the, 'cut and paste' tool, making it difficult for the teacher to assess whether or not the student was able to spell the list words being focused on outside the weekly handwritten pre and post test.

It can be seen from these observation records that there was an uneven balance between the number of tasks completed by hand and the number of tasks completed using the students' personal laptops. The use of the computer within the classroom should act as a complement to handwritten work and Teacher 3 supported the need to steer away from over usage of the computer by claiming that: "The computer needs to be used in moderation..." Oppenheimer (2003, p. 395) again supports this idea, recommending: "that technology be used in more thoughtful ways with clear educational goals and purposes".

4. Are students within this computer-based classroom achieving benchmarks for spelling and grammar?

This case study has revealed that when the Year 5 writing benchmarks were assessed many students within the Year 6 cohort showed considerable differences when writing in two different mediums. In most cases students demonstrated a sound level of achievement in relation to the 7 writing benchmarks when writing with the computer. However, when writing by hand many students showed less ability to meet these writing benchmarks. This result is a cause of great concern when looking at the teaching and assessment of spelling and grammar skills in the computer-based classroom where individual laptop computers are used.

It was also interesting to note from student testing the large number of students among the Year 6 cohort who have a spelling age which is lagging behind their individual chronological age. This result again supported the idea that many students within the Year 6 group may have difficulty meeting the Year 5 writing benchmarks, which was cause for great concern regarding how spelling and grammar skills are developed and maintained within the paperless computer-based classrooms where individual laptop computers are used.

5. How has the use of laptop computers affected the achievement of these benchmarks?

The discrepancies between the results of individual students when comparing the two writing mediums may indicate that many students are less able to meet the Year 5 writing benchmarks because of the computer. One reason for these discrepancies could lie in the high level of computer usage within the teaching and learning cycle that is employed within the classroom. It is undeniable that the computer has the ability to mask students' errors and this notion is indicated by the student results that were recorded from individual writing tasks. When students used their word processor for all stages of writing it was difficult to determine exactly what the student had been able to write themselves and what gaps and errors the computer had filled in for the student.

Recommendations for Teaching

The following recommendations have been formulated following the results of this case study. The recommendations relate to the effective development and maintenance of spelling and grammar skills in a paperless computer-based classroom where individual laptops are used.

Spelling

1. The spelling program used within the computer-based classroom should be based around spelling families/rules/themes.

Having a spelling program of this nature will help students gain specific skills to unlock spelling across the curriculum. Having spelling lists where all words are based around a central spelling family/rule/theme will give students a better knowledge and understanding of how language works in all areas of writing and a sequential approach to learning. In addition to this, adopting a range of morphemic strategies to teach spelling will help students to spell words and understand the meaning of words (Konza, 2006, p. 127).

2. Word families/rules/themes should be explicitly taught throughout the week.

Simply having a common spelling family/rule/theme will not improve students' spelling skills on its own. The common link between spelling list words needs to be explicitly taught and practised throughout the week. Students will develop a better understanding

of the 'how and why' behind spelling and this should improve their ability to writing coherently.

3. Use higher order application based spelling activities during the week.

It is important to incorporate a range of activities when practising spelling during class and at home. These activities should not only practise spelling through simply writing out word lists, but also challenge students when spelling list words. It would be highly beneficial to try application based activities, where students write a variety of sentences incorporating their list words or writing a short creative writing piece using as many spelling list words as possible. Employing such activities will develop students' understanding and skills in spelling while developing other writing skills in students.

4. Ensure that students are practising how to spell words by hand writing them.

It is imperative when working in a paperless computer-based classroom where individual laptops are used that students write by hand. Utilising the use of handwriting activities will ensure that students can accurately spell words on their own without the help of a computer. Using handwritten activities will eliminate the temptation that many students may face simply to cut and paste their spelling words, use the spell-check tool or rely on auto-correct features within the computer's word processing program.

5. Set limits for making personal word lists.

If students are going to use personal word lists for spelling, it is important to set limits on words that students can use. If limits do not exist the situation could arise where students are spelling an array of unnecessary words that they might never use, thus providing absolutely no benefit to students' overall spelling skills for common words. Some beneficial limits on constructing personal word lists could include: errors from previous spelling lists, other words that use the spelling family/rule/theme being studied and errors from additional writing tasks in all curriculum areas. Setting such limits for students will not hamper their ability to extend their vocabulary but will ensure that students are refining and developing their spelling skills when looking at common words that they themselves use.

6. Re-test and re-visit spelling families/rules/themes during the term and year.

For teachers, simply teaching a spelling family/ rule/ theme once will not be enough. To ensure the effective development and maintenance of spelling skills, spelling families/rules/themes will need to be explicitly revisited and re-taught repeatedly throughout the year. This consistent revision of spelling families/rules/themes will ensure that students' spelling skills are continually developed and maintained throughout the year.

Grammar

1. Use a variety of writing tasks regularly – both literary and factual text types.

Students need to be developed as writers and to do this effectively it is essential that students are exposed to a variety of text types and writing styles. Allowing students to create and construct texts of a literary and factual nature will help to develop not only their grammar skills but also their spelling skills. Through using a variety of text types students are able to experience and apply a wide range of grammar functions/ skills and rules when writing across the curriculum.

2. Choose a grammar function/skill/rule to study over the week.

Allowing students to develop and focus specific grammar functions/rules and skills will aid in the effective development and maintenance of grammar in the paperless computer-based classroom. Allowing students to focus on one particular area of grammar for a designated period of time will allow students to develop the skills required to identify and apply grammar correctly when writing.

3. Explicitly teach grammar functions/skills/rules throughout the week.

It is necessary that grammar functions/skills/rules are taught continuously throughout the weekly teaching program. Simply visiting grammar once a week or occasionally will not allow students to build a set of skills that will aid in the effective development and

maintenance of grammar skills when writing. The explicit teaching of grammar is essential across the curriculum to help students understand how to compose and construct texts correctly to bring meaning and understanding to the reader.

4. Use higher order, application based activities to develop grammar function/skill/rule being studied.

Employing a range of teaching and learning activities will ensure that the effective development and maintenance of students' grammar skills are being met. It is essential when focussing on grammar that students are challenged to extend their understanding and skills relating to grammar. Again it could prove to be only beneficial for a range of application based activities to be engaged where students compose sentences, paragraphs, texts using the specific grammar functions/skills/rules being explicitly taught and studied in class. Utilising such activities in the classroom teaching program will help develop and maintain students' understanding and knowledge of how to identify and apply specific grammar functions/ rules/ skills in their writing and the writing of others.

5. Have students complete handwritten grammar activities regularly during the week.

Once again, it is important when working in a computer-based classroom where individual laptops are used that students write by hand. Setting tasks where students

write using pen and paper will make sure that students can accurately apply grammar themselves without the assistance of a computer. By means of handwritten activities the temptation that many students may face simply to rely on the use of the grammar check tool or auto-correct features within the computer's word processing program will be eliminated, therefore by aiding greatly in the effective development and maintenance of the students' grammar skills.

6. Re-teach and re-visit grammar functions/skills/rules during the term and year.

Merely teaching specific grammar functions/skills/rules occasionally will not effectively develop and maintain students' grammar skills when writing. To make certain that grammar skills are being effectively developed and maintained within the paperless computer-based classroom it is essential that specific grammar functions/skills/rules be revisited explicitly throughout the year. This constant revision will ensure that students' grammar skills are being continually developed and maintained throughout the duration of the year.

7. Explicitly teach editing and proof reading skills when writing.

When using computers it is easy to become reliant on the word processor tools and features to edit writing. However, in order for students to write effectively both by hand or with a personal computer it is vital to develop a range of editing and proof reading

skills. Explicitly teaching students' spelling and grammar will enable a set of skills to be developed and maintained that can be used during editing and proofreading, either by hand or on the computer.

Recommendations Relating to Purpose

Students in the computer-based classroom where individual laptop computers are used need to be exposed to explicit teaching. This explicit teaching will help to facilitate the effective development and maintenance of spelling and grammar skills. Using a skills-based approach to teaching with both handwritten and computer based pedagogies throughout the teaching and learning process will enable students most effectively to meet the writing benchmarks and outcomes when composing texts by hand or with a personal computer. Implementing the recommendations for teaching suggested by the researcher in this case study would provide a sound base and foundation for teaching spelling and grammar skills within the computer-based classroom where individual laptop computers are used.

Recommendations for Further Study

Though the results and evidence gained from this case study may indicate that the over-usage of computers in the classroom could have a negative effect on the spelling and grammar skills of students, it may not be the only cause of problems relating to the development and maintenance of spelling and grammar skills in the computer-based paperless classroom.

Some considerations for further study are as follows:

- The fact that this is a case study in one particular school suggests that a broader study is needed incorporating several sites to confirm how the use of laptop computers affects the spelling and grammar skills of students. Further studies should consider the use of a control group and a comparative study to investigate further how the use of individual laptop computer affects the spelling and grammar skills of students.
- The results have identified the need for a balanced approach when teaching spelling and grammar skills in a paperless computer-based classroom. However, the exact balance is not clear. Further study could investigate the balance needed between computer-based and non-computer based activities when working in a paperless classroom to develop effectively and maintain the spelling and grammar skills of students, on the one hand as a collective class, and, on the other hand, as individuals.
- Further study over time and assessing the spelling and grammar of students before and after using individual laptop computers could provide further evidence to support this case study. A study of this nature could help determine exactly how much using individual laptop computers in a paperless computer-based classroom affects the spelling and grammar skills of students.

- Another consideration for further study refers to the motivational aspects of using the computer in classroom. Conducting a study over time to monitor the motivation levels of students towards the use of computers in the classroom could provide further evidence as to the effectiveness of computer technologies when teaching students in any area of the curriculum. It remains to be seen how motivated students will continue to be once computers become as common as pen and paper used to be.

CHAPTER 6

CONCLUSIONS

This case study set out to show that the use of laptop computers within the classroom holds the potential to improve or hamper greatly the spelling and grammar skills of students in a paperless classroom. The case study has also highlighted the need for a balanced approach incorporating both computer-based learning activities and hand written exercises to facilitate effectively the development and maintenance of students' spelling and grammar skills.

It was evident from the study that using individual laptop computers within the classroom did greatly improve the spelling and grammar of students. However, the research also showed that the features and tools within the programs of the computer may mask the difficulties that students could be having when writing in the areas of spelling and grammar.

In conclusion, the information contained within this study implies that there is a need to modify and adjust the current teaching programs and pedagogies being employed within the Year 6 computer-based classrooms that were observed. The data collected from this study also imply that the recommendations presented by the researcher could quite possibly be of benefit to the students and teachers from the sample group, as well as students and teachers in other classrooms of a similar nature.

REFERENCES

- Adamson Hughes, J. (2000). Creating the early literacy classroom. *Contemporary Education*, 71(4), p 54-55. Retrieved October 29, 2007, from ProQuest database.
- Advertiser Editorial: The states behave like Oliver Twist. (2008). Retrieved September 20, 2008 from Adelaide Now Website:
<http://www.news.com.au/adelaidenow/story/0,,23955459-5006336,00.html>
- Beckham, D., & Hirsch, D. (2005). Making a case for paper. *ABA Journal*, 91, p 65-66. Retrieved November 11, 2007, from ProQuest database.
- Board of Studies New South Wales. (1998). English K-6 syllabus. Sydney: Board of Studies New South Wales.
- Burke, L., Fiene, J., Young, M.J., & Meyer, D.K. (2008). Understanding the why behind and the how in reading instruction. *The Educational Forum* 72(2), p. 168-176. Retrieved November 19, 2008 from ProQuest database.
- Education revolution worries teachers. (2008). Retrieved September 20, 2008, from The Australian IT Website: <http://www.australianit.news.com.au/story/0,,23889276-15306,00.html>
- Faulstich Orellana, M., & Morrell, E. (2006). Literacy in the new media age. Retrieved September 20, 2008, from ProQuest database.
- Gilling, J. (2008). Online learning boosts reading and writing skills. *Education Review*, 18(5), p 17.
- Head, B. (2008). Love them or loathe them. *Education Review Technology Guide*, 18(8), p 6.
- Head, B. (2008). Who's teaching who? *Education Review Technology Guide*, 18(8), p 1, 14.
- Heinze, J. (2006). Turn up the juice! *Instructor* (1999), 115(7), p 57-59. Retrieved October 23, 2007, from ProQuest database.
- Hempenstall, K. (1997). The whole language-phonics controversy: An historical perspective. *Educational Psychology*, 17(4), p 399-419. Retrieved November 19, 2008 from ProQuest database.
- Konza, D. (2006). *Teaching children with reading difficulties*. Melbourne: Thomson Social Science Press

- Lankshear, C. & Knobel, M. (2003). *New literacies: Thanging knowledge and classroom learning*. Buckingham, UK: Open University Press.
- New South Wales Department of Education and Training. (2008). About the Department of Education and Training. Retrieved September 20, 2008, from NSW Department of Education and Training Website: <https://www.det.nsw.edu.au/aboutus/index.htm>
- O'Grady, S. (2008). Personalise learning. *Professional Educator*, 7(1), p 22-23.
- O Keeffe, D. (2008). Switching on. *Education Review*, 18(2), p 10.
- Oppenheimer, T. (2003). *The flickering mind: The false promise of technology in the classroom and how learning can be saved*. New York: Random House.
- Parker, M. (2008). *Cheap school computer option still leaves a funding gap*. Retrieved September 20, 2008, from Daily Telegraph Website: <http://www.news.com.au/dailytelegraph/story/0,,23953005-5001030,00.html>
- Patterson, N. (2002). Spelling: blame it on technology. *Voices From the Middle*, 9(3), p 40-43. Retrieved November 17, 2007, from ProQuest database.
- Patterson, N. (2006). Computers and learning: The research says yes. *Voices From the Middle*, 13(4), p 64-68. Retrieved October 30, 2007, from ProQuest database.
- Prestridge, S. (2008). Changing track. *Education Review*, 18(2), p 8.
- Rosenthal, K. (2008). Australia lagging in digital education movement. *Education Review*, 18(4), p 17.
- Schmelzer, D. (2004). Turning out better writers: Practice makes perfect, and computer-based writing makes for more practice. *MultiMedia & Internet @ Schools*, 11(3), p 34-35. Retrieved November 7, 2007, from Academic Research Library database.
- Templeton, S. (2004). Spell-check this! The limitations and potential of technology for spelling. *Voices From the Middle*, 11(3), p 58-59. Retrieved November 17, 2007, from ProQuest database.
- Torrance, M., Van Waes, M., & Galbraith, D. (2007). *Writing and cognition: Research and applications*. Oxford, UK: Elsevier.
- Viadero, D. (2007). Collecting evidence. *Education Week*, 26(30), p 30-32. Retrieved October 23, 2007, from ProQuest database.
- Winch, G., Johnston, R. R., Holliday, M., Ljungdahl, L., & March, P. (2001). *Literacy: Reading, writing and children's literature*. Melbourne, Vic: Oxford University Press.

Appendix B

“An investigation into the effects of individual laptop computer use on the spelling and grammar skills of students in a Year 6 classroom.”

Staff Interview Questions

1. What is your personal philosophy for teaching spelling and grammar in general?
2. What is your personal philosophy for teaching spelling and grammar in a paperless classroom where individual laptops are used?
3. Are spelling and grammar skills explicitly taught in your classroom? How?
4. How are computers used as part of the teaching of spelling and grammar?
5. What are your personal views on the student use of personal laptops within the classroom?
6. Do you believe that the computer should be the sole means of instruction within the classroom? Why/why not?
7. What recommendations would you give for teaching spelling and grammar (or any other subject) where students use personal laptops?

“An investigation into the effects of individual laptop computer use on the spelling and grammar skills of students in a Year 6 classroom.”

Student Interview Questions

1. Do you think it is important to be able to use correct spelling and grammar consistently? Why/why not?
2. Do you have spelling and grammar lessons in your class?
3. How are computers used as part of spelling and grammar lessons in your classroom?
4. Do you use spelling and grammar check on your computer when writing? How often?
5. Do you believe that the computer should be used to do everything in class? Why?
6. Do you prefer using laptops or paper and pen to complete your work in class? Why?

Appendix C

Year 5 Benchmarks for Spelling and Grammar

YEAR 5 BENCHMARKS

WRITING

At the benchmark standard, students compose pieces of writing that convey intended ideas and information to a particular reader. They use a suitable type of writing for a particular purpose.

The pieces of writing contain several related ideas, relevant to the task and topic. Some of the ideas are detailed and tied into the writing.

The pieces of writing show evidence of organisation of the subject matter (e.g. a developed beginning, middle and end in a story). Some ideas may remain undeveloped (e.g. some events in a story may not be well tied into the story-line).

In these pieces of writing, students use:

- simple sentences, and longer sentences using joining words like *but, when, after, so*
- words like *this, those, there* effectively to link ideas introduced in the writing
- words appropriate to the topic, including descriptive and subject-specific words
- appropriate verb tense (e.g. simple present tense in an information report) and correct
- verb form in past tense (e.g. *caught* instead of *catched*) most of the time
- agreement between subject and verb (e.g. *she is/they are, he was/we were*) most of the time
- capital letters, full stops, commas and question marks.

SPELLING

At the benchmark standard, students spell accurately:

- most one- and two-syllable words with common spelling patterns (e.g. *growing, found, might, smooth, teacher, crashed, female, inside*)
- most of the frequently used and readily recognised words which have less common spelling patterns (e.g. *there, because, who, friends, again, knee, sitting, wanted*)
- some other words of more than one syllable (e.g. *yesterday, afternoon, morning, money*).

While students are expected to spell accurately the words described above, they also attempt to spell a wider range of words. Errors made with these words should show students' awareness of sound and visual patterns (e.g. *accross* for *across, comming* for *coming, swimming* for *swimming, finally* for *finally, exorsted* for *exhausted*), and all sounds should be represented.

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* Taken from Curriculum Corporation Web site: <http://www.curriculum.edu.au>

Appendix D

South Australian Spelling Test (SAST)

- | | |
|--------|--|
| 1. ON | Please put your shoe ON. Write ON. |
| 2. HOT | The water in the bath is HOT. Write HOT. |
| 3. CUP | I drink from a CUP. Write CUP. |
| 4. VAN | The lady can drive the VAN. Write VAN. |
| 5. JAM | I like JAM on my bread. Write JAM. |

- | | |
|-------------------|--|
| 36. GREAT | I was chased by a GREAT big dog. Write GREAT. |
| 37. SURE | I am not SURE how to spell this. Write SURE |
| 38. WOMEN | Two WOMEN went for a swim. Write WOMEN. |
| 39. ANSWER | Please ANSWER my question. Write ANSWER. |
| 40. BEAUTIFUL | The flowers in the garden look BEAUTIFUL. |
| 41. ORCHESTRA | I play the piano in the ORCHESTRA. |
| 42. EQUALLY | They shared the money EQUALLY. |
| 43. APPRECIATE | Thank you. I APPRECIATE your help. |
| 44. FAMILIAR | His face seemed FAMILIAR. Had we met before? |
| 45. ENTHUSIASTIC | The student was an ENTHUSIASTIC player. |
| 46. SIGNATURE | She wrote her SIGNATURE on the paper. |
| 47. BREATHE | Fresh air is good to BREATHE. |
| 48. PERMANENT | Will that sign be taken away or is it PERMANENT? |
| 49. SUFFICIENT | We have SUFFICIENT food to last for the weekend. |
| 50. SURPLUS | We will sell the SURPLUS apples. We have too many. |
| 51. CUSTOMARY | It is CUSTOMARY to shake hands. |
| 52. ESPECIALLY | This gift is ESPECIALLY for you. |
| 53. MATERIALLY | This story is not MATERIALLY different from the one in your book. |
| 54. CEMETERY | The funeral took place at the CEMETERY. |
| 55. LEISURE | She spent her LEISURE time in the garden. |
| 56. FRATERNALLY | FRATERNALLY means the same as brotherly. |
| 57. SUCCESSFUL | The fund-raising was very SUCCESSFUL. |
| 58. DEFINITE | I agreed on a DEFINITE time to meet her. |
| 59. EXHIBITION | There is an art EXHIBITION at the gallery. |
| 60. APPARATUS | We use this APPARATUS in the science lab. |
| 61. MORTGAGE | I bought the house by taking a MORTGAGE. |
| 62. EQUIPPED | The campers were EQUIPPED with new tents. |
| 63. SUBTERRANEAN | SUBTERRANEAN means under the ground. |
| 64. POLITICIAN | Did you vote for that POLITICIAN? |
| 65. MISCELLANEOUS | Mixing different items together makes a MISCELLANEOUS set. |
| 66. EXAGGERATE | The fish wasn't that big! Don't EXAGGERATE. |
| 67. GUARANTEE | My washing machine has a two-year GUARANTEE. |
| 68. EMBARRASSING | I find it EMBARRASSING to give a speech. |
| 69. CONSCIENTIOUS | Students who work hard are said to be CONSCIENTIOUS. |
| 70. SEISMOGRAPH | A SEISMOGRAPH is an instrument to measure the strength of earthquakes. |

Appendix E

Name: _____

Male/ Female

Age: _____ Date of Birth: _____

Grade: _____

- | | | |
|-----------|-----------|-----------|
| 1. _____ | 25. _____ | 49. _____ |
| 2. _____ | 26. _____ | 50. _____ |
| 3. _____ | 27. _____ | 51. _____ |
| 4. _____ | 28. _____ | 52. _____ |
| 5. _____ | 29. _____ | 53. _____ |
| 6. _____ | 30. _____ | 54. _____ |
| 7. _____ | 31. _____ | 55. _____ |
| 8. _____ | 32. _____ | 56. _____ |
| 9. _____ | 33. _____ | 57. _____ |
| 10. _____ | 34. _____ | 58. _____ |
| 11. _____ | 35. _____ | 59. _____ |
| 12. _____ | 36. _____ | 60. _____ |
| 13. _____ | 37. _____ | 61. _____ |
| 14. _____ | 38. _____ | 62. _____ |
| 15. _____ | 39. _____ | 63. _____ |
| 16. _____ | 40. _____ | 64. _____ |
| 17. _____ | 41. _____ | 65. _____ |
| 18. _____ | 42. _____ | 66. _____ |
| 19. _____ | 43. _____ | 67. _____ |
| 20. _____ | 44. _____ | 68. _____ |
| 21. _____ | 45. _____ | 69. _____ |
| 22. _____ | 46. _____ | 70. _____ |
| 23. _____ | 47. _____ | |
| 24. _____ | 48. _____ | |

Appendix F

Name: _____ Class: _____

Student Writing Task Handwritten

Look at the following picture.



Writing instructions

- Write a narrative.
- Use the picture above as a setting for your story.
- Use direct speech in your narrative

Name: _____

Class: _____

Student Writing Task Computer-generated

Look at the following picture.



Writing instructions

- Write a narrative.
- Use the picture above as a setting for your story.
- Use direct speech in your narrative

Appendix G

Writing Task - Handwritten Administration Instructions

1 *Introducing the Writing task*

Make sure each student has a piece of scrap paper for planning.

SAY

“Now you are going to do a Writing task. Please remove the last page of the writing booklet.”
Check that everyone is looking at the stimulus page of the Writing booklet.

SAY

“On the page you can see a picture of a rocky coast with some sentences below to it that tell you what to write about. Follow while I read them.” READ WRITING INSTRUCTIONS

SAY

“You should write about something that is interesting for other people to read. Think about the picture. It might be the place where your story starts, or where it ends, or a place in the middle of your story. Your story might be about you and your friends, or about a completely different set of characters.

Does anyone have a suggestion for the story?”

Conduct a short discussion (no more than 5 minutes) to focus students on the Writing task.

SAY

“If you make a mistake, just correct it neatly. If you don’t know how to spell a word, you should write it using the best spelling you can.

You are allowed to write a plan for your piece of writing. You can do this on the piece of scrap paper I have given you. Your plan will not be assessed and you do not need to hand it in.

There are some lines for you to write on, starting on page 1. If you run out of paper, put up your hand and I will bring you more. You have 30 minutes to do your writing. I will tell you when you have five minutes left.

Are there any questions?”

Check that everyone understands what is required.

2 *Starting the assessment*

SAY

“You may start now.”

3 *Ending the session*

After 25 minutes

SAY

“You have five minutes more to work on your writing.”

After a further five minutes, if more than two or three of your students have not finished, you may allow up to five minutes extra.

At the end of this time

SAY

“Put down your pens and close your booklets. Make sure your name & Class is written clearly at the top of each page”

Collect all *Student Writing Booklets* and make sure all student details are completed

Writing Task - Computer Administration Instructions

1 *Introducing the Writing task*

Make sure each student has a piece of scrap paper for planning.

SAY

“Leave the piece of paper face-down on your desk. Now you are going to do a Writing task on your laptop. Please take out your laptop.”

SAY

“On the page you can see a picture of a rocky coast with some sentences below to it that tell you what to write about. Follow while I read them.” READ WRITING INSTRUCTIONS

SAY

“You should write about something that is interesting for other people to read. Think about the picture. It might be the place where your story starts, or where it ends, or a place in the middle of your story. Your story might be about you and your friends, or about a completely different set of characters.

Does anyone have a suggestion for the story?”

Conduct a short discussion (no more than 5 minutes) to focus students on the Writing task.

SAY

“If you make a mistake, just correct it. If you don’t know how to spell a word, you should write it using the best spelling you can and you can use the tools on your computer.

You are allowed to write a plan for your piece of writing. You can do this on the piece of scrap paper I have given you. Your plan will not be assessed and you do not need to hand it in.

You have 30 minutes to do your writing. I will tell you when you have five minutes left.

Are there any questions?”

Check that everyone understands what is required.

2 *Starting the assessment*

SAY

“You may start now.”

3 *Ending the session*

After 25 minutes

SAY

“You have five minutes more to work on your writing.”

After a further five minutes, if more than two or three of your students have not finished, you may allow up to five minutes extra.

At the end of this time

SAY

“Please stop typing. Make sure your name & Class is written clearly at the top of each page and when you have done that please print out your piece of writing and staple any pages together in the right order using the stapler at the front and hand them to me.”

Collect all *Student Writing Samples* and make sure all student details are completed

