

2003

A study of the use of graphic organiser software to support the development of organisational and problem solving skills in a middle school curriculum

Suzanne Bursey
Edith Cowan University

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A STUDY OF THE USE OF GRAPHIC ORGANIZER SOFTWARE TO SUPPORT THE
DEVELOPMENT OF ORGANIZATIONAL AND PROBLEM SOLVING SKILLS IN A
MIDDLE SCHOOL CURRICULUM.

BY

Suzanne Bursey (BA Education)

A thesis submitted in partial fulfillment of the
requirements for the award of

Bachelor of Education with Honours

at the School of Education,
Edith Cowan University

Date of Submission: 5TH December, 2003.

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

Early adolescence, classified from 10-14 years, is an important stage of development where thinking, planning and reasoning skills are evolving. Many young adolescents in this age group encounter problems with these skills in the transition from primary school to high school. Middle school is an educational context which focusses on the provision of support for young adolescents in this transitional period. Graphic organizer software is a program designed to help users visualize problems and organize information into logical structures. This study considered the conditions under which the problem solving and organizational skills of middle school students can be enhanced using graphic organizer software.

The conceptual framework for the study rests on recent research into early adolescent brain development and outcomes based education, which form a basis for middle schooling. The ethos of middle schooling provides for a relevant, challenging and integrated curriculum grounded in developmental pedagogy. Integrating graphic organizer software into a middle school curriculum is consistent with middle schooling principles, as it provides for a guided approach to developing problem solving and organizational skills and actively engages the students in this learning process. The software chosen for the study was *Inspiration* which uses colours, pictures and links to create brainstorming, webs, concept maps and visual diagrams.

One class of year eight students in a Western Australian metropolitan Catholic co-educational College was selected as the sample. The graphic organizer software, *Inspiration*, was integrated into the Society and Environment and English curriculum for these students. The research design for this study incorporated the use of a combination of ethnographic and action-research which enabled the researcher to take into account the cultural context and also apply and evaluate therapeutic action. A variety of qualitative and quantitative data were collected and analysed.

Results of the data analysis revealed that there were significant differences in the skill development of those students who enjoyed using *Inspiration* compared to those who did not. Those who enjoyed using the software found it helpful in organizing information and

planning for the Society and Environment curriculum. The majority of students found the software easier to use as their experience increased and most students stated that *Inspiration* helped them in the information problem solving areas of planing, understanding and organizing information. The colours, graphics, links, editing and save features of *Inspiration* were considered the most valuable by both the students and class teacher. The value of *Inspiration* as a cognitive support tool also emerged as it allowed the teacher to guide the students through the learning process. Access to computers was an issue during this study as the school structure did not adequately support a flexible curriculum or shared resources.

This study found that a middle schooling curriculum that is flexible, relevant, allows for shared resources and has an emphasis on a developmental approach provides suitable conditions for the integration of graphic organizer software. It is then likely, that under these conditions, the use of such software will support the development of students' organizational and problem solving skills.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

- (i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;
- (ii) contain any material previously published or written by another person except where due reference is made in the text; or
- (iii) contain any defamatory material.

Signature:..

Date:.. 22ND January 2004

ACKNOWLEDGEMENTS

The author wishes to acknowledge the support and guidance provided by Dr. Paul Newhouse, research supervisor for this study. His expert guidance and gentle encouragement have been invaluable.

The author would also like to acknowledge the Principal of the Catholic College where this research was conducted. A special thank you must go to Mrs. Alessandra Hardwick for allowing the research to be undertaken with her students and for her on-going assistance and advice.

Finally, the author would like to thank her husband, Chas, for giving her the love, support and motivation to complete this thesis.

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CHAPTER ONE

INTRODUCTION

This chapter presents the rationale, research question, background to the study, a definition of terms used and a description of the school context within which the study was conducted.

Rationale

A review of the literature surrounding middle schooling revealed that young adolescents (10 to 14 years) have highly specific educational and psychological needs. Wormeli (2002, p. 25) and Harnett (1991a, n.p.) state that the stage defined as early adolescence is characterised by a growth spurt in the executive function of the brain. Dyck (2002, p. 19) explains that the young adolescent is only at the beginning stages of developing their organizational and problem solving skills and they need to be helped and guided to maintain and further develop these skills.

The researcher has observed that many young adolescents have difficulty in coping with the transition from a primary school structure with one teacher, to a traditional high school environment with many teachers teaching in discrete subject areas. Middle schooling is designed as an educational process that can provide the guidance in this transition period that young adolescents need. Rosenfield (2002, p.13), however, states that the middle school curriculum needs to be relevant, related and integrated. Stringer (1998, p. 17) asserts that an integrated curriculum in middle school would help young adolescents to recognise the connections between fields of knowledge and encourage evaluation of thinking and learning strategies. Barnett (2001, p. 1) states that integrating ICT into the curriculum can assist in the understanding of the academic content while Hayes, Schuck, Segal, Dwyer & McEwan (2001 p. 32) quote research that suggests innovative ICT integration allows for the promotion of higher order thinking skills and collaborative problem solving strategies.

Dyck (2002, p.20) asserts that structures that promote successful organizational strategies must be put into place for students and suggests some strategies that promote the

development of these skills, are mindmaps and graphic organizers. Mindmaps, brainstorm, flowcharts, and other traditional organizers have been commonly used in teaching and learning programmes; however, graphic organizer software allows for integration across the curriculum using ICT. *Inspiration* is graphic organizer software that can help students to visualize problems and recognise relationships between topics and issues. This software is not subject specific and so the various graphic organizer templates in *Inspiration* can be used for different topics and in different subject areas, thus the link of organizational skills and problem solving can be promoted across all subject areas.

The potential benefits of using graphic organizer software, and specifically *Inspiration*, have been widely reported. Studies have been conducted at the Centre for Electronic Studying, University of Oregon, by Zeitz and Anderson-Inman (1992) who found that the use of *Inspiration* facilitates critical thinking and organizing information into logical hierarchies. They assert that the program was useful in stimulating prior knowledge and facilitating understanding. While there are a number of Australian authors who report on the use of *Inspiration* as a software tool (McKenzie, 1997, p. 1; Dyck, 2002, p. 20), none report on research into integrating *Inspiration* into a middle school curriculum in Australia.

This study was therefore undertaken to integrate the use of *Inspiration* into a middle school curriculum in an Australian school and to research the conditions under which it may be used to support students' organizational and problem solving skills. The research question was formulated together with subsidiary questions to create the focus for the study.

Research Question

The research question addressed by this study was:

Under what conditions will the integration of a graphic organizer software tool into a middle school curriculum facilitate the successful implementation by teachers of strategies and constructs designed to enhance students' organizational and problem solving skills?

In an attempt to answer this research question the study considered the following subsidiary questions:

1. *In what ways does the graphic organizer software tool, Inspiration, facilitate the successful implementation by teachers of strategies and constructs designed to enhance organizational and problem solving skills?*
2. *Are some strategies and constructs better facilitated than others and if so, why?*
3. *Are particular groups of students affected more than others and if so, why?*
4. *How should Inspiration be integrated into the curriculum?*
5. *What other issues need to be considered?*

Definition of Terms

In order to ensure a common understanding for the terms used in this study the definitions applied to the context of this research are presented.

Early Adolescence

Early adolescence can be described as a transitional period. Harnett (1991a, n.p.) quotes Eichorn's (1966) description as a "stage of development which begins prior to the onset of puberty and extends through the early stages of adolescence". There is general agreement that the age classified as early adolescence is from 10 to 14 years.

Middle Schooling

"Middle schooling is an educational process, an overall style of teaching and learning based on well founded beliefs and understandings about adolescents and their development." (Dept. of Educational Services, 1999, p. 12). There are a number different models of middle school in Western Australia, however, they generally operate somewhere between the school years of five and nine.

Outcomes Based Education

Outcomes based education is an educational approach which focusses on learning. The emphasis is on the student and what they are expected to know, understand or demonstrate as a result of the learning process. (Centre for the Advancement of Teaching and Learning, 2003, n.p.)

Integrated Curriculum

An integrated curriculum blurs the lines between traditional subjects. An integrated curriculum allows for cohesion of content and the process across the curriculum. Any number of concepts or processes may be explored in various ways in different subject areas. Knowledge is gained across subject areas, allowing for exposure to ideas and information in different ways to suit different learning styles.

Information and Communications Technology (ICT)

Information and communications technology is defined as the term for technologies, including hardware and software, which are used for accessing, collecting, managing, presenting and communicating information. (National report on schooling, 2001, n.p.)

Problem Solving

There is general agreement among educators on the importance of the role of problem solving, however there appears to be many different definitions of problem solving. Moore (1997, p. 1) asserts that problem solving can be used in information literacy to provide a framework across traditional knowledge areas and also to allow for connections to be made between ideas and to prior knowledge. For the purposes of this study the definition of problem solving in terms of information literacy will be used.

Organizational Skills

The Oxford Dictionary defines the term organize as "give orderly structure to". Hatcher and Pond (1998, p. 716) state that organizational skills are an essential element of critical thinking and help students to remember information. Gluck (1995, pp. 179-182) expounds further on the value of these skills by stating "success is achieved when essential skills that have been taught are those of organization." Organizational skills can be defined in terms of both organizing thoughts and ideas into logical order, and also planning to assist orderly structure. Both of these aspects will be applied in this research.

Graphic Organizer

The term 'graphic organizer' is used to describe visual systems that organize and present information (Martin, 1998). Graphic organizers are described as instructional tools that are flexible and have many applications. Most graphic organizers show order and completeness of the thought process, allow strengths and weaknesses to become evident, whilst also allowing the issue/problem to be viewed in a close-up context or from a "big picture" point of view (WriteDesign On-line, n.d.).

Inspiration

Inspiration is a software tool developed in the United States of America to support visual thinking and learning. It supports the use of techniques that enable students to create and organize their thoughts through the use of visual organizers, concept maps and other visual diagrams (Classroom Ideas Using Inspiration, 1993, p. 7).

Background

In Western Australia at the age of around 12 years students leave primary school and go to secondary school. Entering year eight they can encounter an organizational and curriculum structure which, in many instances, is vastly different from that of their primary school. The philosophy of middle schooling attempts to blur the boundaries between primary school and high school, however, major differences still exist and many students can experience

problems in this transition period. Monahan, Ognibene and Torrisi, (2000, p. 10) state that many students exhibit inadequate organizational skills in the classroom which can affect their academic achievement. Students' inability to recognise this as a problem and so, in turn, their failure to address or solve it, compounds the problem.

Discussions with year eight mainstream and focus teachers at the co-educational metropolitan Catholic College where this research was conducted, identified one of the main problems encountered by incoming students as a lack of organizational skills. To assist in this regard the researcher conducted weekly sessions before school, to help students organize their planning for assignments and homework. Many of the students who attended these classes were encouraged to do so by their teachers and parents, however a number came of their own accord.

After discussing issues of concern with the College Counsellor it was decided to conduct a simple survey of year eight students. One of the results of this survey revealed that 37% of students listed concerns about completion of homework, assignments and the organization of their workload in general. The research associated with this thesis was designed to promote middle schooling initiatives in the area of integrating ICT into the curriculum to determine if this could help the development of organizational and problem solving skills and strategies of these young adolescent students.

The School Context

The researcher held the position of Student Services Co-ordinator at an inner metropolitan Catholic Co-educational College. One of the major roles in this position was the pastoral care and academic monitoring of year eight students. This also encompassed the transition of students from feeder primary schools into the College.

The College had an enrolment of 810 students from year eight through to year twelve. The 2003 enrolment figure for year eight students stood at 186. The year in which the study was conducted there were thirty more boys enrolled than girls and ten students were enrolled in the Education Support Unit. Students enter the College in year eight from a

number of primary schools in the northern suburbs, however the majority of students arrived from six feeder Catholic primary schools located in the surrounding area. To assist with the transition of students from primary school, the researcher requested information by pro-forma about each student concerning academic ability, extra curricular activities, leadership ability and any pastoral care concerns. The researcher also visited each main feeder primary school and to meet with the year seven teachers.

A survey conducted in 2002 by teachers from the LOTE (Language other than English) Learning Area received a response from 307 families. Information from the returned responses revealed that in 74% of the families, a language other than English was spoken, with Italian making up 60% in this category. Many of these students identify very strongly with their Italian heritage.

The College was structured on a vertical pastoral care system, with six houses. Every student and staff member belonged to the same house for their entire time at the College. The home rooms and pastoral care initiatives were based on the house system. There were six mainstream classes for core subject areas. Year eight students were placed into mainstream classes based on what house they belong to. The researcher placed the students into their houses using family relationships as the first criteria; students were placed into the same houses as their older siblings. Using the information obtained from the year seven teachers, students were then placed into houses to ensure that the spread of abilities and talents is as even as possible. Each house had a similar number of students who experienced academic problems, were high achievers, exhibited leadership potential, and other talents and qualities. As far as possible there was parity between house groups in terms of gender, ability, talent and skills.

Students who required extra tuition in literacy and numeracy were removed from their English and Mathematics house classes and placed into smaller focus classes. The students in the focus classes were assessed at the end of the first semester and depending on the outcome of the assessment, some students were then placed back into their mainstream class while others, not coping in mainstream, were moved to a focus class. Approximately 20% of year eight students experienced some time in a focus class. The focus classes had a

teacher student ratio of approximately one to fifteen. While the curriculum in the focus classes was generally the same as the mainstream classes, students experienced a more in-depth approach. There was also an emphasis on organizational and problem solving skills in these classes, as this was perceived as an area of concern by both their mainstream and focus teachers. This emphasis on organizational skills did not use integrated ICT and, as some students only attended these classes for one or two terms, the continuity of intensive skills development was been lost when they returned to mainstream classes.

The principles of Middle Schooling were practiced to some degree in years eight and nine. The transition from primary school into the college was formulated with a strong pastoral care focus. As far as is practicable, year eight students had many of their mainstream subjects in the same classroom. Outcomes based pedagogy was the mainstream curriculum at the college and teachers were encouraged to provide a challenging, supportive classroom environment. Many of the main middle schooling characteristics, however, were not part of the culture of the College. There was some integration of the curriculum, however this was not part of the formal programme, rather initiatives from individual teachers. The physical structure of the school did not allow for sharing of resources or open plan classes for team teaching and the timetable was not flexible.

Inspiration Software

Inspiration is a graphic organizer software tool which provides structures to enable users to organize thoughts and information. It enables students and teachers to create concept maps, idea maps, webs, visual diagrams and specialised templates (Classroom Ideas Using Inspiration, 1998 p. 3). *Inspiration* allows students to insert graphics, weblinks, notes, change colours and shapes and so enables them to creatively personalise their work. This software program was licensed on all the computers which were networked in the College library. Students could access *Inspiration*, other programs and the Internet by entering their password and then their work could be saved to their own workspace. There was a technology class area in the library to allow for individual student computer use. There was also a digital projector in the library and this could be used to demonstrate or instruct using the computer images projected onto the large screen.

Report of Study

This chapter outlined the rationale for this study and stated the research question and subsidiary questions. The culture of the school and students where the research was undertaken has also been described. Terms used in the literature review and throughout the study have been defined. In Chapter Two a review of literature relevant to 'Early Adolescence', 'Middle Schooling', 'Outcomes Based Education' and 'Integrating Technology' is reported. Chapter Three presents and discusses the methodology used for this study. The results and analysis of the data gathered are presented in Chapter Four under the instruments by which they were gathered. Discussion of these results in terms of the research question are laid out in Chapter Five and Chapter Six contains limitations of this research and also recommendations.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents a review of current literature on the major issues pertinent to this research. Early Adolescence as a stage of development is defined and the educational needs of early adolescent learners are discussed. The importance of Middle Schooling, an integrated curriculum and ICT to support learning, in this important stage of development, is also presented.

Young adolescents are in a transitional period of their lives. This transitional period covers their physical and emotional growth as well as their educational development. The transition from childhood into adolescence brings about many changes and in Western Australia moving from a primary school environment into a high school environment, is an additional major change. It is vital that young adolescents are exposed to both challenging and yet safe learning environments and that they are supported and guided as they move through this time of transition. Middle schooling is an educational philosophy which focusses on the provision of support for the young adolescent by an integrated, relevant and flexible curriculum.

Early Adolescence

There are many stages of development from the birth to the death in the life of humans. Early adolescence has been categorised as one of these stages. Hartnett (1991a, n.p.) uses the term 'transescence' and quotes Eichorn (1966) when describing this stage as "beginning prior to the onset of puberty and extending through the early stages of adolescence". Although different for each individual child there seems to be a general agreement that the age classified as early adolescence is from 10 to 14 years.

Hartnett (1991a, n.p.) elaborates further by describing five characteristics that accompany this stage:

1. Physical change, variable according to individuals.

2. Expansive brain growth between the ages of 10 to 12 years leveling out at 12 to 14 years.
3. Decreasing adult influence and increasing peer influence.
4. A developing need for values clarification and acceptance.
5. A need for meaningful relationships with adults and the adult world.

It is surprising to note that Harnett does not include any reference to emotions in these characteristics, where the impending surge of sex hormones would not only influence the physical change in early adolescents but also their emotional state.

Dyck (2002, p.19) points out that while the young adolescent may have a body that is starting to look like an adult, they do not have the life experience or the brain power to make judgments or decisions like an adult. This judgment is further impaired when the child is under stress. Consequently they can seesaw between emotional highs and lows, behave appropriately one day and "screw up" the next (Rosenfield 2002, p.13). This confusion is further compounded by the differing rates at which children mature physically, emotionally and intellectually (Dyck, 2002, p.19).

Early Adolescent Brain Development

Wormeli (2002, p. 25) asserts that there are two stages of development where phenomenal growth occurs, from birth until 2 years of age and from 10 to 14 years. Harnett (1991a, n.p.) explains that the period of growth in early adolescence from 10 until 14 years may be as critical as the first stage. While the brain continues to grow after the first important stage there is a growth spurt in the front of the brain in early adolescence. This growth spurt influences brain function in the areas of planning, problem solving and impulse control (Rosenfield, 2002, p.11). The Publication "Teenage Brain: A work in progress" National Institute of Mental Health, USA, states that this second wave of "overproduction of gray matter" occurs in the thinking part of the brain, the neural connections or synapses. This happens in the frontal lobe, controlling the "executive functions" of planning, impulse control and reasoning. A pruning process may occur with some of these neural links following the principle of "use it or lose it". The functions of these neural links that are used more often thrive, and those not exercised may be lost (Rosenfield, 2002 p. 11; National Institute of Mental Health, 2002, n.p.).

In early adolescence the frontal lobe is developing organizational skills, critical thinking and problem solving skills, however, this is only the start of this process and children need adults to "closely walk them through this maturation process" (Dyck, 2002, p. 19). In guiding young adolescents through this process it is important to take into account the other dynamic changes that are occurring in the child such as their emotions. Rosenfield (2002, p.13) states that emotional connections can enhance memory learning, however emotional stress may inhibit opportunities for learning. Young adolescents can fluctuate between extreme highs and lows in a short period of time and so, to ensure development, these children need to feel safe in a "high challenge, low threat" environment (Rosenfield, 2002, p. 13).

Wormeli (2002, p. 23) asserts that for successful learning to take place the experiences need to be relevant and connected to prior knowledge or experience. This applies to everyone not just young adolescents. However as young adolescents are at the starting point of clarifying their values, relevant meaningful interactions can only enhance their learning capabilities. Immersion in rich, stimulating and diverse environments can only aid the learning process. As well as relevant interactions Wormeli (2002, p. 23) also states that multiple interactions must happen before mastery occurs. He quotes author, David Sousa when asserting that 90 percent of what we hear in the past 24 hours will not be retained unless interaction occurs. He also quotes author, Patricia Wolfe, who goes further to suggest the brain will discard new data within 18 seconds of receiving it unless some form of interaction occurs. Wormeli (2002, p. 25) writes that information is stored by similarities and retrieved by differences, the best way to learn is to tie new information to personal background to create relevance and connectedness.

Early Adolescent Learning and Middle Schooling

In the report *Planning for middle schooling in Western Australia* (Dept. of Educational Services, 1999, pp. 11-12) the terms Middle School and Middle Schooling are defined as follows:

A middle school is a discrete organizational structure designed for the education of young adults including students from both upper primary and lower secondary years.

Middle schooling is an educational process, an overall style of teaching and learning based on well-founded beliefs and understandings about adolescents and their development.

It is important to note that Middle Schooling teaching and learning practices may not occur in a Middle School and characteristics of Middle Schooling may occur in upper primary or lower secondary sites that are not Middle Schools per se (Dept. of Education Services, 1999, p. 12).

The physical, emotional and intellectual characteristics and needs of the young adolescents set them apart from other children. Harnett (1991b, n.p.) states that neither the child centered environment of the primary school nor the subject orientated environment of the high school adequately meet the needs of the early adolescent learner. A Middle School learning environment which provides a transition into high school with flexible programming and a broad, supportive and integrated curriculum would suit the specialised needs of the young adolescent learner. Harnett (1991b, n.p.) uses criteria outlined by Alexander and George (1981) to describe six elements which should characterise Middle School approaches:

- School systems and structures to allow for a supportive environment and interaction with an adult or adults on academic, social and personal issues,
- A transition programme into the curriculum,
- Flexible timetabling to allow for integrated learning,
- A variety of instructional strategies to cater to the needs of the young adolescent learner,
- A diverse range of curriculum subjects designed to engage the interest and participation of all students, and
- Learning experiences focusing on skills and strategies which will enhance future study.

The transition from primary into high school can be a difficult one for some students and research has indicated less than satisfactory progress for many young adolescents. In the report, *Planning for middle schooling in Western Australia*, Hill (1994) states that a dip in achievement occurred for Victorian English students in their first year of high school. The Education Department of Western Australia reported a “plateau effect” in performance comparisons between lower secondary and feeder primary schools in English (1997) Society & Environment (1994) English and Mathematics (1992) and Health and Physical Education (1994). Cumming (1994), also cited in this report, claimed and that the curriculum lacked relevance and cohesion and the organizational structures were “rigid and disempowering”. (Dept. Educational Services, 1999, p. 46),

Rosenfield (2002, p.13) asserts that the young adolescent learner needs to become involved in their own learning. Further, the curriculum needs to be relevant, related and integrated to enable students to have the opportunity to hear and interact with information in different subjects and different ways. This will then allow students to connect ideas and information across the curriculum and to have multiple experiences to develop, improve and evaluate their skills and strategies in the learning process.

With links to the ethos of not only Middle Schooling but also Outcomes Based Education, mastery goals emphasise the importance of not only developing new skills but also the process of learning itself and the fact that success is dependent on effort. Students need to develop their ways of thinking and also skills and strategies to learn, monitor and evaluate their progress (Ames & Archer 1988, p. 260). When discussing mastery goals Ames (1992, p. 263) asserts that learning is enhanced when:

- Information about decision making strategies is embedded in tasks,
- Meaningful and relevant tasks and content are an essential part of the curriculum,
- Opportunities are given to improve skills and gain new skills which lead to a feeling of empowerment,
- Students are given opportunities to apply self-regulatory skills, and
- Students are given opportunities to become involved in the planning, organizing, monitoring and evaluation of their own learning.

With involvement in regulating their own learning students make decisions about their goals and ways of achieving them. The "executive functions" of their brain, organizing, reasoning, decision-making skills, are being given the opportunity to exercise, to practice and so grow. The Middle School experience provides a "high challenge, low threat" environment for this to take place (Rosenfield, 2002, p.13).

The Dept. Educational Services (1999, pp. 47-48) quote the Schools Council Report (1993) which states that learning needs to be connected to students' everyday experiences and to what they already know, building on to more advanced stages of learning. Learning needs to be relevant and integrated. The report goes on to describe the features of Middle Schooling that contribute to early adolescent learning:

- Continuous progress,
- Flexible time-tabling,
- Planned transition from dependent to independent,
- Team teaching,
- School Ethos appropriate to the social needs of early adolescents,
- Exploratory and enrichment learning experiences,
- Individualised and group guidance,
- Student centered, directed and developed activities,
- Interaction with group and teacher to provide support and guidance,
- Personalised, positive evaluation of student achievement.

(Dept. of Educational Services, 1999, p. 48).

Eccles and Midgley (1989, p. 140) state that research indicates there is a decline in motivation in many students as they move from elementary (primary) school. There has been a general assumption that this decline is due to the impending "physiological and psychological changes associated with puberty" and therefore set in stone. Anderman & Midgley (1998, n.p.) state that although a "one size fits all" strategy to motivating students is not always appropriate, there are certain characteristics of middle schooling that encourage positive motivational outcomes. Some of these include:

1. Grouping by interest and student choice in group formation
2. Co-operative learning
3. Portfolios
4. Involving students in evaluation of their achievement
5. Emphasis on intrinsic motivation
6. Student involvement in decision making and self-regulation
7. Thematic and interdisciplinary curriculum
8. Challenging and enriching tasks with the emphasis on problem solving.

Anderman and Midgley (1998, n.p.) further assert that early adolescents are developing their own sense of identity and therefore a sense of self-determination is important. At this age they want to be included in the decision making processes about their own learning. The authors go on to warn however that early adolescents are still in the beginning stages of development of critical thinking, decision making and organizational skills. They require practice and guidance in a safe and also challenging environment. While Anderman and Midgley (1998, n.p.) state the benefits of middle schooling pedagogy, they also quote research from Midgley and Feldlaufer (1987), that "students in middle school actually experience fewer opportunities for self-determination than they did in elementary school." They did not state whether this research still held true in 1998 nor did they attribute this to a determining factor in the philosophy of middle schooling, the education system or the educators themselves.

The MYRAD Project (Middle Years Research and Development) is aimed at developing, evaluating and refining research into middle schooling and is a major part of the research into the middle years strategy in Victoria. In a presentation on the MYRAD Project, Peter Hill states that the motivation for MYRAD has been "the overwhelming evidence of students' disengagement from learning, feelings of alienation and under-achievement" (Hess 2001, p. 34). Mizzell (1999 p. 1) concurs stating that there is evidence that the transition into high school by young adolescents can be a negative experience and for many, a drop in academic achievement and attendance is a consequence.

Teaching practices and learning activities that are being implemented into MYRAD schools include involving students in the decision making process about their own learning with

regard to "content, process and evaluation" (Williams, 2001, p.34). In a report to the Minister for Education, Kruse (1998 p. 6) recommends that there should be an education structure that supports greater autonomy, giving both teachers and students responsibility in the development of the curriculum and learning experiences. The curriculum should be cohesive, relevant and support adolescent developmental learning. Roschelle, Pea, Hoadley, Gordin and Means (2000, p. 79) state that while theories of education may differ, there seems to be general agreement that in order to enhance learning, students must be actively engaged in the learning process.

While some states in the USA require specialised training for teachers of middle grades, most states do not and in Australia there are few undergraduate teacher training courses specifically for middle schooling. Research conducted in 2001 by the Australian Government Department of Education (n.p.) identified only six undergraduate teacher training courses for middle school. Harnett (1991a, n.p.) states that important reports from the Carnegie Corporation and National Middle Schools Association in the United States of America make strong recommendations for teacher training for teachers of young adolescents. In another paper Harnett (1991b, n.p.) states that there is general agreement among researchers and practitioners for the need for teacher training in middle school education. The specialised needs of young adolescents require teachers to possess knowledge about their psychological, social and intellectual development and also the practical skills to implement a curriculum to suit these needs.

Outcomes Based Education

In planning for education in the 21st Century in Western Australia, the Education Department looked at the existing structure of the school system [traditional primary and secondary schools] to determine relevance and effectiveness. The implementation of outcomes based Curriculum Framework to all Western Australian schools was also taken into consideration. Middle schooling pedagogy and school structure is considered consistent with outcomes based education and current educational research (Dept. of Educational Services, 1999, p.11).

Increasingly, in many schools in Western Australia the curriculum is, for the most part, organized through the outcomes based Curriculum Framework. The implementation of the Curriculum Framework into all Western Australian schools is a major educational innovation that, when fully implemented will have spanned ten years. The Curriculum Council, (1998, p. 6) describes the nature of the Framework:

The Curriculum Framework makes explicit the learning outcomes [c.f. goals] which all Western Australian students should achieve. This focus on outcomes represents a major shift in school curriculum from a focus on educational inputs and time allocation toward one that emphasises the desired results of schooling.

The Western Australian Curriculum Framework describes learning outcomes for eight Learning Area Statements applicable to all students irrespective of school or age. Schools establish the process and strategies for achieving these outcomes. Underpinning these statements there are seven key principles stated in the Curriculum Framework (1998, pp. 6,16,17). The fourth principle of Flexibility emphasises the need to be responsive to social and technological change and that new technologies, as tools for learning, should be encouraged. The fifth principle of Integration, breadth and balance, encourages strategies that help students to see forms of knowledge as related whilst also building global connections. The use of graphic organizer software supports the above principles as a technological tool for learning which encourages students to recognise connections between subject areas through strategies and skills. The sixth and seventh Principles stress the importance of a developmental approach to outcomes education and that all stakeholders, students, teachers and parents, should have a say in how these outcomes are achieved. Graphic organizer software is consistent with a developmental approach and encourages students to evaluate and monitor their own learning processes.

Integrated Curriculum for Young Adolescents

Bean, (1992, p.1-2) argues that young adolescents are more than "hormones with feet" and that they not only have concerns about their own identity but also the world at large. At

this critical stage of early adolescence they are in the beginning stage of developing their own opinions and values and making connections between their world and the global world. An integrative curriculum where students have a voice in planning and are able to develop skills related to problem-solving, critical thinking and communication, offers promising possibilities.

Specialisation in subject areas, has been the norm for secondary school education, however, Stringer (1998, p. 17) argues that students in primary school can be successfully educated with one teacher so that when they move to high school they should not have ten plus teachers. An integrated curriculum in middle school would help young adolescents to recognise the connections between fields of knowledge and encourage evaluation of thinking and learning strategies. Stringer (1998, p.17) goes further in stating that "subjects are a resource contributing to learning, not something that has to be learned." Specialist teachers need to use their skills and expertise to ensure the curriculum is relevant, progressive and developmental in order for the learning needs of the young adolescent to be met.

Integrating technology into the curriculum can assist in the understanding of the academic content whilst also enhancing knowledge of technological issues in society (Barnett 2001, p.1). Kruse (1998 p. 6) states that there should be a greater use of learning technologies and "their use as tools for learning rather than areas of study in themselves."

Using ICT to Support Learning

While there may be a generally held perception that computers are a motivation tool in themselves Martinez (2001, p. 3) refers to studies which indicate that there are diverse individual factors such as enjoyment, motivation, frustration and independence that affect learning performance. Roscheile, et al. (2000, p. 78) concur, stating that mixed results of studies make it difficult to generalise about the overall impact of ICT in improving student learning. They do however, state that certain computer-based applications, where students are encouraged to reason, can enhance achievement levels.

Roschelle, et al. (2000, p. 77) further state that while there have only been limited and varied results on the effectiveness of ICT in education it is nonetheless a "powerful and pervasive force in society today". It is, therefore, essential that all stakeholders; parents, policy-makers and educators, debate and determine the most effective way ICT can be implemented to improve student learning. Hayes, et al. (2000, p. 29) go further in suggesting that it is not only essential for teachers and administrators to be involved but also students should be encouraged to "develop, produce, use and assess technology."

The successful implementation of ICT into the school curriculum is enhanced when combined with a complementary organizational structure. For many schools in Australia the implementation of ICT is inadequate and comprehensive planning and restructuring needs to occur. This includes teacher development, curriculum reform, assessment and evaluation and the school's capacity as a whole to change. Key factors affecting student use of computers are: 1) Location and number of computers, 2) teacher expertise 3) teacher philosophy and 4) school culture (Roschelle, et al. 2000, p.92). The manner in which ICT is implemented may vary. There are arguments for both drill and practice and embedding computing skills into the curriculum. A tandem approach, however, that sees basic skills instruction integrated into higher order skills of reasoning and comprehension is a more effective way of introducing ICT into the curriculum (Roschelle, et al. 2000, p.91).

Hayes, et al. (2000, p. 30) recommend that an interdisciplinary curriculum in regard to the integration of ICT helps students develop higher order thinking and promotes valuable connections. They quote studies which assert that integrating ICT into the curriculum "has the potential to produce an educational paradigm shift." This shift is defined as moving from an instructivist approach to a constructivist approach, from teacher centered to student centered.

Consistent with a constructivist approach Hayes, et al. (2001 p. 32) suggest innovative ICT integration allows for the promotion of higher order thinking skills and collaborative problem solving strategies. Also quoted in this study to support this view, is Kneidek's (1996) case study which found that ICT engages students' interests and assists them in exploring how they learn and to self regulate their learning. Eisenberg (2002, n.p.) states that educators are becoming increasingly aware that computer literacy is not just about

knowing how to use a computer, but to use technology “as a tool for organization, communication, research and problem solving”

Rosenfield (2002, p.13) states that teachers should provide varied brain-stimulating learning activities to enable and motivate students to learn new concepts. These activities should give students a greater control of their own understanding and progress. Worneli (2002, p.25) asserts that educators should be using inquiry methods, simulations and varied summarisation techniques to enable students not only to learn but also to learn how they learn best. Dyck (2002, p.20) concurs and adds that teachers need to teach students how to learn. Some strategies that are suggested are mindmaps and graphic organizers such as *Inspiration*. Software tools such as *Inspiration* provide facilities to support these strategies and can help students to visualize problems and recognise relationships between topics and issues.

Inspiration is a computer software tool for visual thinking and learning. It enables students to create concept maps, idea maps, webs and visual diagrams. These visual learning and thinking techniques can help students to organize their thoughts and also organize information, connect prior knowledge to new information and clarify ideas. Visual diagrams can reveal patterns and interrelationships and also allow students to summarise and organize complex information into understandable units (Classroom Ideas Using Inspiration 1998, p.7). Visual organizers can also enable students to plan their work and to evaluate their own progress and achievement. In answering the question of why graphical organizers should be used McKenzie (1997, n.p.) states that they allow complex and messy collections of information to be transformed into meaningful displays. These meaningful displays compress and focus the information and allow for easier interpretation, understanding and insight.

Conclusion

Rochelle, et al. (2000, p.79) point out that the outcomes based model of teaching and learning espoused by the Curriculum Framework document has a clear expectation that students take an active role in the organizing and analyzing of information, problem solving and designing solutions. These hands on and life related learning activities help the young

adolescent in the successful transition from high school and fit with philosophy of Middle Schooling (Mizelle, 1999, p.1). Harnett (1991a, n.p.) adds that Middle Schooling should have an integrated curriculum and provide core experiences that incorporate a focus for students on how to learn. The focus should incorporate problem solving and organizational skills, to prepare them for both present and future learning. Graphic organizer software supports the principles of outcomes based education and middle schooling as it can be integrated into the curriculum to provide relevant and meaningful connections between fields of knowledge. *Inspiration* is graphic organizer software designed to allow students to take an active role designing, monitoring and evaluating the strategies and skills they employ when organizing information and ideas.

This chapter has presented a review of current literature on the specific needs of the early adolescent learner and how these needs are met through Middle Schooling and outcomes based education. A discussion of integrated curriculum and using ICT to support learning in a middle school environment is also presented. Chapter Three outlines the method of research, the procedure, and the instruments used in this study.

CHAPTER THREE

METHOD

This chapter presents the research design and a description of the setting for this study. A rationale and description of the graphic organizer software used is also outlined. The procedure of this study is tabled and the instruments used to gather data are described.

The research design employed is a combination of ethnographic and action-research methodology. This design was selected as the ethnographic method allowed the researcher to take into account the physical and cultural environment of the college whilst using a combination of qualitative and quantitative data collection. Action-research enabled the researcher to conduct on-going evaluation, in consultation with the teacher, during the study and apply therapeutic action when it was deemed necessary. In ethnographic research, fieldwork involves participant observation, triangulation, interviewing and can also include quantitative analysis. Burns (1996, p. 297-299) describes ethnographic research as the study of social custom, ritual in a cultural context. The researcher is also employed at the College where the study was conducted, thus enabling the physical cultural context of the school to be taken into consideration. This aspect of ethnographic research allowed cultural issues such as the curriculum, timetable, lesson times, computer availability, the technology network and programming to be taken into account when gathering the data. The human cultural context was considered when selecting the class to be studied.

Action-research focuses on more than interpreting the data gathered, however, this method also follows a cyclical sequence (Burns, 1996, p. 347). Once an issue has been identified action-research allows for the implementation of therapeutic action and monitoring the effects of this action. The implementation of the graphic organizer software program *Inspiration* into the middle school curriculum was carried out and the effects of this integration on the organizational and information problem solving skills of the students was recorded and analysed throughout the study.

The ability to evaluate findings and modify therapeutic action that is afforded by the action-research model, enabled the researcher to take into consideration the difficulties encountered with the technology network, length of lessons and programming changes to the subject areas.

Background on Technology Network

The school that was used for the study was a Catholic College and as such was designated to become part of the Catholic Education Technology Network, Cathednet, for the commencement of the school year of 2003. A combination of the implementation of Cathednet and school network issues, meant that access to the school's technology network was not available to all students and staff at the beginning of the school year. It was not until week six of term one that many of the technology issues had been resolved.

The library was the only location in the school that had a class set of computers with licenses for *Inspiration* and it was considered the best location for integration of the software. The data projector in the library was seen as a valuable instructional tool when demonstrating the various features of *Inspiration*.

Description and Rationale for Inspiration Software

In keeping with the philosophy of Outcomes Based Education, Middle Schooling and integrating ICT, the researcher decided to choose a graphic organizer software program to integrate into a middle school curriculum. It was necessary to choose a software program that was of reasonable cost, had the ability to be networked, was readily available and user friendly for middle school students. *Inspiration* was chosen as it was already installed at the College, it fitted the above criteria and the researcher had some experience with this software program and found it to be of high quality, reliable and adaptable for specific needs.

Inspiration Software Inc. was founded in 1982 and started to produce brainstorming and organizing tools in 1987, with the first version of *Inspiration* being released in 1988. *Inspiration 6* was used in this study and has a main idea concept map on the start up page. Templates are available for certain subject areas, examples being: Language Arts, Social

Studies and Science. Venn diagrams, cause and effect templates, flow charts, hierarchical organizers and webs are some of the structures available. There are templates available for specific tasks like goal setting or lesson planning for teachers and students. Users of Inspiration also have the ability to create and save their own templates. Different colours, shapes, links, layout, symbols and images may all be used to personalise work. Data may be viewed, saved and printed in visual diagram form or in a text form and notes may be added and 'hidden' if required. Internet links may be included which will take the user directly to the nominated site (<http://www.inspiration.com/companyinfo/index.cfm>).

Inspiration 6 may be installed on Macintosh system 7.0 or later computers or Microsoft Windows 95/98, NT 4.0 or later computers. *Inspiration* can be installed using the CD-ROM and individual site and network licenses are available. Network license costs are calculated on the number of computers installed with *Inspiration*. There is no time limitation on its use and upgrades are discounted to current users. Free trial and subscription to *Inspiration* is also available on the Internet. [<http://www.inspiration.com/companyinfo/index.cfm>]

Procedure

The procedure of this study (Table 3.1) commenced with the distribution of pre-study questionnaires. *Inspiration* was then integrated into three Society and Environment lessons and two English lessons in term one for the selected class of 31 students. Mid-study interviews with a representative sample of students were then conducted. In the second term the class intervention occurred in three Society and Environment lessons and one English lesson. End-of-study interviews with the teacher and selected students were conducted and a post-study questionnaire was completed by the class.

Table 3.1
Procedure of study

Date	Procedure
February 5	Ethics clearance obtained
February 12	Background data obtained – Pre-study questionnaire
March 4	Lesson Observation
March 12-26	Intervention with Inspiration – Lesson observation
March 24-28	Data Collected – Interviews
May 25 – June 18	Intervention with Inspiration – Lesson observation
June 19 -20	Data Collection – Interviews & Post-study questionnaire

Before the commencement of the study ethical clearance was obtained and letters requesting permission to conduct the study were given to the Principal, teacher, parents of the students involved in the study as well as the students themselves. The questionnaires and observation schedules were designed to protect anonymity and permission to record interviews was received from the teacher and students involved in the interviews.

The study was scheduled to take place at the start of the school year with permission for data collection letters being sent to the Principal and the teacher of the students involved in the selected class (Appendices A, B, I & J). The researcher liaised with the class teacher for a suitable lesson time to speak with the class. A single period of 45 minutes in week two of term one, was chosen to explain the purpose of the study and how it was to be implemented by the researcher. Permission letters for parents and the students themselves were also given at this time (Appendices C-H). The students were keen to be informed on all aspects of how the study was to be conducted.

When permission from the Principal, teacher, parents and students had been received, the pre-study questionnaire was distributed. Lesson observation, as outlined in Table 4.4, started in week five of term one. Work samples were collected throughout the lesson observations. Student interviews were conducted mid way through the study and again at

the end of the study. The teacher interview was also conducted at the end of the study. The post study questionnaire was distributed in week eight of term two, at the end of the study.

To overcome some problems with the technology network, the data collection was delayed and the study was extended into the second term of the year. The implementation of *Inspiration* into the curriculum was contingent on all students having access to computers. As there were a number of students who were unable to logon to the student drive, a decision was made not to commence the study until week five. After discussion with the teacher it was decided that the students would begin their first common assessment with a paper brainstorm and this would then give them the opportunity to compare paper brainstorms with creating a brainstorm using graphic organizer software in later assessments.

The research instruments of questionnaires, interviews, observation and work samples were used for this study. The advantages and disadvantages of each instrument were taken into account when conducting the study. Burns (1996, p. 303) states that triangulation is an important aspect to the validity of the cycle of ethnographic research. Validity was addressed in this study by checking the findings of the interviews, questionnaires and participant observations against each other in order to clarify issues. Work samples were also collected to illustrate points made.

Selection of Student Sample

There were approximately 30 students in each year eight class. In the 2003 cohort of 190 students, there were 30 more boys than girls. Consequently there were approximately five more boys than girls in every year eight mainstream class. The sample for this study consisted of a particular house class of 31 year eight students. This class was selected on the basis that they were representative sample of the year eight student body and that they were taught by an experienced teacher who also teaches another year eight class in the subject of Society and Environment.

Five students were selected for interviews from their responses to the pre-study questionnaire on the basis that they were a representative sample of the class. Gender, computer experience and prior experience with *Inspiration* were the criteria used to select the students for interview and for a focus in lesson observations.

Questionnaires

Two questionnaires were constructed by the researcher to collect data from students to determine their perspective on a range of relevant issues and gain information on their experiences. All students were given a pre-study questionnaire and a post-study questionnaire.

Questionnaires enable the researcher to explain to the participants the purpose of the study in writing as well as verbally. Disadvantages arise when questions may be poorly constructed and ambiguous, leading to inaccurate information given or misinterpretation of the questions, thus affecting the reliability and validity of the data. Issues of follow-up may need to be confronted with questionnaires (Burns, 1996, pp. 482,483).

To address the factors affecting reliability and validity in questionnaires, they were trialled with a small number of year 8 students from another school, prior to the commencement of the study. As a result of this trial some of the questions were changed and the number of questions increased. Issues of follow-up were addressed by the selection of a number of students for interviews.

Each student was given an identical set of questions thus avoiding recording errors. The questionnaires were anonymous so that embarrassment and confidentiality issues would be avoided. The students were asked not to write their name on the questionnaires, however to include their date of birth, gender and homeroom. This enabled the pre-study and post study questionnaires to be matched. The issues of reliability and validity were also addressed by triangulation; checking the questionnaire data against the data from interviews and observation. Key issues emerged in the analysis of the questionnaire data and the researcher compared the pre-study and post-study responses using a chi squared analysis

test to determine any significant differences. Issues which arose from observation and the interviews were also cross matched against questionnaire data.

Pre-study Questionnaire

When permission letters were returned the pre-study questionnaire was given to the students to ascertain their prior experience with computers, *Inspiration*, brainstorming and assignment tasks (Appendix K). Students were also asked to comment on their experience in organizing information and identifying problems in attaining information. These questionnaires were handed out and collected in week two of term one during class time. The researcher explained the purpose of the study and answered student questions about their role in the study. The students were also advised that a small number of students would be asked to participate in student interviews.

Five students were selected for interviews, on the basis of being representative of the class, from the information they gave in the pre-study questionnaire.

Post-study Questionnaire

The distribution of the post-study questionnaire took place in week eight of term two (Appendix L). The students were given the questionnaire in class time and it was explained to them to be as honest as they could. The post-study questionnaire asked students to comment on their experience with *Inspiration*. They were asked to consider if *Inspiration* had any affect on their ability to develop strategies and constructs to help solve the information problems of identifying what is required in particular tasks and how to organize information to meet these requirements. They were also asked to comment on the features of *Inspiration*.

Interviews

Five students and the teacher were interviewed by the researcher after the intervention. Interviews were conducted with the five students midway through the study and with these students again and the teacher at the end of the study. Interviews allow for flexibility and the response rate is immediate. Probing may allow for deeper understanding of the

participant responses. The researcher has to allow for bias in terms of interaction with the respondent as this may affect the reliability and validity of the data (Burns, 1996, pp. 484, 485). The issue of bias was addressed when the data from the interviews were checked against the data gathered from the questionnaires and observations.

Student Interviews

Of the 180 students in the mainstream year eight cohort there are approximately 30 more boys than girls. Each of the six classes of mainstream students therefore had five more boys than girls. On this basis it was decided to select three boys and two girls for the student interviews. Using data gathered in the pre-study questionnaire, the five students were selected as a representative sample of the class thus addressing the issue of a limited amount of interviews taking place. Gender balance and experience with computers and the *Inspiration* program was the criteria used to select the students. To protect their anonymity the students were allocated the fictitious names of Linda, Karen, Joshua, Justin and David. These students also provided a focus for the researcher in lesson observation.

The researcher conducted the student interviews in the neutral location of the library during class time, using a tape recorder. A quiet section was used and as the library was where the researcher taught and the students use from time to time and it was considered to be a non-threatening environment for the students. The mid-study student interview took place in week eight of term one (Appendix M). The end-of-study student interview was conducted under the same circumstances and in the same location as the mid-study interview and took place in week eight of term two (Appendix N).

Teacher Interview

In ethnographic research the cultural context is an important part of any study and therapeutic intervention is an important part of action-research. As these two methods were employed in this study, the researcher held ongoing discussions, throughout the study, with the class teacher to consider the cultural issues of technology and curriculum and also to implement therapeutic action where appropriate.

As well as informal discussions, the researcher interviewed the class teacher on a formal basis in week eight of term two. This interview took place in the researcher's office using a tape recorder and the teacher was encouraged to add any points not covered in the Interview Question Schedule (Appendix O).

Observation

Intervention occurred in eight lessons throughout the study, five of which were observed by the researcher. The researcher discussed all lessons, including those not observed, with the teacher to obtain a summary of the lesson procedure. Observation allows the researcher to record behaviour as it occurs in the context of the students' learning experience. It allows the students to remain part of the group so they are not singled out and does not require either the students or teachers to spend time on questionnaires or interviews. Reliability may be affected in the recording of the data and replication of the findings by another researcher. The problem of internal validity must be taken into consideration and the researcher should self monitor and re-evaluate the research methods (Burns, 1996, p. 322-324).

The issue of replication across groups has been addressed with the description of the College background, year eight cohort and selection of sample class. Reliability of this instrument was addressed when the data gathered from the observations was checked against the data gathered from the interviews and questionnaires. As part of the action-research method the researcher constantly re-evaluated the progress of the study.

The observation of classes occurred as *Inspiration* was integrated into the curriculum (Table 4.4). The researcher used an observation schedule to record the data gathered (Appendix P). The researcher observed what work was undertaken and how the class in general was affected by the integration of *Inspiration* into their curriculum. Work samples were taken for each of the lessons observed. To facilitate the class observations, the students selected for interviews were used as a focus by the researcher. Behaviours such as staying on task, asking for assistance, completing set work, experimenting with functions were observed. In accordance with the action-research method, some of the later lessons were modified according to the data observed in previous lessons.

Work Samples

The researcher collected an extra copy of the work produced by the students selected for interviews, at the end of the observed lessons. These work samples then provided a focus in the interviews for the students to elaborate on their answers or to emphasise a particular point.

Data Sources and Research Questions

The data gathered from the instruments of questionnaires, interviews, observation and work samples were analysed to address the subsidiary research questions (Table 3.2).

Table 3.2

Data sources aligned to subsidiary research questions.

Question	Data Source
1. In what ways does the graphic organizer software tool, Inspiration, facilitate the successful implementation by teachers of strategies and constructs designed to enhance organization and problem solving skills?	Pre-study and post-study questionnaire comparison determined where improvement occurred. Teacher and student interviews determined if skill development occurred and if so, in what ways. Work samples provided examples. Observation allowed behaviours to be recorded.
2. Are some strategies and constructs better facilitated than others and if so why?	Teacher and student interviews determined extent of skill development. Post-study questionnaires analysis determined which strategies and constructs were affected.
3. Are particular groups of students affected more than groups?	Teacher Interview determined groupings Pre-study and post-study questionnaire comparison determined groupings.
4. How should Inspiration be integrated into the curriculum?	The teacher interview and student interviews determined implementation strategies.
5. What issues arose that need to be considered?	Teacher interview, student interviews, post-study questionnaires and observations determined issues to be considered.

Summary

This chapter has described the research methods employed in this study, the background to the school technology, the software tool *Inspiration* and the procedure followed and the data sources used. In Chapter Four the data collected and its analysis is presented and Chapter Five discusses the analysis in reference to the Research Question and subsidiary questions.

CHAPTER FOUR

RESULTS

This chapter presents the results of an analysis of the data collected throughout the study. Initially the data from each source is analysed and presented separately commencing with the pre-study questionnaire, lesson observation, and the mid-study student interviews including work samples. This data is examined to ascertain common themes and disparities. Issues which arose from the initial data collection and new issues which subsequently emerged as the study progressed are then explored in data collected from the teacher interview, end-of-study student interviews and the post-study questionnaire. Using the quantitative data from the questionnaire instruments the researcher determined what comparisons could be drawn between perceived skill development in different groups of students during this study. A Chi Squared analysis using Minitab for Windows (Student Edition) Release 9 was applied to these data to determine comparisons. Chi Square is a "simple non-parametric test of significance suitable for nominal data" and is considered an appropriate means of analysis to determine frequencies for some educational issues (Burns, 1996, pp.182,183).

Pre-study Questionnaire

In week two of term one 31 students in the class (100% of the class) completed the pre-study questionnaire. The purpose of the study was explained to the students and they had the opportunity to ask questions related to the study and the role they would play. Explanation of the questionnaire, answering questions and completion of the pre-study questionnaire took one single period of 45 minutes. Table 4.1, 4.2 and 4.3 presents summaries of these data and a discussion of each is provided.

The pre-study questionnaire included a number of questions asking students to comment on their previous experience with computers. An analysis of the data (Table 4.1) indicates that most students used a computer for some of their schoolwork and were familiar with computer programs. In items 1 and 2 the majority of students (94%) at least sometimes, used a computer at home, and 71% sometimes used computers at school, outside of class time for their school work. Responses to Item 7 indicate that the majority of students (87%)

like to try out different software programs, at least some of the time. Responses to Item 8 indicate that 19 students (61%) had not used *Inspiration* at all and 7 students (23%) had only some experience with this software. Clearly the majority of students had previous experience using computers for their schoolwork, however, less than half of the students had had any experience with *Inspiration* software.

Table 4.1

Frequency of responses to pre-study questionnaire items 1-8 (n=31).

No.	Item	Responses	Frequency	%
1	Do you use a computer at home for school Work?	Never	2	6%
		Sometimes	12	39%
		Often	17	55%
2	Do you use a school computer outside of class time for your school work?	Never	9	29%
		Sometimes	17	55%
		Often	5	16%
3	Do you play computer games?	Never	2	6%
		Sometimes	12	39%
		Often	17	55%
4	How often have you used brainstorm on paper in class?	Never	4	13%
		Sometimes	19	61%
		Often	8	26%
5	Have you used brainstorm at home to prepare for assignments?	Never	9	29%
		Sometimes	19	61%
		Often	3	10%
6	Have you worked in groups on brainstorm?	Never	6	19%
		Sometimes	21	68%
		Often	3	10%
		No answer	1	3%
7	Do you like to try out different software programs on computers?	Never	3	10%
		Sometimes	12	39%
		Often	15	48%
		No answer	1	3%
8	Have you used the computer program called Inspiration or Kidspiration?	Never	19	61%
		Sometimes	7	23%
		Often	5	16%

The initial questionnaire asked students to comment on their perception of their skills in planning work (Table 4.2). Over half of the students (58%) sometimes had difficulty in

knowing where to start for assignment work and 12 students (39%) stated they did not have any difficulty starting (Item 10). In Item 14 the majority of students, (90%) stated they often finished their assignments by the due date and 10% stated they sometimes did so.

Table 4.2

Frequency of responses to pre-study questionnaire items 9-15 (n=31).

No.	Item	Responses	Frequency	%
9	Do you find understanding assignment tasks a problem?	Never	11	35%
		Sometimes	20	65%
		Often	0	0%
10	Do you have trouble knowing where to start with assignments?	Never	12	39%
		Sometimes	18	58%
		Often	1	3%
11	Do you have difficulty in finding information for your assignments?	Never	12	39%
		Sometimes	19	61%
		Often	0	0%
12	Do you sort or organize information as you research for assignments?	Never	1	3%
		Sometimes	10	32%
		Often	20	65%
13	Do you check to make sure you have all the information you need for an assignment before you start your good copy?	Never	0	0%
		Sometimes	9	29%
		Often	22	71%
14	Do you complete your assignments by the due date?	Never	0	0%
		Sometimes	3	10%
		Often	28	90%
15	Do you follow the same process when you are working on different assignments in different subject areas?	Never	0	0%
		Sometimes	18	58%
		Often	13	42%

Over half of the students 61% stated they sometimes had difficulty in locating information with 12 students (39%) stating they never had difficulty (Item 11). All students, at least sometimes, checked their work to ensure that they had all the information required for an assignment (Item 13). The responses to item 15 indicate that 18 students (58%) sometimes use the same process in assignment work and 13 students (42%) often do so.

The majority of students believed they sorted or organized information. When asked to comment on this aspect, 20 students (65%) stated they often did so and 10 students stated they sometimes organized their information for assignments with only one student

indicating that he/she never did so (Item 12). The data analysis presented in Table 4.2 demonstrates that the majority of the students perceive they organize their information and check their work for assignments and usually use the same processes to do so.

Table 4.3 presents an analysis of responses to the final questions in the pre-study questionnaire and asked students to comment on their perception of how they work in assignments. The majority of students (94%) stated they checked their work (Item i), although the responses to Item j indicate that 11 students (36%), sometimes left something important out of an assignment. Item d asked students if they found it difficult to work out what information is required for assignments and 26 students (84%) stated they had no problem in this area. Although the data on Table 4.2, however, indicates that 19 students (61%) sometimes have difficulty in finding information for assignments (Item 11). Table 4.3 indicates that the majority of the students consider they draft and check their work and they achieve well in assignments. There are over one-third of students, however, who also find they do not always include everything in their assignments.

Table 4.3

Frequency of responses to pre-study questionnaire items a –j (n=31).

No.	Item	Responses	Frequency	%
a	I like assignment work.	Yes	21	68%
		No	9	29%
		No answer	1	3%
b	I usually need to ask for help with assignments.	Yes	7	23%
		No	23	74%
		No answer	1	3%
c	I usually achieve well in assignment work.	Yes	29	94%
		No	1	3%
		No answer	1	3%
d	I find it difficult to work out what information is needed for an assignment.	Yes	5	16%
		No	26	84%
e	I like to know what work I need to complete ahead of time.	Yes	28	90%
		No	2	7%
		No answer	1	3%
f	I get worried when assignments are handed out.	Yes	12	39%
		No	19	61%
g	I like to work with groups in assignments.	Yes	19	61%
		No	11	36%
		No answer	1	3%
h	I do drafts before my good copy.	Yes	30	97%
		No	1	3%
i	I check my work to make sure everything is completed.	Yes	29	94%
		No	2	6%
j	I sometimes find I have left something important out of an assignment.	Yes	11	36%
		No	20	64%

Findings from Pre-study Questionnaire

The findings from the pre-study questionnaire reveal that most students use computers for school work outside of class time. There were only just over one-third of the students, however, who had had experience with Inspiration. Most students were familiar with the concept of brainstorm and they stated usually organized their information for assignments. Most students also considered they achieved well in assignment work and that they check

their work. However, over one-third of the students found they had left something important out of assignments and they have some concerns about where to start with assignment work.

Lesson Observation

The researcher observed a number of Society and Environment and English lessons throughout the study. The data gathered from these observations is summarised in the timeframe in which it was gathered in Table 4.4. Each lesson is analysed and discussed.

The researcher discussed each lesson with the teacher, including those not observed, to obtain a summary of lesson procedure and to determine if therapeutic action needed to be implemented. During the observation of lessons the researcher focused on the students who were selected for interviews and work samples. In order to protect the anonymity of the selected students, they have been allocated the fictitious names of Linda, Karen, Justin, Joshua and David.

Table 4.4

Lesson Observation Schedule

Lesson date and time	Subject & Activity	Observation of lesson	Location & Seating	Time percentage spent on activity
Term One				
Wk 5 - Tues 4 th March 10.35-11.20	S&E My Heritage	Researcher observed lesson	2 rows of pairs 1 row of three desks	10% teacher talk 70% class discussion 20% individual seat work
Wk 6 - Wed 12 th March 2.05 - 2.45	English Story Web	Researcher observed lesson	Library Individual computers	66% teacher instruction on data projector 34% individual work
Wk 7 - Wed 19 th March 9.00 - 9.40	S&E Middle Ages	Lesson not observed	Library Groups on computers	80% teacher instruction on data projector 20% group computer work
Wk 7 - Thur 20 th March 9.40 - 11.00	S&E Middle Ages	Researcher observed lesson	Library Individual computers	30% teacher instruction on data projector 70% individual work
Wk 8 - Wed 26 th March 2.05 - 2.45	English Character Web	Researcher observed lesson	Library Individual computers	20% teacher instruction on data projector 80% individual work
End of Term Review				
Term Two				
Wk 2- Thur 25 th May 9.40 - 11.00	S&E Term Planner	Researcher observed lesson	Library Individual computers	80% simultaneous teacher instruction and student work 20% individual work
Wk 5 Wed 4 th June 9.00 - 9.40	S&E Cause & Effect	Lesson not observed	Library Individual computers	80% simultaneous class discussion and student work 20% individual work
Wk 5- Thur 5 th June 9.40 -11.00	S&E Report Format	Researcher observed lesson	Library Individual computers	20% teacher instruction 80% individual work
Wk 7 - Wed 18 th June 2.00 - 2.40	English Story Map	Lesson not observed	Library Individual computers	10% teacher instruction 90% individual work

Week Five - Term One

S&E - Paper Brainstorm (researcher observed lesson)

At the beginning of this lesson the students were instructed on their first common assessment requirements. The class teacher introduced the concepts involved by modeling a brainstorm on the whiteboard. The students then completed their own brainstorm on paper. The teacher took approximately 35 minutes of the lesson time in setting up the class to create their own brainstorm. A small number of students did not use the class time effectively and for those students, the output was minimal. There were also a small number of students, including Linda and David who worked well and completed a detailed brainstorm. The majority of the class partly completed their brainstorm with the main idea and some sub-headings. The task of completing the brainstorm was allocated for homework.

Week Six - Term One

English - Story Web (researcher observed lesson)

Many of the technological network issues had been resolved and after consultation between the teacher and the researcher, it was decided to introduce *Inspiration* to the class during a single period of 40 minutes in their English lesson. This was a literature promotion class in the library. Each student sat at an individual computer and faced the data projector screen which was used to demonstrate the features of *Inspiration*. The students were shown how to access *Inspiration* and the various templates that were available. A *Story Web* from the Language Arts template was used to demonstrate how to explore the different components of their novel using a graphic organizer. Students also observed how to change colours and shapes in their web and how to save their work to their own drive.

Approximately two-thirds of the lesson was taken up with instructing the students on how to access and use *Inspiration*. The researcher observed that approximately ten students, two girls and eight boys, including David and Joshua, had started to experiment with the different features while the teacher was still instructing. When the teacher had finished the

instruction all but five students were able to work on their own. Four of the five students who needed teacher assistance were girls. Three of the girls were still seeking assistance when the lesson had finished. The researcher observed that as the remaining students became more familiar with the features of the software program, they were concentrating on changing colours more than on inserting detail into their work as illustrated in this work sample by Linda. (Appendix Q).

Week Seven – Term One

S&E Middle Ages (lesson not observed)

Towards the end of week seven students were given a common assessment task in Society & Environment in which they were asked to research life in the Middle Ages. The teacher reported that students were formed into groups of three or four, each group member was to research a different topic and then this individual research was to be combined for a presentation. A single 40 minute period was used as a demonstration to explore various aspects of life in the Middle Ages on *Inspiration* using the data projector in the library. Students had the opportunity to contribute ideas to the *Brainstorm* on the *Main Idea* page and these ideas were entered by the teacher and displayed on the data projector screen. From this they were asked to choose an aspect of everyday life in the Middle Ages so that everyone in their group had a different topic to research. During this lesson *Inspiration* was used as an instructional tool to brainstorm the subject as well as demonstrate various features of the software program.

Week Seven – Term One

S&E Middle Ages (researcher observed lesson)

The following day students were given a double period of 80 minutes to use the *Main Idea* concept map of *Inspiration* to explore their chosen topic. The teacher instruction lasted approximately 20% of the lesson and included a demonstration of the features of linking to internet sites and to Encarta.

While there were still some problems with the technology, mainly logging on to individual drives, in general, students seemed very motivated. Apart from those students who were experiencing technical difficulties, the majority of students stayed on task for the most of lesson. The students who did talk to those around them were talking about their topic or asking about features of the software program. Of the twelve students who required assistance the majority were girls, as the boys tended to experiment with the features and find what they were looking for. Linda and Karen were sitting next to each other and asked for assistance once during the lesson. Ten students failed to complete their *Brainstorm* during lesson time, however, five of these students were those who had encountered technical difficulties. Joshua was one of the students who experienced technical difficulties and failed to complete his *Brainstorm*. Both Justin and David experimented with the colours and images and inserted weblinks as illustrated in David's work sample (Appendix R). Some students had difficulty in finding suitable images as evidenced by David's work sample.

Week Eight – Term One

English – Character Web (researcher observed lesson)

In their English lesson students were asked to analyse a main character in their novel by using the *Character Web* template on Inspiration. The major technical difficulties had been resolved and the students were now familiar with accessing *Inspiration* and many of the features of the software program. The instruction time of about 20% of the lesson was on how to access the *Character Web*.

The students who started their work quickly were those who had read their novel and were able to use their knowledge to complete the *Character Web*. Approximately ten students did not read their novel and they either asked for assistance or strayed off task. They were instructed to use the main character in their class novel. The seven students who did not complete their character web were also those who had not read their novel. Many of the students wanted to show their work to other students, including Linda and Karen who sat

next to each other. A sample of a Karen's work illustrates the format of the *Character Web* and how the brainstorm format helped students to organize their ideas (Appendix S).

End of Term Review

In accordance with the action-research method of therapeutic action, the researcher and the class teacher discussed issues that had arisen in term one. Network technical problems, limited accessibility to library computers, lesson time and the Society and Environment programme were issues that were considered and problems were highlighted.

Structured templates, created to suit a specific purpose, were discussed and deemed appropriate to alleviate the problems of limited time available on computers and also the specialised nature of the Society & Environment programme. As with many classes, there is a variation in the ability and application in the class of students involved in the study. The idea of providing a structure to allow students to move on at their own pace, is in accordance with the ethos of Middle Schooling, and was also a part of this discussion. It was decided that a term planner would assist all students in their organizational skills and also allow for some self pacing.

The researcher worked on the content of the Society & Environment programme with the class teacher and the Learning Area Co-ordinator. As *Inspiration* did not have a template which was suitable for a term planner, the researcher created an appropriate template for the nine week term. The topics for the first three weeks of the term were inserted to demonstrate the ability of the application. Two relevant internet addresses were also added in the content section to demonstrate the feature of internet links as a resource.

The template was saved in *Inspiration* to the global 'teacher to student' drive. Students could access the template through this drive and then save their individualised *Term Planners* to their own drive. A *Report Format* graphic organizer template and a *Cause and Effect* graphic organizer template were created to assist students in the first common assessment task. These were also saved in the 'teacher to student drive' and students could note the availability of these templates in their *Term Planners*.

Week Two – Term Two

S&E – Term Planner (researcher observed lesson)

Three computers were not working and this meant that six students shared a computer. The teacher demonstrated to the students on the data projector how to open the *Term Planner* template in the global drive and each student entered the information into their own *Term Planner* as instructed. The students were also advised about the *Cause and Effect* and *Report Format* templates available in the global drive. Approximately 80% of the lesson was simultaneous teacher instruction and student work and during this time internet links were demonstrated. Students were advised when common assessments would be occurring and when the additional templates would be used so they could highlight these areas using colours, shapes or graphics.

The first part of the lesson was structured, with only the last 20% of the lesson left for students to work on an individual basis. The majority of the students used this time to personalise their own term planners with colours, shapes and images. A sample of Joshua's work illustrates the features of the *Term Planner* (Appendix T). David and Joshua and Justin all explored the internet links before they had finished their template. All students completed their templates in the time provided and printed off a copy for their file. The three pairs of students who shared computers could only save work into one of the paired student's drive, however they printed off two copies. As the class were printing at the same time, not all students were able to collect their work during the lesson. The printed work was distributed at the next lesson.

Week Five – Term Two

S&E – Cause & Effect (lesson not observed)

In a single period of 40 minutes the teacher used the *Cause and Effect* template to stimulate class discussion. The teacher reported that the data projector was used to access the

template and to add ideas to the template as generated by the discussion. The students added the ideas in the form of text and or pictures to their own *Cause and Effect* template.

Week Five – Term Two

S&E - Report Format (researcher observed lesson)

In a double period of 80 minutes the data projector was used to demonstrate the *Report Format* template stored on the 'teacher to student' global drive and how to insert notes into the graphic organizer. The first 20% of the lesson was used by the teacher for instruction and the students then used the remainder of the lesson to insert notes into the template from the information they had gathered previously. The students were able to use these notes for their in-class essay and this was a motivating factor for some students.

Fifteen students (48%) finished and printed their notes during this lesson time. David, Joshua and Justin were among those students who finished their note-making. Linda and Karen were among those who did not finish their notemaking in this template and there were various reasons why sixteen students (52%) did not finish. Some students did not bring the worksheets to make their notes, others used their time changing colours or inserting images and the remainder were students who are generally slow to complete tasks. Approximately seven of these students strayed off task a number of times by talking or getting up and walking around. Six of the fifteen students to finish made comprehensive notes and the remainder included some notes in each section. A work sample of a Linda's *Report Format* illustrates an average example of work completed for this lesson (Appendix U).

Week Seven – Term Two

English – Story Map (lesson not observed)

In their previous English lesson in the classroom the students had been informed of the *Story Map* graphic organizer and how to access it on the 'teacher to student' global drive.

The teacher reported that in an English single period of 40 minutes the students worked on their *Story Map* to explore the concepts of their novel. This was then printed out and handed in to form part of their literature programme. Twenty students (65%) handed their work in to the teacher and a sample of Justin's *Story Map* is used to demonstrate the use of pictures to expand the concepts in their novel (Appendix V).

Lesson Observation Summary

The major factors in determining the success of integrating *Inspiration* into the curriculum at the start of the study was the reliability and availability of the computers. With the reliability problems resolved the study started in week six of term one. The first two lessons were used to enable the students to become familiar with the software program, with the teacher in the second lesson using *Inspiration* as an instructional tool. Students became more familiar with the functions of *Inspiration* as their experience increased, with confident computer users experimenting with the different features and creating internet links before the teacher instruction had finished.

Discussions between the researcher and the class teacher concluded that 'purpose designed' templates would be more beneficial than the standard templates. This was to alleviate some of the problems associated with limited time and the specialised nature of the curriculum programmes. A *Term Planner*, *Cause and Effect* and *Report Format* template were designed to fit into the Society and Environment programme. The *Term Planner* and *Report Format* templates were used by the students and the *Cause and Effect* graphic organizer was used by the teacher to stimulate discussion. With the structured nature of the templates, students were more encouraged to stay on task and to work at their own pace.

Many of the students were still not able to complete their work in their lesson time with 48% of students finishing their *Report Format* notes and 65% of student handing in their *Story Map* for their English lesson. There were a number of reasons students did not complete their work; available time, students not bringing required worksheets, experimentation with the features of *Inspiration*, students who are generally slow to complete tasks and off task behaviour.

Interviews

Mid-Study Student Interviews

A representative sample of five students was selected at the start of the study to allow the researcher to focus on a small number of students in the lesson observations. These five students were also interviewed at the end of term one to determine their experience with *Inspiration* and identify any issues that may have arisen during the integration of this software program. Karen, Linda, Justin, David and Joshua were the students selected.

The five students all stated in these interviews that they enjoyed using *Inspiration* and would choose to use this software program over a paper brainstorm. David and Joshua indicated that not having to write was a positive aspect of *Inspiration*. David said that it was “easier to write notes on a computer” (Appendix R). Joshua, David and Karen said that it was “neater and easier” to organize their thoughts using a computer. Joshua, David and Justin considered that it was helpful having different templates for different subject areas, citing the reasons that it was “helpful for organizing notes and remembering rules.”

Linda stated that she had some difficulty in understanding how to use the links in *Inspiration*. David indicated that creating links to websites helped him to plan the location of information (Appendix R). All five students found the use of colour helpful in organizing information and Joshua, Justin, David and Karen stated the use of pictures helped them to remember information. An example of this is Justin’s *Story Map* (Appendix V).

End-of-study Student Interviews

In the post study interview all the selected students stated they enjoyed using *Inspiration* with Joshua adding he only enjoyed it “a little bit”. Both girls stated the colours and pictures made *Inspiration* enjoyable with Linda saying it helped to “re think your thoughts”. The example of Linda’s *Story Web* demonstrates her process of deconstructing her novel

(Appendix Q). Joshua and David stated that the reason why they enjoyed *Inspiration* was they didn't have to write on paper. David said that you could put pictures in instead of "lots of writing" and Justin added the pictures were instant. Both of these boys thought the pictures helped them to remember things. All students experimented with the features of *Inspiration* as they became more familiar with them, with all three boys commenting that the feature that allowed web sites to be included was helpful. Examples of weblinks used by the students are in David's *Middle Ages Brainstorm* (Appendix R) and Joshua's *Term Planner* (Appendix T).

All five students said that *Inspiration* had helped them to achieve the learning outcomes at a higher level, however, Linda stated that it only helped her "a little bit." Linda did not know how *Inspiration* had helped, however, Karen considered it "helped her to brainstorm properly" (Appendix S). David said that the notes helped him save time and he could print them out and take them home and Justin said that the "with the pictures I expressed meanings and I was able to write a lot" (Appendix V).

The students were not sure if *Inspiration* had helped them to connect their ideas. David was the only one who stated he could connect the "semi ones" with the main idea by arrows (Appendix R). All students thought the ability to save was valuable because "you could lose it in your file" if it was on paper, "you could go back and add something else" and "you could go back and fix it up."

The *Term Planner* was considered helpful by all the students with Joshua stating that "it was helpful knowing what was coming up so we could think of ideas before we came to it" (Appendix T). All students again found the templates helpful. David stated that the *Report Format* template was helpful because the "the main part was already done and he could just add his notes."

When asked to comment on what has been unhelpful about using *Inspiration* Karen stated that she did not get enough time. Linda could not remember anything. Joshua, David and Justin stated that only being able to access *Inspiration* in the library was a problem.

Teacher Interview

In week eight of term two the researcher interviewed the teacher to determine the effectiveness of integrating *Inspiration* into the Society & Environment programme and to highlight any issues that may have arisen.

The teacher did not have any experience with *Inspiration* prior to this study, however, stated that she found it user friendly and “straight forward.” She thought that the software program was user friendly for middle school students, although, they needed to be “walked through the process.”

When questioned on the features of *Inspiration* the teacher indicated that it was helpful for students in “setting up their thought processes and for those who did not know where to start, it gave them a good idea where to go.” She thought the features that allowed work to be saved and notes to be made on additional information, like web site addresses, were also valuable. The teacher indicated, however, that “this only applied to some of the students as others, who were less organized, were still restricted to just doing the topic sentences.”

The teacher stated that “those who had prior experience on *Inspiration*, and the generally more organized students, seemed to be better equipped and to produce a higher standard of work.” The teacher also noted that those students who were “highly stimulated visually” enjoyed using *Inspiration* and those who were computer literate found it a lot easier. There was some developmental progress as each time the students used it they became more efficient and were able to expand on their previous attempts. The teacher considered “even the really weak students who found it hard to put pen to paper produced more work than they would have using pen and paper.”

Inspiration was considered by the teacher to be a “valuable instructional tool.” The teacher stated this instructional aspect, was enhanced by having the use of the digital projector, as it enabled “the student to be walked through the various steps.” The teacher also found the features of *Inspiration* that allowed the use of symbols, colours and pictures a motivating

factor, as it allowed students to personalise their work. She thought the links, pictures and colour coding features of *Inspiration* were the most useful to the students.

When discussing the issues of integrating *Inspiration* into the curriculum, the teacher thought that technology was a major factor. Reliability of and access to computers being major factors in ensuring the success of integrating this software program. Taking into account these factors the teacher indicated that “*Inspiration* should be beneficial either formally or informally in the planning stages of a topic or assignment.” She stated while using *Inspiration* on the computers was a motivating factor, the lack of availability was sometimes frustrating for the students. The implementation of the planned curriculum by the teacher also, at times, had to be delayed until computers became available.

Findings from the Interviews

From the student interviews and teacher interview it was clear that the colour, pictures, templates and weblinks features of *Inspiration* were positive factors. As the students became more familiar with the software program they gained more confidence and experimented with the different features. The teacher stated that “*Inspiration* gave the students a good starting point to organize their work.” The fact that students could work on computers to brainstorm, and not have to use pen and paper, was also considered to be a motivational factor for most students. The students also enjoyed personalising their work with colours and images.

Inspiration was considered to be helpful by both the students and the teacher. However, the teacher stated that those students who were the more confident computer users and also those who were generally more organized gained the most benefit. From the student interviews the boys seemed more confident in experimenting with the features of *Inspiration* and they made use of the web links feature. Responding to interview questions on any problems encountered, both the teacher and students stated that access to computers in the library to use *Inspiration* was a problem.

Post-study Questionnaire

In week eight of term two the 31 students in the class (100% of the class) completed the post study questionnaire and a summary of the analysis of these data are presented in Table 4.5. The first seven items of post-study questionnaire asked the students to indicate how their experience with *Inspiration* had affected the way they approached their work. Clearly the majority of the students considered *Inspiration* had helped them to some degree in a range of ways.

Table 4.5

Frequency of responses to post-study questionnaire items 1 - 7 (n=31).

No.	Item	Responses	Frequency	%
1	Do you enjoy using Inspiration?	A lot	6	19%
		A little	19	62%
		Not at all	6	19%
2	Has Inspiration made a different to the way you prepared for your assignments?	A lot	5	16%
		A little	13	42%
		Not at all	13	42%
3	Do you think Inspiration helped you to plan in S&E this term?	A lot	8	26%
		A little	16	52%
		Not at all	7	22%
4	Do you think Inspiration helped you to organize your thoughts?	A lot	4	13%
		A little	20	65%
		Not at all	7	22%
5	Do you think Inspiration helped you to sort your information?	A lot	9	29%
		A little	20	65%
		Not at all	2	6%
6	Did Inspiration help you to think about the resources you needed for your assignment?	A lot	6	19%
		A little	13	42%
		Not at all	12	39%
7	Do you think Inspiration helped you to connect ideas?	A lot	9	29%
		A little	14	45%
		Not at all	7	23%
		No answer	1	3%

When asked to comment on how much they enjoyed using *Inspiration* (Item 1) six students (19%) said they enjoyed it a lot and the same number did not enjoy using it at all. The remainder (62%) enjoyed using *Inspiration* to some degree. Item 3 indicates that the

majority of students (78%) considered *Inspiration* had helped them to some degree, with their planning for Society & Environment, with seven students (22%) indicating it had not helped them at all. Items 4, 5 and 7 asked students to comment on the effect *Inspiration* had on their organizational skills. The responses to these questions show that 24 (78%) students considered *Inspiration* had helped them organize their thoughts, (Item 4) and 29 students stated that *Inspiration* had helped them to sort information (Item 5), at least to some degree. Seven students (23%) indicated in Item 7 that *Inspiration* had not helped them at all to connect their ideas.

A summary of responses to items 8-13 on the post-study questionnaire is given in Table 4.6 asked students to comment on whether *Inspiration* would be helpful in other subject areas. There was not a clear majority of responses to Item 9, with 29% stating a combination of subjects and 26% stating English and 26% stating Society and Environment. However, twenty six students (84%) stated in Item 8 that *Inspiration* would be, at least, a little helpful in other subject areas.

Table 4.6

Frequency of responses to post-study questionnaire items 8 to 13 (n=31)

No.	Item	Responses	Frequency	%
8	Do you think Inspiration could be helpful in other subject areas?	A lot	6	19%
		A little	20	65%
		Not at all	5	16%
9	What subject areas would you use Inspiration in and why do you think it would be helpful?	Combination	9	29%
		English	8	26%
		S&E	8	26%
		Science	1	3%
		Health	1	3%
		No Answer	4	13%
10	Did you find Inspiration easier to use as you had more experience with it?	A lot	18	58%
		A little	10	32%
		Not at all	2	7%
		No Answer	1	3%
11	Do you think Inspiration helped you to understand what you needed to do for assignments?	A lot	8	26%
		A little	17	55%
		Not at all	6	19%
12	Did you enjoy using Inspiration in your English Rage lessons?	A lot	9	29%
		A little	18	58%
		Not at all	4	13%
13	Did Inspiration make a difference to the way you reported on your novel?	A lot	7	22%
		A little	20	65%
		Not at all	4	13%

Item 10 clearly demonstrates that the majority of students (90%) found *Inspiration* easier to use as their experience with it increased. Item 11 asked students to comment on how much *Inspiration* had helped them to understand assignment requirements. Six students (19%) stated that *Inspiration* had not helped them at all with twenty five students (81%) indicating that using *Inspiration* had helped them, at least, to some degree. The responses to Items 12 & 13 clearly show that twenty seven students (87%) considered that *Inspiration* had made a difference to their English lessons.

A summary of responses to items 14 to 18 on the post study questionnaire is presented in Table 4.7. Item 14 asked students to comment on the features of *Inspiration*. Many students gave multiple answers and therefore the frequency indicates the number of responses, not the number of students. The feature that enabled pictures or images to be inserted, indicated by the number of responses (84%), was considered the most helpful.

The print and save features were also popular with 81% responses. Different templates and the feature that allows ideas to be linked were considered helpful features recording 77% and 71% of responses respectively.

Table 4.7 Frequency of responses to post- study questionnaire items 14 to 18 (n=31)

No.	Item	Responses	Frequency	%
14	Tick the following features of Inspiration you found helpful.	Colours	19	61%
		Shapes	17	55%
		Links/ideas	22	71%
		Links/internet	20	64%
		Print	25	81%
		Pictures	26	84%
		Save	25	81%
		Notes	19	61%
		Templates	24	77%
		Main Idea	15	48%
15	Which of these features do you think are the most helpful and why did you find them helpful?	Colours	7	23%
		Shapes	-	0%
		Links/ideas	3	10%
		Links/internet	3	10%
		Print	2	6%
		Pictures	7	23%
		Save	3	10%
		Notes	2	6%
		Templates	6	19%
		Main Idea	1	3%
16	Do you think you had enough time in your lesson to finish your work on Inspiration?	Yes	21	68%
		No	10	32%
17	Describe any problems you had using Inspiration.	Finding things	2	6%
		Familiarity	4	13%
		Time	2	6%
		Good Pictures	4	13%
		Unsure	2	6%
		None	14	47%
		Symbol palette	1	3%
		No home use	1	3%
		Remember work	1	3%
18	What was the best thing about using Inspiration?	Pictures	9	29%
		Colours	9	29%
		Templates	1	3%
		Planning	1	3%
		Organize	9	29%
		Creative	2	6%
		Fun	3	10%
		Easy	2	6%
		Settles you	1	3%
		Links	1	3%
		Brainstorm	1	3%
		Took up time	1	3%

When asked to comment on any problems with *Inspiration* (Items 16 and 17) 32% of students stated they did not have enough time to finish their work (Item 16). There were a number of problems stated in Item 17 including time familiarity with the program, however, 14 students (47%) stated they had no problems with *Inspiration*. Colours, pictures and the ability assist with organizing were equal with 29% each of the nominations for the best thing about using *Inspiration* (Item 18).

A summary of responses to item 15 on the post-study questionnaire is presented in Table 4.8. Item 15 asked students to indicate which of these features were most helpful and why. The colours and pictures were equally considered most helpful by 23% of the students and the templates by 19%. The responses to why the nominated features were helpful, included the reasons that it helped in organizing, was fun and helped with association of information and ideas (Table 4.8).

Table. 4.8

Frequency of responses to post-study questionnaire item 15 (n=31)

Feature	Student Comment
Pictures	"pictures help associate words" "express yourself" "interesting and [funner]" "you don't have to write a lot."
Templates	"templates give a starting point" "it was all set out and helps you understand"
Colour	colour represents different things" "you can decorate"
Colour and images	"colour and images help to remember" "sort and colour code"
Notes	"notes helped with S&E" "you can fit in a lot of information"
Links	"links helped sort" "makes you think"
Save	"so you can come back to it" "you could loose a piece of paper"
Internet Links	"just click and I'm there"
Main Idea Concept Map	"because you didn't need to think or plan"
Print	"otherwise it would be no use doing it"

Findings from the Post-study Questionnaire

The final questionnaire in this study asked students to comment on their experience with *Inspiration*, if it had helped them throughout the term and what features they considered most helpful. Most of the students responded that they enjoyed using this software package, although there were nearly 20% of the students who did not enjoy using *Inspiration* at all. The majority of students responded to the questions in the post study questionnaire that *Inspiration* had helped a little in various planning and organization tasks. *Inspiration* was considered 'a lot helpful' when connecting ideas, sorting information and planning for Society & Environment by nearly one-third of the students.

The features of links, pictures, colours, templates and the ability to save work were nominated as the most helpful features. Students stated that these features, helped them to organize their work creatively and then save it. Although nearly half of the students did not have problems with *Inspiration* some of the students found time, familiarity and the lack of appropriate pictures a problem.

Comparison Between Groups on Questionnaires Data

Further analysis of the data from the two questionnaires was conducted to compare response frequencies between responses for items and to compare responses of various groups of students based on gender or response to particular items. The chi squared (χ^2) test was used for all comparisons due to the nominal nature of the data and the small population sample. Each analysis was undertaken using two-way tables with χ^2 analysis with a 0.05 level of significance applied. Numeric results of these tests are only provided for findings of significant difference.

Gender Difference and Experience with Computers

Analysis using the χ^2 test on Items 1 and 2 of the pre-study questionnaire found no significant difference between genders in use of computers for school work at home or at school. However, significant differences were found based on gender for Item 7 in the pre-study questionnaire (Table 4.1) that asked students to indicate whether they liked to try out different software programs on computers ($\chi^2 = 11.903$, $df=3$, $p<0.05$). Overall the boys liked to try out different software more so than the girls.

Item 10 of the post-study questionnaire data (Table 4.6) asked students if they found *Inspiration* easier to use as they had more experience with it and 90% of the students stated that, to varying degrees they did find it easier to use with increased experience. The gender split to this response was even, although analysis of Item 7 in the pre-study questionnaire (Table 4.1) revealed boys liked to try out different software programs more than girls. Analysis of these data indicate that although boys tend to enjoy experimenting with technology more so than girls, both the boys and girls in this study found *Inspiration* easier

to use with increased experience. This may indicate that the boys were accustomed to experimenting with software and the girls were motivated to increase their level of expertise as *Inspiration* supported the assigned tasks.

Previous Experience with Inspiration

When interviewed, the teacher stated that those students who had prior experience with *Inspiration* had “a definite advantage because they had used the system and they knew how to work it.” The teacher also stated that “they were good in the sense that they were able to be peer teachers to those who weren’t familiar with it.” Analysis grouping students using Item 8 in the pre-study questionnaire (Table 4.1) which asked students to comment on their previous experience with *Inspiration*, and using the χ^2 test on Items 2,3,4,5,6 (Table 4.5) in the post study questionnaire, where students were asked to indicate whether *Inspiration* had been helpful, was conducted. There were no significant differences in the perceived benefit of *Inspiration* using any of these items, between those students who had prior experience with this software program and those who had no prior experience. The absence of significant differences based on experience may have been due to the experience they gained.

Item 10 of the post-study questionnaire (Table 4.6) asked students if they found *Inspiration* easier to use as their experience with the program increased. The majority of students (90%) stated that, to varying degrees, they did find *Inspiration* easier to use as they had more experience with it. The teacher stated in the interview that “there was some developmental progress as each time the students used it they became more efficient and were able to expand on their previous attempts.”

One of the criteria used to select students to be interviewed was their prior experience with *Inspiration*. One student had used this software often, one student had ‘sometimes’ used it and the other three had not used this software program before. All students stated in their interviews that they thought *Inspiration* had been helpful in a number of areas and that they had enjoyed using it.

Attitude Towards Inspiration

The students' attitude towards Inspiration was discussed in the teacher interview. The teacher thought that the students who were "very much visual learners" seemed to enjoy using the software and so were more motivated when using it.

Students were grouped according to their stated enjoyment in using *Inspiration* as expressed in Item 1 (Table 4.5) of the post-study questionnaire. Using the χ^2 test significant differences were found for Items 3 and 4 (Table 4.5) in this post study questionnaire which were concerned with the perceived benefit of the software program to the development of organization and information problem solving skills. For Item 3, compared with students who did not enjoy using *Inspiration* with those who did, found it helpful in planning for S&E ($\chi^2 = 16.054$, $df=4$, $p<0.05$). For Item 4, compared to student who did not enjoy Inspiration, those who did, found it helpful in organizing their thoughts ($\chi^2 = 10.246$, $df=4$, $p<0.05$).

When analysing the post-study questionnaire it should be noted that one student responded to all but one of the post-questionnaire questions negatively, indicating in the short answer section that he was bored with the program. One of the interviewed students, David, responded positively to all of the post-study questionnaire questions, indicating that *Inspiration* had helped him a lot with everything. When interviewed, the teacher stated that "the generally more organized students, seemed to be better equipped and to produce a higher standard of work". The standard of work David produced demonstrated good organizational skills and when interviewed, his attitude indicated he was, in general, a keen and highly motivated student.

Skill Development

The pre-study questionnaire (Table 4.2 and Table 4.3) asked students to comment on their perception of their present skills in working on assignments. Items 9,11, 10 and 12 requested responses on students' perception of the difficulty they had in understanding assignment requirements, finding information, preparing for and organizing assignments. Analysis using the χ^2 test was used for these pre-study questionnaire items against

corresponding Items 11, 6, 2 and 3 in the final study questionnaire (Table 4.5 and 4.6). There was no significant difference in perceived skill development between those students who found they sometimes had difficulty with the above aspects of assignment work before they used *Inspiration* and after they had used this software.

Summary

The analyses of the qualitative and quantitative data collected in the study were presented in this chapter. One of the major issues that arose in this study was the availability of computers and the reliability of the technology network at the school. The negative impact of these factors delayed the start of the study until the middle of term one. After resolution of the technological problems, access to the library computers was still an issue for both the teacher and students.

The results of the analysis of data from the pre-study questionnaire (Table 4.1, Items 1 and 2) indicated that there was no significant gender difference in computer use and that majority of the students used computers for schoolwork outside of the classroom. More boys than girls, however, indicated they enjoyed experimenting with software programs. Even though most of the students had not had a lot of experience with *Inspiration* the majority of students, both boys and girls indicated (Table 4.6, Item 10) they found it easier to use as their experience with the software program increased. Analysis of the data revealed there was no significant difference in the perceived benefit of *Inspiration* between those students who had prior experience with the software program and those who had not used it before. Although, when interviewed, the teacher stated that the more familiar the students became with the program the “more valuable it was for them.” However, most students had quickly developed competence with their experience in the lessons.

Clearly the majority of students enjoyed using *Inspiration* at least ‘a little.’ However, a number of students found that the software had not been particularly helpful in preparation for assignments. The students interviewed all enjoyed using *Inspiration* and would use it in preference to a paper brainstorm. The teacher stated that using *Inspiration* was a motivating factor for students to stay on task. Analysis of the post study questionnaire revealed there were significant differences between those students who enjoyed *Inspiration*

and those who did not. Those who enjoyed using this software had found it particularly beneficial in developing planning and organizational skills.

The action-research method of research enabled the researcher to evaluate and when necessary, modify the integration of *Inspiration* into this middle school curriculum. The teacher stated in the interview that *Inspiration* was a valuable instructional tool and that students needed to be “walked through the process”. Structured templates were created for the second term to alleviate time constraints, the limited access to computers and the specialised nature of the curriculum. Lesson observation revealed that, when students were prepared for their lessons, structured templates were a motivating factor for some students to stay on task, although time constraints were still an issue.

From the post-study questionnaire (Table 4.8) students perceived that different colours for background and text, pictures and the ability to provide links were some of the most valuable features of *Inspiration*. Different templates and the feature that allowed work to be printed, and or saved, was also considered to be helpful by both the teacher and students. Nearly one third of the students used the term “organize” when asked to comment on the “best thing about using *Inspiration*”.

The next chapter discusses the findings from these analyses in relation to the subsidiary questions and then the research question. The strategies and constructs which have been enhanced are identified, different groups that have been affected are nominated and issues to be considered are discussed.

CHAPTER FIVE

DISCUSSION OF FINDINGS

From the results presented in Chapter Four a number of factors emerged regarding the integration of the use of Inspiration into a Middle School curriculum. This chapter discusses the results of these analyses in terms of the subsidiary research questions and then the main research question. The ethnographic method of research permitted the researcher to observe and record issues as they arose during the study and these are also discussed in this chapter.

Research Subsidiary Questions

The discussion of findings will firstly address the four subsidiary questions prior to addressing the overall research question.

Subsidiary Question One

In what ways does the graphic organizer software tool, Inspiration facilitate the successful implementation by teachers of strategies and constructs designed to enhance organizational and problem solving skills?

Addressing this question relies on the meaning behind the skills involved. As defined earlier the term of 'problem solving' concerns information problem solving which allows for the development of successful search strategies, organization and evaluation of information (Moore, 1997, p.1). The Oxford Dictionary definition of organization is to "give orderly structure to". Organizational skills can be defined in terms of both organizing thoughts and ideas into logical order and planning to create a structure.

The strategies and constructs, which emerged as having been affected by the integration of *Inspiration* into the curriculum, are those of planning, understanding, organization and identification of information. These strategies and constructs are now discussed in the light of the analyses of the data gathered.

Planning

In the pre-study questionnaire (Table 4.2) students were asked to note if they had difficulty in planning assignments. Just over half of the students responded that they only sometimes had difficulty in knowing where to start with assignments. The teacher's comments in the interview indicated that *Inspiration* gave students a good place to start, however, when analysing the responses in the post-study questionnaire (Table 4.5) regarding the difference *Inspiration* had made in students' preparation for assignments, there was no significant difference. Therefore, from the students' perspective it cannot be stated that *Inspiration* has made a significant difference to the way they planned for assignments.

In the post-study questionnaire (Table 4.5) a significant number of students stated that *Inspiration* had been very helpful in planning for the term and over half of the students stated that it had been of some benefit. In their interviews, the selected students all stated that *Inspiration* had been helpful in the term planning. The teacher stated in her interview that *Inspiration* should be integrated into the curriculum "at the planning stage". When observing the lesson where the *Term Planner* template was used, the researcher noted all students completed their work. Joshua's *Term Planner* is an example of a structured template that allowed students to personalise their work with colours and images and also include relevant weblinks (Appendix T).

Clearly from analysis of the data in the post study questionnaire, student interviews and teacher interview, *Inspiration* was of some benefit to the majority of students, in enhancing their planning skills for the term.

Understanding Task Requirements

The post-study questionnaire (Table 4.5) asked students to respond to the question asking if *Inspiration* had helped in the understanding of assignment requirements. A significant number of students indicated that *Inspiration* had been very helpful in understanding assignment requirements and over half stated that it had been of some benefit. When interviewed the teacher stated *Inspiration* was helpful for student in “setting up their thought processes”. David’s ‘Middle Ages’ *Brainstorm* demonstrates how he has broken down the main topic into various sub-headings, and definitions (Appendix R). A number of responses in the short answer section of the post-study questionnaire (Table 4.7) stated that *Inspiration* helped students in their understanding in assignments.

Taking into account student responses to the post-study questionnaire and the comments of the teacher, it can be stated that *Inspiration* has helped the majority of students, to some degree, in developing their understanding of assignment requirements.

Organizing Information

As indicated by their title, graphic organizers assist in organizing information graphically and the *inspiration* program was selected in this study for this purpose. Questions on organizing skills were therefore included in the questionnaires and interviews. The post-study questionnaire data (Table 4.5) indicated that there was not a clear majority of students who thought *Inspiration* made a lot of difference to the way they organized their thoughts. Linda and Karen’s *Story Web* and *Story Map* demonstrate the structure that allows students to organize their thoughts into a logical sequence (Appendix R and V). There was, however, a significant number of students who stated that *Inspiration* helped them to sort their information, with nearly one-third stating *Inspiration* had helped them a lot and two-thirds stating it had helped them to some degree. Linda’s *Report Format* demonstrates a structure that allows students to organize information (Appendix U). When asked to write the best thing about *Inspiration* in the post study questionnaire (Table 4.7) nearly one-third of the students used the term ‘organize’.

In the student interviews three students stated that they liked to use *Inspiration* because it made their work neater and easier to organize. The teacher also commented on the value of *Inspiration* in developing the students' organizational skills. In observing the lessons the researcher noted that the templates gave students a structure in which to organize and record their information or ideas. Karen's *Character Web* demonstrates information organized into logical categories and accompanied by illustrations to emphasise the concepts (Appendix S). The teacher also thought the templates added structure to the students work and stated that "all students across the board were better organized" after using the *Report Format* template. An example of this is in Linda's *Report Format* (Appendix U).

Taking into account student responses to the questionnaire, the data collected in the student and teacher interviews and observation of lessons, it can be stated that *Inspiration* has helped the majority of students in enhancing their organization skills.

Identifying information

The post-study questionnaire (Table 4.5) asked students to comment on the value of using *Inspiration* in identifying resources for assignments. Just under two thirds of the students considered *Inspiration* had helped, to some degree, in this aspect. The boys selected for the interviews stated that feature of *Inspiration* that allowed web links to be inserted was valuable. David's 'Middle Ages' *Brainstorm* illustrates how weblinks can be used to identify the location of information (Appendix R). The teacher stated that for those students who were more confident on computers and of generally higher ability, *Inspiration* was beneficial in identifying possible sources of information. She stated that for the other students "they were still only able to work on topic sentences." When observing the lessons, the researcher noted that there were only some students who noted information sources in their work.

Taking into account the data gathered from the questionnaire, interviews and observation it cannot be clearly stated that *Inspiration* made a significant difference to the students' information problem solving skills of identifying and locating information.

Conclusion for Subsidiary Question One

In summarising the response to subsidiary question one, it can be stated that *Inspiration* facilitated the successful implementation of strategies and constructs to support organizational skills for the majority of students. It can also be stated that *Inspiration* facilitated, to some degree, the development of understanding assignment tasks and planning for term work. It cannot be stated that the integration of *Inspiration* into the middle school curriculum facilitated the development of skills in identifying information sources and planning for assignments.

Subsidiary Question Two

Are some strategies and constructs better facilitated than others and if so why?

From the data gathered and analysed in subsidiary question one it can be seen that *Inspiration* has enhanced the strategies and constructs to support students in organization. It can also be stated that skills development in term planning and understanding assignment requirements have been enhanced to some degree by *Inspiration*. It has not been clearly demonstrated in this study that *Inspiration* has significantly enhanced the development of skills in identifying and recording sources of information or planning for assignments.

There were a number of features of *Inspiration* that were considered by the students to be the most valuable (Table 4.7). Pictures, colours, links and templates can all assist in the organization of information. The students stated in the mid-study interview that compared to paper brainstorming, using *Inspiration* on computer was "neater and it was easier to organize your thoughts and notes." Karen's *Character Web* demonstrates concepts organized into logical categories using links and pictures (Appendix S). Using the computer the students could evaluate, and edit their work as they went. The save and print functions also allowed students to save their work to their own drive where they are able to modify or print at any stage.

Inspiration has a number of goal setting and planning templates available. This software program also has the flexibility to create templates. A specialised template was created to

assist students in planning for the term in the subject of Society and Environment. Both the *Term Planner* template and the lesson were structured, however, there was time allocated for students to personalise their own work (Appendix T). In keeping with the philosophy of Middle Schooling, students were guided through the process, the task was relevant to their needs and they had some say in how they presented their work.

This structure also assisted students' in their understanding of assignment requirements. When interviewed, the teacher stated that the structured approach to brainstorming using *Inspiration* allowed students to be "walked through" and "their thought processes were much clearer than those who did not use *Inspiration*." This structured, step by step approach enabled students to breakdown the assignment requirements into units they could understand. An example of this structured approach is Linda's *Report Format* (Appendix U).

In discussing identifying information, the teacher stated that the feature that enabled students to insert web links was used by those who were "computer literate" and also those "who were generally more organized in their thought processes." The data gathered from the student interviews, the teacher interview, the post-study questionnaire (Table 4.6) and lesson observations showed that the students became more confident in using *Inspiration* as their experience with the software program increased. However, the data did not reveal if there was a clear majority of students who consistently used the web links feature or recorded other sources of information in their work.

Conclusions for Subsidiary Question Two

In summarising subsidiary question two it can be stated that *Inspiration* has enhanced the strategies and constructs used by students in organization and to some degree in term planning and understanding assignment requirements. The features of *Inspiration* that include structured templates, brainstorming pages, colours, pictures and also the ability to save and print appear to have assisted in the development of these constructs and strategies. When the lessons included teacher instruction and templates the students were able to work

in a structured environment, however, they also had the ability to use images and colour to personalise their work and make it relevant to their needs.

Subsidiary Question Three

Are particular groups of students affected more than other groups?

The two main groupings that emerged from this study were based on the students' prior experience with *Inspiration* and their attitude towards *Inspiration*. Gender and computer experience was also analysed to determine if there was any significant difference that could impact on skill development.

Gender difference and experience with computers

Analysis of initial questionnaire (Table 4.1, Items 1 and 2) found no significant difference based on gender in the use of computers for schoolwork at home or at school. There was, however, a significant difference based on gender in the response to question (Item 7) on whether they liked to try out different software. Overall the boys liked to try out different software more so than the girls. It should be noted that there was no significant difference in gender in the responses to the questions (Items 1, 2, 3, 4, 5, 6, and 7) in Table 4.5 where students were asked if *Inspiration* had been helpful and if they enjoyed using it. It can then be stated that even though, overall, boys liked to try out different software programs, the girls enjoyed *Inspiration* as much as the boys and there was an equal response by both genders to the helpfulness of *Inspiration*.

Previous experience with Inspiration

When interviewed the teacher stated that experience with computers and prior experience with *Inspiration* was an advantage. In the pre-study questionnaire (Table 4.1 Item 8) only a small number of students indicated that they had some experience with this software program. An analysis of the final questionnaire (Table 4.5) data for Items 2, 3, 4, 5, 6 and 7 where students were asked to comment on the helpfulness of *Inspiration*, revealed that there was no significant difference in skill development between the students who had prior experience with *Inspiration* and those who had no experience.

In the post-study questionnaire (Table 4.6 Item 10) the majority of students stated that *Inspiration* was easier to use as their experience with it increased. The teacher also stated that “the more experience the students had with *Inspiration*, the more valuable it was for them.” It can, therefore, be stated that previous experience with *Inspiration* was not a significant advantage in skill development in this study, and all students found it easier to use as their experience increased.

Attitude towards Inspiration.

When interviewed the teacher stated that the students who were “very much visual learners” seemed to enjoy using *Inspiration* and so, were more motivated when using it. The students selected for the interviews all stated they enjoyed *Inspiration* and that it had been helpful to them.

From the data gathered in the post-study questionnaire the students’ attitude towards *Inspiration* was assessed. Most students indicated that the program became easier to use as their experience increased (Table 4.6, Item 10). Some students noted, however, they experienced problems “finding things” in *Inspiration* and a small number of students also indicated that they did not have enough time in the lesson to complete their work (Item 17, Table 4.7). Analysis of the data revealed that there was a significant difference, in perceived development of organization and term planning skills, between those students who enjoyed using *Inspiration* and those who did not. From analysis of this data it can be asserted that those students who had a positive attitude towards *Inspiration* generally found that this software program had been helpful in enhancing their organization and term planning skills.

Conclusion for Subsidiary Question Three

In summarising subsidiary question three regarding the affect on particular groups, it can be stated that gender and prior experience with computers and *Inspiration* did not have a significant difference on skill development. There was a number of students, however who experienced problems in developing competence in using the features of *Inspiration* which

affected their attitude towards the program. A positive experience with *Inspiration* seemed to enhance skill development. A significant difference was noted between the development of organization and term planning skills, between those students who enjoyed using *Inspiration* and those who did not.

Subsidiary Question Four

How should Inspiration be integrated into the curriculum?

The teacher stated in the interview that *Inspiration* should be integrated at the 'planning stages' of a topic or assignment and added that this could be done both formally and informally. In the student interviews, the students nominated a number of different subjects for which they believed *Inspiration* would be beneficial. In the post study questionnaire (Table 4.7) a number of students considered *Inspiration* would be helpful in a combination of subjects. *Inspiration* has a number of subject specific templates and also some general templates that would be suitable to all subjects. *Inspiration* has the flexibility to enable specialised templates to be created by students or teachers to suit many tasks and topics.

The teacher also stated that *Inspiration* was a valuable instructional tool as the teacher could "walk through it with them and go through the various steps." The researcher observed a number of lessons where *Inspiration* was used on the data projector as an instructional tool to generate discussion, create links in ideas and information, demonstrate cause and effect in topics and breakdown information into structured displays. It is therefore asserted that *Inspiration* could be valuable as a graphic organizer tool in the planning and organizing of topics for students across the curriculum subjects. *Inspiration* may also be beneficial to teachers when used as an instructional tool.

Subsidiary Question Five

What issues arose that need to be considered?

A number of issues emerged during the course of this study. Problems with computer technology was one of the main issues, together with the value of *Inspiration* as an instructional tool and also the American content of this program.

Computer Technology

Accessibility and reliability of the computer technology was a main issue that emerged in this study. The start of the study was delayed due to technological problems with the network. When these problems had been resolved and the computers were available to students, accessibility to the computers where *Inspiration* was installed then became an issue. The computers in the library were the only computers in the school that had network licenses for *Inspiration*. The integration of the use of this software into the curriculum then had to be arranged to suit the availability of the library computers. The teacher found this frustrating as the curriculum programme had to be modified to suit the accessibility of computers not the needs of the students. The students also found this frustrating and in the end-of-study interviews three students stated that having to wait to go to the library was a problem.

Burns (1996, p. 6) states that replication is an essential facet in ensuring the reliability of any study. To ensure replication of this study, the researcher did not attempt to alter in any way, the availability of the computers to students. The availability of computers would be an issue in many schools; not all students have access to computers all of the time. The availability of computers did affect the timing of the study and also the timing of integrating *Inspiration* into the curriculum.

Inspiration as an Instructional Tool

The value of *Inspiration* as an instructional tool was not evident to the researcher before the study. During this study *Inspiration* was used a number of times as a cognitive tool. The use of the data projector was a definite advantage in lessons, however, this is not an essential part of instruction. When interviewed, the teacher noted the value of *Inspiration* as an instructional tool especially when used in conjunction with the data projector.

The flexibility of *Inspiration* that allows use of the existing templates and also the creation of specialised templates caters to the specific needs of both teachers and students. Teachers can create specialised templates or use the existing ones to demonstrate particular points of

view, arguments, cause and effects, relationships and many more concepts covering all subject areas. The colours, pictures and links features can add weight to an argument or emphasis a point perhaps more clearly than on a white or black board.

Graphics on Inspiration

When interviewed, the teacher stated that students who were visual learners were motivated to use *Inspiration*. A number of students stated that pictures were a helpful feature of *Inspiration*. In the student interview Joshua, David and Karen stated the use of pictures helped them to remember information. In the final questionnaire four students stated that finding good pictures was a problem with this software. *Inspiration* is an American produced software program and some of the pictures were specifically tailored for American students. An example of this is in the Social Studies symbol palette. There are quite a few pictures which have American flags, historical figures or images. As *Inspiration* is a software tool which promotes the use of graphics as a main feature, it was disappointing to note that many of the images were suitable for American students only.

The Main Research Question

The main research question for the study was:

Under what conditions will the integration of a graphic organizer software tool into a middle school curriculum facilitate the successful implementation by teachers of strategies and constructs designed to enhance students' organizational and problem solving skills?

The two main factors affecting the effectiveness of implementing the software that emerged from this study were technology and motivation. These factors need to be considered when discussing the conditions for the successful implementation of *Inspiration* into the curriculum to enhance organizational and problem solving skills. The first factor to emerge was that of technology.

Computer Technology – Access and Reliability

The cultural context of the school, with the introduction of a new technology network and the ensuing delays this brought about, meant a pause in the start of the study and also subsequently, some logging on difficulties during the study. The cultural context also influenced the study with the availability of computers with site licenses for *Inspiration*. Access to the library, the only location with site licenses, was not always possible when it was most desirable for the curriculum programme. Frustration was expressed by both the teacher and students in interviews and in the post-study questionnaire. Certainly the structure of the timetable at the College where the study was conducted was not flexible enough to allow for overlap of times for computer use.

One model of Middle Schooling used by a number of Middle Schools in Western Australia including Mandurah Catholic College and Mercy College, has flexible time-tabling and shared resources. The students in the middle school share resources at any time nominated by their teacher and these resources can and often do include the use of computers. The installation of *Inspiration* on shared computers could allow students who were motivated, to use this software program as and when needed.

Motivation

Motivation was seen as a significant issue in the effectiveness of *Inspiration*. The teacher stated that those students who were generally more organized and “highly visually stimulated” enjoyed using *Inspiration*. The analysis of the post-study questionnaire responses revealed that there were significant differences in skill development between those who enjoyed using *Inspiration* and those who did not. Those students who enjoyed using *Inspiration* found the software helpful in organizing and, to some degree, in term planning and understanding assignment requirements.

When discussing computers in education Martinez (2001, p.3) points to studies which indicate that there are diverse individual factors such as enjoyment, motivation, frustration and independence that affect learning performances. While the majority of the students

stated they enjoyed using *Inspiration*, to some degree, there were also a number of students who expressed frustration about the limitations of time and availability of computers. Therefore this study supports that allowing middle school students access to *Inspiration* when it is relevant and meaningful to them can enhance successful development of organizational and problem solving skills.

In this chapter the analysis of the data has been applied to the research question. Chapter six considers the limitations of this research, presents recommendations and provides a conclusion for this study.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

In Chapters Four and Five the analyses of the data collected have been presented firstly in terms of the data sources and then against the research question and subsidiary questions. Chapter six discusses the limitations of this study and makes recommendations for the implementation of graphic organizer software and for further research. Finally this chapter presents conclusions from the findings of this study.

Limitations of the Study

The limitations of this research will be discussed in terms of the sample size, assessment of skills, construction of the questionnaires and also the time allocation.

Sample Size

The sample size of 31 students, being a typical class, was determined by the researcher to be a manageable number to observe as they interacted with the software program. It was also deemed to be suitable for the action-research methodology, within which therapeutic action may occur. If any changes to the curriculum or timing of the study were to occur, it was considered appropriate that only one class may be affected. Using a sample size of 31 students, however, may have reduced the possibility of finding significant differences in the quantitative analysis of students' perception of their skills in the pre-study questionnaire and the skill development in the post study questionnaire.

A number of possible variations in the construction of the study may have alleviated this problem. In further research perhaps two classes could be used to compare skill development. This may occur with both classes involved in the study using graphic organizer software or one class using graphic organizer software and one class using pen and paper organizers. This would give the researcher a larger sample size and also comparisons could then be made between classes.

Assessment of Skills

The students were asked to complete the pre-study questionnaire giving responses to questions on their perceived skills in organization, planning, understanding and identifying information for assignment work. From the responses it would appear that some of the students had unrealistic perceptions of their ability. An example of this is that almost all of the students stated that they usually achieved well in assignments, however over one-third stated that sometimes they omitted something important from their assignments.

As the students who were a part of this study were new to the school, only a general overview of their skills and abilities was obtained from their primary schools. It would have been difficult to gain a more accurate account of their skills from their teacher in the previous year, as they had come from different primary schools and the task of contacting each of the former teachers would have been too great. One possible solution to this could have been that perhaps the study be conducted in the middle of the year. Their year eight teacher could then have been consulted on their organizational and problem solving skills. However, the focus of this study was on the support of strategies and constructs to facilitate skill development, not directly on these skills themselves.

Construction of Questionnaires

The questionnaires generally asked students to respond with three given choices. An alternative to this method could have been to ask the students to respond on a numeric rating scale. This could have allowed the students a wider selection of choices and so perhaps the difference may have been statistically significant. Burns (1996, p.473) states that closed items in questionnaire can achieve uniformity of measurement, however can also lead to superficial responses. To address this problem in this study, the post-study questionnaire contained a mixture of open-ended and fixed alternative questions and interviews were conducted with a representative sample.

Time Allocation on Computers

Problems with the computer technology meant that the timing of the integration of *Inspiration* into the curriculum had to be modified according to the availability of the computers. The teacher of the class became frustrated that the class was unable to gain access to the library computers when it was appropriate for the integration of *Inspiration* into the curriculum. Three of the students who were interviewed stated that the limited access to the library computers was unhelpful. This unavailability of computers is a problem which many schools would experience. Burns (1996, p. 6) states that replication is an essential requirement of reliable research. In order to ensure that the results of this study could be repeatable for a similar population, the researcher did not alter in any way the availability of the computers for this class.

Recommendations

The findings of this study have enabled the researcher to make recommendations regarding the integration of graphic organizer support into a middle school curriculum.

Software

The researcher would recommend that graphic organizer software should include a more universal coverage of symbols and graphics. A number of students were frustrated that the symbols were predominately oriented toward American students. The software could include a variety of symbol palettes for different countries and age groups, where the symbols and graphics cater to specific needs.

An on-line version of the software would alleviate some of the problems associated with limited access. Schools could pay a fee on a student and staff population or annual basis and the program could be placed on the school's website and accessed by a logon name and password. Students and teachers could then access this software from any computer at school or at home, which may then allow them the time they need to use the program effectively.

Integration into a Middle School Curriculum

Access to the technology and the motivation of students were two of the main conditions for success that emerged in this study. Martinez (2001, p. 3) quotes studies which state that factors such as enjoyment, motivation, frustration and independence affect learning performance. Roschelle, et al. (2000, p. 78) list the key factors which affect student use and the successful implementation of ICT into the school curriculum as: 1) location and number of computers, 2) teacher expertise, 3) teacher philosophy and 4) school culture. These key factors can be addressed in a teaching and learning environment that have the characteristics of middle schooling.

The ethos of middle schooling has been based on research of early adolescent learning. Some of the characteristics of middle schooling include flexible timetabling, shared resources, an integrated, relevant curriculum, a developmental approach and an emphasis problem solving (Anderman & Midgley, 1998). These characteristics are congruent with the implementation of graphic organizer software into the curriculum and could also alleviate some of the problems of access to available technology, while providing opportunities for those students motivated to use the software.

Analysis of the data gathered in this study has revealed that *Inspiration* has the capacity to allow students to be guided through the process of developing organizational and problem solving skills and to enhance the successful development of these skills. It is therefore recommended *Inspiration* be used either as a teaching tool or as a structure for independent student use in an environment consistent with middle schooling principles.

Recommendations for future research include a study of the use of graphic organizer software in a school environment which is more established in the practice of middle schooling. Shared resources, flexible timetabling and an integrated, relevant curriculum with a developmental approach to learning are principles of middle schooling which would support graphic organizer software. Flexible timetabling, integrated curriculum and the sharing of resources could also avoid problems of limited access to suitable technology.

Further research could also focus directly on the actual skills developed using graphic organizer software in a middle school context.

Conclusion

This study employed a combination of ethnographic and action-research methodology to investigate the integration of the graphic organizer software, *Inspiration* into a middle school curriculum. The study was conducted to determine under what conditions problem solving and organizational skills of middle school students would be enhanced. One class of 31 students used this software program over a period of approximately eleven weeks, covering part of term one and the majority of term two. The use of *Inspiration* was integrated into the Society and Environment and English year eight curriculum.

A range of data sources and instruments were used including questionnaires, interviews, observation and work samples. Ethnographic research allowed the researcher to take into account the physical cultural context of the school. The action-research model allowed for therapeutic action and the researcher discussed the integration of *Inspiration* with the class teacher and amended the intervention as and when needed. The availability of computers was a major issue that influenced the timing of the intervention and the start of the study was delayed until network problems had been resolved. Limited access to computers with *Inspiration* was an issue for the students and class teacher during this study.

Findings from the study indicated that the software became easier to use as the students had more experience with the program. There were however, a number of students, who stated they had problems navigating their way around *Inspiration* and this, in turn, appeared to have had a negative effect their attitude towards the program. There was a significant difference between those students who enjoyed using *Inspiration* and those students who indicated that they did not enjoy using the program. Those who enjoyed using *Inspiration* found it helpful in organizing and in planning for the Society and Environment curriculum. *Inspiration* was considered by the majority of students to be helpful in organizing their

thoughts and information. Most students stated that *Inspiration* had also been helpful, to some degree, in the understanding of assignment requirements and in planning the term for Society and Environment. There were no significant differences in skill development based on gender. Both the boys and girls found the software equally beneficial in developing skills and strategies. The teacher and students indicated that the *Inspiration* features of colour, graphics, templates, links and the save and print functions were considered to be the most valuable. Some of these features support organization and information problem solving in ways that are not available using pen and paper. However, the teacher believed that the students still needed to be “walked through the process” of organizational and problem solving skills and instruction using *Inspiration* provided an appropriate structure for this to take place.

A middle school curriculum that is flexible, relevant, allows for shared resources and has an emphasis on a developmental approach to problem solving is consistent with the philosophy of early adolescent learning and outcomes based approaches to the curriculum. This study has found that a middle schooling context provides suitable conditions for the integration of graphic organizer software to facilitate the successful implementation of strategies and constructs to enhance students’ organizational and problem solving skills. However, in addition *Inspiration* was considered a valuable and flexible instructional tool, which provides a variety of structures to stimulate class discussion and guide and involve students in the process of planning, organizing and monitoring their own learning. It is then likely, that under these conditions, the use of such software will support students in developing strong organizational and problem solving skills.

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APPENDIX A

LETTER TO PRINCIPAL

1st February, 2003

Dear

I am currently involved in research for my Honours Thesis through Edith Cowan University and this research has the approval of the Faculty of Community Services, Education and Social Sciences Ethics Committee. As part of my research I would like to set up an action research study. The purpose of this study is to investigate whether students' organizational and problem solving skills can be enhanced through the use of a graphic organizer software programme.

The name of this programme is Inspiration and it has been used on an informal basis in the school prior to this research. I am writing to ask you to consider granting permission for this study to be conducted. If you agree to this study please complete the attached Informed Consent.

During Term One of 2003 it is planned for Inspiration to be integrated into the Year 8 curriculum in four lessons in Society & Environment and two lessons in English. Inspiration is designed to help students organize their ideas and research strategies and enhance their problem solving skills.

I will ask students of a selected 'House' to complete a questionnaire at the start of the term regarding their prior experience on computers and also with Inspiration. They will be requested to complete a further questionnaire at the end of the term, which will ask them to comment on their experience with Inspiration. I will also select five students for one interview mid term, observe during each lesson and collect subsequent work samples. Permission is to be sought from parents of the students in this class. Permission has been sought from the class teacher of the selected 'House' to participate in the study and this teacher will also be interviewed. The interviews are to be recorded on audio-tape and the tapes will be erased once transcribed. If a participant decides to withdraw at any time, their data will be destroyed.

The study is completely voluntary. The identity of the students and teacher throughout this study will remain anonymous and the school will not be identifiable. It will not, in any way, affect a student's grade if they do not participate in this study.

Thank you for your consideration of my request and if you have any further questions, please do not hesitate to contact me at the College or at home on 9370 1231. If you have any concerns about the project or would like to talk to an independent person please contact Dr. Andrew Taggart, Postgraduate Coordinator in the School of Education at Edith Cowan University. On 9370 6806.

Yours sincerely,

Suzanne Bursey

APPENDIX B

PRINCIPAL

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

Ihave read the attached information and any questions I have asked have been answered to my satisfaction.

I agree to give my permission for students in a Year 8 class at this College to take part in this study. I understand that any student may withdraw at any time.

I agree that the research data gathered for this study may be published and I understand that students and the College will not be identifiable.

Signature:..... Date:.....

Investigator:..... Date:.....

APPENDIX C

LETTER TO PARENT

1ST February, 2003

Dear

I am currently involved in research for my Honours Thesis through Edith Cowan University. As part of my research I intend to set up an action research study. This research has the approval of the Faculty of Community Services, Education and Social Sciences Ethics Committee. The purpose of this study is to investigate whether students' organizational and problem solving skills can be enhanced through the use of a graphic organizer software programme. The name of this programme is Inspiration and it has been used on an informal basis in the school prior to this research.

During Term One of 2003 Inspiration will be integrated into the curriculum in four lessons in Year Eight Society & Environment and two lessons in Year Eight English. Inspiration is designed to help students organize their ideas and research strategies and develop their problem solving skills.

I will ask students to complete a questionnaire at the start of the term regarding their prior experience on computers and also with software programme. They will be requested to complete a further questionnaire at the end of the term, which will ask them to comment on their experience with Inspiration. I would like to select five students for an interview, observe their experience with Inspiration in the class situation and collect the subsequent work samples. If you agree for your child to take part in this study could you please complete the relevant consent forms. The interviews are to be recorded on audio tape and the tapes will be erased once transcribed.

The study is completely voluntary. Your child's identity throughout this study will remain anonymous. It will not, in any way, affect his/her grade if you choose not to let him/her participate in this study. If your child withdraws at any time the relevant data would be destroyed. Could you please complete the attached consent form and return it in the envelope provided at your earliest convenience.

I would really appreciate your co-operation, as the findings of this research have the potential to benefit all students. Any questions concerning this project entitled *Integrating Graphic Organizer Software into the Middle School Curriculum* can be directed to myself at the College on 9444 6333. If you have any concerns about the project or would like to talk to an independent person, you may contact Dr. Andrew Taggart, Postgraduate Coordinator in the school of Education, Edith Cowan University on 9370 6806.

Yours sincerely,

Suzanne Bursey

APPENDIX D

PARENT

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

Ihave read the attached information and any questions I have asked have been answered to my satisfaction.

I agree to give my permission for my son/daughter
to be observed during class in this study, realising that he/she may withdraw at any time. I understand that if my son/daughter decides to withdraw at any time their data will be destroyed.

I agree that the research data gathered for this study may be published and I understand that my son/daughter will not be identifiable.

Parent/Guardian:..... Date:.....

Investigator:..... Date:.....

APPENDIX E

PARENT

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

Ihave read the attached information and any questions I have asked have been answered to my satisfaction.

I understand that my son/daughter may be selected for an interview and I agree to give my permission for.....to be interviewed. I also understand that the recording will be erased once the interview is transcribed. I understand that if my son/daughter decides to withdraw at any time their data will be destroyed.

Parent/Guardian:..... Date:.....

Investigator:..... Date:.....

APPENDIX F

LETTER TO PARTICIPATING STUDENTS

1st February, 2003

Dear

I am doing some research through Edith Cowan University. I have been given approval to do this study by the Faculty of Community Services, Education and Social Sciences Ethics Committee. As part of my research I would like to set up a study project in your class. I would like to find out whether organizational and problem solving skills can be improved by using Inspiration.

You may have used Inspiration or Kidspiration in Primary School. Inspiration is a computer programme where you can brainstorm by using pictures and colours to help you organise your information. During Term One of 2003 Inspiration will be part of four lessons in Society & Environment and two lessons in English.

If you agree to take part I will ask you and the other students in your class to complete a questionnaire at the start of the term. The questionnaire will ask you to tell me about your experience on computers. I would also like you to fill out another questionnaire at the end of the term, telling me what it was like to use Inspiration. These questionnaires should only take about 10 – 15 minutes to complete. I will be coming into the class in each lesson with Inspiration to see how you are getting on. I would also like to ask you some questions in the middle of the term, once you have used Inspiration a few times. I would also like to see your Inspiration charts so you can show me how you have used Inspiration.

The study is completely voluntary, you don't have to take part if you feel uncomfortable about it. You won't have to write your name on any forms and so your identity will remain a secret. It will not affect your grade if you don't take part in this study. If you decide you don't want to continue you can pull out at any time and I will destroy any information about how you got on in the study.

Thank you for reading my letter and if you do want to take part please fill out the consent forms and ask your parents to complete their form and send it in to me. If you have any concerns about the project please ask Mum or Dad to ring me or ask them to contact Dr. Andrew Taggart of Edith Cowan University on 9370 6806.

Yours sincerely,

Mrs. Bursey

APPENDIX G

STUDENT

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

I..... have read the attached information and all questions I have about this have been answered.

I agree to be interviewed in this study, and I know that I can withdraw at any time. I also understand that the tape recording will be erased once the interview has been typed out. I know that if I decided to stop being a part of this study at any time, all information about me will be destroyed.

I agree that the information gathered for this study may be published and I understand that no one will be able identify me.

Student:..... Date:.....

Investigator:..... Date:.....

APPENDIX H

STUDENT

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

Ihave read the attached information and any questions I have asked have been answered to my satisfaction.

I agree to allow Mrs. Bursey to look at how I am working with Inspiration during class lessons. I know that I can withdraw from this study at any time and that my grade will not be affected..

I agree that the information gathered for this study may be published and I understand that no one will be able to identify me.

Student:..... Date:.....

Investigator:..... Date:.....

APPENDIX I

LETTER TO PARTICIPATING TEACHER

1st February, 2003

Dear

I am currently involved in research for my Honours Thesis through Edith Cowan University. This research has the approval of the Faculty of Community Services, Education and Social Sciences Ethics Committee. As part of my research I would like to set up an action research study. The purpose of this study is to investigate whether students' organizational and problem solving skills can be enhanced through the use of a graphic organizer software programme. The name of this programme is Inspiration and it has been used on an informal basis in the school prior to this research.

I am writing to ask you to consider granting permission for this study to be conducted in Year 8 Society & Environment class you will be teaching. During Term One of 2003 it is planned for Inspiration to be integrated into the Year 8 curriculum in four lessons in Society & Environment and two lessons in English. Inspiration is designed to help students organize their ideas and research strategies and enhance their problem solving skills.

I will ask the students in your class to complete a questionnaire at the start of the term regarding their prior experience on computers and also with Inspiration. They will be requested to complete a further questionnaire at the end of the term, which will ask them to comment on their experience with Inspiration. I will also select five students for one interview mid term and observation during each lesson. I would also like to collect work samples from the students interviewed. Permission is to be sought from parents of selected students in this class. I would also ask you to consider granting me permission to interview you after the first lesson with Inspiration and also at the end of the term. The interviews are to be recorded on audio-tape and the tapes will be erased once transcribed. If you agree, please complete the attached informed consent.

The study is completely voluntary. Your identity and the identity of each student and the College will remain anonymous throughout this study. It will not, in any way, affect a student's grade if they do not participate in this study. Participants can withdraw at any time and if they decide to do so their data will be destroyed.

Thank you for your consideration of my request and if you have any further questions, please do not hesitate to contact me at the College on 9444 6333. If you have any concerns about the project or would like to talk to an independent person please contact Dr. Andrew Taggart, Postgraduate Coordinator in the School of Education at Edith Cowan University on 9370 6806.

Yours sincerely,

Suzanne Bursey

APPENDIX J

TEACHER

INFORMED CONSENT

Integrating Graphic Organizer Software into the Middle School Curriculum.

I..... have read the attached information and any questions I have asked have been answered to my satisfaction.

I agree to be interviewed in this study, realising that I may withdraw at any time.

I agree that the research data gathered for this study may be published and I understand that I will not be identifiable.

Signature:..... Date:.....

Investigator:..... Date:.....

APPENDIX K – PRE-STUDY QUESTIONNAIRE



INSPIRATION QUESTIONNAIRE



Please do not write your name on this questionnaire, just fill in these details.

Male/Female Contact Group: Date of Birth:

1. Do you use a computer at home for your school work?

2. Do you use a school computer outside of class time for your schoolwork?

3. Do you play computer games?

4. How often have you used brainstorm on paper in class?

5. Have you used brainstorm at home to prepare for assignments?

6. Have you worked in groups on brainstorm?

7. Do you like to try out different software programmes on computers?

8. Have you used the computer programme called Inspiration or Kidspiration?

9. Do you find understanding assignment tasks a problem?

Never	Sometimes	Often
-------	-----------	-------

10. Do you have trouble knowing where to start with assignments?

Never	Sometimes	Often
-------	-----------	-------

11. Do you have difficulty in finding information for your assignments?

Never	Sometimes	Often
-------	-----------	-------

12. Do you sort or organize information as you research for assignments?

Never	Sometimes	Often
-------	-----------	-------

13. Do you check to make sure you have all the information you need for an assignment before you start your good copy?

Never	Sometimes	Often
-------	-----------	-------

14. Do you complete your assignments by the due date?

Never	Sometimes	Often
-------	-----------	-------

14. Do you follow the same process when you are on working on different assignments in different subject areas ?

Never	Sometimes	Often
-------	-----------	-------

- a. I like assignment work. YES/NO
- b. I usually need to ask for help with assignments. YES/NO
- c. I usually achieve well in assignment work. YES/NO
- d. I find it difficult to work out what information is needed for an assignment. YES/NO
- e. I like to know what work I need to complete ahead of time. YES/NO
- f. I get worried when assignments are handed out. YES/NO
- g. I like to work with groups in assignments. YES/NO
- h. I do drafts before my good copy. YES/NO
- i. I check my work to make sure everything is completed. YES/NO
- j. I sometimes find I have left something important out of an assignment. YES/NO

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.

APPENDIX L – POST-STUDY QUESTIONNAIRE



Inspiration Questionnaire



Please do not write your name on this questionnaire, just fill in these details:

Male/Female

Contact Group SC

Date of birth

When answering the following questions, please be careful to answer truthfully and to the best of your ability. Circle the answer you want to give.

1. Did you enjoy using inspiration?

A lot	A little	Not at all
-------	----------	------------

2. Has Inspiration made a difference to the way you prepared for your assignments?

A lot	A little	Not at all
-------	----------	------------

3. Do you think Inspiration helped you to plan in S&E this term?

A lot	A little	Not at all
-------	----------	------------

4. Do you think Inspiration helped you to organize your thoughts?

A lot	A little	Not at all
-------	----------	------------

5. Do you think Inspiration helped you to sort information?

A lot	A little	Not at all
-------	----------	------------

6. Did Inspiration help you to think about the resources you needed for your assignment?

A lot	A little	Not at all
-------	----------	------------

7. Do you think Inspiration helped you to connect ideas?

A lot	A little	Not at all
-------	----------	------------

8. Do you think Inspiration could be helpful in other subject areas?

A lot	A little	Not at all
-------	----------	------------

9. What subject areas would you use Inspiration in and why do you think it would be helpful?

10. Did you find Inspiration easier to use as you had more experience with it?

A lot A little Not at all

11. Do you think Inspiration helped you to understand what you needed to do for assignments?

A lot A little Not at all

12. Did you enjoy using Inspiration in your English Rage lessons?

A lot A little Not at all

13. Did Inspiration make a difference to the way you reported on your novel?

A lot A little Not at all

14. Tick the following features of Inspiration you found helpful?

Different colours		Insert pictures/images	
Different shapes		Save work	
Links to Ideas		Notes function	
Links to Internet		Templates for different subjects	
Print work		Main Idea Concept Map	

15. Which of these features do you think are the most helpful and why did you find them helpful?

16. Do you think you had enough time in your lesson to finish your work on Inspiration?

YES NO

17. Describe any problems that you had using Inspiration.

18. What was the best thing about using Inspiration?

APPENDIX M – MID STUDY STUDENT INTERVIEW QUESTIONS

Interviews Conducted on 16th April, 2003 – Location: Library

1. Do you have a computer at home?
2. Do you use it for games or for school work?
3. What types of computer software do you use?
4. Did you enjoy using Inspiration at School?
5. What features of Inspiration did you enjoy using?
6. Did you discover any different features about Inspiration?
7. Do you think Inspiration helped you when you were brainstorming?
8. You did your first assignment in S&E using a pen and paper and writing your brainstorm and for the second one you used Inspiration. Can you tell me which one was the most helpful?
9. Can you give me the reasons it was helpful?
10. Have you had any problems with Inspiration?
11. If you could access Inspiration at home would you use it for school work?
12. Has Inspiration changed the way you prepare for assignments?
13. Do you think you had enough time when using Inspiration?
14. Do you think Inspiration would work in other subject areas?
15. How would you use it in this/these areas?
16. If you had to choose between a paper brainstorm and Inspiration which one would you choose?

APPENDIX N – POST-STUDY STUDENT INTERVIEWS

Interview conducted 18th June, 2003 – Location Library

1. Did you enjoy using inspiration?
2. Why did you enjoy using it?
3. Did you experiment with the different functions as you became more familiar with it? If so, what did you find out?
4. Were these helpful?
5. How were these helpful?
6. Do you think Inspiration helped you to achieve to a higher level in S&E?
7. What sorts of things has Inspiration helped you with?
8. Do you think Inspiration helped you to connect ideas?
9. How did it help you to connect ideas?
10. Do you think it is good to be able to save your work and go back to it?
11. Did you do this?
12. Was it helpful to know the S&E term programme?
13. What template did you find the most helpful?
14. Would you use Inspiration to help you with assignments again?

APPENDIX O – TEACHER INTERVIEW QUESTIONS

Interview conducted on the 18th June 2003 – Location Researcher's Office

1. Have you had any experience with Inspiration before this study?
2. Did you familiarise yourself with Inspiration during this study?
3. Did you find Inspiration user friendly?
4. Do you think Inspiration is user friendly for Middle School students?
5. What functions of Inspiration do you think are valuable for Middle School students?
6. Has Inspiration made a difference to your students information organizational skills ?
7. In way ways has this happened?
8. Have there been particular students or groups of students affected in different ways?
9. Has Inspiration made a difference to the way your students solve problems of information literacy?
10. Have there been particular students or groups of students affected in different ways?
11. Have you noticed any developmental progress in your students as their experience with Inspiration has increased?
12. Have there been particular students or groups of students affected in different ways?
13. Do you think Inspiration has value as an instructional tool for Middle School Students?
14. Have you noticed any difference in the learning outcomes of the class of students who have not used Inspiration and the class involved in this study?
15. Do you think Inspiration has an impact on the affective domain of the students involved in this study?
16. Are there any functions of Inspiration you think have more value than others?
17. At what stages do you think Inspiration should be integrated into the curriculum?
18. What issues do you think need to be addressed when integrating Inspiration into a Middle School Curriculum?

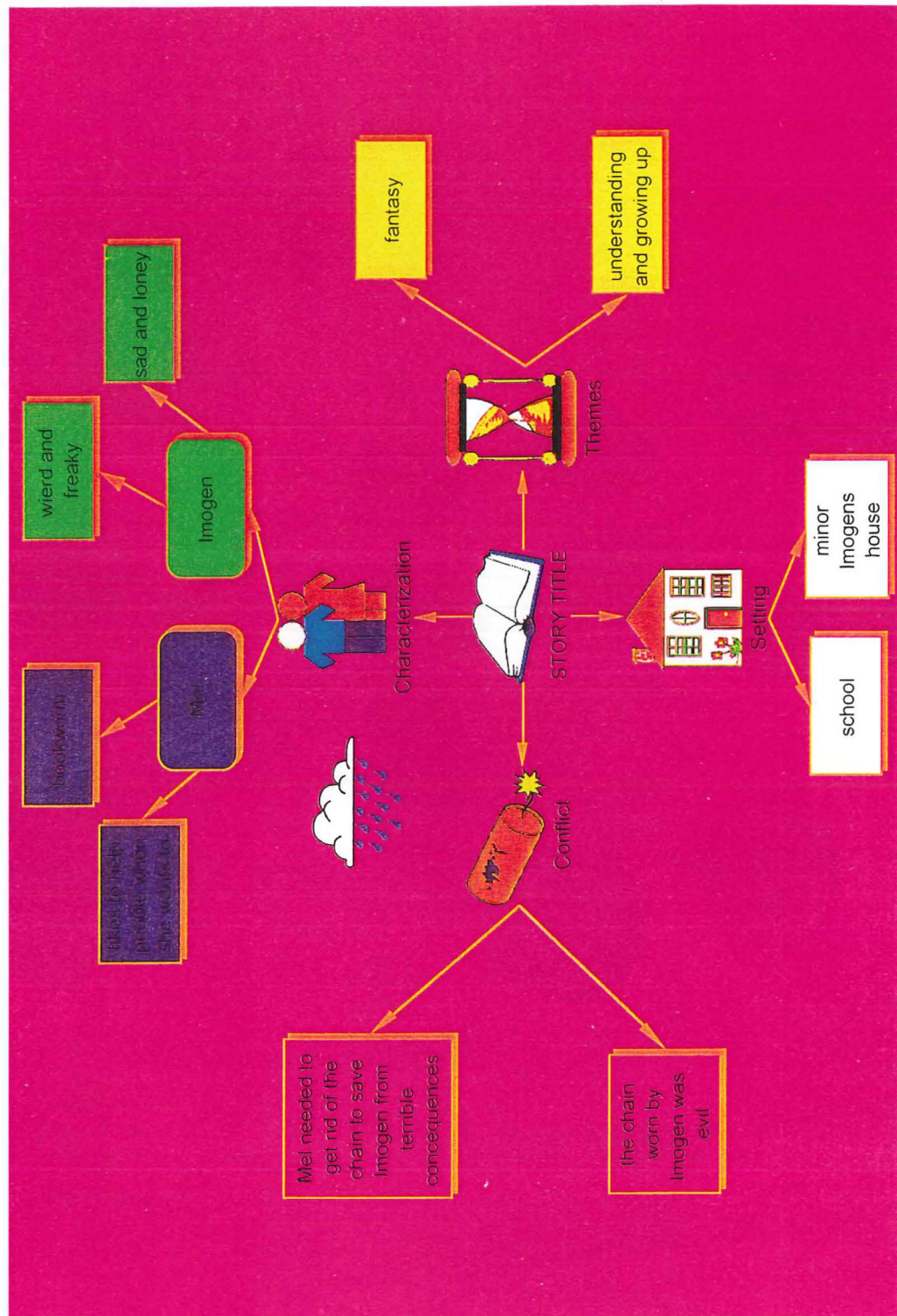
APPENDIX P – OBSERVATION SCHEDULE

Date:
Location & Seating Plan:
Number of Students:
Subject:
Lesson:

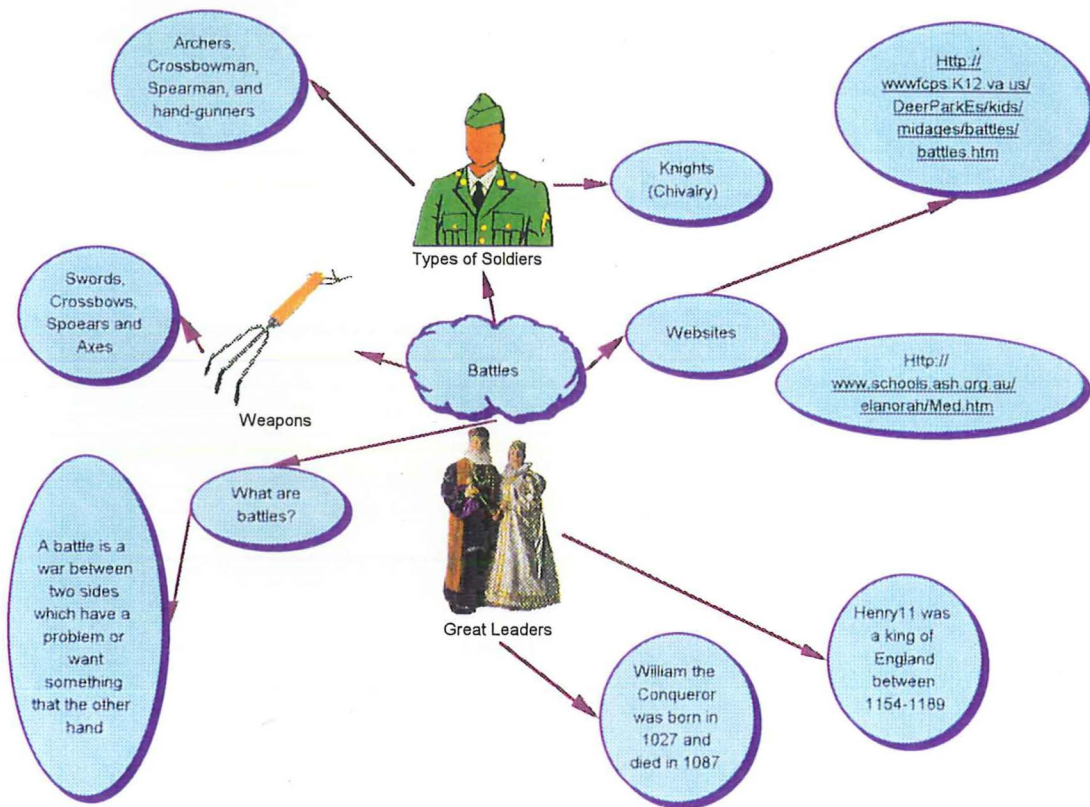
Time:	Comments:

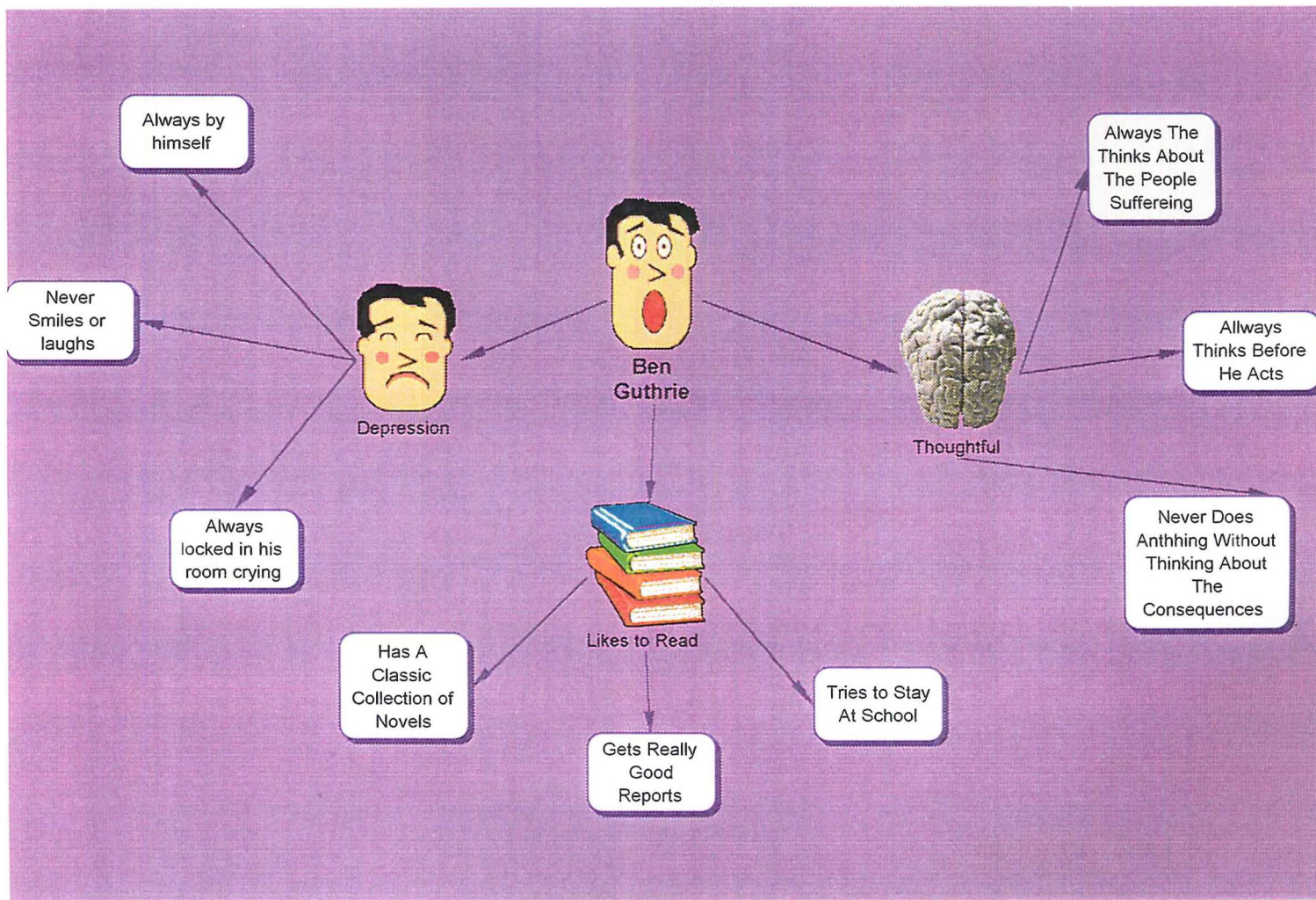
General Comments:

APPENDIX Q – WORK SAMPLE –STORY WEB



APPENDIX R – WORK SAMPLE – MIDDLE AGES BRAINSTORM





APPENDIX T – WORK SAMPLE – TERM PLANNER



My name is:

Goal Setting Worksheet

Today's date:

! My goal is: Achieving

! Term Two 2003

1 Completion of Presentations

2 Tuart Hill - History and Location

<http://www.stirling.wa.gov.au/aboutOurCity/geographical/>

3 Tuart Hill - Climate and Settlement

<http://www.bom.gov.au/climate/>

4 Tuart hill Hertiage Report Writing

Tuart Hill report - Global Drive

5 Stirling Heritage

<http://www.stirling.wa.gov.au/aboutOurCity/geographical/>

6 Heroes and Migrants

Worksheets

7 Depression and Difficulties 1928-1934 Creative Writing

A video and the Video is call "Boy Soldiers"

8 Sweet Potates or Bust

Field Trip to Viast Settles College

9 History in a recycling box activity

Notes from visit notes from week 6, 7, and 8



Tuart Hill Report
Common
Assessment
Week 4



Poster
Letter
Diary
Weeks
6, 7, 8



RecycledToy
Week 9

APPENDIX U – WORK SAMPLE – REPORT FORMAT



REPORT ON TUART HILL

REPORT ON TUART HILL

You will write your report on Tuart Hill in class using the notes you have made under the following headings

Introduction Here are some ideas you can include in your introduction:
Statistic - Quote - Anecdote - Question
Make sure you tell the reader what your report is about.

History of Tuart Hill
Make sure you include some dates and names.

Location of Tuart Hill
You can give the boundaries and distance from important places

Climate of Tuart Hill
Remember the climate of Tuart Hill is the climate of Perth. You could include temperature and rainfall averages and the name of Perth's climate

Settlement of Tuart Hill
You can talk about the different types of settlement in Tuart Hill.
Where they are located.
The effects of settlement.
What could be done to protect the environment

Conclusion
There are several ways you can finish your report. You need to combine all the main points. Possible ideas:
Statistic, Quote, Anecdote, Question, Call to Action, State your opinion

Intro

Tuart Hills location, it's history, and the climate

Para 1

1. 1840 trc walters given 6020 acres of land.
2. 1872 road to settlemnt of wanneroo constructed sold.
3. 1905 sold the land used for sanitary depot, poultry farming.
4. tuart hills from tuart trees eucalyptus

Para 2

1. wanneroo rd. Morley dr. Main st. hodgsen
- 2.2 reserves robins reserve and greenville reserve.
3. primary school-tuart hill ps. st. kierans

Para 3

mediterranean-hot dry summers, mild, wet winters

Para 4

wasn't very popular to buy first because it was far from the city in those days.

Conclusion

APPENDIX V – WORK SAMPLE –STORY MAP

