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An attitudinal study of computer-based learning for English language competence with learning disabled secondary school students

Dorothy Sinclair
Edith Cowan University

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AN ATTITUDINAL STUDY OF COMPUTER-BASED LEARNING FOR ENGLISH LANGUAGE COMPETENCE WITH LEARNING DISABLED SECONDARY SCHOOL STUDENTS

by

DOROTHY SINCLAIR

Dip.Teach., B.Ed., Post Grad. Dip. Ed. Stud.

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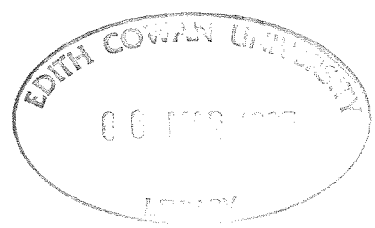

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Abstract

The issue of sub-standard English language competence in school leavers is one of prime concern to educators. Some Western Australian secondary school teachers endeavouring to improve English language competence in students with learning disabilities have implemented computer-based learning programmes.

The purpose of this project was to establish, through the students' attitudes and the teachers' perceptions, whether or not computer-based learning for English language competence is perceived to be successful for those Western Australian secondary school students who have learning disabilities. The study will benefit Western Australian secondary English teachers who may be searching for alternative strategies for inclusion in future programming for their learning disabled students.

The research method is descriptive and the report includes the qualitative thematic analysis of data collected through interviews and observation, as well as the quantitative analysis of an attitudinal questionnaire.

The findings indicate that the teachers consider computer-based learning to be an invaluable instructional strategy for teaching English language skills to the learning disabled, and that the majority of students have an extremely positive attitude towards their

computer-based English language lessons. All students believed that their English language skills had improved with the computer-based lessons, and that these lessons were more motivating than traditional pen and paper English lessons.

The teachers reported that computer-based lessons keep the students on task and elevate their self concept through improved performance. This begins a cycle of improvement which benefits the students and eases the teacher's burden. The need for a greater variety of pedagogical English-language-specific software was discovered.

The report gives a local aspect of computer-based English learning for students with learning disabilities.

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Dorothy Sinclair

January, 1994

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CHAPTER

ONE

Introduction

1.1 Background

Concerns have been consistently raised through the media that a comparatively large proportion of Australian students are leaving school without English language competence. Prospective employers find this problem reflected in retarded reading ability and poor communicative skills, both written and oral. Ultimately, employment opportunities are considerably reduced for these school leavers with inadequate English language skills (Shaw, 1993).

This issue of literacy has also been one of prime concern for other English speaking countries, including the United Kingdom. Following the release of Turner's now celebrated paper which pointed to the worst reading results in the UK since the war (Turner, 1990), even members of the monarchy were moved to make provocative public remarks about the standards of English competence in the schools (Weigall, 1992).

This concern is shared by the United Nations Educational, Scientific, and Cultural Organisation (UNESCO), members of which launched an appeal for worldwide literacy awareness which began with the designation of 1990 as 'International Literacy Year' (Carceles, 1990). Education and industry planners in Australia, the UK, and the USA have conceded a serious problem and have begun to implement appropriate programmes of rectification.

A concentrated effort has been made in Western Australia in recent years to address the literacy question, and in 1989 the Minister for Education introduced a directive which led to the formation of The Council for Better English, whose task it was to create public awareness of the importance of literacy to the future of Western Australia. Subsequently, 1989 was designated the 'Year of Better English' and a working party was formed to assess 'English language competence for secondary graduation' in Western Australian schools, the findings of which resulted in the introduction of projects such as Monitoring Standards in Education, which provides data about the standards of student performance in Western Australian Government schools. The Student Outcome Statements were then developed, and are to be utilised as the framework upon which the performance of students is measured and reported. Student Outcome Statements are descriptions of expected levels of students' skills, knowledge and understanding. They cover eight curriculum areas, K-12, and are seen by the Education Department of Western Australia to be one component in the long term solution to the problem of students leaving school inadequately equipped to cope with employment or further studies.

Additionally, the 'First Steps' programme for Primary Schools was introduced to schools for trialling

in 1989 and is based on the theory that if the literacy problem is addressed in the formative years of children's intellectual growth, it will correspondingly become less significant in the secondary schools. More recently, the 'Stepping Out' programme was trialled in lower Secondary Schools, aiming to equip teachers with strategies designed to enhance literacy learning in each of the content areas. The prime objective of these projects is to raise literacy outcomes.

The long term effects of such recently implemented strategies will not be known for some time. Meanwhile, educationalists are concerned that many students are currently beginning high school ill-equipped to cope with the secondary school study load because of inadequate English language skills. This results in students displaying a lack of motivation and application, and ultimately they may be more likely to perceive themselves as failures and drop out of school at the first available opportunity.

1.2 Significance of Study

The majority of research into computer-based learning situations for students with learning disabilities has focused on Schools or Universities in the USA or UK, environments which may not be directly applicable to secondary schools in Australia, and in particular Western Australia.

This study is relevant to Western Australian secondary school teachers who wish to investigate the possibility of utilising the computer as an instructional strategy in the future.

This report may also lead to further studies of this nature which could ultimately guide educational policy makers and planners toward the formulation of policies and strategies which take advantage of the technology available to us at the present time, and may also encourage forward planning to include technology which will be available in the future.

Appropriate educational policy guidelines and relevant teaching applications which take advantage of our rapid progression toward a technological era, may grant students who begin high school with a language handicap an opportunity for higher achievement.

Local research, such as this study into the attitudes of learning disabled secondary school students towards computer-based learning for improved literacy, may serve to close the gap between technological development and the educational response to such development.

1.3 Definition of Learning Disabilities

Prehm (1975), in Kameenui & Simmons (1990) offers the following definition of a disability:

'a deviation (actual or objectively measured) in body or functioning that results in a functional inadequacy in view of environmental demands' (p6).

The reasons for learning disabilities are broadly considered in terms of intellectual retardation, or physical handicaps. However, there are sometimes more subtle elements involved, such as maturational, emotional, environmental or cultural, with each of these primary causes having its own particular diagnostic and treatment technique (Shennum & Nino, 1992; Hurst, 1968). These management factors can be as equally detrimental as the more obvious problems leading to a learning disability, but because of their subtle nature can be more difficult to diagnose. Stress, for example, has been found to have a particularly negative effect on a student's ability to assimilate knowledge (Elkind, 1983).

With such a wide variation of causes for a student's inability to learn, as well as a variation of levels of inability, **the term 'learning disabilities' has been used in this study for all students who have been reported as having had difficulty in learning, and have been tested and found to be a minimum of two years below the norm in reading and spelling.**

1.4 Purpose of Study

The purpose of this project was to establish, through students' attitudes and the teachers' perceptions, whether computer-based learning for English language competence is considered to be successful for Western Australian secondary school students who have learning disabilities.

1.5 Research Questions

The main research questions which were addressed are as follows:

1 Is there a significant difference between the attitudes of male and female learning disabled secondary school students towards computers?

2 Do learning disabled secondary school students have a positive attitude towards computer-based English language learning?

3 Is computer-based learning for English language competence for learning disabled secondary students perceived to be successful by the students and teachers?

4 Are there any problems associated with the implementation of computer-based English language lessons in secondary schools?

CHAPTER

TWO

Review of the Literature

2.1 Effects of Learning Disabilities

Students commencing Year 8 with inadequate English language skills face the daunting task of not only endeavouring to improve their English, but of applying that knowledge to other areas of study. Their problem is compounded by the pressure brought about by attempting to perform to the expectations of their more capable peers. This type of pressure can inhibit their ability to learn, or their will to learn and can amount to a learning disability in itself (Elkind, 1983).

Learning disabilities can manifest themselves in a diversity of behavioural patterns where students can be difficult to motivate, have a short concentration span, resist independent work, and are generally disruptive at best, or aggressive at worst (Shennum & Nino, 1992; Kameenui & Simmons, 1990; Bailey, 1989). The range of behaviours is as varied as the causes for the learning disabilities (See definition, p 5). Ideally, the teaching programmes planned for each student and the instructional strategies utilised, should be individually designed to minimise stress (Shennum & Nino, 1992; Elkind, 1983).

Secondary teachers who concern themselves with the problems of the learning disabled within mainstream classes have many aspects to consider. They need to address issues such as the students' autonomy,

self esteem, task engagement and motivation (Kameenui & Simmons, 1990; Becker, 1986). As well as affective considerations, the cognitive realm must be considered, and teachers need to employ specialist methodology such as the precise skills approach of direct instruction (Engelman & Carnine, 1982; Carnine & Silbert, 1979), and mastery learning (Darch & Carnine, 1986; Bloom, 1984).

The general demands placed upon a mainstream teacher can render specific goals for their learning disabled students unattainable, and under such conditions, teachers can become frustrated in search of effective classroom management strategies. The computer is one resource which can be utilised to enhance learning and reduce demands on the teacher in a mainstream classroom where the students have a wide range of ability (Shennum & Nino, 1992; Grossen & Carnine, 1990; Carnine, 1989; Johnson, Gersten & Carnine, 1987).

2.2 Computer-based Learning

Effectively utilised, the computer relieves the teacher of time consuming tasks, such as repetitive reinforcement, enabling them to spend more time with individuals, thereby enhancing classroom efficiency (Carnine, 1989). The potential benefits of computer-based learning for students with learning

disabilities include individualised, self-paced instruction and immediate, private feedback, allowing students to achieve and develop in a non-threatening, self-empowered environment (Lieberman & Linn, 1991; Yang, 1987).

Computer-based learning can take a variety of forms, each determined by the type of educational software used, and the associated teaching methodology. The software referred to in this study can be categorised into the main areas of Drill and Practice, Simulation, Tutorial, and Word Processing (Oliver, 1986).

Drill and Practice is widely used for instruction and remediation in subjects such as spelling and mathematics, where there is only one correct answer. The computer generally presents a problem or question; the student responds, and the computer gives immediate feedback.

Simulation programs add a decision making component to this problem solving facility, encouraging the student to find an appropriate solution to a simulated lifeskills problem.

Tutorial programs place the computer in the role of tutor. They provide information, ask questions on the concepts presented and provide feedback on responses, thereby allowing students to progress at their own pace.

Word Processing, which can include Desk-top Publishing, provides a means of written expression for learning disabled students who have difficulty with manual writing.

This diversity of software allows the computer to be utilised to support both cognitive and affective teaching and learning objectives.

2.3 Computers, Achievement and the Learning Disabled

2.3.1 Student empowerment.

One factor common to students with learning disabilities, appears to be the need for empowerment. Empowerment is the sense of control a person has over his or her life (Rappaport, 1981). For many learning disabled, the lack of this sense of control in their lives can cause emotional conflict which inhibits the learning process.

Research conducted by Ryba & Chapman (1983) into the use of computers for the learning disabled led them to the following conclusions:

> 'Our own experiences lead us to speculate that feelings of personal control and effectiveness over the computer medium may yield psychological benefits including improvements in self concept, reduction of emotional dependence and self-management of behaviour and learning' (p48).

Whilst studying a group of mentally retarded students, Ryba & Chapman (1983) observed that their control over the computer gave them a sense of independence. This was evidenced by the fact that they waited for their supervisors to leave the room in order to proceed with their computer work without fear of interference. Ryba & Chapman conclude that mentally handicapped people are largely controlled by other people or outside influences in most aspects of their lives, so by taking the opportunity to exercise control over their learning environment, these students began to experience internal control and self-satisfaction, leading to improvements in performance.

Similarly, research conducted with learning disabled high school students revealed comparable results (Ryba, et al, 1989). It was found that these students enjoyed computer work more than traditional lessons because it allowed them to work individually and at their own pace. Teachers in this study found that the major advantage of allowing learning disabled students to control their own learning environment was the social and emotional progress made by the students, which ultimately led to improved academic achievement.

The use of LOGO[1] programming in promoting social skills and esteem with a small group of learning disabled

[1]LOGO is a procedure oriented programming language, devised for children by Seymour Papert in Massechusetts in the 1960's (Papert, 1980).

high school students was investigated by Larson & Roberts (1986). It was concluded that for students who face learning difficulties in the classroom, the opportunity for social interaction through skills sharing on the computer provides benefits in self-concept through empowerment.

2.3.2 Self-concept.

A student's self-concept, if persistently low, can amount to a learning disability (Avazian, 1987). A study involving learning disabled high school students with low self-concept revealed that non-judgmental computer-based learning produced improvements in both achievement and self-concept (Dalton & Hannafin, 1984). Similarly, a study undertaken of the effects of LOGO on children's ideas of themselves as learners concluded that particular qualities of LOGO can increase incremental or mastery-oriented thinking in young children, and that the children who received LOGO experience showed significant increases on the IAR (Intellectual Achievement Responsibility) scale (Burns & Hagerman, 1989).

Lieberman & Linn (1991) agree that students' opinion of themselves as learners, or their self-concept, forms the basis of their attitude towards learning, and empowerment appears to bring about heightened self-concept. Their research led to the conclusion

that computer-based learning through an appropriately designed curriculum, increases motivation and subsequently enhances the student's ability to achieve through the empowerment of self-directed learning.

2.3.3 Non-threatening learning environment.

A study investigating the effectiveness of computer-based learning with learning disabled students revealed significant increases in both reading and mathematics scores for the majority of students (Swan, et al, 1990). Interviews with the teachers and students disclosed a number of features which made computer-based learning particularly useful to the learning disabled. It was perceived by the students that computer-based instruction was less threatening than traditional classroom instruction. The teachers observed that computer-based learning programs which provide extensive drill and practice with immediate feedback were a reliable aid in the classroom. They also concluded that computer-based instructional programs which perform individual diagnostics provide students with greater academic support.

These findings concur with the results of previous research undertaken by Niemiec & Walberg (1987) who found that the learning disabled learn more readily with computer-based learning compared with traditional methodology.

2.3.4 Teacher support and task engagement.

A study of the effectiveness of computer-based learning for the learning disabled in the mainstream classroom revealed a significant reduction in the performance differences between learning disabled and non-disabled students (Carnine, 1989). The key to the improvement in achievement for the learning disabled was found to be a combination of computer-based learning and a structured lesson base. It was also found in this study that the teacher was freed from a substantial amount of repetitious instruction, allowing more time to attend to individual needs.

The findings of a previous study conducted by Johnson, Gersten & Carnine (1987) also revealed that computer-based learning combined with mastery learning strategies for teaching spelling, result in performance improvements for learning disabled students.

In another context, McArthur, et al (1990), undertook a study to compare computer-based instruction with traditional methods of paper and pencil instruction in spelling classes for learning disabled students. The content was identical in the two groups but the instructional strategies differed with the medium. Significant achievement differences were found in favour of computer-based learning for the retention of spelling. It was also found that the computer group's task engagement time was longer.

2.4 Computer Anxiety: A Problem?

Negative attitude or anxiety towards computers may be suggested as a possible disadvantage in the use of the computer as a teaching aid. In a study undertaken by Woodrow (1991) with secondary school teachers, it was found that some teachers demonstrated anxiety towards using the computer as a teaching resource. These findings concur with a previous study conducted by Cambre & Cook (1984), which revealed that teachers often exhibit a greater degree of anxiety than their students regarding the use of computers.

Computer anxiety appears to be more common with female students. Miura (1987), in a three-year study, found that males expressed a more positive and confident attitude towards computers than females, one reason being that the boys had less fear of the machines.

Research with Year One students undertaken by Collis & Ollila (1990) established that students at this age believed computers to be 'boys toys', and it was concluded that a difference in attitude between boys and girls towards computers appears to be brought about by sex role conditioning from early childhood and later reinforced by extraneous experiences in the developmental process.

Koohang (1989) concurs with these findings, and theorises that unfamiliarity with machines, leading to a lack of confidence and subsequently a lack of

experience, are factors which can contribute to anxiety towards computer use. These theories were supported by Levin & Gordon (1989) and Chen (1986), who each conducted studies to find that a lack of experience had a major effect on the attitudes of girls towards computers. It was reported that boys tend to use computers more than girls for computer games, both in entertainment arcades and at home, thereby gaining experience which enables them to feel confident with a computer (Loyd & Loyd, 1988).

The implications of these studies dealing with student and teacher anxiety, appear to be that familiarity and experience can negate anxiety towards computers (Koohang, 1989; Levin & Gordon, 1989; Loyd & Loyd, 1988; Chen, 1986).

2.5 Pedagogical Software for the Learning Disabled

Neuman (1991), conducted a study with learning disabled students aged from 9 to 18 using 26 different commercial courseware packages. The purpose of the study was to investigate the interactions of learning disabled students and their teachers with the instructional elements of commercial software. The findings revealed that confusing graphics, extensive reading or keyboarding requirements, and unmotivating presentation formats were amongst the main design faults in some of the software tested. These flaws

prevented independent student interaction with the computer, hindering rather than helping the learning process.

In utilising the computer as part of an instructional strategy design for the learning disabled, classroom teachers must base their choice of software on desired learning outcomes, and carefully select relevant software appropriate for the task (Wager & Gagne, 1988; Tennyson & Christensen, 1988).

In a study undertaken to evaluate the software available for school use, Fisher (1984), found that many of the programs contained elements which may appeal more to males, ie, aggressive competition, violent action and loud noises. These findings are reinforced by research reports by Sanders & Stone (1986), and Sanders (1984), which warn that software which is too competitive, warlike, and aggressive, and contains primarily male characters is not favoured by girls. Gilligan (1982) also reports that the majority of girls do not respond positively to software programs that require aggression and competition to solve problems, nor to programs that use traditional male symbols for motivation or feedback.

Teachers must review software thoroughly before selecting programs which are oriented toward one gender as they may not be appropriate for their instructional

needs (Rosenthal & Demetrulias, 1988; Lockheed & Frakt, 1984). The most important aspect of software selection is the exigency to take into consideration the individual needs of the prospective users (Merrill, 1988).

2.6 Summary

After reviewing the literature, it has become apparent that characteristics of computer-based learning, including individualised, self-paced learning, and immediate, private and positive feedback can improve self-concept and give learning disabled students a sense of empowerment which generates success (Shennum & Nino, 1992; Ryba & Anderson, 1990; Ryba, et al, 1989; Dalton & Hannafin, 1984; Ryba & Chapman, 1983). Computer-based learning also appears to increase on-task behaviour, encourages independence and enhances the development of self-directed learning skills, which leads to an improvement in achievement in students with learning disabilities (Lieberman & Linn, 1991; McArthur, et al, 1990; Swan et al, 1990).

Teachers of the learning disabled can benefit from the utilisation of the computer as a medium for instruction, in that it allows the students to practice time-consuming repetitive tasks and keeps them on task, which enables the classroom teacher to spend more time with individual students, thus creating

a more efficient and successful classroom environment (Kameenui, 1993; Grossen & Carnine, 1990; McArthur, et al, 1990; Carnine, 1989). Computer programs which include diagnostic and prescriptive facilities can assess students' progress and give individualised feedback for remediation or enrichment which is also an invaluable aid to the busy classroom teacher (Swan, et al, 1990).

It appears that the success of effective computer-based learning for students with learning disabilities depends upon a combination of three factors: a supportive computer environment; good quality, pedagogically sound software; together with appropriate and effective teaching methodology. These three elements combined, can lead to improvements in achievement in English language competence for the learning disabled. Further, improvements in achievement in English language competence may be expected to affect other areas of learning.

CHAPTER

THREE

Theoretical Framework

A UNESCO report published in 1990 entitled, 'Is literacy for all by the year 2000 a feasible target?' (Carceles, 1990), describes aptly the international significance of this problem. Local awareness of the importance of literacy has been stepped up in recent years and Western Australian educators have introduced tentative corrective measures. However, the current situation sees many secondary school students experiencing learning difficulties through a lack of English language competence. This deficiency amounts to a learning disability, which arguably flows on to other areas of study.

The previous literature review reveals that computer-based learning can provide significant affective and cognitive benefits for students with learning disabilities.

This study was undertaken to ascertain the perceived success of computer-based English language lessons from the viewpoints of Western Australian learning disabled secondary students and their teachers.

CHAPTER

FOUR

Method

4.1 Design of the Study

The research method was descriptive in that the researcher's aim was to establish the students' and teachers' perceptions of computer-based English language learning for learning disabled students, without hypothesising the outcomes (Gay, 1990).

Data were collected from the students by means of an attitudinal questionnaire, interviews and observation, and the teachers were also interviewed. Triangulation was used to validate the data analysis for reliable descriptive recording. The report includes the qualitative thematic analysis of data collected through the interviews and observations, as well as the quantitative analysis of the attitudinal questionnaire (Gay, 1990; Patton, 1990; Van Manen, 1990; Miles & Huberman, 1984).

Perceived outcomes were sought rather than actual outcomes, because experimental testing for a possible correlation between absolute performance indicators and the use of computers, ie, the independent variable, would require control over all extraneous variables in the everyday teaching/learning situation (Gay, 1990; Hopkins, 1985). Given the complex educational setting used as a focus for this study, this stringent control would have been difficult to exercise, thereby

effecting validity of results (Cohen & Manion, 1986).

Furthermore, research reveals that there appears to be a link between perceived performance and actual outcomes (Ryba, et al, 1989; Ryba & Chapman, 1983; Burns & Hagerman, 1989).

4.2 Ethics

To guarantee confidentiality and anonymity, the schools have not been named; the students and teachers have not been identified; and upon completion of the report all questionnaires, observation notes and typed transcripts have been destroyed and the tapes erased.

Methods of data collection were unobtrusive and complemented the students' programme where possible for minimal disruption to their daily routine.

4.3 Participants and Context

Twenty-six learning disabled senior high school students aged between 12 and 17, were randomly selected from two schools in suburban low - middle socio-economic areas to participate in the study. These students were chosen to participate in this study because they had difficulty in learning and had been tested and found to be a minimum of two years below the norm in reading and spelling. Fifty-two names were listed in alphabetical order and every second name was selected for participation. There were twelve students from

School 1 and fourteen students from School 2; thirteen girls and thirteen boys.

Both of the participating schools are senior high schools catering for students from Years 8 to 12, and both schools have teaching support for students with learning disabilities in the subject areas of English language competence and maths.

School 1 has classes in a separate transportable building apart from the main school, and School 2 has classrooms in a wing at the back of the school. Each school has six BBC computers which are utilised solely for teaching English language competence and maths to lower achieving students.

In School 1 the computers are housed in a small room which leads off the main classroom, whereas School 2 has the computers situated around the perimeter of the main classroom. Both environments encourage student interaction with each other as well as with the teacher. In both schools the computer-based instructional strategy is used to complement a direct instruction language skills approach. In each school the computer learning takes place every day after the teacher's instruction.

School 1 uses Drill and Practice software in the main, as well as some Simulation software which promotes reading skills and problem solving ability. Some games are also used to develop motor skills and

spatial awareness. School 2 uses a variety of Drill and Practice software and a Word Processing package. Games are only used at School 2 in the students' own recreational time, such as lunch time.

The two participating schools provided examples of educational settings where computers were used every day for teaching English to students with learning disabilities. It proved difficult to widen the sample and identify further schools where computers were being utilised by learning disabled students as part of a daily routine within the English curriculum.

The students participating in the study are in the mainstream classes for subjects such as Physical Education, Manual Arts, Home Science, Social Studies, Art and Sport, and go to support teachers for English and Maths.

Two experienced teachers of English who take the computer-based English classes for the learning disabled in the respective schools, participated in the study. They were selected because their teaching qualifications and experience included English language teaching as well as teaching students with special needs.

4.4 Instruments

As students' attitudes towards computers in general could be expected to have a bearing on their attitudes

towards computer-based learning, a questionnaire based on the computer attitude scale developed and tested by Loyd & Gressard (1984, 1986) was used to assess three factors related to overall computer attitude: computer anxiety; computer confidence; and computer liking.

Massoud (1990) examined the reliability and factorial validity of this scale and subscales with 59 low-literate adults, who had been tested and found to be functioning between the 5th and 12th grade levels in reading and mathematics. It was found to be a valid and reliable measure of attitudes. These findings supported the Loyd & Gressard (1984) study in which the scale was administered to 155 students in grades 8 to 12, and also a further Loyd & Gressard (1986) study with teachers enrolled in staff development programmes related to computers. Loyd & Gressard found the scale to be a convenient, reliable and valid measure of computer attitudes.

Further validation of this scale was undertaken by Gardner, et al (1993) who compared four different measures of attitudes towards computers. The Loyd & Gressard scale proved to be valid and reliable and was recommended as superior under certain criteria.

The questionnaire, adapted from the scale and designed by the researcher, is divided into two sections. (See Appendix 1)

Part A consists of 24 items requiring an opinion. There are three variables: Computer Anxiety, Computer Confidence and Computer Liking; with every fourth item pertaining to the same variable. Part B consists of four semi-closed questions, requiring short answers relevant to computer experience. The adaptation from the original scale consists of minimal alterations to the wording, to ensure that each statement is appropriate to the subjects concerned.
(See Appendix 2).

Data was collected for qualitative analysis by means of recorded interviews and observations. Interviews were semi-structured. This method of asking structured questions, then unstructured questions following the response given by the interviewee, leads to greater clarity and depth of response and follows guidelines set down by Gay (1990), for conducting an interview study.

Observations were recorded unobtrusively in anecdotal form for descriptive reporting. Audio tapes were also used to tape the interactions of the class as a whole, to support and enhance the data collected through the student interviews. A naturalistic method of observation was selected as the most suitable for this project as it lacks the restrictions of checklists or rating scales. In this situation the intent is to record and study behaviour as it naturally occurs,

rather than compile a list of behaviours expected of the students (Borich, 1990; Gay, 1990).

4.5 Procedure

The questionnaire was administered at the beginning of the session for both groups to help ensure that the students were not tired. They were asked to answer the questions honestly and were given as long as they needed to complete each response. They were told that they did not have to place their name on the paper, assuring anonymity. They were asked to print their age in the space provided and circle 'Male' or 'Female'. The requirements were explained carefully and an example worked before commencement. The statements were read aloud to the students and dealt with one by one.

The students were asked to place their finger on the statement and follow with the researcher while she read it aloud; then to run their finger across to the responses; then circle the one closest to their opinion. The researcher monitored the students to ensure that they were responding to the correct statement. The questionnaires in this way served the dual purpose of an alternative English activity, as well as assisting with the study.

The students were also interviewed informally with semi-structured questioning (See Appendix 3) to discover the following:

i) their attitude towards computers in general;

ii) their attitude towards using a computer for English lessons;

iii) their perception of whether or not the lessons have improved their English language competence.

iv) any perceived problems associated with computer-based English language lessons.

Item (i) was included because existing attitudes towards computers in general could influence the students' responses to other aspects of questioning. Although their general attitude towards computers is assessed quantitatively through the attitudinal questionnaire, this additional measure of gauging the students' general attitudes served as a way of cross-validating the data.

The teachers were interviewed for background information to ascertain:

i) the degree of perceived success of computer-based instructional strategies.

ii) whether or not there are any problems associated with the computer-based instructional strategy from the teachers' perspectives.

The interviews were taped with the participant's permission, then played back to the participant and discussed, to ensure accuracy of information and to eliminate the possibility of misinterpretation of data. Transcripts were typed verbatim from the tapes and themes or patterns of thought which emerged were given a title and coded for the purpose of reliable descriptive recording (See Appendix 4).

Observation of the students' interaction with the medium, the teacher, and each other, was unobtrusive and included audio taping the interactions as a whole class. This unobtrusive method was used to ensure that the students did not display their perception of 'expected' behaviour, and it also enabled the researcher to study the interactions in more depth at a later time, thereby avoiding observer bias (Gay, 1990).

Anecdotal notes were taken and compared with the audio tape transcripts for cross-validation during reporting. The anecdotal notes were taken of specific behaviours involving individual students, and/or the teacher. For example, an incident was recorded as it occurred, then interpreted at a later time for accurate descriptive reporting.

CHAPTER

FIVE

Results

5.1 Introduction

The results have been directly applied to the research questions, which have been addressed separately.

5.2 Question One

Is there a significant difference between the attitudes of male and female learning disabled secondary school students towards computers?

5.2.1 Attitudinal questionnaire.

The responses from the questionnaire were based on the Likert scale and weighted from 4 (Strongly Agree) to 1 (Strongly Disagree) for items that are favourable to the variable, whilst the point values were reversed for negative items. A middle response of Undecided or No Opinion was deliberately omitted to ensure that all responses were given thoughtfully.

These scores have been presented in Table form to simplify interpretation. Each variable consists of both positive and negative items, therefore a high score in each of the three variables, Computer Anxiety, Computer Confidence and Computer Liking, represents a more positive attitude toward computer use. The most positive score attainable for each of the variables, would be 32, totalling 96 for overall Attitude. The most negative score would be 8 for each variable, totalling 24, overall.

Included in the Tables is the information gleaned from the semi-closed questions on the questionnaire. (See Appendix 1)

Table 1, below, sets out the individual response patterns for the male participants. The lowest male response in attitude is 50, which is also the lowest score of the sample, whilst the most positive response from the boys totalled 81, contributing to a mean of 68.2.

Table 1

Scores of Male Responses to Computer Attitudinal Questionnaire

ATTITUDE SCALE RESULTS - MALE						
COMPUTER ANXIETY	COMPUTER CONFIDENCE	COMPUTER LIKING	TOTAL	OUT OF SCH HRS WEEK	HOME COMPUTER	COMPUTER EXPERIENCE
24	22	21	67	7	Y	4
21	19	26	66	10	Y	5
25	26	30	81	28	N	5
24	24	23	71	8	N	4
24	24	25	73	18	N	4
23	23	23	69	7	Y	5
23	23	21	67	6	N	4
20	19	23	62	7	Y	4
17	17	16	50	0	N	0
24	24	24	72	10	N	4
20	20	22	62	7	Y	5
25	25	25	75	14	Y	4
24	25	22	71	7	N	4
294	291	301	886	129	Male	
22.6	22.4	23.2	68.2	9.9	Mean	
2.4	2.8	3.2	7.5	6.9	Std Dev	

Table 2, p 36, shows that the variance for the female participants is similar to the boys.

One of the girls has responded with 84 for attitude; the highest overall score of the sample. The lowest overall score for the girls was 52, showing a mean of 66.5.

Table 2

Scores of Female Responses to Computer Attitudinal Questionnaire

ATTITUDE SCALE RESULTS - FEMALE

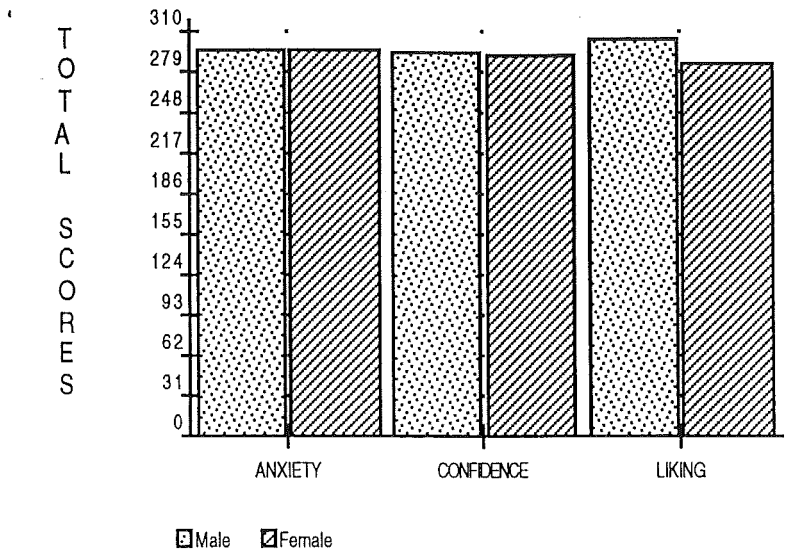
COMPUTER ANXIETY	COMPUTER CONFIDENCE	COMPUTER LIKING	TOTAL	OUT OF SCH HRS WEEK	HOME COMPUTER	COMPUTER EXPERIENCE
24	26	24	74	1	Y	4
23	24	26	73	2	N	5
19	19	14	52	0	N	1
20	20	21	61	0	N	4
27	28	29	84	2	Y	5
20	20	22	62	0	Y	4
23	23	20	66	2	Y	4
23	23	21	67	2	Y	5
24	22	24	70	2	Y	4
22	21	22	65	0	Y	4
24	22	20	66	1	N	4
22	22	20	64	2	Y	5
21	20	19	60	1	Y	4
292	290	282	864	15	Female	
22.5	22.3	21.7	66.5	1.2	Mean	
2.1	2.6	3.6	7.8	0.9	Std Dev	

The bar graph in Figure 1 (p37), shows minimal variation between boys and girls overall in each of the variables. The males scored slightly higher in computer liking, but a 2 x 3 factorial analysis of variance (ANOVA) using a significance level of .05

proved that the difference in each of the variables was not significant.

Figure 1

Bar Graph Comparison Between Male and Female Scores By Variable



From the Tabled data, it can be determined that there is no evidence to suggest that a computer at home provides for greater use outside of school hours. The two male students who spend the majority of time on a computer out of hours do not have a computer at home.

Similarly, having a computer at home does not necessarily correspond to greater levels of use. Table 2 (page 36) shows that two of the girls who

do have a computer at home, do not spend any time on the computer out of school hours.

Reinforcing this trend, it can be seen that the total of the hours spent on a computer outside of school for the fifteen students who do have a computer at home totals 64 hours; a mean of 4.3 hours per student, while the sum of the hours of the eleven students who do not have a computer at home equals 80 hours; a mean of 7.3 hours per student. 78 of these 80 hours have been reported by the boys of this sub-group.

These findings support the research of Chen (1986) and Levin & Gordon (1989) who reported that boys tend to use computers more than girls out of school hours. It was found that boys were interested in computer games, both in entertainment arcades and at home, contributing to a liking for computers which leads to more experience with computers (Loyd & Loyd, 1988).

Further reinforcing this theory, a pattern has emerged between the boys' computer liking scores and computer useage outside of school.

To illustrate this pattern, a statistical analysis of the correlation has been included. Table 3 (p39), shows a correlation co-efficient of .898, indicating that the two variables are positively correlated. Figure 2 (p39), graphs the pattern.

Table 3

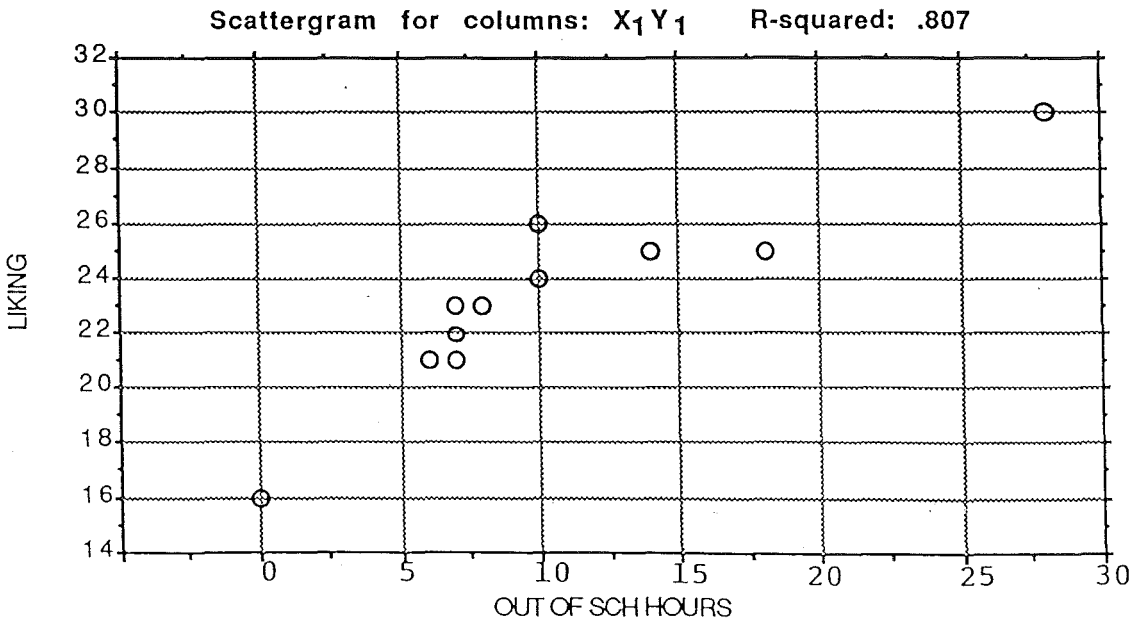
Correlation Between Male Out of Hours Computer Use and Computer Liking Scores

Corr. Coeff. X_1: OUT OF SCH HOURS Y_1: LIKING

Count:	Covariance:	Correlation:	R-squared:
13	20.013	.898	.807

Figure 2

Scattergram Charting the Correlation Between Male Out of Hours Computer Use and Computer Liking Scores



This significant correlation indicates that the boys' liking of computers is positively related to their out of school use of computers, be it through computer games or other computer software.

With two exceptions, each of the participants in the sample has had 4 or 5 years computer experience. The boy who reports that he has had no computer experience, and spends no time on the computer outside school hours is the participant with the lowest total score in computer attitude, (50). The girl with the lowest score of any of the variables, (14), in computer liking, has had only 1 year of computer experience.

Data presented in this report lends support to the theory that experience and familiarity with a computer can be related to a positive and confident attitude towards computers whereas lack of experience or familiarity can lead to a more negative attitude (Koohang, 1989; Levin & Gordon, 1989; Loyd & Loyd, 1988; Chen, 1986).

In general terms the similar scores attained by the females and males in the three variables, computer anxiety, computer confidence and computer liking, lead to a possible conclusion that as girls and boys amass more experience with computers, the tradition that stereotypes females as being anxious about computer use, as described in the Miura (1987) study, becomes less significant.

5.3 Question Two

Do learning disabled secondary school students have a positive attitude towards computer-based English language learning?

5.3.1 Interviews.

The data from interview questions relating to this research question were categorised as 'sp' for strongly positive, 'p' for positive, and 'n' for negative.

Twenty-four of the twenty-six students had a strongly positive attitude towards their computer-based English language lessons, and two students were categorised as positive. None of the students had a negative attitude towards their computer-based English language lessons.

One comment from a student at School 1 in response to the question, 'If you had a choice, would you prefer to have lessons with or without the computer?', summarised the general consensus of the students throughout the sample, with the response, "Yeah, it's much better when you can learn on the computer and you can type it in, because when you're always writing down, it's harder, and it gets boring after a while just writing, writing, and stuff like that." - Student 6 (Male - School 1)

This is further reinforced by another response from a female student in answer to the question,

'Do you have any particular reason why you would rather work with a computer than just a book and pencil?'

She commented, "Because, like with the computer, you have to.. like you don't have to look up the words, you just have to look at the computer.. instead of flicking pages in a book, and trying to read all those words.. and you don't have all that writing to cramp your fingers up. It's just easier is all." - Student 1 (Female - School 2)

5.3.2 Observations

Anecdotal notes were compared with the interviews for cross validation of data. The same thematic coding of 'sp' for strongly positive, 'p' for positive, and 'n' for negative was used to indicate patterns of behaviour.

Observations confirmed the interview data which showed a preference for computer-based English language lessons over traditional pen and paper English language lessons. Students became easily distracted during the pen and paper segment of the English lessons and needed constant supervision and teacher 'reminders' to keep them on task. Once on the computer, their task engagement improved as they became totally absorbed, and the teacher was then able to mark the desk work and deal with students on a one-to-one basis.

There was only one 17 year old boy who had not had computer experience before this year, and who

showed a reluctance to transfer to the computer after his lesson with the teacher. Once on the computer, however, he soon became absorbed and then expressed disappointment when the siren interrupted his work, which leads to the supposition that he will probably become more confident as he gains more experience with the computer.

These findings are in line with the McArthur, et al, (1990) and Carnine, (1989) studies with regard to enhanced task engagement with the use of computers for the learning disabled.

5.4 Question Three

Is computer-based learning for English language competence for learning disabled secondary students perceived to be successful by the students and teachers?

5.4.1 Interviews.

Students were asked if they thought that their English had improved with computer-based learning, and teachers were invited to comment on the positive aspects of computer-based English language learning.

All twenty-six students acknowledged improvement in English language competence, albeit in varying degrees. Student 7 (Female - School 1) said, "You would have to ask my teacher.. Oh well, I got 8 words right out of 10 on Friday in my spelling. That's

heaps better.. I used to get one or two right on a **good** day."

Student 4 (Male - School 2) responded with, "I write much longer stories on the computer, 'cause it's easier."

Student 9 (Female - School 1) was very confident about her improvement in English. Her comments were, "Not just me (thinks she has improved).., everyone I know tells me how much I've improved.

The teacher at School 2 commented, "(Learning disabled) individuals are making progress in all manner of ways through this computer-based learning approach, whether it is in the social skills, or in the academic ..., or a combination of both."

The School 1 teacher summed up with, "In my experience, used in conjunction with a proven skills methodology the computer can get results where no results were possible previously. In repetitive work it has no equal. It means that as many students as you have computers are receiving individual reinforcement, which can be likened to having six teacher's aids in the classroom really, allowing the teacher to spend quality time with an individual."

The questions pertaining to the perceived success of utilising the computer as an instructional strategy from the teachers' perspectives brought out the following main points from both teachers:

i) The computer keeps students on task for longer than bookwork, and gives them the diversity required to keep them interested.

ii) Computers allow teachers to give more individual instruction to students whilst others are reinforcing learning.

iii) Computers allow students to produce quality work, and eliminate laborious writing and re-writing which is self-defeating for these students.

Observations reinforced these findings, and concur with the reviewed studies by McArthur, et al (1990), and Carnine, (1989) with regard to achievement, task engagement and teacher support.

5.5 Question Four

Are there any problems associated with the implementation of computer-based English language lessons in secondary schools?

5.5.1 Interviews.

In answer to the question, 'Is there anything you don't like about your (computer-based English) lessons?', Student 3 (Female - School 1) commented, "No, except that I'd rather come here for all my lessons." Student 4 (Female - School 1) had the opposite view. She was happy with the classes, but wanted them "..all in the same rooms as the other classes". She did not know why.

Student 7 (Female - School 1) was asked, 'Do you think these (computer-based English) classes are a good idea?' She responded, "Yes, it's excellent!", but then in answer to, 'Is there anything you don't like about your lessons?', she said, "No...but, it's just that kids tease us." When asked why she thought that happened, she stated, "They think that we've got a learning problem, like spastic or something."

Student 8 (Male - School 2) responded to the question, 'Is there anything you don't like about your (computer-based English) classes', with, "Not the classes, but...kids pick on you and all that, and say you're stupid." When asked why he thought that happened, he said, "Because **they're** stupid is all."

These were the only two students out of the sample of twenty-six who mentioned mainstream student attitudes as being a problem. However, when asked whether they thought there was a solution to this problem, Student 7 (Female - School 1) responded with "..Just ignore them". Student 8 (Male - School 2) said, "I don't listen to them, their bad attitudes are their problem, not mine."

In summary, it appears that some of the students are treated as 'different' because their lessons are computer-based and are conducted away from the mainstream.

Both teachers were in agreement that the main problem associated with computer-based learning for English language competence was the lack of appropriate English-language-specific software for secondary students which was available locally and at a reasonable price.

Other individual concerns were the cost of hardware, the availability of funds to purchase same, and the preparation time needed for teachers to become familiar with packages, particularly if they are unsure about computer use initially.

Both teachers insisted that the advantages of computer-based learning for English language competence outweighed the associated problems, and advocated that, "..computers are essential for these kids." (School 2), and, "Well, we are investing in more computers, that speaks for itself." (School 1)

Initial questioning of teachers with reference to levels of ability, age, and IQ, revealed that there are lower achieving students who have borderline IQ's, are experiencing learning difficulties, and whose reading age is at least one year below the norm, but do not qualify for the support classes. These students are endeavouring to cope in the mainstream.

A comment by one of the students appeared to support the teachers' responses. Student 9 (Female, School 1) was asked, 'If you were the teacher, is there anything that you would do to change your

timetable, or your lessons?' She responded with, "Get other kids to come here, because it's not fair, they are missing out. Some kids I know want to come here but they aren't allowed." When given an explanation, she replied, "Well, they should have it over in the other classrooms then."

The results of the analysis of data gathered through observation and interviews is varied and the majority of the findings concur with the literature reviewed with regard to the positive aspects of computer-based learning for students with learning disabilities. However, attention must be drawn also to the associated disadvantages for purposes of rectification, if computer-based learning for English language competence for learning disabled students is to develop and thrive.

5.6 Limitations of Study

The results of this study may not be generally applicable, as the following variables need to be accounted for in relation to the findings.

i) The location of the schools:

The schools used are located in the metropolitan area, therefore schools in the country and remote areas are not represented.

ii) The size of the sample:

A sample of twenty-six students and two teachers was selected from two schools. Further studies in a broader context should be undertaken.

iii) The students' ages and levels of ability:

The participants, aged between 12 and 17 years, were tested and found to be a minimum of two years below the norm in reading and spelling. This designation does not purport to cover the full range of students with learning disabilities.

iv) The available resources:

The schools in the study have prioritised the allocation of funds for the purchase of hardware and software for students with learning disabilities. Other schools may have different priorities.

v) Students' performance levels were not measured and cannot be inferred from this study.

5.7 Discussion

The results of this study support the research discussed in the review of the literature and provide evidence of the potential of computer-based learning for improved literacy for secondary students with learning disabilities in this state.

The students, both girls and boys, have a positive and enthusiastic attitude towards computers in general, as well as towards their computer-based English lessons. They also perceive personal improvements in English language competence as a result of these lessons.

The teachers perceive the computer to be an invaluable instructional tool particularly in the management of remediation, and also as a method of facilitating individual performance in a class with many levels of ability. They believe that computer-based learning improves task engagement with students with learning disabilities, and that it also supports the direct instruction learning techniques which require repetitive reinforcement. Consequently, the computer allows the teacher to spend quality time with individuals, which enhances student achievement.

As revealed by the review of the literature and supported by the results of this study, there are three key factors which ensure maximum achievement for students in a computer-based learning programme; the environment created by the teacher, pedagogically

sound software, and an effective basic skills-approach teaching strategy. Computer use alone will not bring about improvements in results for the students.

There is potential for computer-based English language learning for all secondary schools, but there are also adverse conditions facing practitioners. This study shows that the main disadvantage from the teachers' perspectives with regard to computer-based learning for English language competence appears to be a deficiency of curriculum-specific, English-language software available locally.

The nature of rapid technological advancement in society today brings about the necessity for lateral thinking by educational planners and policy makers at both school and state levels. Theirs is the responsibility of shaping the society of the future. For example, current innovations in technological progress include interactive multimedia courseware and virtual reality. Five years ago, we would have been wary of the suggestion that such concepts were possible. In five years time virtual reality could well take the place of our present day simulation courseware in education (Pantelidis, 1993; Helsel, 1992; Loge, 1992).

Forward planning with rapid technological advancement in mind is imperative if we are to keep education abreast of the times.

5.8 Recommendations

a) The perceived success of the computer-based English language learning classes for English language competence for secondary students with learning disabilities leads one to question: Why is it that many secondary schools function without these classes?

The recommendation is that further studies be undertaken in similar computer-based environments in this state. If the findings of this study are replicated the recommendation would be to provide all secondary schools with adequate funding to establish computer-based support for English language learning for all students with learning disabilities.

b) An outcome which emerged through interviews with the teachers and students was that although some secondary schools have support classes for the lowest achievers, and the average and higher achievers are catered for in the mainstream, there is still a 'grey' group of lower achieving students with learning disabilities who do not fit into either category. These students struggle to keep up with their peers, and the English teacher endeavours to remediate, in some cases, within the mainstream class.

The recommendation is that we ensure all students with learning disabilities, not just a minimal percentage of the lowest achievers, be given an equal chance to improve and develop.

c) The teachers agreed that the main disadvantage of computer-based English language learning is the lack of appropriate English-language-specific software available locally.

The recommendation is that production of curriculum-specific English-language courseware be negotiated locally in collaboration with practitioners, taking student outcomes into consideration.

APPENDICES

APPENDIX

ONE

Instructions

Remember:

1. **You do not** name your paper.
2. Write your age on the paper.
3. Circle whether you are male or female.
4. Please answer honestly, so that we can plan for your future.
5. Circle the response that is the closest to what you believe.

Example:

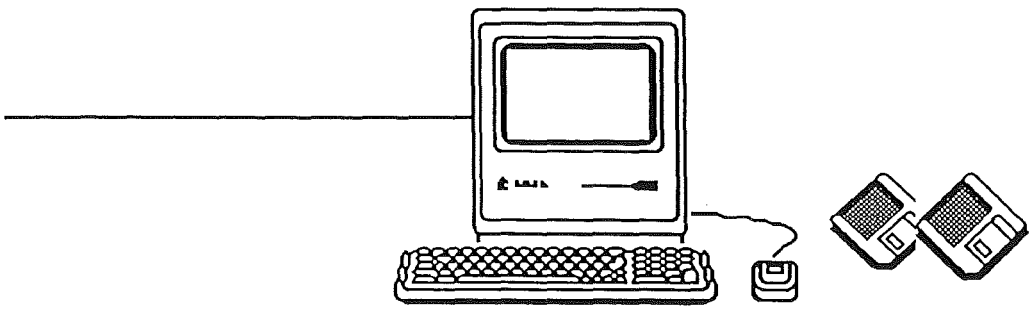
"INXS" is a great singing group. SA A D SD

If you definitely strongly agree with that statement, then circle SA.

If you think that they are really the worst you have ever heard and you strongly disagree with the statement, then circle SD.

If you agree that they are pretty good, then circle A.

If you think that they are not that good, or, if you have never even heard of them so they can't be that great, then circle D, to disagree with the statement.



Please turn the page to begin.....

QUESTIONNAIRE

Male/Female **Age ....**

Section A

1.	I would feel comfortable working with a computer every day.	SA A D SD
2.	Using a computer is very hard for me.	SA A D SD
3.	I like working with computers.	SA A D SD
4.	Working with a computer makes me very nervous.	SA A D SD
5.	I'm not the type to do well with computers.	SA A D SD
6.	Solving problems with computers does not appeal to me.	SA A D SD
7.	I feel at ease in a computer class.	SA A D SD
8.	I am happy working on a computer.	SA A D SD
9.	I think working with computers is great.	SA A D SD
10.	Computers make me feel uncomfortable.	SA A D SD
11.	Computers are just not my scene.	SA A D SD
12.	Once I start working on the computer, I don't want to stop.	SA A D SD
13.	It wouldn't bother me at all to take computer courses in the future.	SA A D SD
14.	I have a lot of self confidence when it comes to computers.	SA A D SD

Please turn the page....

15.	Computers do not interest me.	SA A D SD
16.	I get a sinking feeling when I think about using a computer.	SA A D SD
17.	I could get good grades using computers.	SA A D SD
18.	I do as little work with computers as possible.	SA A D SD
19.	Computers do not scare me at all.	SA A D SD
20.	I'm no good with computers.	SA A D SD
21.	I do not enjoy talking to others about computers.	SA A D SD
22.	Computers make me feel uneasy and confused.	SA A D SD
23.	Generally I feel OK about trying something new on the computer.	SA A D SD
24.	I am interested in all types of computers.	SA A D SD

****

Section B

1.	Do you have a computer at home?	Yes/No
2.	Do you use computers outside of school? (Including video games)	Yes/No
3.	If you do use computers outside of school, about how many hours do you spend on the computer after school during the week or on weekends?	_____
4.	If you have used a computer before this year, how many years experience do you have?	_____

APPENDIX

TWO

The **Loyd & Gressard (1984) Computer Attitude Scale** consists of the following items listed under the variables, Computer Anxiety, Computer Confidence and Computer Liking.

The Questionnaire used in this study (Appendix 1) has been created by the researcher from this Attitude Scale with adaptations to suit the subjects concerned which consisted of minimal changes to the wording.

Computer Anxiety

Computers do not scare me at all.
Working with a computer would make me very nervous.
I do not feel threatened when others talk about computers.
It wouldn't bother me at all to take computer courses.
Computers make me feel uncomfortable.
I would feel at ease in a computer class.
I get a sinking feeling when I think of trying to use a computer.
I would feel comfortable working with a computer.
Computers make me feel uneasy and confused.

Computer Confidence

I'm no good with computers.
Generally I feel OK about trying a new problem on the computer.
I don't think I would do advanced computer work.
I am sure I could do work with computers.
I'm not the type to do well with computers.
I am sure I could learn a computer language.
I think using a computer would be very hard for me.
I could get good grades in computer courses.
I do not think I could handle a computer course.
I have a lot of self confidence when it comes to working with computers.

Computer Liking

I would like working with computers.
The challenge of solving problems with computers does not appeal to me.

I think working with computers would be enjoyable and stimulating.
Figuring out computer problems does not appeal to me.
When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.
I don't understand how some people can spend so much time working with computers and seem to enjoy it.
Once I start to work with the computer, I would find it hard to stop.
I will do as little work with computers as possible.
If a problem is left unsolved in a computer class, I would continue to think about it afterward.
I do not enjoy talking about computers.

APPENDIX

THREE

The students were interviewed informally using the following structured question base and a semi-structured questioning technique. The students were put at ease initially with general questioning. The following questions were then slotted in at the most appropriate time, not necessarily in the following order.

i) Do you like working with a computer?

ii) What kind of things do you like to do with the computer? ..or

iii) Do you know why you don't like working with a computer?

iv) In your English lessons, you work sometimes with a computer, and sometimes with a workbook. Which do you like best?

v) Do you have a computer at home?

vi) Do you do any schoolwork on your computer at home, for example, spelling, word processing?

vii) What kind of computer packages have you got at home?

viii) Do you enjoy your English lessons here?

ix) Is there anything you don't like about your English lessons here?

x) If you were the teacher, is there anything you would do to change these English lessons?

xi) Do you think that your work has improved since you have been coming here for English lessons?

xii) In what way has your work improved? ..or

xiii) Why do you think your work hasn't improved since you have been coming here for English lessons?

* * *

APPENDIX

FOUR

Chart 43
Qualitative Analysis Documentation Form

QUALITATIVE ANALYSIS DOCUMENTATION FORM

M.B.Miles, A.M.Huberman
NIE G-81-0018

Version VII
3/83

1. Research issue being explored:_____ Analyst_____ Date_____ FORM NO._____

2. In this analysis task, what, specifically, were you aiming to do? (Give context and a short rationale; say whether focus is exploratory or confirmatory; make the connection with earlier analyses.)

3. Description of procedures. Work sequentially, keeping a log or diary of steps as you go through the analysis. Use a second sheet if needed. If the analysis task changes substantially, use a new form, redoing items 1 and 2 above.

SPECIFIC DATA SETS IN USE*	PROCEDURAL STEPS (number each one, explain what was done, and exactly how it was done) @	DECISION RULES# followed during analysis operations	ANALYSIS OPERATIONS (enter codes) Readying data for analysis	Drawing conclusions	Confirming conclusions	CONCLUSIONS DRAWN from these specific analysis operations; remarks on any of the preceding. give substance in brief. RESEARCHER COMMENTS, reflections,

*Indicate whether single or multi-site. May include: field notes; write-ups; summaries; documents; figures; matrices; tables; tape recordings; photos; film/videotapes; others (specify).

Explicit list of actual rules used for "readying" data (clustering, sorting, scaling, etc.); may also apply to drawing/confirming conclusions.

@ PROVIDE ALL RELEVANT EXHIBITS; give each a letter, describe briefly, and also give numbers of procedural steps where used.
Work notes/work sheets:_____
Interim data displays:_____
Final data displays:_____
Final text written (excerpts):_____

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