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PROBLEMS AND DIFFICULTIES ENCOUNTERED BY LEARNERS OF DIFFERENT ABILITY IN COMPUTER ASSISTED LANGUAGE LEARNING (CALL)

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A Dissertation submitted to the Faculty of Education, University of the Witwatersrand, Johannesburg, in part fulfillment for the Degree of Master of Education

Johannesburg, February 1994

A B S T R A C T

One hundred standard nine male and female students who were divided into four groups by the school, were conveniently kept in these same groups during the research project, and make up the population being investigated. Only 12% of this multiracial group were not ethnic Blacks.

The total group underwent the CALL programme on PLATO used in this study, which consists of the 'Writing Currriculum' CALL lessons on 'Logic and Organization' which incorporate six modules (A-F) based on topic sentences, unnecessary sentences, the order of sentences, transitional devices, improving structure and paragraph development. Each paragraph exemplifies a standard method of development, examples, comparisons, contrasts, cause and effect, characteristics, classifications, chronological ordering and sequencing of sentences in paragraphs.

Prior to the PLATO lessons which totalled about eight hours exposure on the computers, the students were given a pre-test based on the contents of the 'Logic and Organization' but in a format different from that of the PLATO lesson presentations. The purpose was to assess how much students knew about the structuring of a paragraph.

After the PLATO lessons on the computer, the post-test was administered which was exactly the same as the pre-test, but numerically

differently arranged, in order to respond to the following research questions:

1. Do all students' scores progress towards objectives with the use of Call materials?
2. Do high and low ability students progress equally towards objectives with the use of CALL courseware?

Furthermore, a considerable amount of attention was given to the third question:

3. What difficulties do students experience in using CALL courseware?

Twelve ESL students were randomly selected, for intensive investigation, through observations and interviews. These students consisted of six high ability students and six low ability students, as adjudicated by their school performance.

The major findings of the study indicate general improvement, with regard to research question 1. With regard to research question 2, a significant difference in ability groups was found in that the low ability group benefitted more from the PLATO lessons than the high ability groups. Research question 3 proved to be most revealing in that, amongst many other difficulties, what seemed to stand out most was that learning content matter on CALL was in jeopardy because students were so preoccupied with the complexities involved in operating the computer system.

However, assumptions concerning whether or not learning and conceptualization had taken place is debated, since in order to

understand the notion of paragraph construction one needs to have concepts, which have alot to do with formal education in childhood, and once one has the concepts one can work out a problem for oneself.

But if one has learnt something by heart, one doesn't know why things work out one can only know WHAT happens, and not WHY it happens. One can only apply something if one understands the principle behind it.

It was discovered that because PLATO lessons give rise to guessing, and memorization, many students cannot really understand what is being taught on the tutorial modules. It is therefore imperative that a close monitoring by teachers trained in computer management must be integrated in the English curriculum especially for students who have English as a second language, since assumptions that students actually learn by themselves on the computer is a fallacy.

D E C L A R A T I O N

I declare that this dissertation is my own, unaided work. It is being submitted for the degree of Master of Education in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.



Angela Bernadette Joses

14th day of February 19 94

This Thesis is dedicated to my loved ones

Harald and Olivia

A C K N O W L E D G E M E N T S

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LIST OF ABBREVIATIONS AND TERMINOLOGIES

CALL	:	Computer Assisted Language Learning
CAI	:	Computer Assisted Instruction
PLATO	:	Programmed Logic for Automated Teaching Operations
DOS	:	Dos Operating System. The System that tells the computer that load means load, save means save, write means write.
DISK (DISKETTE)	:	A flexible piece of plastic covered with iron oxide sometimes known as rust, that is used to store information.
HARDWARE	:	The computer, the disk drive, the printer, or various peripherals excluding the software.
SOFTWARE	:	Instructions, or pre-packaged programs on disks to be run on the computer.
COURSEWARE	:	CAI or CALL lessons - that is educational lesson material or software, a term often used to distinguish between instructional software and non-instructional materials.
CRT	:	Cathode Ray Tube, the TV MONITOR that displays the information from the computer.
MONITOR	:	A display unit similar to a TV screen but with higher resolution.
GRAPHICS	:	Pictures, illustrations or charts on a screen, that may or may not move around.
MENU	:	A set of instructions for running a program, displayed on the screen (or available by pushing a button,) allowing the user to merely select among options. A programme that is menu-driven is one that at every step, has a menu forcing the user to choose among set alternatives.

LIST OF ABBREVIATIONS AND TERMINOLOGIES

HELP MENU : A set of instructions on the screen (or available by pushing a HELP button on some computers) that will assist the user by explaining various options if he is unsure of what command to use.

LOAD : To take from storage or disk and bring to the computer's memory to be displayed on the screen for editing.

BOOTING UP : Getting started on the computer. For micros it means either inserting the diskette with the computer off, then turning it on, or using one of the BASIC commands to have the computer read the diskette inserted in the disk drive.

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CHAPTER 1

INTRODUCTION:

There is a considerable body of literature which suggests that Computer Assisted Language Learning (CALL) is effective. My study proposes to explore the problems and difficulties that students have in using the CALL courseware on PLATO.

Difficulties will be detected by pre- and post-test measurements in order to establish general progress of students in response to research question 1, and specific progress of the high and low ability students in response to research question 2. In response to research question 3, the students are observed using the courseware and later interviewed about the problems and difficulties which they encountered, with the use of the courseware.

Research into CALL can be divided into four broad areas:

1. Research into the development of hardware and software, for example by authors such as: (Fletcher 1983); (Wyatt 1984); (Alessi and Trollip 1985) and many others.
2. How CALL fits into the standard English Curricula (e.g. J.M.B.) is another important area of research e.g. (Underwood 1984); (Esling et al. 1984); (Robinson 1985); (Piper 1986); (Chan 1987) and others.

3. CALL and learning styles is another area which has been researched e.g. (Zampogna 1976), (Schaeffer 1981), (Boyd 1982), (Higgins et al. 1983), (Carrier et al. 1984) (Abrahams 1985), and (Hsien-Chin 1986).

4. And finally, the effectiveness of CALL in comparison with Traditional Teaching, e.g. (Ahmad et al. 1985), (Hartley 1985), (Swett 1986), (Chapelle and Jamieson 1986) and others.

The research questions asked in this study relates to the effectiveness of CALL (1) above, and to describe typical difficulties which students have in utilizing the CALL courseware on PLATO.

CALL is not any one specific 'tool' or 'aid' - it can be one of several different types of application of any educational software packages used in order to assist in language learning. The PLATO lessons used in this study are one such CALL package which will be investigated for student difficulties which seem to be under-researched in the literature.

The study will look at standard nine students at a privately funded college north of Johannesburg .

CHAPTER 2

THE RESEARCH PROBLEM

The research deals with the problems and difficulties of CALL, that is, do students' scores improve with the use of CALL courseware. This is an area which is much debated. Some studies indicate that whilst students improve after CALL, this influence may be short-lived, and not discernible when sitting in formal examinations written the end of the year.

The general problem in this study then, is to establish the problems and difficulties which students encounter in CALL at a multiracial college north of Johannesburg, and funded by private enterprise.

Research Questions

1. Do all students' scores progress towards objectives with the use of CALL materials?

   Stated as an hypothesis - students do not progress equally towards objectives with the use of CALL materials.

2. Do high and low ability students progress equally towards objectives with the use of CALL courseware?

   Stated as an hypothesis - high and low ability students do not progress equally towards objectives with the use of CALL courseware.

3. What difficulties do students experience in using CALL courseware?

Explanation of Terms

In research question 1. 'progress towards objectives' refers to measured student learning, that is; with the improvement of student scores in the post-test over the pre-test. 'Students' scores' refers firstly, to all the standard nine students' English scores of CALL compared with their entrance results in English at the college at the beginning of the year, and secondly, whether either high or low ability students' scores improve when using CALL.

In research question 2, 'high ability' students would be those with 50% score and more, and low ability students would be those with 15% - 38% See (Figure 1) on the basis of scores attained at the Victory College entrance test on English, at the beginning of standard 9 from a sample of 100 students.

In research question 3. 'difficulties' means errors in CALL routines that is in handling the hardware, software and other basic techniques required in manipulating the computer. For example, when students don't respond to CALL commands and don't know how to respond to the procedures on the computer; and students' perceptions of their difficulties as observed by the researcher.

Context of the Study

Victory College is a multi-racial college and offers assistance to students from disadvantaged backgrounds who have had an impoverished

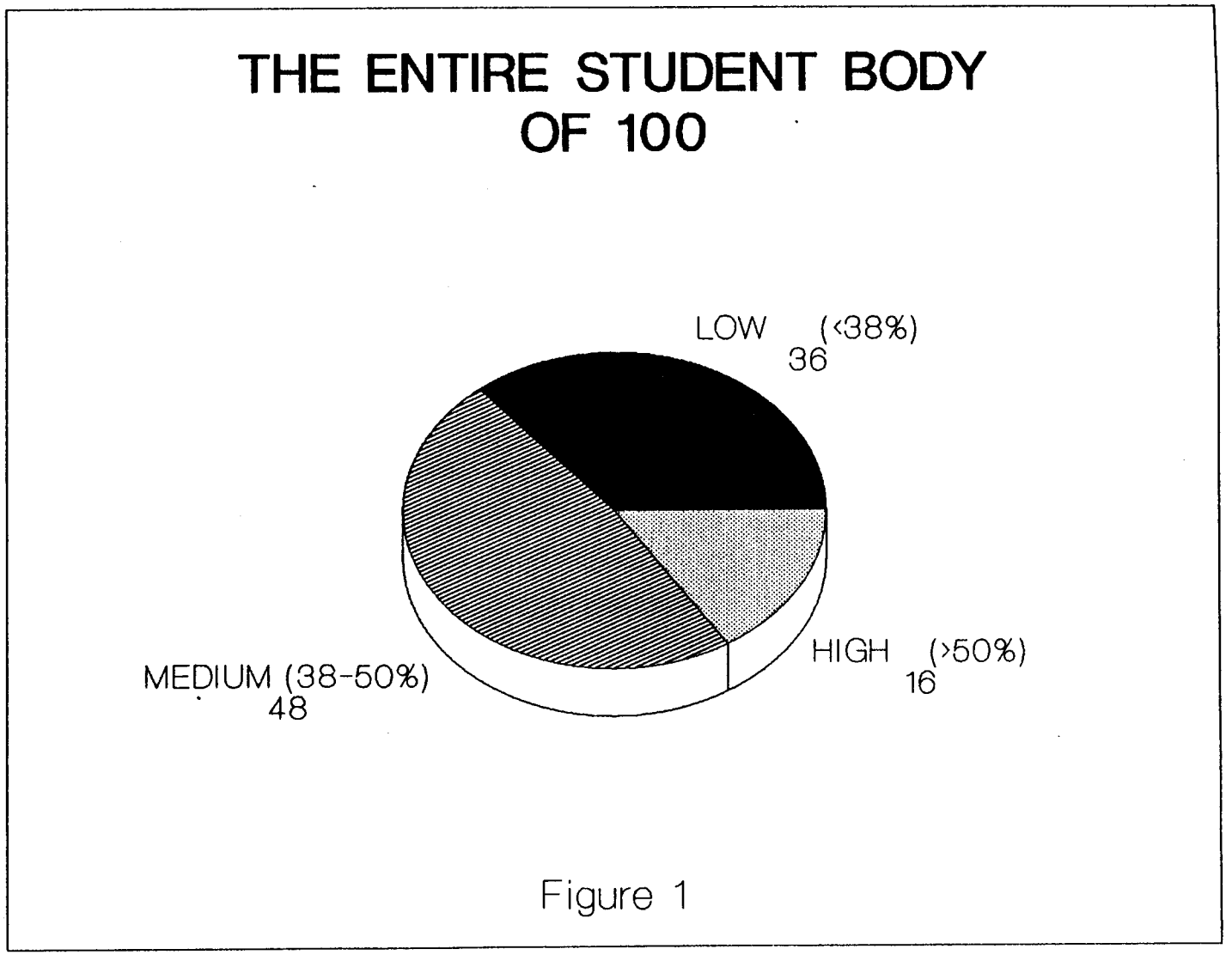

THE ENTIRE STUDENT BODY
OF 100
LOW (<38%)
36
HIGH (>50%)
16
MEDIUM (38-50%)
48

Figure 1

educational background and who want to obtain their matriculation certificates in order to compete with their advantaged peers for entry in the English speaking Universities of South Africa. This college is funded by private enterprise, and is in its inaugural year. The medium of instruction is English, and it needs to be noted that English is the second language for about 90% of the students.

Inevitably, students typically encounter severe difficulties with English across the curriculum.

The PLATO Courseware

CALL is still at an experimental stage abroad, with development in South Africa being almost negligible. The PLATO lessons used in this study, consist of the 'Writing Curriculum' CALL lessons on logic and organization which consists of six modules based on topic sentences, unnecessary sentences, the order of sentences, transitional devices, improving structure and paragraph development. Each paragraph exemplifies a standard method of development, examples, comparison, contrast, cause, effect, characteristics, classification, chronological order.

The lessons are intended to help students view language use as a means for building whole thoughts from smaller parts to express real meanings and to monitor their written work to check for surface errors.

The PLATO lessons are used for computer-based education that allows one to study at one's own pace. PLATO is a registered trade-mark of Control Data Corporation Minneapolis and was designed by this Corporation, and developed by Dr Robert Caldwell of the Southern Methodist University, and programmed by Schaefges and Traynor Savoy. Illinois (1979 and 1986).

However, since PLATO lessons have been developed mainly by teachers, the lessons have been regarded as 'highly interactive and professionally executed' (Schmidt 1986: 299). Informing, re-inforcing, integrating process, and utilization, are criteria endorsed by the PLATO lessons. Whether or not CALL has been effective, be it on PLATO or any other courseware, has been, and still is, an interesting topic for research.

My assumption was that the gap between low and high ability students would become smaller if the use of CALL was effective and that because the courseware is a systematic programme, the students would be able to follow the routines correctly. But this was not so. However, finding out why students made the mistakes they did, indicates difficulties with courseware. Student difficulties will be described and contrasted.

Tape-recordings of students during the interview were content analysed, that is, accounts of what high ability and low ability students give of their errors was noted.

A modest claim for the importance of this study rests in the fact that it may have significant advantages in alerting teachers and students to some of difficulties entailed in using CALL courseware in similar situations. As the design of this study is not experimental in nature, only a modest claim about the efficacy of CALL can be made. Results can be applied to the context of Victory College. No universal generalizations will be made for this small scale study since the research programme is designed in order to assist students in writing good paragraphs in English by employing the use of the PLATO CALL programme, together with the pre- and post-tests. The objective is to ascertain whether or not students improve, and whether or not it is the low or high ability student who benefits most, and what students themselves have to say about the problems and difficulties which they encounter.

CHAPTER 3

THE OVERVIEW OF LITERATURE

From the overview of literature, different kinds of difficulties with computer courseware emerges. There has been a wide range of research studies done on CALL, which is one of the larger areas of research in English CAI programmes.

Literature in South Africa regarding Computer Assisted Language Learning is very slight, so the trend in the international status of CALL is emphasized, although very little is said about problems and difficulties which students encounter and that is the major focus of this study.

Teaching language using the computer indicates four specific broad areas of research namely:

1. Hardware and Software

Development of hardware and software problems including courseware problems have shown researched instances where software was found to be by far the most crucial concern in the suitable development of courseware. Teaching collegial and entering level university students the requisite skills to write intelligible papers and reports in English with the aid of the computer, proved successful for (Boyd 1983: 110). He devised courseware which assisted in remediation, learning style development and sentence correction diagnostics. (Brebner 1984: 473) assessed the effectiveness of nine

lessons which were tested in evaluation programmes for drill and practice, and compared with the traditional approach found no differences in the results. While indicating many obstacles in the development of courseware, (Wyatt 1984: 14) recounts new possibilities for learning grammar. Researching problems particularly related to certain language groups, (Dalgish 1984: 22) developed grammar drills on an individualized basis, in such a way that the student's errors would be detected and the programme would adjust to give the student more practice where it was most needed.

'The Writer's Work Bench' programmes (WWB), developed by (Reid 1986: 14) for different types of learners, was concerned to discover whether his WWB programmes were reliable predictors of the quality of student's writing. Computerized adaptive testing courseware, was developed by (Tung 1986: 25) in order to obtain an accurate estimate of a test taker's ability.

Chan (1987: 238) discovered that the main difference amongst students of different ability levels lies in their interest in different kinds of software, since some software appeals to creative, patient and high I.Q students, while average creativity but 'good' students like drill and practice. On drill and practice software programmes she observed that while brighter students obtained higher scores, they also tended to get bored easily, while medium ability students were not bored as quickly. Low ability students constantly needed to have their programmes changed in order to maintain their interest. It was discovered that even the gender differences, effected student preference for software.

2. CALL versus Standard English Curricula

How CALL fits into the Standard English Curricula is seen for example in a study where the objectives set for English language proficiency was being researched by the use of CASET (Computer Assisted Spanish English Transition) This was the purpose of an evaluation by (Rutherford 1981: 27), who not only questioned whether CASET fitted in with the curriculum, but whether English language skills on CALL would improve through the use of the student's native tongue. For (Underwood 1984: 48), the problem with current CALL materials arose from a 'misconceived notion of the role of the computer.' In view of the potential of what CALL programmes can offer today, I would agree with Underwood that there are far more advanced possibilities and capabilities for both hardware and software for CALL.

Other findings while acknowledging problems have not been so vehement in their criticism as Underwood has been. Educators are called upon by (Robinson 1985: 45), to take a long hard look at what is happening in the use of computer language teaching, so as to help determine the direction it will take. Her research findings convinced her that sound pedagogical principles must be applied if good results are to be expected, but if not, harmful results would ensue.

3. CALL and Learning Styles

CALL and learning styles questions whether or not students do learn in the way that it is assumed they learn, or whether or not the

lesson is appropriate for the individual student's learning style. This is a major concern for Steinberg (1977: 87) amongst many other authors. In evaluating learner control of materials, she discovered that what students like is not always educationally the best for them. However, results from her investigation of learner characteristics, showed that the student is the best judge of an appropriate instructional strategy for effective learning.

Steinberg 's finding has importance for this study in that it asks similar questions albeit from the vantage point of efficacy as far as student learning is concerned as well as student problems and difficulties (Steinberg 1977: 89)

The relationship between learning styles and learning environments was discovered by (Zampogna 1976: 158) which indicated no statistically significant difference for the traditional and CALL group, however, students of high ability scores needed more individualization. Since this study concerns high and low ability learners, here too, similar questions are being asked, although the specific focus is different.

In a comparative finding made by Higgins and John they not only found that computers enable students to learn better than the traditional method alone, but that the main advantage of the computer was that it:

> challenges us to use our brains to explore language, to play with it, to find out how it works and how it doesn't... - to replace 'you're wrong' with 'I win'.
> (Higgins and John 1983: 46)

Given the here and now situation of this investigation my question as far as difficulties are concerned would be to find out whether or not students do find CALL challenging in the way Higgins and John suggest.

Concerning the different characteristics of learners, it has been shown in a number of studies (Carrier et al. 1984: 50) that the cognitive style of field independent and field dependent learners is related to success in second language classrooms in which deductive teaching dominates (Abrahams 1985: 689); while (Jonassen 1985: 33) argues that learning strategies represent a new technology, and that micro-computers are especially amenable to the inclusion of learning strategies, because of their ability to accept, store and manipulate a variety of input, and because of their insistence on a response before allowing the learner to proceed.

4. Effectiveness of CALL in comparison to that of traditional teaching

The effectiveness of CALL in comparison to that of traditional teaching is the fourth area on CALL literature to be discussed. Of all the studies which showed various results and had various meanings, there have been no significant results between those taught traditionally and those taught on the computer programme. However, the comparison between CALL and the traditional method of teaching is not the intention of this research. Efficacy, however, is one of the major disputed areas on the CALL courseware itself.

As far as student motivation and attitudes was concerned (Steinberg 1977: 84-85) studied learner control versus machine control. It was found that students under learner control did worse than those under computer control; learner control did not improve student attitudes, and Steinberg's research did not provide useful information about learner control simply because (as stated already), it was found that what students like is not always educationally best for them.

The correlation between student attitude and performance, was studied by (Rushinek 1985: 255) who discovered that as a user invests more time, he learns more, and feels that the tutorial becomes easier, clearer, and more enjoyable. For (Johnson 1985: 11) effectiveness lies in seeing the computer as a valuable part of education for students of limited English proficency (LEP) since the computer can provide information on how children and adolescents learn a second language. On the other hand (Ahmad et al. 1985: 20) sees the increasing number of variables to consider in research on CALL as the main problem in evaluating the effectiveness of CALL.

Cognitive psychologists such as Hartley have only until recently become more interested in the importance of cognitive psychologists' involvement in CALL in order to move away from the empirical approach which he maintains:

> is lacking in rationale and pays insufficient attention to the mental process of students. (Hartley 1985: 147)

Furthermore, he believes that 'greater involvement of psychologists in the field of CAL is required' (Hartley 1985: 140) and maintains that at the time of his writing, cognitive psychologists had left behaviourists of the Skinnerian mode to employ researched empirical experiments to test effects of active and observable responses in learning which he describes as 'surprising and worrying' (Hartley 1985: 141).

Swett, in research undertaken in three schools in New York using computers to teach bilingual students stressed that:

> The educational bottom line ... is using the computer to teach English language skills..to speed up English language acquisition and proficiency in ESL... in Grammar Skills, Writing Skills, and Oral Language Skills.
> (Swett 1986: 15)

The focus for (Chapelle & Jamieson 1986: 38) was upon time and attitude and they added four cognitive/affective variables to those, namely, ambiguity tolerance, motivational intensity, English class anxiety as well as field independent learning in their attempt to test CALL effectiveness. The research findings indicated that CALL lessons predicted no variance on the criterion measures beyond what could be predicted by the cognitive/affective variables. She points out that CALL is a vehicle for implementing a range of approaches representing a variety of teaching philosophies, and it is important to question the value of CALL especially for the ESL student.

This study attempts to question efficacy specifically in terms of ESL students and their difficulties in order to see whether CALL assists

students to write well structured paragraphs. The implications of this study I believe, has far reaching effects for the new South Africa, in helping to bridge the educational gap in schools where pupils from third world disadvantaged backgrounds rub shoulders in the classrooms on an equal basis with their first world counterparts. High standards of educational performance are expected, and a computer programme like CALL can serve as a 'tool' to assist the ESL teacher who will then be able to focus on main issues of the English lesson whilst students have a chance to resort to CALL to reinforce basic aspects of paragraph structuring and other basic grammar principles. These lessons can be repeated many times over.

CHAPTER 4

METHODOLOGY

MEASUREMENT AND DESCRIPTIVE METHODS

The PLATO CALL Modules A - F (Appendix 1) based on 'Logic and Organization' form the dependent variable. The pre-test and the post-test which I devised, constitute the independent variable.

The methods used in this study are based on two kinds of approaches - measurement approach for research questions 1 and 2, and the approach based on description, for research question 3. In research question 1 and 2, non-parametric statistics is used, that is:

> tests which require no special distributional assumptions.
> (Woods Fletcher and Hughes 1986: 188)

and which use the:

> chi-square are known as nonparametric, or distribution-free statistics.
> (Downie and Heath 1983: 225)

Research question 3, is based on description. It is anthropologically orientated. This means that it is based on detailed observational data, of a sample of six low and six high achievers out of the population of one hundred students, in order to describe what they did while using CALL. By interviewing students, I elicted feedback on their perception of what they did. This was done in order to establish difficulties with CALL, analyse those predominating technical errors and difficulties pertaining to the various routines

conducted by students while using the computer. These various routines were observed and noted, enabling me to arrive at some understanding of the problems.

Population

This research was carried out on a population of one hundred standard nine students (Appendix 7) who were already divided into four groups as a result of an entrance examination conducted by the college at the beginning of that year, which was the students' inaugural year.

This division was kept for the research project since it facilitated organization for the me. There was a maximum of twenty seven computers available on which PLATO could be run. These students were studying for the JMB Matric (that is, the Joint Matriculation Board Examination Certificate).

Sample

From one hundred students, three different samples were used in response to the three research questions. Sample one is actually the entire population of one hundred students (Figure 1) in response to research question 1. Sample two consists of fifty two students (Figure 2) - sixteen high ability students (above 50%) and thirty six low ability students (below 38%) where the highest score of a student is taken as 100% (i.e. 80% corresponds to 100%) - in response to research question 2. Sample three consists of twelve students (Figure 2) - six high ability students and six low ability students who were randomly selected from the sample of fify two.

LOW AND HIGH ABILITY STUDENTS AND 12 SELECTED STUDENTS

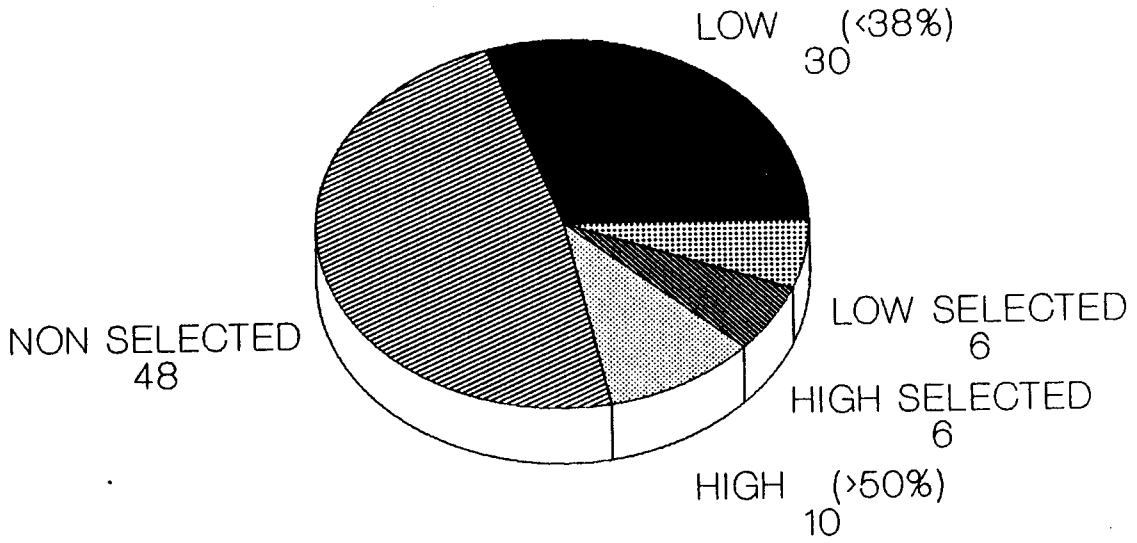


Figure 2

Data Analysis

Non-parametric statistics was used in order to establish whether or not Call affected the population of one hundred students in general, and which ability groups benefitted most from CALL.

In the first sample, the whole population of one hundred standard nine students, was taken as a sample in order to establish a general base line in response to research question 1: 'Do all students' scores progress towards objectives with the use of CALL materials'? The objective of the question was to establish the general effects of CALL on the students in response to the above question, in order to assess whether or not CALL had assisted students to achieve objectives.

The ability test scores were a composite of marks gained from an English entrance test (Appendix 7) at the beginning of that year, as well as marks taken from the first and second semester English tests. It was on the basis of these scores that the total population was determined as high, medium, and low ability groups. Research question 2 was being responded to: 'Do high and low ability students progress equally towards objectives with the use of CALL courseware?'

The second sample then, consisted of fifty two students (sixteen high ability, and thirty six low ability.) These students were selected on the basis of test scores administered to the whole group to elicit high and low achievers at these cut off levels: low ability

students, (that is, 38% and less), and high ability students (50% and more).

The high and low ability groups are of particular interest. There was also a medium range group of forty eight students with averages ranging between 39% - 49% (Figure 2).

The purpose was to establish in general whether or not one group benefitted more than the other, and then, in order to facilitate matters for observation, and interviewing, to select a sample of twelve students from the general high and low ability groups for further investigation in greater depth and so diagnose particular problems and difficulties.

The third sample was selected from the population of high and low ability students (above) and constituted one tenth of the total population, namely six high, and six low ability students. It was only possible to accommodate a maximum of twenty seven students at a time, since there were only twenty seven computers available on which PLATO could run. Therefore, each of the four groups completed the research project over a period of six sessions each. The limited time alloted for the research made it possible only to study the small, but representative group of twelve.

NUMERICAL DATA AND ANALYSIS

By gathering test data in response to research questions 1 and 2, I attempted to establish a base-line of students' progress on CALL objectives. The following section describes the PLATO CALL programme, how notions of ability were arrived at, and how the pre- and post-tests were devised. Reference will be made to the two statistical tests employed by the statistician, - the paired t-test and the McNemar test. How observation techniques and how interview techniques were adjudicated follows thereafter.

The Paired T-Test

For the PLATO CALL Modules A-F, repetition for each module pair was conducted using the paired t-test method, and comparisons were made between PLATO/pre- and PLATO/post-tests, and pre- and post-tests. For each PLATO Module A-F test, there were different scores namely: For Module A there were 8 scores, Module B - 5 scores, Module C - 4 scores, Module D - 6 scores, Module E - 8 scores, and for Module F there were 1Ø scores. (Appendix 1)

The purpose in using the statistical method employing the paired t-test was to ascertain whether or not 'progress towards objectives' that is measured student learning had been effected. Since elements for a paired t-test are utilized:

> for differences in means for small independent samples.
> (Hickey 1986: 2Ø4)

The Pre- and Post-Tests

For the pre- and post-tests which I devised, the statistician also used the paired t-test. The pre-test (Appendix 3) was conducted before the PLATO module 'treatment' and the post-test (Appendix 4) was conducted after the PLATO module 'treatment', in order to test whether or not there were any statistically significant improvements for all students. The total scores for the pre- and post-tests amounted to twenty five. Pre and post-tests were exactly the same except that the numbering of the questions in the post-test were changed (Appendix 4).

Furthermore, the pre- and post- tests which I devised, were based on ESL standards relating to topic sentences and paragraph construction, (Fletcher and Swanepoel 1975: 310) as well as the JMB Core Syllabus for English First Language: Phase 4: 21-25, for higher grade standards 8,9 and 10.)

The McNemar Test

In response to research question 2: 'Do high and low ability students progress equally towards objectives with the use of CALL courseware?' The purpose of this measure, was to test for congruency as to whether or not high or low ability students benefit most, in order to find out: 'Was there any difference?' and 'who benefitted most?' from the various lessons of CALL for the past five months of that year.

The McNemar test was used to test for significant differences

between each of the ten questions on the pre- and post-test results in an attempt to ascertain how effective (which simply means better scores) the CALL lessons were in assessing what students had learnt. The post-test was the instrument used to gather data to test whether or not there had been any improvement after the PLATO Module 'treatment', since the content in the pre- and post-tests was similar to that of the PLATO Modules except that it was formulated and set- out differently.

The purpose of the McNemar test was to look at significant changes between students themselves that is, each student's pre-test is literally compared to his/her post-test:

> The McNemar test for the significance of changes is particularly applicable to those 'before and after' designs in which each person is used as his own control and in which measurement is in the strength of either a nominal or ordinal scale. Thus it might be used to test the effectiveness of a particular treatment.
> (Siegel 1956: 63)

Table 1. - Fourfold Table for use in testing significance of changes

		After	
		-	+
Before	+	A	B
	-	C	D

The purpose in testing significance of changes between ability groups was to focus on the problems and difficulties encountered by learners of different ability, and to establish whether or not observations of the different groups by the investigator have any bearing upon their outcomes, and whether or not there is an equal 'progress towards objectives' between the ability groups, and if not, to establish reasons for the discrepancies. This information was used together with data on the observation procedure, as a sequence to the interview procedure.

From the above it can be seen that the tests were used to study different aspects concerning CALL programme usage. In some instances the same test was used on the same data sources, in order to indicate statistically significant differences, improvements or changes, and whether or not high and low ability students had improved or regressed.

OBSERVATIONAL PROCEDURE

The data sources for research question 3 were based on observations noted in long hand, of the technical errors conducted by the six high and six low ability students using the PLATO CALL Modules A - F. Feedback or responses were gleaned from interviews (Appendix 5) with the twelve students following the post-test, to establish their view of errors which they had made. These responses were tape-recorded and later transcribed.

The schedule (Appendix 6) was arranged in such a way that each of

the four groups would have six sessions each, amounting to twenty four sessions in total. Each session was approximately forty minutes long. During these sessions each of the twelve students had a chance to be observed on two occasions each. Other observations of six students outside of these sessions also took place, in order to serve as stand-bys in the event of dropouts.

Impressions were recorded in writing of the groups in general, as well as in particular of the twelve students and everything that they did in hands-on sessions on the computer, bearing in mind that I had not only covered those lessons thoroughly but had a clear understanding and grasp of the various routines. The same criteria applied for students observed outside sessions.

In this way a record was kept of the students' performance which together with test results were used to discuss their reasons for failing certain aspects of the programme, so as to give them an opportunity to explain what troubles they had with the various tines, and how familiar or not familiar they were with the courseware routines.

INTERVIEW PROCEDURE

After having completed the pre-test, (Appendix 3) the PLATO CALL lessons Module A - F (Appendix 1) and the post-test (Appendix 4) an invitation by way of a letter (Appendix 2) was distributed to the

twelve students in which the purpose of the interview, the time, and the venue was stated.

I succeeded in interviewing nine out of twelve students who had been observed and who had been invited for the interview, since three students declined the follow-up invitation by letter, (Appendix 2). However, three other students whom I had observed outside of the stipulated sessions were invited for the interview, and accepted.

The purpose of the interview was to find out why students made the technical errors they did, and what effect the PLATO CALL programme had on them. I asked them open-ended and closed questions arising from the PLATO tests as well as from the pre- and post-tests. A transcript of these questions can be found in Appendix 5.

I have detailed not only student perceptions of their difficulties, but also what I observed, analysed and interpreted. This method is corroborated by Adelman and Young who maintain that:

> Empiricist research in education (and the social sciences) assumes the observer's version of events to be superior in reliability and validity to that of the actors (or subjects of study); the observer's version is the only reliable account with claims to objectivity which can be used as the basis of constructing theory.
> (Adelman and Young 1985: 47)

The interview focused on research question 3: 'What difficulties do students experience in using CALL Courseware?' the interview method was based on student's views or what Shertzer calls 'fact finding' (Shertzer and Stone 1976: 257) By that is meant a method of securing information which will be collected qualitatively and analysed.

Prior to conducting the interviews, the questions derived from the tests to establish student difficulties were tested on two students who were not going to be interviewed. The recording of these interviews were played back to Mrs Jones from the University's Careers and Guidance Department. Critical comments, and constructive feedback, suggestions and recommendations were given to me over a period of three sessions of interview practice with Mrs Jones. During this time, she and I role-played interviews and discussion emerged after I listened to myself objectively for faults and errors.

As a result of this interview practice, the various suggested techniques in asking questions, listening attentively and not interrupting or putting words into students' mouths, I rehearsed, reflected upon, and implemented during the interviews.

Each student was interviewed and tape-recorded for half an hour. Firstly, I asked open-ended questions in order to assess the students' response to CALL as a whole.

Secondly, the questions that I asked were directed to focus on students' subjective responses to the 'treatments' on the PLATO CALL lessons, and their responses to the pre- and post-tests, in the light of what I observed. I asked questions about the major problems and difficulties which students had with CALL in order to ascertain why the mistakes that I had observed them making, had been made. All the interviews were taped and content analysed.

CHAPTER 5

ANALYSIS OF MEASUREMENT DATA AND INTERPRETATION OF RESULTS

The purpose of this section is to analyse the statistical findings in terms of the paired t-test, and the McNemar test. These findings will be looked at in response to research question 1: 'Do all students scores progress towards objectives with the use of CALL materials?'.

The paired t-test (Siegel 1956: 62) was used in order to measure 'progress towards objectives' and whether or not student learning had been effected or not. The paired t-test indicates the average percentage of how the group scored on the whole, and whether or not students on average did better or worse.

However, the purpose of the McNemar test highlights the progression students made, and questions whether or not someone who had done the pre-test badly, had also done the post-test badly or better? McNemar therefore looks at differences, and notes who scored low in the pre-test question, is now scoring higher in the post-test and vice versa. McNemar counts how many changes there are, and therefore indicates the exact number of changes rather than looking at a mean or average change which would indicate the same results for both pre- and post-tests. (Refer to Table 1.)

> The McNemar test for the significance of changes is particularly applicable to those 'before and after' designs in which each person is used as his own control and in

> which measurement is in the strength of either a nominal or ordinal scale. Thus it might be used to test the effectiveness of a particular treatment (meeting, newspaper editorial, mailed pamphlet, personal visit, etc) on voters' preferences among various candidates. Or it might be used to test say the effects of farm-to-city moves on people's political affiliations. Notice that these are studies in which people could serve as their own controls and in which nominal measurement would be used to assess the 'before to after' change. (Siegel 1956: 63)

The following indicate the various sources of data, results and findings of the tests:

1. Results yielded on the Pre- and Post-Tests using the Paired T-Test

The comparison of the pre-test and post-test indicated a significant improvement of post- over pre-test at a .Ø1 level. The mean difference was Ø,Ø3 and this resulted in a significance level of Ø,Ø2 (T = 2,45).

The hypothesis which is being tested is that students do not progress equally towards objectives with the use of CALL materials. By that is meant that after students have undergone a computer intervention on the same content as the pre and post-tests, there is no progress toward objectives. However a significant difference between student's pre- and post-test scores emerged.

Based upon the results given above, the hypothesis is being rejected at Ø,Ø2 level, since there is a significant statistical difference in the progress towards objectives.

It must be noted that the pre- post-test instrument was the key measuring stick to the effectiveness of the PLATO modules. However, one questions whether or not the expense and trouble it takes to have computers installed in order to run a CALL programme is worth it, since it is not only very costly to install and maintain, but hardware failure often causes set-backs for both the teacher and students.

Does such a 'tool' really serve as a teaching aid to the teacher? The answer to a certain extent, is yes - it takes the burden of having to repeat some of the basic aspects about paragraph construction and the basic ESL problems with English grammar off the teacher's shoulder somewhat, despite all the problems and difficulties students encounter. The question of learning will always rest with the student, no matter how good the teaching aids are. If the teacher is not skilled enough in utilizing the teaching aids, this too, is a problem. It seems then, that PLATO can solve the problem of getting students to learn the structures of the English language only to a certain extent.

> resistance, hostility, ignorance, and apathy towards computers in language instruction persist ..... and lack of quality lessons or, as they are called courseware.
> (Braun and Jorstad 1980: 53)

2. Results yielded from the Pre- Post Test Instrument in the light of the McNemar Test

The outcome from the McNemar test shows that seventeen students changed from the positive to the negative; forty eight of the students changed from negative to positve; nineteen responses were negative before and after, and sixteen responses were positive

before and after.

Outcomes concerning the McNemar test concerning students' 'progress towards objectives' for research question 1, relating to the pre- and post-tests can be summarized as follows:

* Students progress toward objectives on questions 1,3,4,6,7,9, but question 1Ø showed no significant change.
* Question 2,5 and 8 showed significant changes, and question 2 and question 5 were not answered as well as question 8 in the post-test. (Figure 3)

The meaning and significance of these results have to be evaluated in the light of this research study as a whole. Therefore the feedback from the interview sessions in Chapter 7 is so meaningful.

3. Results obtained in response to Research Question 2:

'Do high and low ability students progress equally towards objectives with the use of CALL courseware? is graphically depicted in (Figure 4 and Figure 5). The answer to the question is - not equally - there was a difference between the score of students in those tests. The evidence of who benefitted most is indicated in the following statistical outcome:

There was no significant statistical difference between ability groups on improvement between the pre- and post-tests. (F = Ø,47)

In the light of the above finding, the null hypothesis that high and low ability students do not progress equally towards objectives with the use of CALL courseware is rejected. However, the finding was that high ability students had more difficulties and did not progress equally towards objectives as did low ability students.

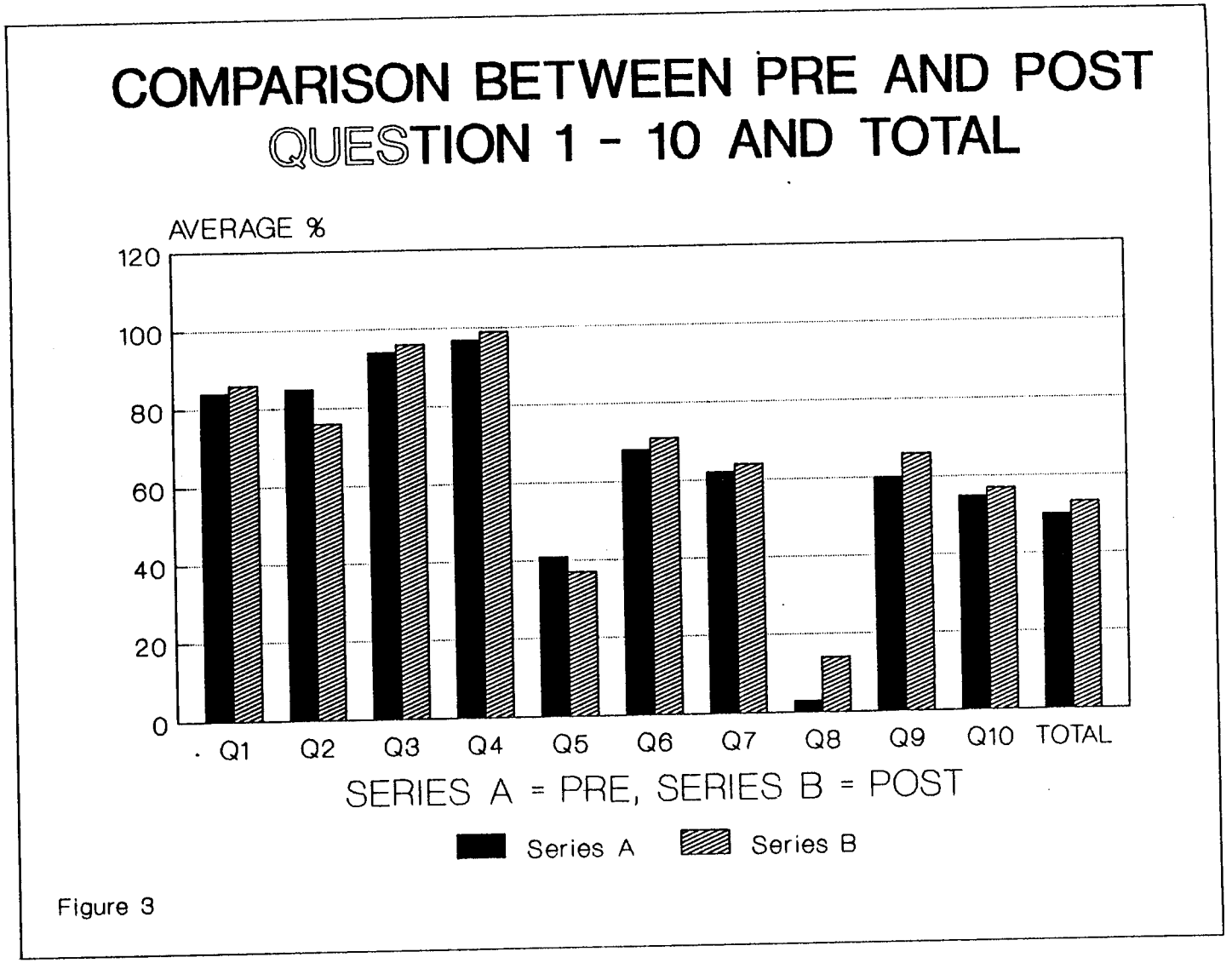

COMPARISON BETWEEN PRE AND POST
QUESTION 1 - 10 AND TOTAL
AVERAGE %
120
100
80
60
40
20
0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
TOTAL
SERIES A = PRE, SERIES B = POST
Series A
Series B

Figure 3

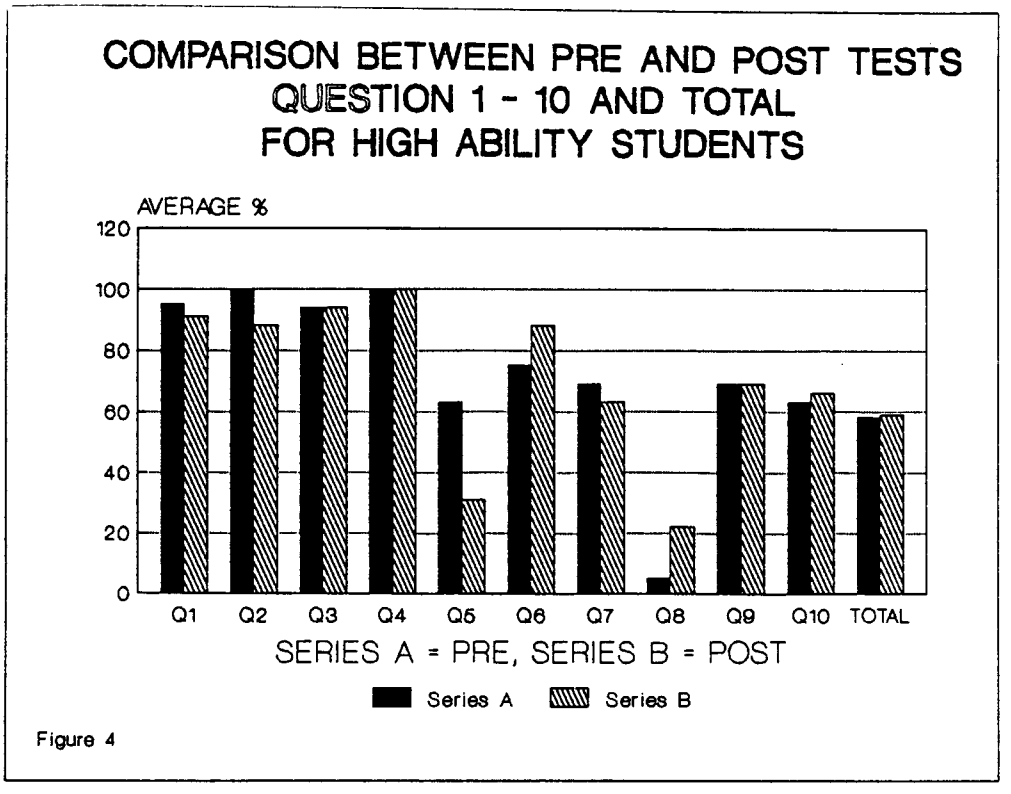


Figure 4

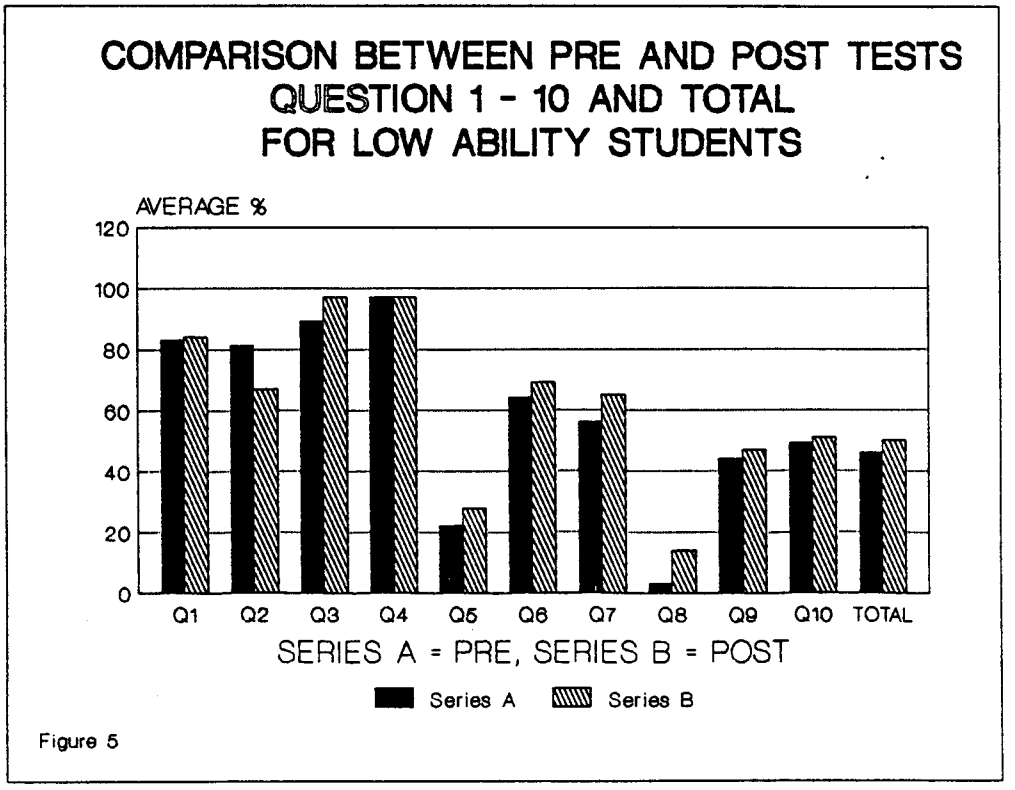


Figure 5

The purpose in finding out why and where those changes occured, was to compare averages of the high and low ability groups in order to see which ability group was responsible for those changes.

Although the medium ability group does not form part of this research study, it is interesting to note that of all the groups, the medium ability group did not contribute to the various significant differences at all. In all questions one sees slight improvement or no improvement at all in their pre- and post tests. They of all the groups showed hardly any 'progress towards objectives'. Outcomes of their scores in no way highlight any aspect of the findings. Except for questions 1,4,8,9,and 1Ø which show very slight improvements, the opposite is the case with questions 2,3,5,6,and 7 where a decline is evident, even though the total outcome indicates very slight positive progression, - the outcome on the whole is rather mediocre.

In general, it was found that a significant improvement was shown by the lower ability group over the high ability group. It seems then that the weaker students seemed to benefit more from such a me, while the high ability students (Figure 4) seemed not to show as great a progress as the low ability students. (Figure 5).

More specifically, - the outcome for the low ability group on the pre and post tests indicate a slightly greater improvement (Figure 5) in all questions with the exception of question 2 where they fall back significantly. However significant improvements can be found in questions 3,5,7 and 8. In question 8 the low ability students scored significantly higher in their post-test over their pre-test.

On the other hand, the high ability students only showed improvements on questions 6,8, and 10, where question 8 was very significantly improved. Question 5 and question 2 were significantly worse answered. It is the high ability students who scored the low marks in question 5. One can therefore conclude that the outcome of the McNemar test in general, as far as significant changes in the way the questions were answered, is attributed to the high ability group.

Conclusion

It must be noted at this point that the value of the PLATO lessons used in determining quantifiable differences in the way students are now able to construct paragraphs is questionable - since good writing is more than the sum of its parts, in a programme such as PLATO CALL.

A brief overview of findings in relation to research questions 1 and 2. Regarding question 1 - all students progressed toward objectives with the use of CALL materials. Findings show that the total population of students' scores improved on the post-test over the pre-test by a mere 3%. Regarding question 2 - high and low ability students do not progress equally toward objectives with the use of CALL materials. Findings statistically indicate that the low ability students scored higher in their post-test over their pre-test than that of the high ability students.

CHAPTER 6

DIFFICULTIES STUDENTS EXPERIENCE USING CALL

OBSERVATIONAL ANALYSIS

The Observational Analysis addresses the question: 'What difficulties do students experience in using CALL courseware?' By employing observational data, I observed twelve students of two ability groups (six high, and six low) using the PLATO CALL courseware, and matched the intentions of the instructions and the systematic steps of the programme against the views of students when using the CALL programme. (Table 2)

I recorded the names of the students, and matched these names against the overall intentions and systematic steps of the programme in order to detect discrepancies, and to note the problems and difficulties which students had. (Table 2).

By difficulties is meant the discrepancies which exist between the programme intentions and the observations which I made. What seems to be the main problems deriving from these discrepancies are analysed in detail in Table 2. For instance, the main difficulty amongst some high and low ability students was that they did not seem to be able to master the programmed method of approach where the systematic steps are thoroughly integrated and logically structured, and where careful thought is required. Many high ability students especially, were observed to have used the programme so rapidly, that it did not appear that much thought had been given to

Table 2: Summary of the types of problems and difficulties encountered in relation to the overall Intentions and Systematic Steps on the PLATO Programme.

Overall Intentions	Systematic Steps	Problems and Difficulties Observed
To master the preceding question before going onto new material.	By means of a series of gradual questions, pupils are guided to perceive new relation ships. The aim is to master the preceding questions before going on to the next one.	Student one, a low ability student did not seem to perceive these new relationships from one frame to the next.
To note the progressive relationships of preceding lessons.	The subject-matter is carefully analysed taking into account the expected pupil reactions which in turn can be broken down into a number of logical consecutive progressive steps, in order to deduce the relationships.	Student two, a high ability student tended to see the lesson in fragments and seemed to be unaware of the progressive relationships between what had gone before and what he was tackling at the moment.
To learn from one's mistakes.	The students are enabled to learn from their mistakes. For instance, when students make a mistake, they are able to resort to a side branch and receive extra tuition by way of being asked focused questions, sothat after this practise, they can go back to continue the lesson where they had left off.	Since the same types of errors recurred, the concretizing of abstract concepts for this third student of low ability seemed to be a key difficulty.
To consider the questioning technique as a means to get one thinking.	In a sequence of consecutive questions or tasks, these logical steps are presented. The frames start with easy tasks, and move on to more complex ones.	Because the correct response is readily available Student four, a low ability student seemed impatient, and errors occurred because not enough time was taken to think.
To grapple with the logically structured method of approach.	The systematic steps are thoroughly integrated and logically structured, each consisting of short-term objectives.	Student five, a low ability student, seemed to battle with this logically structured method of approach.
To encourage students by means of positive comments and motivating symbols.	Being successful in one answer serves as an encouragement which motivates the student to attempt the next step.	Because no creative abilities are required, student six (High Ability) did not seem to be challenged. It seemed that all initiative was smothered by the PLATO comments.

Overall Intentions	Systematic Steps	Problems and Difficulties Observed
To take time to think carefully instead of guessing.	The student is able to see immediately whether or not he has been successful.	For this student seven of medium ability who was substituted for a high ability student, scoring seemed to be the mark of success, and therefore irregularities were resorted to because of software discrepancies in the Report Card.
To complete a Module within a specified time.	Individual tuition allowed by CALL enables pupils to work at their own pace, and so take responsibility to discipline themselves.	The eighth student of medium ability, who was substituted for a low ability student was observed to day-dream and seemed to lack the ability to concentrate.
To make a correct choice in selecting multiple-choice questions.	The PLATO Tests at the end of each of the six Modules are based on the problem-solving method of approach.	Studend nine, a low ability student found it difficult to detect the fine distinctions in the multiple-choice questions.
To review work, and to consolidate certain aspects which pose problems.	Facilities in the programme make it possible for students to repeat excercises which they found difficult.	Student ten of high ability, disregarded the use of the Review facility which enables students to re-inforce difficult parts of the lesson.
To identify sentences that do not logically connect and to identify methods to connect those sentences.	All six of the Modules required students to identify sentences and to choose the best word.	Student eleven of high ability gave evident signs of boredom, and seemed to be merely guessing.
To eliminate wordiness and unclear meaning in sentences, and to use the appropriate voice.	This method of approach is closely associated with the textbook method.	Student twelve, a high ability student seemed to loose concentration and to have difficulty in coping with the textual quantity displayed on the screen.

the CALL lessons. For instance on Table 2, there is also an example of low ability student, number four, whom I observed making many errors simply because this student seemingly did not take the necessary time needed to think, and seemed very impatient to get through the task as quickly as possible.

The programmed method of approach is regarded as problem-solving tuition, where the teaching aim is carefully analysed in terms of how pupils are expected to react, and these reactions in turn can be broken down into a number of logical, consecutive progressive steps starting with simpler tasks, and going on to more complex tasks. For (Gagne and Briggs 1979: 13-41) the programmed method of approach falls into the category of Instructional Design Systems where principles such as 'contiguity, repetition and reinforcement', while good principles in themselves, are still not sufficient, and therefore the:

> missing conditions are to be sought within the individual.... they are states of mind that the learner brings to the learning task;.... previously learned capabilities of the individual learner (which are) a highly important set of factors in insuring effective learning. (Gagne and Briggs 1979: 13-41)

The nature of this study does not dwell on indepth notions about Instructional Design Systems, the reference made above is merely to establish what the programmed method of approach is all about.

DIFFICULTIES EMERGING FROM OBSERVATIONAL DATA

The sort of problems encountered amongst the low ability group and the high ability group are tabulated and summarized in Table 2. By way of elucidating the details in the Table 2, it must be noted that of the eighty two frames in the six PLATO modules, (Appendix 1) twenty major Steps are pertinent to all six modules, of which twelve of these steps in particular are being addressed because those twelve steps pertain specifically to the selected twelve students who were observed. The other eight major steps did not seem to offer any major difficulties and therefore have no relevance to this discussion, although they are included in the discussion of the overall findings as far as problems and difficulties are concerned.

Students were observed in the light of a list of the overall major intentions of the six PLATO modules which were matched against the overall major steps of the six PLATO modules. I observed the problems and difficulties which emanated in order to find out what the discrepancies were. In the tabulated column of Table 2 therefore, I pin-pointed the intentions for each of the systematic steps which are depicted in column two. The third column describes the problems and difficulties which I observed in terms of what the programmed method of approach required. One out of three observations made of the major problem and difficulty of each of the twelve students is given in Table 2.

Having observed each one of the twelve selected students on three occasions, I noted what keys were being pressed while students worked through the tutorials and tests. This is the syntactical level, and even if it is the lowest of the three levels depicted for end-users it colours what they are doing all the time, and was, for many students very complicated. On the one hand they had to come to grips with learning about paragraph construction using the CALL lessons, and on the other hand they had to master the complexities involved in operating the computer. My observation was confirmed by Mr Lestor Cowley of the Department of Computer Science at the University of Port Elizabeth, speaking at the National Symposium of the Computer Society of South Africa. For some of the students observed it was obviously difficult to master the hand and eye co-ordination which requires a great amount of practise, thought and imagination.

My purpose in observing what keys were being pressed, was to establish from a pragmatic stance, what problems were seemingly being encountered. I then utilized these findings during the interview discussions to a certain extent. The most outstanding problems observed in each of the PLATO module tests and their relevant frames are summarized in Table 3. Table 4 indicates that the lowest scores in general, for both high and low ability groups, were obtained in Module B and Module E.

Table 3 highlights the frames which I observed and their corresponding difficulties since it was these frames out of all the other

Table 3: Problems Pertaining to the PLATO Tests observed of the twelve Selected Students.

MOD. A.		MOD. B.		MOD. C.		MOD. D.		MOD. E.		MOD. F.	
Frame/Diffs.		Frame/Diffs.		Frame/Diffs.		Frame/Diffs.		Frame/Diff		Frame/Diffs.	
12	4/8	6	Tut.	5	2/4	6	Tut.	1	1/4	6	Tut.
13	5/8	9	1/5	6	3/4	9	2/6	8	3/4	9	1/10
15	7/8	11	3/5			10	3/6	10	4/4		
		12	5/5			11	4/6	10	4/4		
		13	4/5					11	3/4		

Abbreviations:

Frames: PLATO Frames for the programmed method of approach (Appendix 1)
Tut. Tutorial.
Diffs: Difficulties with the specific Tutorials and Tests. (eg. 4/8 means that of the 8 tasks set, student had difficulty with the 4th task etc. ...)

Notes: The most outstanding problems observed were found in Modules B and E, while Modules A, C, and F had the least problems.

Table 4: Summarizes the key problems and difficulties in Modules B and E where the lowest scores were obtained.

Module B	Module E
‡ Difficulty in finding which sentences were not related.	‡ Difficulty in answering questions concerning wordiness of the sentences and improvement of sentences given.
‡ Difficulty in choosing topic sentences which could serve as good support sentences.	‡ Difficulty in choosing the sentence that is best improved out of four given possibilities.
‡ Difficulty in choosing the sentence that is not related to the topic sentence.	‡ Difficulty in choosing from a given paragraph, the given suggestions which would improve the sentence.
‡ Difficulty in choosing from a sentence not related to the topic sentence.	

out of all the other frames in Module A - F (Appendix 1) which caused difficulties to the students. The level of difficulty ranged from that of the more simple straightforward problems such as choosing the correct conjunction to begin a sentence to the more difficult aspects in paragraph construction which required critical thinking - for example, out of six sentences to choose the sentence which is not related to the topic sentence. Since the modules build on one another in the level of difficulty, the most difficult module ought to have been F. However, if there is a difficulty along the line which is not mastered, it is understandable that in the final analysis there will be loopholes.

Conclusion

With such a finding, that is, mastering each step before going on to the next step, the teacher knows immediately where the majority of students might have problems, and may require extra re-inforcement either by means of repeating Module B and Module E CALL lessons on PLATO, or by giving students extra lessons from their text books, for instance, pertaining to Module B. Students would have to look critically at sentences and how to choose those that are related and relevant to the topic sentence and those that are not. For Module E, it also seemed that reinforcement for more critical thinking was needed in order to improve sentences. Low and high ability students progress equally toward objectives by interacting with the computer and the text materials, since Call programmes were found to be most beneficial and most positively interactive than classroom activities since they supplement and enrich the learning situation.

PLATO CALL Results

The bar graph (Figure 6) illustrates the PLATO CALL results, that is, the results obtained by the twelve selected students in comparison to that of the entire population of students as corroborating evidence to the fact that Module B and Module E were found to be particularly problematic. Of the two ability groups even if Module B and Module E were found to be difficult, the high ability group's scores were still higher than that of the low ability students. (Figure 7)
There is an intricate link between software and hardware problems which have effected student use of the PLATO CALL courseware, and there is a summary of those problems in Table 5 under three headings:

- The most common, overall difficulties,
- The most frequently recurring difficulties, and
- Isolated difficulties.

Since these findings were based on observation analysis it must be noted that all these difficulties pertain only to the six high and six low ability students in order to be used as a springboard to discussion during the interview sessions. This is so, because these observations served as substantial evidence for each of the twelve individuals observed, rather than basing the interview sessions on problems and difficulties in general. The objective was to focus on whether high or low ability students progress toward objectives in relation to research question 1 with the use of CALL courseware.

In the section: 'Other Emerging Difficulties' additional other problems which were not anticipated will be mentioned as part of the observations which I encountered.

SELECTED INTERVIEWED STUDENTS COMPARED WITH RESULTS OF ALL STUDENTS IN PLATO

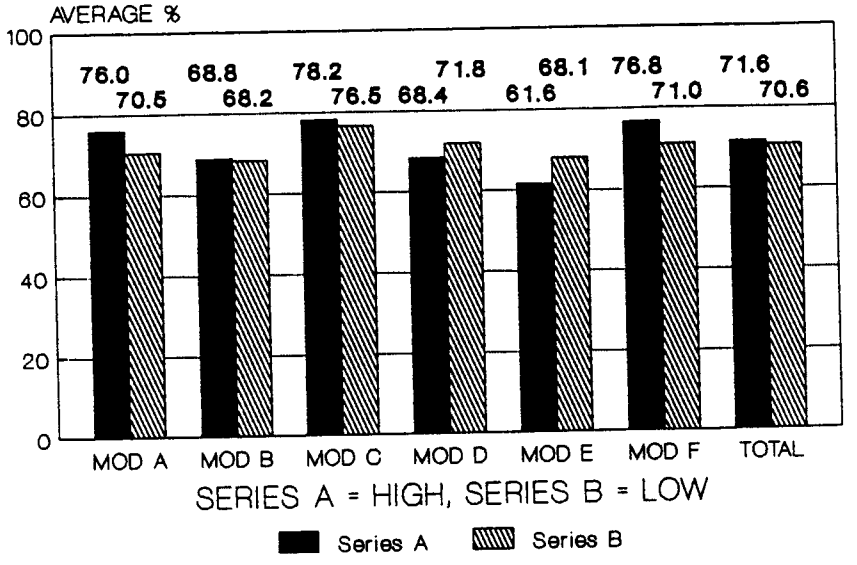


Figure 6

COMPARISON BETWEEN HIGH AND LOW ABILITY STUDENTS FOR PLATO TESTS

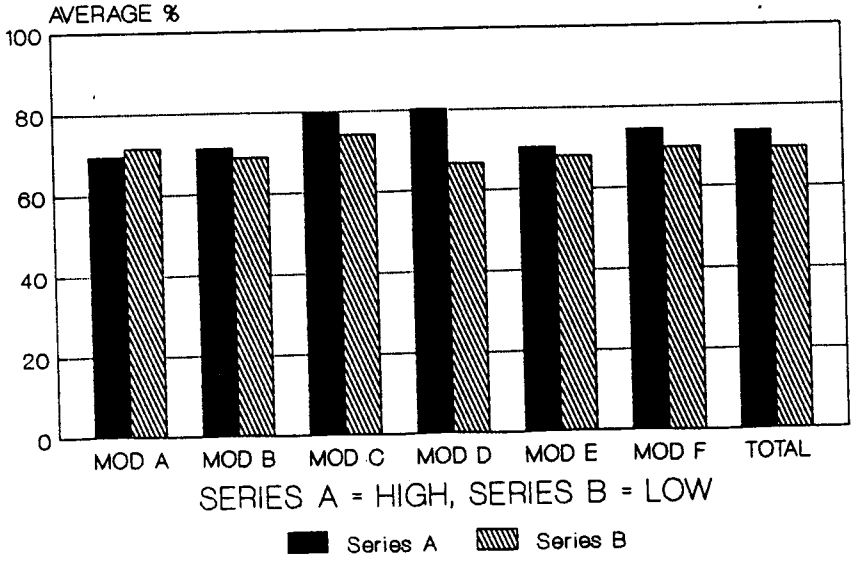


Figure 7

Table 5: Summary of Software and Hardware Problems effecting Students.

1. The most common, overall difficulties,
2. The most frequently recurring difficulties,
3. The most isolated difficulties

MOST COMMON, OVERALL DIFFICULTIES	MOST FREQUENTLY RECURRING DIFFICULTIES	ISOLATED DIFFICULTIES
* Following Instructions on the PLATO Lessons.	* Confusion re: Disk-drive operations.	* Disregard for Re-inforcement possibilities.
* Confusion re: Menu Procedure.	* Interrrupting the System.	* Difficulty in coping with screen.
* De-motivating comments in Report Card	* Disk-Drive Problems.	* Errors in handling the keyboard.
	* Strategies to quit lesson.	
	* Discrepancy with PLATO Courseware Test Scores.	
	* Motivating symbols in the PLATO Courseware.	
	* Difficulty in coping with Screen Display.	

CASE STUDIES

INTRODUCTION:

The following is a description in the form of two case studies of my observations of specific students of high and low ability and the kind of courseware problems which they encountered. Schematic summaries of these difficulties have already been alluded to in detail in Table 2, Table 3, Table 4 and in Table 5.

My approach is supported by Cohen and Manion who maintain that:

> the case study researcher typically observes the characteristics of an individual unit - a child, a clique, a class, a school or a community.
> (Cohen and Manion 1986: 120)

These case studies take a close look at two individuals who seem to represent typical cases . For example, as far as the high ability students are concerned, a look is taken into the most frequently recurring difficulties which these students encountered. As far as the low ability students are concerned, a look is taken into the most common difficulties which these students encountered.

Four considerations concerning these cases are:

* The actual courseware problem,
* A brief example of the problem
* What the students were observed to have done,
* What conclusions can be drawn from my observations.

CASE STUDY 1

The following study looks closely at student two of high ability, and the most frequently recurring difficulties she encountered.

It seemed that this student did not understand the important injunction given by PLATO concerning the function of the key 'NEXT' which is also known as 'RETURN' or 'ENTER' and which is clearly mentioned on the PLATO template. In the PLATO lesson it is explained that 'NEXT continues the display on your screen or presents a new display.' This student was observed to have pressed 'F9' key instead and was thus taken out of the lesson to irrelevant details about the design and development of the PLATO CALL lessons.

This suggests a courseware problem, in that the student did not seem to understand what the 'Next' function key was about. The first impression gleaned from observation of this student which was also typical of other students, was that difficulties inevitably emerged when students did not understand the instructions given by PLATO.

Impatience seemed to dominate this students' progress since it takes about a minute before the system can bring itself to the operational status (loading operational system MSDOS) in order to run internal diagnostic routines, and to set up the internal parameters.

This student was then observed to interrupt the system whilst the system was reading a diskette. This clearly indicated that the student was unaware that when the red light lit up on a particular drive, the system was reading certain information from

that drive into the system's memory and therefore ought not to be interrupted.

This suggests that the student did not seem to understand some of the basic functions of the computer. So while it was quite simple to press keys in order to access the lessons, (where one would be expected to know certain basic aspects of how a computer functioned), understanding the meaning of what was taking place, was lacking.

It was further observed that after an incorrect answer was given, PLATO would give an explanation and encourage the student to try again. However, the student did not seem to study the hints carefully nor take time to reason clearly, or to closely analyse and conceptualize what was being taught. It seemed instead to be a matter of: 'Well that's wrong, let me try the next number' and the student quickly pressed the next number so as to try to obtain as many scores as possible. The method of multiple choice questioning thus gave rise to guessing. In general, I noticed that scoring points seemed to be uppermost in the mind of the student.

Observation of how a Problem-Solving Test was Handled.

The following is an example of a detailed description of how the student handled one of the problem solving tests - Module B, problem 1 of 5 (Appendix 1. Application - Frame 9)

The student went through the routines by pressing 'NEXT' very

quickly, skim reading aloud through the tutorial section. The first problem of the application section emerged as follows: Answer this question:

'---------- give more details about the main idea in a paragraph.' (Student must choose from the following):

Topic sentences
Complex sentences
Support sentences
Imperative sentences

The instruction given is: Please press a number>

Press NEXT to continue

Seemingly without thinking, the student chooses '1' instead of '3' on the first try, and then tries a second time after PLATO gives a hint. This time the correct answer is scored. Since this question was quite straight-forward, it indicated that the student had rushed through the tutorial, and not grasped the key concepts.

This suggests that while students appear to be busy and seem to know what they are doing, one begins to question whether or not learning to categorize and conceptualize what is being learnt is really taking place. Furthermore, one begins to question whether package use training on the syntactical level, where students merely learn how to push keys and where there are no organizing principles to hold them together, is of any relevance to learning English.

CASE STUDY 2

The following case study looks at student five, a low ability student who seems to epitomize the most common difficulties

encountered by students in this category.

The English lessons on PLATO required the use of the student's diskette in drive 'A' and a module diskette in drive 'B'. It was observed that time and again, this student did not seem to be aware of this, and attempted to start the lessons with the module diskette in drive 'A', instead of in drive 'B', and the student diskette in the 'B' drive instead of the 'A' drive.

Observations drawn from this concur with the observation in case study 1 in that students did not seem to understand basic concepts in the operation of courseware, and what basic principles are involved in computer usage.

This student furthermore seemed to manifest confusion with the menu procedure in that when it came to the selection of the module to be studied, the student would press the incorrect key or number which would display something completely other than what was required. A great deal of time would be wasted before settling into the lesson. In some instances an attempt was made to access a module that was not on that particular diskette.

This suggests a lack of concentration or retention of specific details concerning the PLATO instructions.

When the student wanted to go to Module F, 'BACK' was supposed to be pressed as indicated, and page two of the menu would appear.

However, because this was not done the student got into difficulty with this routine and by pressing the incorrect number was found to be doing the application first (that is, the PLATO Test) before having completed the relevant tutorial. As a consequence, the logical sequencing of one module after the next was interrupted.

Here again, the data suggests that the student disregards specific instructions. Or could it be that the language used by PLATO was so confusing and misleading?

Another problem seemingly pertaining to disregard or lack of concentration was evidenced when this student did not close the 'B' drive in which the module diskette was placed. This student had problems with the system which would display: 'non-System disk' or 'disk error', or 'replace and strike any key when ready' The more 'any key' was pressed the more the system would display the above information. The student then attempted all kinds of strategies to get out of the lesson, one of which was to press 'Ctrl' + 'Alt' 'Del' - or the 'Reset' button. These function keys eradicate everything from the screen, and the student is able to reboot the system and start all over again. All this can take up to fifteen minutes before one can get re-started, and waste alot of time.

Observation of How a Problem-Solving Test was Handled

The following is a detailed description of what student three did for Module D which was based on the testing of Transitional Devices - Problem 3 of 6 - (Appendix 1. Application Frame 1Ø).

The student looked very closely up to the screen and the small print seemed to cause a strain on his eyes, indicative from the frowning expression on the student's face. However, on closer observation I noticed that the screen had not been properly adjusted, and this accounted for the blurred print on the screen.

It took up to one and a half minutes for the student to read the extract, which consisted of six short sentences. After checking for the time, and student thought aloud and mumbled, using his fore-finger to point to the screen. The student read the instruction, paused to think, then sighed, sat back awhile, and pressed '3' instead of pressing '2'. PLATO gave an explanation of why it was incorrect as follows:
'No. This is not a key word, not important enough to function as a transition repetition.'

The student finally came to problem 6 of 6 which has the same text as the above problem, but which has a different instruction:
'The repeated key word in sentences 3 and 4 is _____'
After pressing '1' PLATO responds: 'No. This is not the key word'.

The student spent more time re-reading the text, sighing once again and seemed rather anxious to be complete. He then pressed '4', to which PLATO respondsed: 'No - this is not in both sentences. The correct answer is '2'. This student had a problem in recognizing that the function of the transitional devices was to link ideas.

It appeared from the observation, that no learning really took place. An inability to follow the PLATO instructions stood out as the most common problem for this low ability student.

Conclusion:

The conclusions which can be drawn concerning the problems observed from these two case studies are as follows:

For the high ability student what stands out most in case study 1 was the confusion concerning disk-drive operations. For the low ability student what stood out most was the inability to follow the instructions of the PLATO lessons.

Other students observed showed problems such as interrupting the system and having problems with the menu procedure which indicates a lack of understanding basic structural principles on the computer. Problems with regard to the strategies necessary in order to quit the lesson, amongst many others, has already been discussed and summarized in Table 5.

These findings indicate that the operational problems are temporary, and that with time and practise these problems will be mastered. Once these problems are mastered, they will not influence students of low and high ability and their progress towards objectives in using the computer as a learning 'tool' in order to understand the basics of paragraph construction. In no way do the findings indicate that such a means of learning is futile.

OTHER EMERGING DIFFICULTIES

Arising from the observations there were other problems which were not anticipated, such as problems with the organization and planned schedule, technical problems, problems with students, interferences in the smooth running of the programme, which, whilst not being directly related to the courseware/hardware problems were still very much part of the difficulties.

It seemed that a basic understanding of how the computer functioned in so far as basic procedures was concerned, did not seem to be very clear, even after students had used the system on a regular basis for six months.

Because of disk-drive problems some of the diskettes would not run on the system during the course of the project which caused delay and disruption to the project. Other systems were taken for repair, and the technician came on four occasions to check and repair some systems while the students were working on the research project. This was very disappointing, since the announcement of the project had been made well in advance, and I was given to understand that the systems were all in good working condition.

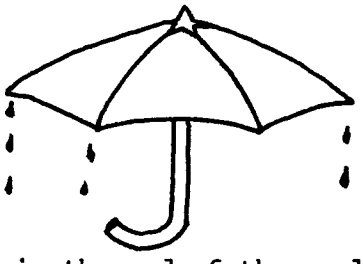
However, I learnt that only when there was a technical problem with a computer would the technician come to repair that computer. During the time of the research project there were three computers which underwent repair. Now since the reliability of the courseware CALL, is also dependant on the hardware, one has to take that into

consideration, since there is no telling when problems arise with the hardware.

Some students were unable to complete their modules during the stipulated times, and came during their free time to complete. These problems jeopardised what one would have hoped to be a normal and orderly procedure. It also made it difficult to observe the twelve students on three occasions each, as had been proposed.

Limitations of the PLATO Courseware for Accuracy on Test Scores

For the purposes of this research project, it was made clear to students that after each module was complete irrespective of the score they had obtained, they were to do the test once. However, when low scores were indicated, that is, less than 50%, PLATO would portray an umbrella sign, with rain drops falling as follows:



This is the end of the application.

There seem to be a few shady areas
yet. Perhaps you should go through
this lesson another time.

You got 2 of 8 correct on the first try.

Press BACK to try again, LAB to leave.

'LAB' could return one to the main menu where one would then have to select the next lesson. However, I observed that many students

back tracked and choose 'BACK' instead, which gave them a chance to flash through the test once again, recalling the previous correct answers which PLATO had given them. With the corrected answers fresh in mind it was easy to score higher on those tasks that had orginally been incorrect. Because some students took advantage to repeat some of the tests so as to score higher points, it must be noted here, that where I observed this to be the case, I only took the first scores into account and recorded these. That some students escaped my attention was inevitable, and I therefore acknowledge this, and do not claim hundred percent accuracy on the PLATO scores obtained.

Deceptive Remarks on PLATO

The following is an excerpt from the PLATO CALL lessons on the Report Card:

Report Card

You had
1 out of 6 correct

You did fairly well, but it might help if you reviewed the material before going on to the next lesson.

Press NEXT to continue.

Here students were instructed to continue to the next lesson, and ignore the above instruction during the research project. Some did, but some didn't. I noticed the obvious disappointment on the

faces of some students when such a report card was displayed, and added to that was the somewhat 'sarcastic remark' of PLATO in stating that: 'you did fairly well' - which did not seem to assuage their efforts but must have highlighted agitation considerably, apart from the fact that such a remark is deceptive to say the least.

Another example of discrepancies in recording test scores:

Review Index

Choose one:

OR '*' denotes a reviewed section. >

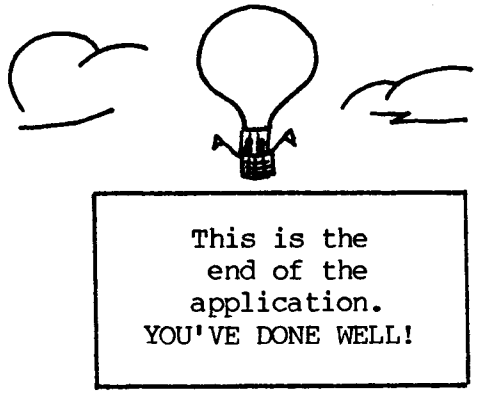
1. WORDINESS
* 2. UNCLEAR MEANING
* 3. Improper use of VOICE
* 4. Final Exercise
5. Review the Entire Lesson
6. Leave This Lesson

Type a number.>

Because the review concerned the tutorial, and not the test, students could choose to go over a section of the lesson again. But once they had reached the test (i.e. the application section) they were to put up their hands, and I noted their scores.

Some chose to repeat the test and obtained higher scores the second time around: a factor which was very difficult to monitor with twenty seven students at a time. I had to rely on the honesty of the students, but some chose to dishonour this trust. There were obvious signs of excitement when a good score was obtained, and conversely, a feeling of disappointment with low scores.

An example of a Motivational Symbol:



You got 6 of 8 correct on the first try.

Press LAB to leave this lesson.

The impression gained from observing students who obtained a balloon was one of delight and satisfaction. I complimented those those who had achieved good results. There were discrepancies with the PLATO CALL programme in that it would spell out that it had been a students' 'first try' irrespective of the fact that a quick re-run through the test and upgrading of former marks had taken place. This anxiety to score higher could be seen either as an attempt to impress me, or to gain some words of praise and attention. It seemed that students were not so much motivated to improve themselves as to prove a point about themselves and how good they were.

It seemed that the most important thing for many students was to get as many correct answers as possible. This indicates that neither self-improvement, nor interiorization of learning was the key concern, but rather gaining scores, and getting finished with the

'job'. I can assume therefore, that strategies for learning in most cases, were in no way interiorized. Time and time again I observed that that students who had problems with a specific question on the CALL PLATO lessons, when asked whether there had been any difficulties with the question, would respond in the negative.

Toward the end of the project what was most worrying to observe was that some students seemed to have lost interest. This can be attributed to the fact that the project was not entirely given the seriousness and importance that was expected. Irrespective of the fact that I had given an introductory talk to each group and the procedure of the project was clearly spelt out to students, teachers and the principal. No co-ercion by the teachers was placed upon the students as far as their full committment was concerned.

Further interruption to the research project ensued because the sponsors were connecting the terminals to a main frame system. The link was established by means of modems.

Absenteeism

I noticed that on several occasions there were absentees, and I had to track down these students, write messages to the various groups concerned, and put up notices on the bulletin board, in order to get the students to complete modules that were outstanding. This had to take place during those student's free time, and it was not always easy to get the students to work in their free time.

Factors hindering completion of Modules at Stipulated Times

There were also a few students who were not able to complete the modules during the stipulated times, either because their systems had been taken for repair, and on three occasions, because staff members were using the systems during the times that had been set aside for the research project.

Games versus Lessons

In using the computer as a learning aid one opens the possibility for students to play games as well. The danger is that programmes written for CALL as well as for the games use preferably only a few keys, namely, the spacebar, the return key, and the four arrow keys, more often than the average use of other keys. Students were observed roughly striking at these keys at a high speed which leads to early breakdown of the hardware, especially of the keyboard.

On the other hand, bad habits in the use of the keyboard learnt during the playing of games are formed, and practised during the course of the PLATO lessons. Some students openly remarked remarked that they were playing games in order to 'cool off'.

This observational analysis is followed by the interview data which tends to locate difficulties in terms of student responses to the questions, and to ascertain and analyse why students responded to the PLATO CALL lessons in the way that they did. Both sources of data then, are trying to establish what difficulties students experienced in using the PLATO CALL courseware.

CHAPTER 7

INTERVIEW DATA AND DISCUSSION OF STUDENT DIFFICULTIES USING CALL

INTRODUCTION:

This chapter analyses interview data of six high ability students and six low ability students on their perception of errors made on the PLATO CALL tests as well as on the pre- and post-tests.

INTERVIEW DATA AND DISCUSSION BASED ON THE PLATO TESTS

Interviews with twelve students address different as well as similar aspects of difficulties encountered with CALL, in order to ascertain student perceptions of difficulties and problems with CALL in response to research question 3: 'What difficulties do students experience in using CALL courseware?'

This finding is corroborated by Steinberg who maintains that:

> Results showed that the student is the best judge of an appropriate instructional strategy for effective learning, (since her findings indicate that) those who did not do well exhibited inefficient learning strategies, and this conclusion applied both to achievement using computers as an aid, as well as with the traditional approach.
> (Steinberg 1977: 86)

In this section student's perception of their mistakes are indicative of those students who showed a change for the better, for the worse, or those who showed no change at all. Student perception and response concerning their mistakes and their reasons for having specific

difficulties in completing the task. I asked students what they did when they had problems with the CALL routines? Both high and low ability students expressed agitation, frustration and impatience with the PLATO System because the system was too slow and somewhat cumbersome. This is what student one of low ability said:

> It wasted my time and I had to start from the beginning.
> (student one)

Student two of high ability maintains that:

> whenever I pressed 'Lab' I found myself back at the menu - and there was a constant need to have to reboot whenever there were difficulties and so having to repeat entire lessons as a consequence.
> (student two)

The problem of anxiety when the system broke down in the middle of a lesson was another problem expressed. This is what student three of low ability had to say:

> My computer was out of order for a couple of weeks after it broke down in the middle of a lesson, so I am now far behind the rest of the class - and this makes me panic - will I ever catch up?
> (student three)

Student response on how interruptions and breakdown of the system as the cause of lack of continuity was voiced by student six of high ability:

> There is no continuity in a lesson where one has to wait until the technician comes to repair the system.
> (student six)

Student perceptions also suggest the use of 'trial and error' as corroborated by an extract from the literature below. In the research findings for Mathematics, Waker, for instance, in dealing with strategies maintains that:

> From conversations with pupils, and recordings of their conversations with each other, it seems that they do not develop strategies involving algorithms to maximise the results in a simulation, but rather work by trial and error, often establishing two extreme values and then finding the optimum by moving in step by step from both sides. (Waker 1984: 14)

Student perceptions in general indicated such 'strategies' and 'work by trial and error' which were observed in this research report. My first finding in this regard indicates that real problems with operating the computer system exist, and that this can inhibit progress toward objectives to such an extent that learning the content matter is at stake.

Preoccupation with the function keys, seemed to be so overwhelming that students are baffled at the end of the lesson, and don't know what they were supposed to have learnt anyway.

The problem with the routines indicated student perceptions and response concerning their difficulties and mistakes on what they did. What were the major problems encountered in the use of the PLATO courseware as perceived by the students was the second question asked in the interview.

There were a diversity of responses to this question, ranging from a lack of understanding to a lack of self-discipline. One or two students at most seemed to have the same problem.

Students number one, three, and four, respectively, of low ability simply stated their major problems as follows:

> If the teacher is not there to explain when I have a problem, -
> (student one)
>
> I don't give myself enough time. Sometimes I get discouraged because I feel that I'm wasting time, -
> (student three)
>
> Because I can't go back to the tutorial when I've started the application test, I usually jot down notes in my book, and this then takes me a long time to complete the modules. I also find it strains my eyes when I have to read long extracts from the screen.
> (student four)

Other problems encountered by student five of low ability:

> I had difficulty getting started because I kept on typing in 'PLATO' and it would read 'disk err.' When that happens I usually like to fiddle, but sometimes I fear I might break the computer, so if it still says: 'disk err'

> I keep on fiddling with the keys until it gets right which usually happens when I wait for a while between the loading of the diskette. Other times I just press 'Next' to the end or 'back' and re-try the whole lesson again - its a kind of revision, but its a rather long process.
> (student five)

Students of low and high ability stated their difficulties in understanding and remembering instructions as their major problem as follows:

> I think my problem has something to do with trying to cope with figurative language - I couldn't understand what was meant by 'implied meaning'. There are so many things to remember in using computers - like you've got to press 'Next' and to get used to it you must practise it.
> (student eight - low ability)

> It's also the American expressions used, and the way the statements in PLATO modules are put... it seems as if they are meant to trick you, but then its very difficult to know what is expected.
> (student ten - high ability)

> I never feel very sure of what is wanted. I find the multiple choice style more difficult than just answering in a paragraph. When you answer a question, you know exactly what to say, but here you have choices and all of those choices might sound the same, and have a bit of truth but only one of them is to be the right answer.
> (student nine - low ability)

> Another problem I find is understanding grammar requirements - especially if you don't know what a verb or a noun is, you can't proceed, because you might think its the right answer because you fancy a particular word, so you just have to guess.
> (student eight - low ability)

With regard to understanding and remembering, student eleven of high ability acknowledged that:

> I often don't understand what is happening in the tutorials, and even if I do go through the application (test) and scores, I still find that as time goes on, and I am asked again about the same thing, I am unable to answer it. I also find it a problem that PLATO only gives an answer after a long time, and sometimes this makes it difficult to try to catch up with what one has been learning, and it also makes it difficult to concentrate. If the lessons could come sooner, this would be better.
> (student eleven)

Major difficulties for high ability students seemed to be very critical, and more objective than that of the low ability students. Student twelve of high ability maintained:

> I think that most students are just looking at the information, and don't interpret it or think about it, but just go to the next question. I think I have to consider everything that I am doing, and what helped me was that I was making notes and studied them because I thought that if I could just go through and finish the whole programme I wouldn't benefit anything from it. I find that most of my colleagues go through the lessons just to finish with it, and now with your research project it seems that they are only interested in getting the marks; they don't really learn anything.
> (student twelve)

> Games, - are another problem and make alot of noise in the computer room, - this causes a great disturbance if one wants to concentrate.
> (student eleven)

An interesting discovery was noted by student seven of high ability who stated:

> We do go over the PLATO lessons but afterwards we can't explain what they were all about, and that for me is a great problem. It's because we do all the exercises but don't speak or write what we are doing after that is the reason why we are unable to remember the content matter.
>
> And
>
> I believe that our English will only improve with time, and if we're doing it like we're doing it in this research project, (that is, being tested on the content by a different method) our English will certainly progress. (student seven)

Hartley, in regarding different approaches being utilized in order to ascertain how efficacious CALL applications were, maintains that:

> Psychologists are unrepresented, therefore most CALL applications are Empirical and lacking in rationale, or follow a logical Epistemological approach. (Hartley 1985: 140)

My findings corroborate with what Hartley maintains, in that mere outcomes based on statistical findings and empirical methods simply do not suffice a true reflection on how students deal with CALL. One has to take into account many other factors which influence the student positively or negatively in managing to handle CALL.

For instance; a highly emotional, but very real problem was expressed by student six of high ability who revealed that:

> PLATO often makes one feel rather stupid and humiliated when, because of a slip of the fingers one chooses, for example, number three instead of number two by mistake, and PLATO says: 'Wow! You're kidding!' or 'Wrong! ..... Try again.' Yet you know the corect answer and you know that you pressed that key by mistake. Now if this happens often enough you feel humiliated and don't feel like going on with the next part, or you feel discouraged and say 'agh! I might as well just guess for the rest of the answers!
> (student six)

Reading from the screen was another problematic issue for student two of high ability:

> The most difficult thing I find is reading from the screen. I get impatient with myself, and I take a long time to get the answer, and if I get it wrong, I get very angry.
> (student two)

The impersonal way in which questions are formulated in the CALL programme seemed to be a worry, a problem, and concern for student six of high ability who said:

> The way questions are put makes it too complicated and impersonal compared to the teacher's approach where she would explain the question more fully - giving examples, or even compared to the text-book which explains the problems in more detail.
> (student six)

Concerns of both high and low ability students about teacher-student relationships were voiced out as follows:

> Using computers as a supplement for the teacher could destroy student-teacher relationships, because if we rely too much on getting lessons on the computers, students might tend to trust the computers more than the teachers - especially in the case where some teachers are already seen by students to be incompetent.
> (student twelve - high ability)

In favour of the computer versus the teacher especially when students believe that a teacher is incompetent - this type of criticism was reinforced by student ten of high ability who that:

> I find the computer quite fun to work with, because it is better than sitting in a boring classroom and listening to a teacher droning on and on. At least with the computer you're working at your own pace, and if you don't understand you can go back to it. You're getting individual attention, yet in a classroom, a teacher cannot possibly see to everything that students need, I feel that is so much better.
> (student ten)

Comparing the responses of these students to that of findings in other studies, for instance, (Fletcher 1983: 7-13) evidenced similar problems. In posing the question: 'What problems do American Indians have with English?' his aim was to guide the adaptation and development of instructional materials for elementary and junior

high school reading presented by the computer.

Major difficulties included phonology, morphology, syntax and semantics, which were found to be problems which other ESL learners experience as well.

> Despite these results and others like them, there seems little reason to attribute them to lack of mental ability, because the IQ average was 101.5 which is slightly superior to the average number of Indians.
> (Fletcher 1983: 7-13)

The results showed a receptive, rather than an expressive use of language as indicated below:

> Learning language in school is a different experience than learning a first language at home and lists recommendations for ESL lessons that they be entertaining, motivating, interactive, perceived to be culture-fair and private, easily transported and exactly reproduced, individualized on an item to item basis.
> (Fletcher 1983: 10)

as well as a host of other recommendations based on the interlinking of both computer text and audio capabilities with the teacher's close guidance.

The evidence in particular, from the teacher's guidance cannot be stressed enough, in order to assuage some of the problems expressed by the students such as waste of time because of lack of understanding and other confusions, as well as the many frustrations encountered in handling the courseware.

Many teachers seem to be unaware of such problems. Many teachers believe that students have to be kept 'busy' on the computer for forty minutes or so with hardly any previous input on what they're doing. Neither do they get any guidance.

Because the students appear to be 'busy' some teachers actually believe this, and do not acknowledge that students have any problems. For instance, on enquiring what problems and difficulties students encountered at a specific school in Durban, with regard to the actual usage of computer courseware, the response given me was that as far as this person was concerned:

> Children don't experience any difficulties at all - give children a computer, and any package, and they make it come alive - since children are very very inventive!
> (conference contributor at a computer meeting in Durban)

The conference contributor was convinced of this, and no one from the audience challenged such a response, which seemed to indicate

that hardly anyone had studied or considered that there are many real problems.

The real issue at stake here, is that before one can train students to use and make sense of courseware, one has to train the teachers adequately to re-inforce by means of written application in the classroom, what has been spelt out in the courseware, so that when students go back to the computer room and try it out, they have a better understanding of what they've been doing, and slowly learn to conceptualize.

The major set back which is realized from this investigation is that most Teacher Training Colleges are far behind in adequately preparing teachers to meet the needs of young students today who in turn need to be prepared for the technological jobs which are awaiting them when they leave school. So little money is spent by the Department of Education on their most crucial asset - the future teachers.

Using computers at the lowest syntactical level (that is, pressing keys) in the various courseware packages is meaningless. There are no organizational principles to hold them together. Only when students are taught to use computers at the semantic level, with representative modern software to solve problems, as well as learning computer science principles and structures in order to 'hang' their knowledge - will it be somewhat meaningful to use computers in schools.

INTERVIEW DATA TO ELICIT STUDENT PROBLEMS IN USING CALL COURSEWARE

The statistical analysis and outcome of the pre- and post-test results have already been dealt with in Chapter Five, where findings for research question 1 indicate that the total population of students' scores improved on the post-test over the pre-test by a mere 3%. The findings for research question 2 indicate that the low ability students scored higher in their post-test over their pre-test than that of the high ability students.

The second part of the study focuses upon the twelve selected students' subjected evidence of problems and difficulties and the accounts they give in relation to using the key boards etcetera.

Research question 3: - 'What difficulties do students experience in using CALL courseware?' is being addressed, since both the CALL programme on PLATO and the pre- and post-tests together form part of this research study. The pre- and post-tests indicated that:

Five of the students showed a change for the better, namely two high ability students, and three low ability students.
Six of the students showed a change for the worse, namely three high ability students, and three low ability students.

It must be noted here that initially six students from the high ability group, and six students from the low ability group had been invited to the interview. However, one student from the low ability group declined to be interviewed, and a student from the medium ability group volunteered instead.

The measurement data as spelt out in chapter 5, further supports the observational data in that the general findings indicate a mere 3% improvement of the post-test over the pre-test instrument, which does not seem to indicate that much learning seems to have taken place through using computer aided instruction. The interview questions are therefore a feedback into research questions 1, 2, and 3. For instance, the first question: 'Do all students' scores progress towards objectives with the use of the CALL materials?'

The students' perception concerning the pre- and post-test instrument and PLATO modules link, can be assessed from their responses given to a series of questions related to research question 3. These are discussed with six high and six low ability students to get data on difficulties with CALL during the Interview. (Appendix 3) For instance:

'How did you find the pre and post tests? Did you encounter any difficulties?'

Student one, of low ability, whose scores from the pre- to the post-test changed for the better (that is, 48% for the pre test, to 52% for the post test) had this to say:

> It was interesting for me because it helped me to see where I was going wrong, and the pre- and post-tests made me realize the need to go back on certain modules which I only realized later that I did not understand fully. (student one)

Student four, of low ability, whose results changed for the worse (that is, from 56% to 36%) acknowledges that:

> It was useful, and it related to my writing of English essays where I did not know that I ought to have a topic sentence, and I find myself adding unnecessary things which are unrelated to the topic sentence. The research project was very beneficial for me.
> (student four)

The response from student eight of low ability student whose results changed from 40% for the pre-test, to 44% for the post-test, states that:

> The pre-test encouraged me to want to know what the the content matter was all about, before I came to the PLATO modules. The post-test after the computer lessons challenged me on how much I had understood from the PLATO modules, and this I liked.
> (student eight)

A remarkable jump from 24% for the pre-test, to 60% for the post-test was made by student two of high ability who maintains that:

> The research project helped me very much, and came at the right time - prior to the examinations. If only I was more attentive doing the Modules A -F and attended more whole-heartedly, I would have benefitted more.
> (student two)

The response of student nine of low ability student whose scores indicated no change and remained at 64% for both the pre- and post-tests:

> I preferred doing the pre- and post-tests because that is what I am used to doing.
> (student nine)

A drop from 52% for the pre-test, to that of 48% for the post-test was the outcome for student eleven of high ability. Another case where no change was noticed was with that of student seven, of high ability, whose score remained at 56% for both the pre- and the post-tests. However, both students maintained that because they liked writing, they learnt alot about the use of the topic sentence and how to put their information about the topic sentence in logical sequence, which would make others understand their essays better.

Student twelve, of high ability whose scores improved from 50% for the pre test, to 56% for the post-test states:

> I found that after doing the Modules A -F it was easier to do the post-test. I think that the tests definitely determined the improvement I made at the end. I found the post-test easier after having done all the modules.
> (student twelve)

Despite the fact that student ten, of high ability's scores dropped from 64% in the pre-test, to 56% in the post-test his recommendation was:

> I would still rather use the text book rather than the computer.
> (student ten)

Student six, one of the top students of high ability, who showed a tremendous improvement from 44% for the pre-test to 64% for the post-test and who assumed the role of spokesperson for the rest of the group stated:

> I would recommend such a CALL project for the standard five, six and seven students, and those students at grassroot levels of English. But I suppose it should help some of the second language students here at our level, because for many students the standard of English is poor, and the lessons on PLATO definitely do give them problems. I find that I am bright in literature, but unable to express myself clearly - so it does help the standard nine student as well, myself included.
> (student six)

Student five, a low ability student whose results showed a change for the worse, (that is from 60% for the pre-test to 56% for the post-test) says that:

> From time to time I think it is good to be tested on what we do on PLATO, because one realises that this is what I answered in the pre test questionnaire before I did the PLATO Modules A-F and this is what my response is now in the post test questionnaire now that I have completed. I think it is important since one can realize just how much one has learnt or not learnt from the modules, because it is important for me to know how much I have learnt, and not just how many scores I have received.
> (student five)

Student three, of low ability, whose scores progressed from 60% in the pre-test to 64% in the post-test maintains that:

> What helped me the most was the section on the 'characteristics of a topic sentence'. At the moment I cannot say that I have learnt everything, but I do know that I have done well, and that the research project was a very good thing as far as I am concerned.
> (student three)

In the light of the above responses made by the students, the answer to the research question 1, whether or not all students scores progress towards objectives, one has to respond by considering that while scores may be one way of assessing students' progress, feedback from what students perceive of their problems shows a different perspective.

In response to research question 2: 'Do low and high ability students progress equally toward objectives with the use of CALL' - it does become evident from the responses of the low ability group that whilst the high ability group scored more for the PLATO tests, (Figure 7) the overall results show that together with the pre- and post-test results, the weaker students benefitted more in the long run, and this is corroborated from their responses in the interview. For example, regarding the PLATO CALL lessons as a whole, student eight of low ability had this to say:

> CALL has helped me because I like to work on my own, especially since I get bored in the classroom and can understand some of the computer lessons better because I can go over and over sections that I am confused about. When I make a mistake PLATO gives me the reason, and puts me on the right track, and this helps me alot.
> (student eight)

Another significant insight by student one, of low ability was that:

> I have always found it difficult to arrange sentences in a paragraph and to sequence my ideas logically so the PLATO lessons have helped me alot.
> (student one)

Student three of low ability relates just how vast the progression from simple to difficult is, on PLATO lessons:

> PLATO lessons are very clear at the beginning, and start off with simple things, but as you move on it gets more and more difficult, so you have to concentrate from the start if you want to understand what to do at the end.
> (student three)

Student twelve, of high ability also acknowledges the progression from simple to difficult:

> After having done the first few lessons which I found easy, I found that as I got to the last section it was getting tougher. CALL has helped me alot, because I find it difficult to go up to the teacher and ask her to re-do the whole lesson, or to ask the teacher to repeat something I really do not understand. But I can repeat as much as I need to on PLATO.
> (student twelve)

The response of student eleven, another high ability student who had a similar experience as the previous student was:

> I find that I appreciate the pace the computer ter allows in that I can often review a section or move faster if I want to, and to be able to go back when I feel I want to, or to repeat the whole lesson again. This is not always possible in a classroom situation.
> (student eleven)

Student two, of high ability who has difficulty with knowing why she make cerain mistakes says:

> Learning immediately from my mistakes after PLATO has given an explanation of why my answer was incorrect, helps me overcome those difficulties.
> (student two)

A very honest and interesting response came from student nine, a low ability student who comes from a rural area and who does not speak or hear English spoken except when he is at the college. He states:

> These PLATO lessons in English are alright for people who have a good English background The language used in those lessons for example I find very difficult as a second language speaker coming from a rural background. In the area where I come from, no one speaks English regularly. It has been difficult for me to adjust to the first language used on the PLATO CALL Modules.
> (student nine)

Student seven, a high ability student finds PLATO'S motivating remarks a problem:

> At first when PLATO states 'Fantastic!' or 'Very Good' or 'Excellent', I found it did encourage me, but I later found it very boring. Regarding the positive and more helpful aspects, PLATO Modules often touch upon things which the teacher would not have touched upon, or that the teacher supposes students ought to know by the time that they are in standard 9. I find that studying language structure in class today is getting to become unfashionable, but we can get to understand all those little things about the language on the computer which the teacher has no time to waste upon.
> (student seven)

Conclusion

In this chapter I have shown that students have a variety of different problems and difficulties in using computers as a learning aid for language. I have shown how the major difficulty in general for both low and high ability student expressed, is that of frustration, agitation, and impatience with the hardware and course-ware of the PLATO CALL lessons. The courseware is rigid, and doesn't allow students to interrupt the lesson and go back to specific areas of their choice. If the students want to repeat a specfic section, they have no alternative but to start again from the beginning. This slows down the lesson and gives rise to boredom.

Both high and low ability students are averse to the PLATO CALL multiple-choice method of answering questions because they have difficulty choosing the correct answers.

I have shown that these different problems on CALL reflect different needs for students of high ability and for students of low ability. What stands out as a problem specific to the low ability students was that when they come to a point where they need more information in order to proceed or to understand what is required, there is no resort to additional help. On the other hand, what stands out as a problem specific to the high ability students, is that they don't find it challenging enough. Therefore they rush through the lessons, and fail to consolidate the objectives for that lesson. Furthermore, another difficulty they find is that the PLATO courseware cumbersome, cannot distinguish between a typing error and an incorrect answer given.

I have also shown that teachers need to be aware why so many user problems occur. This was because the PLATO CALL lessons were originally designed as a main frame programme and then curtailed to meet the needs for personal computer usage. Therefore students encountered difficulties.

CHAPTER 8

CONCLUSION AND DISCUSSION OF FINDINGS

CONCLUSIONS

Conclusions drawn from this research report are as follows:

In response to research question 1 - 'Do all students' scores progress towards objectives with the use of CALL materials?' They do. Mere outcomes based on statistical findings and empirical methods of deducing conclusions simply do not suffice a true reflection on how students managed the PLATO CALL lessons. One has to take into account many other difficulties which emerged and which influenced the students positively or negatively in handling CALL. For instance, a highly emotional problem was expressed by student six, of high ability (p. 70) of the student's frustration on the one hand, and on the other hand, how some of the students reacted positively to PLATO's words of encouragement 'fantastic,' 'very good,' 'excellent,' and yet later, found it boring and monotonous (p. 82).

Students' progress towards objectives indicated a statistically significant improvement of post- over pre-test at a .01 level, and findings show that the total population of students' scores improved on the post-test over the pre-test by a mere 3%. However, limitations are acknowledged in that it is difficult to assess measurable progress accurately, in such a short time. I would have to conduct such a programme over a longer period in order to arrive at more effective results.

The fact that such a project was conducted amongst the students definitely created an awareness of the importance in mastering difficulties encompassing hardware software and courseware problems in order to eliminate frustration for students in computer usage.

The computer can only do what the person operating it instructs it to do, and nothing else. Seen as a learning aid also necessitates a change in the attitude of students and teachers - they can be aided by the use of computers. The teacher will never be supplanted, but rather freed from repetitive explanations of language lessons.

Preconceived notions and impossible expectations of computers often lead students to be totally disillusioned and so encounter unnecessary and untold problems and difficulties. The fact that the PLATO CALL programme dealt with a subject which was not entirely new to the students did not lend itself to the sort of excitement and enthusiasm I would have expected. However, it does seem that the content which was based on paragraphs in which sentences had to be reordered - thus requiring understanding of the complete text - many students said that they benefitted.

In response to research question 2: 'Do high and low ability students progress equally towards objectives with the use of CALL courseware?' Findings indicate that high and low ability students do not progress equally toward objectives with the use of CALL materials. These findings statistically indicate that the low ability students

scored higher in their post-test over their pre-test than that of the high ability students.

I have shown that in response to research question 3: 'What difficulties do students experience in using CALL courseware?' that there are problems with operating the computer system and this inhibited progress to the extent that learning the content matter was at stake. Preoccupation with the functional keys seemed to be so overwhelming that students were baffled at the end of the lesson, so much so that learning the content matter on the CALL courseware was in jeopardy. Because of this problem the students also experienced difficulty in relating what was learnt on the CALL courseware, during the interview sessions, to their perceptions of their difficulties.

The case study and interview data revealed that the low ability students who are regarded as the weaker students, benefitted more from the programme than did high ability students. It was the low ability students' positive outlook and attitude toward CALL as a whole, which stood out as the key factor in their benefitting greatly from the programme.

My observations and interviews of the low and high ability students using CALL courseware suggests that there may be difficulties with the medium of instruction which were not identified by the quantitative data.

The PLATO modules often touch upon aspects about language learning which the teacher would not have touched upon, or that the teacher supposes students ought to know by the time they are in standard nine.

But at the same time it should be noted, that the majority of students both low ability, and high ability while favouring teacher mediation also found that CALL was not only more positively interactive than that of exercises in the classroom, but that the CALL programme supplements or enriches the learning situation. This was found to be most beneficial when followed by classroom activities, in solving student problems and difficulties.

DISCUSSION OF FINDINGS

The PLATO CALL programme needs more upgrading and sophisticated implementations to be made, so as to become easily accessible for use in the schools. When schools utilize PLATO CALL programmes computer literacy training should be established in order to be able to work effectively with the PLATO CALL programmes and so help to eliminate difficulties such as working from diskettes as its present format is. It is clear then, that advances in CALL are clearly tied to advances in computer hardware and software.

This PLATO programme provides a remarkable instrument or aid to the language teacher since it would give the teacher better control to

bring subject matter to students in a well structured sequence of teaching materials, unlike the teacher who in any given lesson is faced with interruptions which disrupt the sequence of learning. All the material is presented on a basis that all the students receive the same individual input.

Relevance of teacher guidance cannot be stressed enough, in order to assuage some of the problems expressed by students such as waste of time, because of lack of understanding and other confusions as well as frustrations encountered in handling the courseware. Many teachers seem to be unaware of such problems, and believe that students have to be kept 'busy' on the computer for up to forty minutes at a time with hardly any previous input on what they're doing.

Before one can train children to use and make sense of courseware, one has to train the teachers adequately to re-inforce by means of written application in the classroom, what has been spelt out in the courseware sothat when students go back to the computer room to try it out they have a better understanding of what they have been doing and slowly learn to conceptualize.

Once students have mastered the subject matter on the computer it would be far easier for the teacher to go through that material in the classroom, addressing the most difficult aspects. Especially in the case of the ESL teacher who is at pains to know where to begin teaching students who do not know the basic grammar rules. Because many teachers find that it is unfashionable to teach grammar rules in

the classroom, many students experience difficulties throughout their student years. Teacher Training Colleges ought to establish possibilities for computer literacy amongst the student teachers.

By using the PLATO CALL programme, students would definitely learn more this way, than having a teacher talk to forty students without knowing whether or not what she has said has registered. Whereas with the CALL courseware, each student is challenged, and simply has to answer the given questions. In this way the teacher is able to monitor progress on an hourly basis to see who has done well, and who is having difficulty, as opposed to only being able to assess students at quarterly tests.

The teacher has the opportunity to give more time to the weaker students, whilst the brighter students work on their own on the CALL programme. Both high and low ability students are able to revise problematic areas, and repeat lessons which they have found difficult. In this way both teacher and student alike are relieved of some of the stress that goes with language teaching and learning.

The results of this research report have in no way been conclusive, however, it may provide guidance for the use of such courseware in English language teaching.

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Appendix 1: Frames for PLATO Modules A - F

Module A - The Topic Sentence.

Objectives:

- to identify the Topic Sentence in a paragraph,
- to identify the qualities of a good Topic Sentence
- to identify the Topic Sentence regardless of its placement in the paragraph.

The various frames in this Module were as follows:

A. Tutorial:

Frame 1: The four characteristics of a Topic Sentence are given and for each characteristic a definition is given and explained with two examples, from which the student has to choose the correct one.

Frame 2: Out of six sentences given, the student has identify the Topic Sentence. 'A Motor cycle .....' A further two sentences of the same nature are given in order to reinforce the concept of the first characteristic of a Topic Sentence which is stated as being 'the most important sentence in a paragraph'.

Frame 3: By pressing 'Help', one is able to review the four characteristics of the Topic Sentence.

Frame 4: True or False statements are given about the Topic Sentence, from which students have to choose the correct one. Re-inforcement of the second characteristic of a Topic Sentence by way of three statements is asked. The second characteristic of a

Topic Sentence is that it must 'state or suggest the central idea of a a paragraph' - 'No other playground in the world .....'

Frame 5: Two examples are given in order to re-inforce the third characteristic of a Topic Sentence which is 'to state of imply an attitude about an idea.' Student has to choose from two given sentences which Topic Sentence shows an attitude.

Frame 6: The final characteristic is that the Topic Sentence 'suggests ideas for the development of the rest of the paragraph'. From two sentences, the student must choose where the best developed ideas are, compare and decide which is the better of the given two.

Frame 7: 'Looking Back' From six possibilities, students are to choose four characteristics. Illustration is given on the monitor, to show that the Topic Sentence can be placed at the beginning, middle and end of a paragraph. Now it is the students' turn to decide out of four sentences in the paragraph, which one is the Topic Sentence. 'Female cosmonauts .....'

Frame 8: Two paragraphs are given, and students have to pick out the Topic Sentence in each. 'It was the kind of day that made you .....' and 'Many beautiful trees.....'

Frame 9: Review Option is given for students to go through the entire tutorial again or to choose certain sections:

(i) Characteristics of the Topic Sentence (1 & 2)
(ii) Characteristics of the Topic Sentence (3 & 4)
(iii) Placement of the Topic Sentence
(iv) Practice with the Topic Sentence

B. Application: Test Scores = 8

Frame 10: Problem One:

Frame 11: Problem Two:

Frame 12: Problem Three:

Frame 13: Problem four:

Frame 14: Problem Five:

Frame 15: Problem Six:

Frame 16: Problem Seven:

Frame 17: Problem Eight:

Module B - Unnecessary Sentences.

Objectives:

- to identify the sentences in a paragraph that develop the Topic Sentence,
- to learn to tell which sentences within a paragraph are not related to the Topic Sentence.

The various frames in this Module were as follows:

A. Tutorial:

Students are given the chance to 'Review' that all sentences in a paragraph should:

Frame 1: Relate to the Topic Sentence (and several other sentences relate to Topic sentence; all Supporting sentences relate directly to the Topic Sentence.)

A detailed explanation with examples is given, and students are asked to choose from four sentences:

* Which does not relate to the Topic Sentence. 'Living in the city has.....'

* Which sentence is the Topic Sentence. (five sentences are given) 'Old folk songs .....'

* What is the central idea of the Topic Sentence in the paragraph - 'Old folk songs.....' and

* Which sentence is not related to the Topic Sentence in the paragraph - 'Old folk songs .....'

The second Review consideration is that:

Frame 2: All sentences in a paragraph should relate by meaning to the Topic Sentence.

Here again detailed explanations and examples are given, and students have to choose out of five sentences:

* Which of the following are Not related. 'This time of year.....'

Frame 3: Considerations for the third 'Review' question is that all sentences in a paragraph should give the reader more information and details about the Topic Sentence, (i.e. the Supporting Sentences.)

Four choices are given to establish:

* Which sentences are related to the Topic Sentence by meaning. 'The old jewelry box.....'
* To notice the controlling idea and which sentence is not related to the controlling idea in: 'The Watermelons .....' and in: 'The fish in our pond .....'

Frame 4: 'Review' comes up again, and students have a choice to review all three steps above, or to press 'Lab', which takes one back to the Menu.

B. Application: Test Scores = 5

Frame 5: Problem One

Frame 6: Problem Two

Frame 7: Problem Three

Frame 8: Problem Four

Frame 9: Problem Five

Module C - Order of Sentences.

Objectives:
- to arrange a series of related sentences in their logical order and
- to identify sentences NOT arranged in ascending order.

The various steps in this Module were as follows:

A. Tutorial:

Illustration given to explain how supporting sentences must relate to each other and to the Topic Sentence in logical order, either ascending, or descending in interest or importance of the idea.

By way of example, four sentences are given to illustrate this

point.

Students are given three Review options:

Frame 1: To review the logical order of support sentences, by choosing:

* Which sentence is not related to the others or to the Topic Sentence in ascending order. Six sentences are given: 'The ancient Greeks.....'

Frame 2: To practise the exercises by deciding:

* Which sentence does not contribute to the ascending order? Six sentences were given: 'We cried when we heard of Joe's death .....'

* Which sentence is out of place in the ascending order: Six sentences were given: 'Commander byrd trudged wearily onward ....'

Frame 3: A Review Option is given, or students can leave the tutorial and go on to the Application (test)

B. Application : Test Scores = 4

Frame 4: Problem One

Frame 5: Problem Two

Frame 6: Problem Three

Frame 7: Problem Four

Module D: Transitional Devices.

Objectives:

- to identify sentences that do not logically connect,

- to identify methods to connect those sentences,
- to choose a word that best relates one sentence to another.

The various steps in the Module are noted and a 'Review Index' is given where students were given seven possibilities of choosing from the menu in this section:

1. What is a transitional device.

   An explanation and an example of what a transitional device is, was given.

2. Words that show relationship.

   An explanation and an example of the unique words and phrases of transitional devices were given.

Frame 1: The student has to identify the transitional device in the given sentences. By pressing the 'Help' key, the student is able to review the definitions as explained in 1 and 2 above. Students are to find the transition words/phrases in the following paragraphs.

'He ran .....' and

'Melinda ate.....'

'Richard simply loved to grow orchids ..... nothing but orchids.'

Students are to find the transitional device which best expresses the contrast between the paragraphs:

'Rabbits are cute little critters .....'

3. Repetition of key words

This is another way to show relationship between two sentences or paragraphs. Examples are given.

Frame 2: Students are to find the key words in each of the following pairs of sentences that have been repeated to connect the sentences:

'The neon lights blinked.....'

Frame 3: At this point students can press 'BACK' to 'REVIEW', or press 'NEXT' to continue.

Frame 4: Students are to the find repeated word or words that connect(s) these paragraphs:

'Varied topics were presented .....'

4. The use of Pronoun Referents

An explanation and examples are given of the Pronoun Referent and how it is used.

Frame 5: Students to to practise the use of the Pronoun Referent:

'They tried to race the moon .....'

'The penalty was severe .....'

'The old actors .....'

5. Repetition of part of the sentence structure

Here again explanations and examples are given.

Frame 6: Students are to pick the constructions that go together:

'I wanted.....'

'Jack Sprat could eat .....'

6. Review of entire lesson

7. Leave this lesson

B. Application Test Scores = 6

Frame 7: Problem One

Frame 8: Problem Two

Frame 9: Problem Three

Frame 1Ø: Problem Four

Frame 11: Problem Five

Frame 12: Problem Six

Module E: Improving Structure in Paragraphs.

Objectives:

- to identify wordiness, unclear meaning, and improper use of voice,
- to eliminate wordiness and unclear meaning in sentences, and to use the appropriate voice,
- to select improved structures.

The various steps in the Module are noted, and a 'Review Index' is given where students were given six possibilities of choosing from the menu in this section:

1. Wordiness

An explanation and examples are given on how to imporve paragraphs by doing away with words that are necessary.

Frame 1: Students are given a sentence and questioned about various aspects of that sentence, namely:

'Is this sentence wordy?'
'Does the revised sentence leave out any significant meaning?' and
'Is the above sentence an improvement over the first sentence?' etc. e.g.

'The romantic lovers climbed .....'

2. Unclear Meaning

An illustration is given, by way of example, and explanation, of the confusion caused as a result of unclear meaning.

Frame 2: Students are given six sentences next to which 'yes' or 'no' must be placed in order to ascertain whether or not the meaning is clear.

3. Improper use of Voice

Two examples of Active and Passive Voice are given and explained.

Frame 3: Students have to pick out Active Voice by selecting from seven sentences given.

Frame 4: Back tracking. Students have a chance to Review 'Wordiness', 'Unclear Meaning' or 'Voice'

4. Final Exercise

A series of exercises are given to reinforce the lessson.

Frame 5: Students have to pick the item from each sentence that improves it. 'The angry cat hissed at the dog.....' 'The house was set on fire by .....' 'They rode the horses in the stable.....' 'After quite a bit of

very careful study we .....'

Frame 6: Students are requested to improve the structure in the paragraph, by responding to the question: 'What would you do to improve sentence number one, or two, or three etc. - four possibilities are given, from which the student has to choose.

'Slowly the hill was topped by the Indians.....'

Frame 7: A REPORT CARD is given and students are advised to review the lesson before doing the test, if they have done well in the tutorial lesson.

5. Review the entire lesson
6. Leave this lesson

Module F: Paragraph Development.

Objectives:
- to identify paragraphs by example, sequence of events, comparison and contrast, and cause, and
- to develop a paragraph in more detail.

The various steps in the Module are noted, and a 'Review Index' is given where students are given seven possibilities of choosing from the menu in this section:

1. What is paragraph development and organization?

   An example and an explanation of the terms is given, as well as an illustration to indicate the different levels of organization in a paragraph.

2. Examples

Four paragraphs are given, and a summary to explain the Topic Sentence.

Frame 1: Students are to determine whether or not the paragraph is developed by example or not.

'Every spring my husband.....'

Frame 2: Using the same paragraph 'Every spring my husband....' students are given four possibilities to choose from in order to determine what the examples develop, and to decide how many examples there are.

3. Sequence of events

Another method of paragraph development, is ordering the sequence of events in logical order.

Frame 3: Students are given details of four possibilities to choose which event occurs first, both in the situation and in the paragraph:

'We waited inside the cabin.....'

4. Comparison and Contrast.

Examples and illustrations are given in order to explain similarity and difference.

Frame 4. Students are to decide from the three possibilities given, by what method the following paragraph is developed:

'After looking at all the information, I decided that'

Frame 5: Points of similarity are given, and the student has to pick three from the same paragraph:

'After looking at 11 the information, I decided that'

5. Cause and Effect

Graphic illustrations and examples are given to show how paragraph development by cause and effect can be used.

Frame 6: Students must decide by what method the following paragraph is developed:

'It was completely Karen's fault.....'

Frame 7: Employing the same paragraph: 'It was completely Karen's fault .....' Students are given four possibilities to choose from, and must decide what the one effect is that the paragraph discusses.

Frame 8: Further employment of the above paragraph is used for the next task. Students are to choose which of the sentences encompasses a cause that is not discussed in the paragraph as resulting in the effect.

6. Review the entire lesson.

7. Leave this lesson.

B. Application - Test Scores = 1Ø

Frame 9: Problem One

Frame 1Ø: Problem Two

Frame 11: Problem Three

Frame 12: Problem Four

Frame 13: Problem Five

Frame 14: Problem Six

Frame 15: Problem Seven

Frame 16: Problem Eight

Frame 17: Problem Nine

Frame 18: Problem Ten

Appendix 2: Letter requesting participation in Research Interview.

1 November, 1988

VICTORY SENIOR COLLEGE

PARTICIPATION IN A RESEARCH INTERVIEW
ON THE PLATO LESSONS, "LOGIC AND ORGANIZATION" MODULES A-F

Dear .....

I would like to thank you for participating in the Research Programme so far. I appreciate your co-operation. As I explained in my introductory talk to you, a random sample of the students has been conducted and you have been selected for an Interview with me.

The purpose of this interview is to find out what specific difficulties and problems you encountered with Modules A - F on the computer. I would like to ask you for twenty minutes of your free time on Saturday 5 November 1988, if you are willing to participate, since your participation is voluntary. What is said between us is strictly confidential.

I am convinced that your contribution will be of great value in helping other students and will also provide a unique learning experience for you. Please complete the attached form and hand it to me in the enclosed envelope by Thursday the 3 November 1988.

Yours sincerely

ANGELA JOSES

Appendix 2: Reply to Participation in a Research Interview.

(Tick the appropriate boxes)

1. I am interested to take part in an Interview of twenty minutes with you on Computer Assisted Language Learning. _____

2. Thank you for considering me for this Interview. However, I do not wish to take part. _____

3. I will be available for twenty minutes on Saturday 5 November anytime between:

   11.30 to 13.30 _____

   OR

   14.00 to 17.00 _____

Date of Birth: Day Month Year

....

Home Language: .....

Approximate hours a week that you use the computer _____

Today's date: .....

Signature: .....

Thank you very much for your co-operation.

Appendix 3 - Pre-Test

NAME..... GROUP.....

DATE .....

PRE-TEST

1. Pair off the statements in the left-hand column below with those of similar basic meaning in the right-hand column (at present they do not match), and fill in the blank spaces below.

(a) In the border war we invaded the enemy before they could attack us.	(i) We want a decision on better pay.
(b) We were driven back by a successful enemy attack.	(ii) Unemployment is bound to result from this policy.
(c) We cannot afford it.	(iii) In an outbreak of hostilities on the frontier, our men made certain incursions into hostile territory as a purely defensive manoeuvre.
(d) We can state categorically that we are desirous of seeing a satisfactory outcome to the negotiations at present in progress over the amelioration of rates of remuneration.	(iv) Heavily outnumbered, we made a tactical withdrawal to our own positions.
	(v) Certain factors not unconnected with our financial difficulties compel us to decline this offer.

(a) ..... (b) .....

(c) ..... (d).....

2. The Main or Topic Sentence states or implies an atttitude about an idea. Which of the following sentences shows an attitude. Circle the appropriate number:

   (i) I painted my wall in the same way as I saw it done in the TV Advertisement.

   (ii) I painted the wall according to the directions of the T.V. advertisement which is the best way to protect against weather-beaten walls.

3. Learning to classify and order information in paragraphs enables one to learn how to write unified paragraphs. Circle the appropriate one.

   Agree Disagree

4. The value of a topic sentence is making clear the main idea of a paragraph. Circle the appropriate one.

   Agree Disagree

Appendix 3 - Pre-Test Continued.

5. The function of the following underlined word is to join the sentences. "Her car was full of nothing <u>but</u> old empty chocolate boxes".

Agree Disagree

6. The Sentence with the main idea must always be at the beginning of the paragraph. Circle the appropriate one.

Agree Disagree

7. Which of the following sentences are Finite sentences? (i.e.complete?) Circle the approriate one/s.

(i) These towns growing out from a castle.
(ii) This castle was called the Acropolis.
(iii) It was the only refuge.

8. By cutting out unnecessary words, and repetition, reduce the following extract to one well-constructed sentence:

"All club members who have joined the club are asked and requested to pay over their money for their subscriptions as they arrive, on entering the club. All members of the club are asked and requested to please inform the person acting as the club's secretary beforehand and in advance if and when they, the club members, wish to bring one or more visitors or guests with them to the club. All members of the club are asked and requested to wear plimsolls on their feet when they go into the games-room, whether to play games or for some other purpose.

.....

.....

.....(35 words)

9. Identify the sentence with the Main idea in the following: Circle.

(i) There was no time left for him to answer. (ii) It was a one-rand piece, and it went from hand to hand among them for a quarter of a minute. (iii) Morgan found a piece of gold. (iv) The buccaneers leapt into the pit.

10. Circle the clumsy and incorrect sentences from the following:

(i) That is kind of good; (ii) My mother was taken ill.
(iii) You ought not to go; (iv) He talks on about it so!

<u>THANK YOU VERY MUCH FOR YOUR CO-OPERATION</u>

Appendix 4 - Post-Test

NAME..... GROUP.....

DATE .....

POST TEST

1. By cutting out unnecessary words, and repetition, reduce the following extract to one well-constructed sentence:

> "All club members who have joined the club are asked and requested to pay over their money for their subscriptions as they arrive, on entering the club. All members of the club are asked and requested to please inform the person acting as the club's secretary beforehand and in advance if and when they, the club members, wish to bring one or more visitors or guests with them to the club. All members of the club are asked and requested to wear plimsolls on their feet when they go into the games-room, whether to play games or for some other purpose.

.....

.....

.....(about 35 words)

2. The value of a topic sentence is making clear the main idea of paragraph. Circle the appropriate one.

Disagree Agree

3. Circle the clumsy and incorrect sentences from the following:

(i) You ought not to go, (ii) He talks on about it so!
(iii) My mother was taken ill. (iv) That is kind of good;

4. The Sentence with the main idea must always be at the beginning of the paragraph. Circle the appropriate one.

Agree Disagree

5. Identify the sentence with the Main idea in the following: Circle.

> (i) There was no time left for him to answer. (ii) It was a one-rand piece, and it went from hand to hand among them for a quarter of a minute. (iii) Morgan found a piece of gold. (iv) The buccaneers leapt into the pit.

6. The function of the following underlined word is to join the sentences. "Her car was full of nothing <u>but</u> old empty chocolate boxes".

Agree Disagree

Appendix 4 - Post-Test Continued

7. Pair off the statements in the left-hand column below with those of similar basic meaning in the right-hand column (at present they do not match), and fill in the blank spaces below.

(a) We can state categorically that we are desirous of seeing a satisfactory outcome to the negotiations at present in progress over the amelioration of rates of remuneration	(i) Certain factors not unconnected with our financial difficulties compel us to decline this offer.
	(ii) Heavily outnumbered, we made a tactical withdrawal to our own positions.
(b) In the border war we invaded the enemy before they could attack us.	(iii) We want a decision on better pay.
(c) We were driven back by a successful enemy attack.	(iv) Unemployment is bound to result from this policy.
(d) We cannot afford it.	(v) In an outbreak of hostilities on the frontier, our men made certain incursions into hostile territory as a purely defensive manoeuvre.

(a)..... (b).....

(c)..... (d).....

8. Learning to classify and order information in paragraphs enables one to learn how to write unified paragraphs. Circle the appropriate one.

Disagree Agree

9. The Main or Topic Sentence states or implies an atttitude about an idea. Which of the following sentences shows an attitude. Circle the appropriate number:

(i) I painted the wall according to the directions of the T.V. advertisement which is the best way to protect against weather-beaten walls.

(ii) I painted my wall in the same way as I saw it done in the TV Advertisement.

10. Which of the following sentences are Finite sentences? (i.e.complete?) Circle the approriate one/s.

(i) These towns growing out from a castle.
(ii) This castle was called the Acropolis.
(iii) It was the only refuge.

THANK YOU VERY MUCH FOR YOUR CO-OPERATION
YOU'RE A STAR!

Appendix 5: Transcript on Students Interviewed

Outcome of Student's Pre and Post Tests and PLATO Modules

Pre-Test Total out of 25 points
Module A Total out of 8 points
Module B Total out of 5 points
Module C Total out of 4 points
Module D Total out of 6 points
Module E Total out of 8 points
Module F Total out of 10 points
Post-Test Total out of 25 points

Open-ended Questions

(Q.1) What kind of Computer Programmes in English do you most prefer to work on?

(Q.2) How did you find the Pre and Post Tests? Did you encounter any difficulties?

(Q.3) In what way did the Tests relate to the PLATO Modules A - F, and what did you learn from them?

(Q.4) Can you sum up in general what you thought of the programme?

(Q.5) In what way has Computer Assisted Language Learning helped you? and what would you say is most effective in CALL?

(Q.6) Do you have enough time to use the computer efficiently? and would you like to spend more time on the computer?

(Q.7) Would you rather be in a class where everyone works on the same material at the same time, and then have the teacher follow up on that lesson, rather than left to choose what you want, and do what you prefer to do?

(Q.8) I noticed that you spent a considerable amount of time reading those long extracts, - is there something you want to comment about that?

(Q.9) I notice that you often tend to lean back and lounge in your seat while reading from the screen. Are you able to concentrate? OR I noticed that some people mumble alot as they read the screen, and point with thieir fingers. Are you one of those?

(Q.10) What about the routines i.e. the procedure of pressing the various keys. What do you do when you have a problem with this? or when the computer breaks down in the middle of the lesson? What do you do when this happens?

Aoppendix 5: Continued.

The Body of the Interview

Focused Interview Questions based on PLATO Lessons:
(Print-out of Tutorials and Lessons are displayed for students to comment upon)

(Q.11) The following statement required that you respond 'yes' or 'no', but I would like to know what your reason for choosing 'yes' was. The question is as follows: (Module E - Tutorial)

Is this sentence wordy?

"The romantic lovers climbed the gentle, grassy knoll, looking carefully for the four-leaf clover they remembered from the dark recesses of their past.

1. Yes 2. No

Type a number.) .....

(Q.12) How would you go about explaining your choice for the following question? (Tutorial Module B)

"This time of year, I really enjoy attending basketball games."

Which of the following sentences are NOT related to it by meaning?

1. I enjoy basketball because I played it in school.
2. My brother likes basketball, too.
3. I like being able to sit close to the action of the game.
4. Going from the cold outdoors into the warm gym pleases me.
5. Football games are fun to attend, also.
6. I especially enjoy taking a date to see the play-off game.

Type a number) .....

Now look for one more.) - which was correct?

Appendix 5: Continued

(Q.13) I noticed that you had difficulty with 'The Order of Sentences in Paragraphs' - Could you explain how you went about the following?: (Module C - Problem 3 of 4)

(1) When would the nightmare end? (2) Bandits terrorized the coutryside, but no one did anything to stop them. (3) Alas when Zakarac finally did return to the village, there was nothing left to save. (4) Was it possible that the very village in which Zakarac had lived would be looted,and left unfit for life? (5) One by one, the villages were plundered and burned. (6) Where had Zakarac gone? (7) Why wasn't he here? (8) Who would save them now?

The sentences of the paragraph are most logically arranged as _____

1. 1-2-3-4-5-6-7-8
2. 8-1-7-2-6-3-4-5
3. 2-5-6-7-4-1-8-3
4. 6-7-8-5-4-3-1-2

Please type a number) .....

Questions Based on Pre and Post Tests

(Q.14) Why do you think that you would have been expected to know about transitional devices in order to carry out the instruction for the question on 'unnecessary words, and repetition'? (Pre #8, Post #1)

The Closing of the Interview

(Q.15) What do you consider the major problem and difficulty in computer assisted language learning?

(Q.16) What suggestions or solutions do you have to offer?

Appendix 6 :

SCHEDULE OF RESEARCH PROGRAMME

Group 1 }
Group 2 } Total = 100 (about 25 students per group)
Group 3 } Std 9 students
Group 4 } 30+ Tatung CM 1360-E01 P.C's available.

27 Student Diskettes } PLATO Lessons: "Logic and Organization" A - F
27 Tutorial Diskettes } on the Topic Sentence and Paragraph Development
& consisting of Tutorial and Application Modules:

SEVEN X 40 MINUTE SESSIONS:

	Group 1		Group 2		Group 3		Group 4	
	Date:	Time	Date:	Time	Date	Time	Date	Time
1.	13.10 (Thurs)	11.50-12.30	14.10 (Fri)	13.50-14.30	13.10 (Thurs)	8.50-9.30	14.10 (Fri)	2.30-3.10
2.	19.10 (Wed)	11.50-12.30	19.10 (Wed)	9.30-10.10	18.10 (Tues)	3.10-3.50	18.10 (Tues)	2.30-3.10
3.	20.10 (Thurs)	11.50-12.30	21.10 (Fri)	13.50-14.30	20.10. (Thurs)	8.50-9.30	21.10 (Fri)	2.30-3.10
4.	26.10 (Wed)	11.50-12.30	26.10 (Wed)	9.30-10.10	25.10 (Tues)	3.10-3.50	25.10 (Tues)	2.30-3.10
5.	27.10 (Thurs)	11.50-12.30	28.10 (Fri)	13.50-14.30	27.10 (Thurs)	8.50-9.30	28.10 (Fri)	2.30-3.10
6.	2.11 (Wed)	11.50-12.30	2.11 (Wed)	9.30-10.10	1.11 (Tues)	3.10-3.50	1.11 (Tues)	2.30-3.10
7.	3.11 (Thurs)	11.50-12.30	4.11 (Fri)	13.50-14.30	3.11 (Thurs)	8.50-9.30	4.11 (Fri)	3.30-3.10

SCHEDULE FOR SAMPLE OF 12 STUDENTS AFTER HOURS

Date:	Time		
05.11 (Sat)	11.30 -	1.30 ..	Group 1 and Group 2 x 6 (20 mins per student)
05.11 (Sat)	2.00 -	4.00 ..	Group 3 and Group 4 x 6 (20 mins per student)

FOLLOW-UP QUESTIONNAIRE.

Appendix 7: Victory College - (Group 1)

* MC = Average of Graphicacy, Literacy, Numeracy

	ENGLISH		AFRIKAANS		MATH		SCIENCE		BIOLOGY		HISTORY		GEOGRAPHY		AVERAGE		3xMC* TEST	MATH	ENG	TOTAL AV
STUDENTS	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	%	%	%	%
NAME	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
STUDENT 1	48	48	55	50	77	83	71	57	53	52			68	62	62	55	71	65	32	63
STUDENT 2	57	43	53	64	75	71	71	63	71	68	71	62			66	62	53			
STUDENT 3	40	39	64	60	75	66	56	49	60	57					49	45	61	43	28	44
STUDENT 4	41	48	54	55	76	79	58	54	57	65					48	50				
STUDENT 5	70	66	72	73	81	66	66	65	80	76			81	79	78	71	88	80	70	79
STUDENT 6	59	61			42	55	61	46	62	67	59	56			57	57				
STUDENT 7	41	42	58	53	75	59	65	58	48	60					57	54	42	24	42	36
STUDENT 8	45	47	51	61	67	72	54	58	60	57	61	47			56	57				
STUDENT 9	57	57	64	61	69	60	50	47	50	58	63	61			59	57	45	50	55	50
STUDENT 10	47	46			94	90	73	68	54	64			57	59	65	65	51	91	38	60
STUDENT 11	40	37	55	68	77	85	75	65	45	63			56	51	58	62	42	53	32	42
STUDENT 12	43	41	60	54	67	56	61	51	57	55			50	58	56	53	54	39	30	41
STUDENT 13	41	37			53	56	69	63	64	73			66	61	59	58				
STUDENT 14	45	38			82	78	73	72	48	51			67	64	63	61				
STUDENT 15	48	45			74	76	65	67	58	67			54	63	60	64	40	52	53	48
STUDENT 16	52	47			73	61	59	52	70	66			68	67	64	59	39	39	23	34
STUDENT 17	36	45	46	40	62	61	62	54	65	65	77	65			58	55	41	28	48	38
STUDENT 18	54	57	44	46	68	50	71	59	63	60	76	68			63	57	45	33	50	43
STUDENT 19	59	56	67	79	69	63	72	44	71	73			68	57	68	62	67	58	58	60
STUDENT 20	50	48	54	65	68	69	63	62	63	71					60	63	40	62	62	55
STUDENT 21	53	50	74	62	68	48	53	36	57	44			57	55	60	49	60	41	52	51
STUDENT 22	64	57	83	89	76	73	46	49	74	75			71	71	69	69	56	49	35	47
STUDENT 23	34	37	47	54	78	71	64	50	55	60			59	61	56	56	45	35	38	39
STUDENT 24	57	52	63	59	72	69	77	59	57	75			58	63	64	63	50	56	38	48
STUDENT 25	55	51	57	69	81	84	74	69	66	70	67	58			67	67	47	58	43	49
STUDENT 26	63	60	79	86	74	75	77	57	74	75			73	75	73	71	61	80	58	66
STUDENT 27	52	46	46	45	81	58	49	52	54	61	54	50			56	52	47	49	28	41
AVERAGES	50	48	59	62	72	67	65	57	61	64	66	59	64	63	61	59				

Appendix 7: Victory College - (Group 2)

* MC = Average of Graphicacy, Literacy, Numeracy

	ENGLISH		AFRIKAANS		MATH		SCIENCE		BIOLOGY		HISTORY		GEOGRAPHY		AVERAGE		3xMC* TEST	MATH	ENG	TOTAL AV
STUDENTS	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	%	%	%	%
NAME	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
STUDENT 1	48	41	58	58	56	51	54	41	52	47	60	58			55	49	34			
STUDENT 2	45	45	54	45	61	45	60	56	64	71			64	67	58	55	55	50	38	48
STUDENT 3	51	45	62	64	63	61	54	48	45	55					55	55	47	62	40	43
STUDENT 4	53	41	55	60	57	54	65	53	60	60					58	54	33	38	43	38
STUDENT 5	57	46		40	63	54	53	41	56	50	57	46	53	43	57	53				
STUDENT 6	43	34	50	51	49	30			40	46	38	26	49	53	45	40	45	74	58	59
STUDENT 7	52	47	65	69	66	52	54	38	57	46					59	50		29	50	
STUDENT 8	56	50	58	59	29	48	57	45	61	61	54	44			52	51	64	20	57	47
STUDENT 9	56	43	65	69	54	49			55	51	53	40	55	44	56	49				
STUDENT 10	46	40	59	66	65	65	56	54	50	61			50	45	54	55				
STUDENT 11	48	46	57	52	65	50	54	45	30	38			54	54	51	48	51	49	52	51
STUDENT 12	39	41	43	45	72	66	66	57	63	68			58	55	57	55	40	30	28	33
STUDENT 13	49	39			62	55			60	65	61	50	64	57	59	53				
STUDENT 14	53	46	44	50	52	36	32	39	47	40	37	31			44	40	50	60	47	52
STUDENT 15	60	55	51	62	42	37	49	43	56	65	62	60			53	54	61	64	52	59
STUDENT 16	40	31	41	41	55	51	55	47	36	44			39	34	44	41	40	35	22	32
STUDENT 17	44	42	59	59	65	44			48	51	37	32	49	53	50	47				
STUDENT 18	40	39	55	55	62	60	45	39	43	50					49	49	57	91	50	66
STUDENT 19	44	39	41		69	80	51	56	42	56			50	54	50	48				
STUDENT 20	31	27	39	42	70	70	44	43	31	42			38	37	42	44	60	67	27	51
STUDENT 21	42	33	46	48	64	49	52	39	51	53			54	51	52	48				
STUDENT 22	58	55	52	46	51	40		39	57	54	56	45	60	48	56	47	54	39	42	45
STUDENT 23	54	59	56	65	41	41	48	32	50	42	38	43			48	47	68	71	55	65
STUDENT 24	50	41	64	59	52	38	48	41	60	43			48	40	54	44	37	49	45	47
STUDENT 25	58	48			64	55	57	54	58	48			47	65	57	54				
STUDENT 26	61	44	75	72	54	46			62	58	61	47	56	48	62	53	44	89	37	57
AVERAGES	49	43	54	56	58	51	53	45	51	53	51	44	52	50	53	49				

Appendix 7: Victory College - (Group 3)

* MC = Average of Graphicacy, Literacy, Numeracy

	ENGLISH		AFRIKAANS		MATH		SCIENCE		BIOLOGY		HISTORY		GEOGRAPHY		AVERAGE		3xMC* TEST	MATH	ENG	TOTAL AV
STUDENTS	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	%	%	%	%
NAME	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
STUDENT 1	55	48	64	63	46	36			60	47	57	61	69	51	58	51	42	33	27	34
STUDENT 2	35	37	49	56	42	32	29	39	40	50	35	46			38	43	36	35	27	33
STUDENT 3	40	34	50	42	42	23	34	32	50	38			41	39	43	35	52	49	35	45
STUDENT 4	46	34	55	49	32	28	43	38	55	50			69	68	50	45	63	47	67	59
STUDENT 5	32	31	48	46	65	43	40	48	43	42					46	42	46	32	20	33
STUDENT 6	48	42	54	56	29	23	40	37	42	41	37	33			42	39	47	11	50	36
STUDENT 7	51	35	60	60	36	34			52	60			50	45	50	47				
STUDENT 8	37	38	51	54	35	34	46	33	42	43			50	49	44	42	46	15	27	29
STUDENT 9	33	28	37	49	60	44	40	41	33	48			42	40	41	42	40	66	37	48
STUDENT 10	37	38	49	58	57	34	56	38	60	46			56	58	53	45	48	15	43	35
STUDENT 11	30	27	45	52	63	54	63	62	60	63			64	64	54	54	37	38	27	34
STUDENT 12	47	30	47	51	33	27	41	36	50	46			56	61	46	42	43	23	51	39
STUDENT 13	42	37	45	55	48	35	52	43	51	42			50	40	48	42	50	29	28	36
STUDENT 14	30	31	45	47	43	32	47	42	48	56			50	51	44	43	36			
STUDENT 15	43	38	59	66	54	71	63	51	44	67			60	51	54	57	56		21	39
STUDENT 16	32	26	38	41	35	24	43	24	38	48			42	42	38	34	48	35	30	38
STUDENT 17	37	37	55	48	46	40	62	41	54	46	55	48			52	43				
STUDENT 18	38	35	51	54	44	51	42	39	53	52			53	51	47	47	53	17	35	35
STUDENT 19	28	38	45	50	42	41	40	42	47	46			31	50	39	44				
STUDENT 20	41	44	58	52	41	33	52	45	47	45			44	44	47	44	53	26	58	46
STUDENT 21	37	21	48	46	44	28	43	48	42	56			56	52	45	42				
STUDENT 22	45	48	56	57	28	30	43	45	53	56			58	60	47	49	47	10	33	30
STUDENT 23	39	39	40	47	40	29	28	22	33	34	34	33			36	34	39	20	40	33
STUDENT 24	40	36	45	44	41	35			41	33	27	44			39	38				
AVERAGES	39	35	50	52	40	36	45	40	47	48	41	44	52	51	46	43				

Appendix 7: Victory College - (Group 4)

* MC = Average of Graphicacy, Literacy, Numeracy

	ENGLISH		AFRIKAANS		MATH		SCIENCE		BIOLOGY		HISTORY		GEOGRAPHY		AVERAGE		3xMC* TEST	MATH	ENG	TOTAL AV
STUDENTS	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	%	%	%	%
NAME	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
STUDENT 1	38	40	49	62	31	36	41	25	42	50	25	37			38	42	38	53	67	53
STUDENT 2	42	38	52	63	32	31	18	29	40	48	42	34			38	41	37	35	57	43
STUDENT 3	44	36	55	58	29	29	32	32	50	45	40	43			42	41				
STUDENT 4	49	27	37	36	29	21	37	38	47	33			28	40	38	33	72		50	61
STUDENT 5	48	44	59	60	36	29	35	44	48	44	31	42			43	44	38	9	45	31
STUDENT 6	27	28	39	41	15	16	19	21	20	32					24	28	53	38	23	38
STUDENT 7	34	39	49	50	56	59	43	49	45	48					45	49	49	24	25	33
STUDENT 8	36	36			40	42	37	31	43	57			41	46	39	42	44	30	35	36
STUDENT 9	27	34	37	41	51	62	52	47	41	46					42	46	43	23	53	40
STUDENT 10	37	38	44	51					43	50	36	41	39	39	40	44				
STUDENT 11	31	37	48	49	35	40	36	38	43	48			36	44	38	43				
STUDENT 12	45	42	51	49	47	45			38	42	47	48			46	45	41	21	48	37
STUDENT 13	31	34	46	42	48	50	38	41	42	52	48	47			42	44	39	18	38	32
STUDENT 14	29	32	42	45	39	41	33	37	36	50					36	41	40	27	32	33
STUDENT 15	32	34	36	37	34	40	28	30	35	34			44	37	35	35	44	20	30	31
STUDENT 16	35	24	34	25	47	40	19	27	25	31	19	33			30	30	34	61	32	42
STUDENT 17	37	16	54	61					30	18	39	40			40	34				
STUDENT 18	31	38			47	43	40	43	36	47			42	34	39	41	38	43	20	34
STUDENT 19	40	38	48	53	44	40	46	47	48	48			62	59	48	48				
STUDENT 20	42	30	57	54	41	38	55	35	48	42					49	40	33			
STUDENT 21	40	32	39	42	27	25	27	28	32	42					33	34	48	28	15	30
STUDENT 22	34	36	47	40	52	55	35	26	43	48			45	49	43	42	42	23	45	37
STUDENT 23	39	32	37	49	44	52	48	52	44	53	55	48			45	48	37			
AVERAGES	37	34	46	48	39	40	36	36	40	44	38	41	42	44	40	41				