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A comparison and contradistinction of the methods of selecting educational computer software employed in W.A. primary schools

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A COMPARISON AND CONTRADISTINCTION OF THE METHODS OF SELECTING EDUCATIONAL COMPUTER SOFTWARE EMPLOYED IN W.A. PRIMARY SCHOOLS

BY

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USE OF THESIS

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

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ABSTRACT

This thesis reviews the methods and criteria that Western Australian school teachers and District Consultants of computers use in the selection of educational computer software.

Questionnaires were used to survey these two groups (N=301, teachers and N=20 District Consultants) on aspects such as: how they select software; what criteria they employ in selecting software; how confident they feel about software selection; their level of training in software selection; and the skills and resources they have in software selection.

This data was then analysed through the application of computer based analysis programs.

From the data collected some questions arose about the methods employed in software selection and whether they were conducive to the selection of good quality software. The current status of the Education Department's (formerly called the Ministry of Education) preferred document on software selection 'Software Focus' was also bought into focus as a result of the data collected in this study.

The questions raised in this study relate to several important issues, not least of all, how can Western Australian primary school teachers be helped in making careful and considered selections of software for their classroom ?

The findings of the research, provided useful information about the attitudes, understandings, skills and needs of the teachers in W.A. primary schools with regards to the selection of educational software. It indicated a need for further training in software selection; a need for increased awareness of the Education Department document 'Software Focus'; and a need to bring to the attention of teachers the importance of the proper selection of software for increased efficiency. It also indicated that 'Software Focus' would need to be reviewed and updated to be the effective resource for which it was designed

This research also provided useful information about the similarities and differences which exist between W.A. primary school teachers and District Consultants with regards to software selection.

This research indicated that District Consultants and teachers differ significantly in their methods of selection of software and the factors which influence that selection. Other significant indications are that District Consultant are: more likely to assess software before they use it; feel better trained in software selection; have more tertiary training in software selection; use 'Software Focus' more frequently in the selection of software, and; believe teachers to be better trained and more competent in software selection than teachers themselves do.

Declaration

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

Signature .....[redacted].....

Date .....25/9/1995.....

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I would like to thank my wife Sandra and my children Chris and Sarah for their support and understanding during the preparation of this thesis, anyone who has undertaken a task such as this realises the impact it has on not only the author but also those close to the author.

I would also like to offer sincere thanks to my principle supervisor Mr Rod Ellis without whose guidance the thesis would have been a greater travail than it turned out to be.

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Chapter 1
Introduction

Background

Over the last few years, educational institutions in Western Australia have been asked to decrease their spending in real terms, and come to grips with an economic system which is already strained, and finding difficulty in coping.

Increasingly, schools are being asked to take control of their finances and to make sure that each educational dollar is spent 'wisely'. Mis-managed expenditure can no longer be supplemented by funds from a central source, and any program which is to be instituted into a school needs be done so within the framework of the budget of that school.

Schools are continually looking to spend their money on tools or methods which will make them more educationally efficient and effective.

Computers are tools that have been introduced into the schools of many countries, with an encouraging level of success. A variety of studies has shown computers to be an effective tool for instruction (Brown, 1991; Schueckler and Shuell, 1989; Krendl and Lieberman, 1988 etc) and consequently an efficient method of spending educational funds.

In 1984 the Beazley Committee of Enquiry into education in Western Australia, recommended that computer usage in schools should be implemented. In 1987, the Education Department of Western Australia (at that time called the Ministry of Education of Western Australia) embarked on the introduction of computers into Western Australian primary and secondary schools. A great deal of money was made available (some five and a half million dollars) to place the computers in the schools and provide the infra-structure for their successful implementation.

This allocation of staff and funds was for a limited time of three years and came to an end in December 1990 (Australian Education Council, 1991). By this time, computer usage in schools was supposed to have begun and a sound degree of 'computer literacy' was to be in place. A policy document was produced by a central body called the Computers in Education Project (C.E.P.), in consultation with other interested parties, that outlined the areas which should be addressed by the schools and individual teachers. One of the areas focussed on, was that of software, and its use.

> ..using their knowledge about good teaching practice to identify potential software and to evaluate its usefulness in achieving their educations objectives (Policy Document, 1987).

Just the inclusion of a section on software in such a succinct document (the whole policy plus an "Outcome Indicators" continuum was presented on one side of a 60 cm 42 cm wall chart) suggests that the writers of the policy document realised that the successful implementation of computer software was a vital ingredient in the introduction of computers into all areas of education. The "Outcome Indicators" continuum (see examples below) indicated that teachers would develop the ability to recognise good software but failed to explain how they would develop the ability to do this.

> Teachers are able to explain what constitutes good software and how it can be used across the curriculum to achieve their educational objectives
>
> Teachers confidently make use of sources of evaluation and review in selecting software to support their educational objectives.
>
> Teachers are confident in their selection and appraisal of software - willing to contribute their views to others via *Software Focus* (Policy Document, 1987)

There is no doubt that the selection of appropriate software is a crucial factor in the successful implementation and use of computers in education (Bangert, Drowns and Kozma, 1989; Callison, 1987; Talmage, 1985; Haycock and Callison, 1984; Cohen, 1983). Without suitable software, computers can not fulfil the potential they have as tools for education. It is the selection of suitable software which is difficult for some teachers. In many cases they neither have the time, the opportunity, the confidence, nor the expertise, to choose relevant and efficient software.

In Western Australia the need for considered selection of software has been addressed through the introduction of a document which shares 'expert' views and opinions on educational computer packages available for Western Australian schools. This document was put together by the Computers in Education project team (C.E.P.), first in the form of 'Wesrev' in a magazine format, and then as 'Software Focus', a loose leaf file format, which allows the flexibility of inclusions at later dates. This resource provides expert reviews that could help those teachers who don't have the expertise, opportunity or confidence, to make a considered determination about the software that they select. It is possible that teachers with less confidence in software selection are more inclined to use 'Software Focus' as a selection tool.

Of course, a lack of confidence was not the criteria by which 'Software Focus' was made available to teachers, all schools were provided with a copy of this set of documents. The question can then be asked, do those people high in confidence use this resource? If not, how do they select software? Is it a different method to those who are not confident with selection? Indeed, is anyone at all using this resource 'Software Focus', which has been carefully planned and compiled and so widely distributed?

In 1992 'Software Focus' Vol. 7 No. 4 was printed as the final issue. Although software reviews were continued in a few subject specific documents, there was no current, one source of software review, recommended by the Education Department that one could turn to except.

If teachers are not using an Education Department recommended resource such as 'Software Focus', or another method of selection that allows them to select software of value, are they getting the full value from using computers in the classroom? The current value of 'Software Focus' is then deserving of comment and the future of this resource needs consideration.

NEED FOR THE STUDY

Computers are just one of the many tools that are available to schools in order to better facilitate learning. Proponents of computers in schools assert that there are gains to be made in employing computers in learning (Brown, 1991; Roblyer, 1990; Krendl and Lieberman, 1988; Telfer and Probert, 1986; Richards, 1985; Kulik, Bangert and Williams, 1983; Sprecher and Chambers, 1980; Thomas, 1979), but unless these gains can be substantiated by teachers, then it is unlikely that they will bother spending funds on such a resource.

With increased accountability on the spending of money on education, both in a macro and micro - economic sense, there has to be more care taken to ensure that money is spent wisely. If the community perceives that the money which a school spends on computers and software could be better spent some other way, then there is every possibility that funds will be channelled away from the use of computers in education.

Since the Beazley Commission Report was released in 1984, there has been an increasing level of interest focussed on the spending of Government revenue on Education in Western Australia.

The key recommendations which came from the Beazley Commission Report (1984), required the departments within the Education Department to efficiently and effectively meet the needs ascribed them, with funds which were in demand from all quarters.

In a background of financial austerity within the education system, education using computers has still managed to enjoy a high priority in Western Australian schools over the last few years and has received a fairly high level of expenditure. But in spite of this substantial financial outlay there has been little evaluation of teacher's ability to select and utilise software in education.

Investigations in the United States and the United Kingdom (Callison, 1987; Akahori 1988; Davis, Redmann & Seaward, 1988; Schueckler & Shuell, 1989) can be synthesised into a list that, not counting the various permutations of these methods, shows there are six major methods by which a teacher can become aware of the available software and its usefulness to their teaching situation.

The six methods are:

1. through seeking advice and assistance from the computer Consultants within their school District;
2. by seeking other teacher's opinions of packages;
3. through teacher education programs, pre-service, inservice and post service tertiary;

4. by reviewing software for themselves, either on an ad hoc basis or by using a review instrument;
5. through independent journals that review educational software;
6. advertising materials sent to schools by commercial suppliers; and

In relation to circumstances in Western Australia, use of the Education Department preferred document on software selection, such as 'Software Focus' can be added to the above list.

These seven criteria deserve further examination. Each criteria is restated and discussed briefly (see below) in the context of Western Australian schools.

1. Seeking advice and assistance from the computer Consultants within their school District;

At the end of 1990, the financing priority for introducing computers into schools came to an end and some Districts decided that a District Office based computer Consultant was no longer required, while others decided to combine this role with other duties. At least 16 of the 29 Districts had taken one of these courses of action by the end of 1991. This brought to a close an important and informed source of information for those Districts.

This focuses some attention on the current benefits of existing District Consultants as agents for teacher selection of software.

2. Seeking other teacher's opinions of packages

The opinion of another teacher recommending software must be considered in terms of the context of their particular situation. For example, just because a package 'worked' with one group of Year 7 children does not mean it is assured of working

with a different group of Year 7 children. This may be due level of maturity of students; familiarity with computers of students and teacher; time constraints on both teacher and students; availability of computer hardware; teacher's ability to use the available software; teacher's understanding of the limitations of the software; 'off computer' work which is done on topic; or a multitude of other variables. No two classes are alike and no two classes are likely to respond to a software package in exactly the same manner. These issues will be explored in this study

3. Through teacher education programs, pre-service, inservice and post service tertiary;

Teacher training, pre-service, in-service and Tertiary study, in methods of selecting software is still in its infancy and consequently may not be as well handled as it could be, or for that matter given the time it deserves. Some teachers may never have received training, and even those that are given training, may find that training insufficient. This could be due to factors such as: teacher training priorities, lack of resources, etc. This creates a potential problem, in that the trainee teachers and graduate teachers, may not be as effective as they should be in software selection.

In this study the types of training that respondents had undergone was explored, to determine out how this training effected their perceived ability to perform software selection and the methods which they employed to do so.

4. Reviewing software for themselves, either on an ad hoc basis or by using a review instrument;

The seemingly simple task of reviewing can often turn out to be one of great complexity, when attempted by teachers, and one which requires an expenditure of time as well as the use of some knowledge.

Self review of software by teachers was analysed in this study to find out which teachers were more likely to use this process and how effective the process was perceived to be.

5. Independent journals that review educational software.

Independent journals that review software have potential short-comings that a teacher must be aware of before he or she can be fully satisfied with the recommendations they stated in that publication. There is always the possibility that the magazine reviewing the materials might be: not very well grounded; culturally biased; published by an interest group with a 'stake' in the findings ; assessing software not available outside of the country which publishes the magazine ;with pedagogical concerns different in the reviewers environment from the readers; using software which does not conform to the hardware requirements of the school .

A teacher probably does not have the resources nor the time to determine these factors in their own judgement of the journal based review.

This study looked at which teachers were likely to employ this method of selection, and how using this method related to their perception of their own ability to select educational software.

6. Advertising materials sent to schools by commercial suppliers.

It is usually in the interest of the commercial supplier of a piece of software, to present it in a manner in which it would best sell, and to this end would possibly not be impartial in their judgements.

It is therefore necessary to investigate how many teachers are using this method as their sole method of software selection and whether there is a relationship between their confidence in selecting software and the use of this method.

7. Using Education Department documents on software selection such as 'Software Focus';

As previously stated, the Education Department in Western Australia has produced two publications related to the selection of software in schools. 'Wesrev' was the first publication and was subsumed into the document 'Software Focus', which was made available to all state schools. One copy of 'Software Focus' was delivered to each school by means of a District Office in-service, through a 'key person' (usually the school computer co-ordinator).

This study examined if schools actually have these documents, if the documents are employed in the selection of software and the value of 'Software Focus' to teachers when engaging in software selection.

In relation to all seven of the above, if there is a shortfall in any of the areas of teacher education or available resources for software selection, then this needs to be addressed as soon as possible. Otherwise, schools may decide that poor training and sources equates to poor software selection and poor software selection equates to wasted spending on resources. Consequently they may decide that money should not be put into using computers in education but into other areas of need.

PRIMARY RESEARCH QUESTION 1

What are the methods currently employed by W.A. Government school teachers in selecting educational computer software for use in their classrooms?

PRIMARY RESEARCH QUESTION 2

What are the factors which influence teachers in the selection of educational computer software?

Subsidiary Research Questions related to Primary Research Question 2

2.1. What percentage of W.A. Government primary school teachers :

(a) Use computers in their classrooms?

(b) Select educational computer software for use in their teaching ?

(c) Assess educational computer software before its use in their teaching?

2.2 Do W.A. Government primary school teachers believe they have the necessary skills and resources to effectively select educational computer software?

2.3 What training background have W.A. Government primary school teachers received in the selection of educational computer software?

2.4 Does: age; gender; teaching position; year level taught; teaching experience; years of training; post service tertiary study; and perceived competence affect the way in which teachers select educational software?

2.5 What is the relationship between teachers' perception of whether they have the skills and resources to select software and their method of selection ?

2.6 What percentage of W.A. Government primary school teachers have knowledge of and choose to employ the Education Department documents on software selection such as 'Software Focus' for selecting educational computer software?

2.7 What is the relationship between teachers' confidence in assessing software and their use of 'Software Focus'

PRIMARY RESEARCH QUESTION 3

What are the differences between District Consultants and W.A. Government school teachers in the process of selecting educational software ?

Subsidiary Research Questions related to Primary Research Question 3

3.1 Do District Consultants differ significantly from W.A. classroom teachers in respect to:

1) Their methods of software selection.
2) Their favoured methods of software selection.
3) The factors which influence the selection of software.
4) If they assess software before its use.
5) Their belief in whether they have the necessary skills to select educational computer software.
6) The types of training they have been involved in.
7) Their knowledge and use of Education Department material on software selection, particularly 'Software Focus'.

3.2 Do District Consultants differ from W.A. classroom teachers in rating the adequacy of training of teachers, and general competency in software selection of teachers?

SIGNIFICANCE OF THE STUDY

This project will show:

1) What percentage of Western Australian primary school teachers are using computers in their classroom teaching.
2) What methods are used by Western Australian primary school teachers in selecting educational software.
3) If Western Australian primary school teachers are selecting their own software or relying on other agencies to make choices for them.
4) What percentage Western Australian primary school teachers are using a preferred Education Department document such as 'Software Focus' in their selection of education computer software.
5) If Western Australian primary school teachers believe they have the skills and resources available to them to select educational computer software effectively.
6) How Western Australian teachers can be better aided in the process of selecting educational software.
7) If Western Australian teachers differ greatly to District Consultants in the methods they use in selecting software and the factors which influence that selection.

DEFINITION OF KEY TERMS IN THE STUDY

Assessment of software packages

Any form of consideration or judgement in an informal or formal manner, in order to judge the quality of a software package.

Co-ordinators

Co-ordinators within schools responsible for the organisation of the courseware within that school. Usually co-ordinators are selected to fulfil that position due to an interest and some skill in the area, though they may not have any formal qualifications in computer education.

Computer Education

The use of computer courseware to help in the school room. Using computers across the curriculum to learn, rather than learning about computers. Computer education differs from computer literacy or computer science in that they are more oriented to teaching about computer technology in particular programming.

District Consultants

District Consultants are teachers who have been seconded to their District Office to act as a resource in computer education for that District. Usually selected to fulfil that position due to an interest and some skills in the area but not necessarily with any formal qualifications in computer education. Sometimes selected due to a grounding in computer science. The District Consultant may be employed in this position on a full or part time basis. As of 1991 there were 20 District Consultants in the 29 school Districts of W.A.

Educational computer software

Computer software which is used to enhance learning.

Education Department

The Western Australian Government authority in charge of education, formerly known as the Ministry of Education.

Review/Evaluation

There exists some confusion over the terms of software review and software evaluation and the terms have often been used in the same context, however the terms are different and should not be used as alternatives. According to the Computers in Education project team who put together 'Software Focus', the preferred Western Australian Government Education Department document on computers in education, the differences are :

> *Software review* is what the teacher does. when s/he runs through a particular package, to see how it works, to check the suitability for various classes and courses, and to examine such things as error trapping, use of graphics, clarity of instruction, and quality of supporting materials. *Software evaluation* should focus on children, (the target group) and what they have learnt from the package. Rigorous software evaluation should also examine the comparative effectiveness of other approaches to the same content- for example, use of books, audio visual materials, or a teacher centred approach. (W.A. Ministry of Education, 1990)

Software

Software being the programs which contain the instructions which control the computer (Oliver and Newhouse, p. 24).

OUTLINE OF THE STUDY

Questionnaire 1 - Teachers Questionnaire

A trial questionnaire was delivered to 17 schools in the Darling Range and Northam Districts. These schools were selected as a matter of convenience. From this pilot study a revised questionnaire was constructed. The following mechanics of distribution were observed for the revised questionnaire.

1) The questionnaire was sent to all 543 Government primary schools. (See Appendix 1)
2) The questionnaire was addressed through the Principal to a nominated teacher (see below).
3) The teacher who was nominated was from a particular year level within that school.
4) The year level required from that school was determined by:
   a) placing schools in categories as determined by the Education Department (e.g. Class 1A schools, Class 1 schools, etc.) This ensured that each category of school in the State of Western Australia was represented.
   b) dividing at random all the schools within each category into seven smaller groups to represent the seven year levels in W.A. primary schools. This was to ensure as much as possible that all year levels were represented in the survey.

The statistical computer package "Systat" was applied to all of the gathered information.

The returned questionnaires were then analysed for the following :

1) What percentage of teachers use computers in their classroom.
2) If teachers are actually assessing software before they use it.
3) What are the methods by which teachers select educational software.
4) What are the criteria that teachers employ when selecting software.
5) If the teacher's have knowledge of and use of the preferred Education Department documents on software selection.
6) If the teachers believe they have the ability to select educational software.
7) What types of training in software selection, teachers have been involved in.
8) What the demographic factors of all subjects are and how these may effect their responses to all of the research questions posed.
9) What the relationship is between teachers belief in their ability to select software and their use of Education Department documents.
10) What the relationship is between teachers perceived ability to select software and the type of training they have received.
11) What the relationship is between teachers belief in their ability to select software and their method of selection?

Questionnaire 2 - District Office Consultants

A revised version of the questionnaire referred to above, was sent to the District Consultant in each of the Districts in Western Australia (see appendix 2). The revisions were required due to the different emphasis on the information which was being sought from District Consultants.

The returned questionnaires were then analysed for the following trends:

1. If District Consultants are actually assessing software before they recommend it,
2. What are the methods by which District Consultants select educational software,
3. What are the criteria (if any) that District Consultants employ when selecting software,
4. If the District Consultants have knowledge of and use of the preferred Education Department document on software selection. (Software Focus)
5. If the District Consultants believe they have the ability to select educational software,
6. What types of training in software selection, District Consultants have been involved in,
7. What the relationship is between District Consultants perceived ability to select software and the types of training in software selection they have received,
8. How the District Consultants rate the adequacy of training of teachers in software selection, and the general competency of teachers in software selection, opposed to how the teachers rate themselves,
9. If there is any difference in the manner in which District Consultants and teachers approach software selection.

Where the data is nominal, that is categorical, the data were handled through the use of cross tabulation tables to determine the significance via a chi square, test of standard error of difference of two individual proportions and ANOVA.

Chapter 2
Review of the Literature

Any educational concern these days runs into a pervading need to justify itself. It must justify itself in terms of being economically and pedagogically effective. Introducing computers into classrooms faces these same areas of scrutiny. To this end many studies have been undertaken to determine the effectiveness of computers in education (Bangert-Drowns, 1993; Kearsley, Hunter and Furlong, 1992; Bruce and Rubin, 1992; Niemiec, Sikorski and Walberg, 1989; Bangert - Drowns, Kulik and Kulik, 1985; Levin and Woo, 1981), and how we can measure that effectiveness (Windham, 1989; Shuell and Schueckler, 1989; Poppen and Poppen, 1988; Jolicoeur and Berger, 1988).

The introduction of computers in schools must be seen to be economically sound, that is, an effective way to spend limited educational funds (Hawkridge, 1990). Computers must not only show that they work well as an aid for teaching but also that the software used, is the best that is available. If computers can not be shown to have a good record on these counts then their introduction into education is likely to be less than well accepted and funded accordingly.

Since the Beazley Commission Report was released in 1984, there has been an increasing level of interest focussed on the financial strictures which need to be applied to the spending of Government revenue on Education (Louden, 1988). The interest in economic 'accountability' became more important in schools at this time.

The key recommendations which came from that report centred on the requirements of the soon to be formed Ministry of Education (prior to this time called the Education Department and then in 1994 renamed as such). These requirements were for: flexibility; efficiency; effectiveness; responsiveness to community needs; support for non-Government community groups; and, an innovative approach to

management (Louden, 1988). These requirements were to be met under the conditions that the Minister for Education had difficulty " in deciding the allocation of resources cause of the competing demands from the many agencies for which he had responsibilities" (Louden, 1988).

Although the terms 'efficiency' and 'effectiveness' can be interpreted in a variety of ways, there is little doubt at the financial aspects of these two words was high in the thoughts of the Beazley Commission. This is spelled out in point 1.9 of the general overview of the inquiry:

> There is no doubt that important sections of the community have developed an increasing interest in the State's educational institutions and are vitally concerned with the conduct of their affairs. This has come with an increasing realisation of the vast community resources directed towards education in recent years, particularly at the post-secondary level, and this interest has been enhanced by a recent recession (Beazley 1984, p. 4-5).

Inefficient use of funding in education, specifically education involving computers has also become a topic of more than just passing interest in the U.S.A.

> Even after spending more than $2 billion on an estimated 1.7 million personal computers educators are hard pressed to spot the heralded revolution in the schoolhouse. What derailed the revolution? (Boe 1989, p. 39).
>
> or;
> As higher education increasingly adopts computer technology, the selection of effective software is imperative to make these investments productive (Bangert - Drowns & Kozma 1989, p. 241).

"Productivity may be the central problem for education and educational research for the remainder of this decade " (Melmed 1983, p. 4). This prediction made in 1983 is proving itself true with each passing year as we head further into the 1990's. This is further supported by the Organization for Economic Co-operation and Development (OECD):

> While limits on educational spending have considerably reduced the amount devoted to education as a percentage of the GNP and of total government expenditure, the savings made have created problems that teachers - who constitute a powerful pressure group - have not failed to point out (OECD 1987, p. 25).

Both of these articles and others of their ilk (Windham, 1988; Bork, 1983), take great pains to indicate that education is feeling a very real economic squeeze.

It perhaps can be reasonably assumed that, in the economic climate that is developing in the early 1990's, economic accountability is going to be an even more pressing item on any government agenda.

Sweet (1989, p. 133) relates in some depth a seminal speech by an economist T.W. Schultz in 1960. In this speech as reported by Sweet, Schultz asserted that human knowledge and skill was indeed a form of capital and so able to be treated by economic theory and methodology.

Further, Sweet (1989, p. 133) indicates that this speech gave rise to a political response, which meant that Governments must embrace that education is a good thing on which to spend money. Given that the Western Australian Government spent $1,150 million dollars in 1992- 1993 on Education, (Education Department of Western Australia, Education Statistics Bulletin, 1994) it would seem reasonable to assume that they do, indeed, embrace this assertion. A Government which has this view on education would of course wish to see the best possible return on that investment. It therefore would seem axiomatic that stringent checks would be made to sure that the money was well spent and that they were getting good value for their educational dollar.

Educational institutions in Western Australia have been asked in the last few years to decrease their spending in real terms and come to grips with an economic system that is already strained and finding difficulty with coping. Partially to make for a 'better' system and partly in order to ease the burden on the educational system, the state Government has been decentralising the responsibilities for expenditure. Schools now have their own money for which they are responsible and no longer apply to a central body for all of their requirements.

More and more, each school is being asked to take control of the allocation of their finances and to make each Educational dollar 'count.' No longer are schools able to cap in hand to a central body to ask for supplementary funds should they find that their needs are greater than their finances. Windham (1988) declares that when faced the increasing social and economic demand, a human resource system such as education is left with three alternatives. These are: to obtain new sources and levels of funds; accept poorer quality and/or poorer access; and, increase the efficiency with which the existing resources are used . It is now up to individual schools to use their grants in a manner that will afford them the greatest productivity for their educational dollar.

> The key to productivity improvement in every other economic sector has been technological innovation. Effective application of modern information technology in schools is therefore a critical subject for research (Melmed 1983, p. 4).

Most areas in society have taken the changes in human communications through computers uses in a manner that suggests that they see computers as being necessary to keep pace with economic realities. It is important then to ask how education has managed this change.

> Indeed the information revolution has been marked by a shift from labour and capital intensity since computer assisted technology can cost effectively replace capital and labour. Yet what about education ? Why does education seem to lag behind the rest of society ? Why has technology in the classroom remained substantially unchanged for so long ? (Niemiec, Sikorski and Walberg, 1989, p. 395).

In 1984 the Beazley Committee of Enquiry into education recommended;

> That all schools and school systems develop and implement policies in computer usage in schools so that all students benefit from the use and experience of computers and are educated in relation to this form of technology (Beazley, 1984, p. 368).

Then in 1987, The Education Department embarked upon the task of spurring on in a systematic and financially supported manner the wider introduction of computers into Western Australian primary schools. In order to achieve this they provided five and a half million dollars ($5,500,000) for the placement of approximately two thousand six hundred computers into State schools and for the Regional Offices to employ computer Consultants to oversee their smooth deployment (W.A. Ministry of Education, 1988). According to Hawkridge (1990), in industrial countries, children use computers in schools for four main purposes: to become generally aware of the uses and limitations of computers; to learn computer programming; to learn to use programs for word- processing, spreadsheet analysis, graphics process control and information retrieval from databases; and to learn selected topics from school subjects right across the curriculum, with the computer and educational software then complimenting or temporarily replacing the teacher. In addition to this, the education system has three other purposes for introducing computers: to train students to fit into the information technology industry and to be able to cope with new products, new ways of production and new technology (DEET, 1988); to deal with children with special needs such as those with physical and sensory impairments (Williams, 1987); and, to be as cost effective as possible (Hawkridge, 1990; Marshall, 1989; Lane, 1988).

Before the question of the educational value of our computing dollars can be addressed it is important that the value of Computer Assisted Instruction (C.A.I.) is first of all considered.

Computers are still relatively new to education. We are still in a stage of exploring the various ways in which computers can be used effectively for instructional purposes (Schueckler and Shuell, 1989, p. 26). Consequently, even though " Over the past three decades, computers have become progressively more important as instructional vehicles,..." (Shute and Gawlick-Grendell, 1994, p. 177), educational decision makers are still determining how effective computers are, (Peled, Peled & Alexander, 1992, p.82) and in what circumstances they are most effective; as,

> ...in certain situations computers might not be the best mode for the presentation of a particular topic and other forms of instructional media might better do the job, particularly if the computer's full capabilities are not being used (Schueckler and Shuell, 1989, p. 26).

Basically, research shows us that the computer has been of value in increasing the rate, and the amount of learning, as well as increasing the student's motivation for learning (Cavalier and Reeves, 1993; Cates and McNaull, 1993; Bangert-Drowns, 1993; Kearsley, Hunter and Furlong, 1992; Bruce and Rubin, 1992; Roblyer, 1990; Krendl and Lieberman, 1988; Telfer and Probert, 1986; Richards, 1985; Kulik, Bangert and Williams, 1983; Sprecher and Chambers, 1980; Thomas, 1979). Other research supports these findings, though perhaps the results of such instruction are more ambiguous than one might expect (Peled, Peled and Alexander, 1992; Schueckler and Shuell, 1989; Hattie, 1989; Krendl and Lieberman, 1988; Orlansky, 1983; Kulik, Bangert - Drowns and Williams, 1983; Sprecher and Chambers, 1980; Thomas, 1979).

However effective the productivity of increased technology, it can not be fully realised without software of a good standard.

> As higher education increasingly adopts computer technology, the selection of effective software is imperative to make these investments productive (Bangert - Drowns and Kozma, 1989, p. 1).

In order achieve effective software selection, " ...numerous evaluative schemes have been created to help educators locate well designed instructional software " (Bangert - Drowns and Kozma, 1989, p. 1).

Authorities are becoming even more aware that poorly considered selection or 'blind' purchase of software is not in the best interest of education.

> Recent recommended procedures for the selection of educational software have placed the review and selection process on the same high and demanding level as textbook review involving teachers, parents, administrators, students and media professionals in committee work which is based on long-range planning for local educational growth
> (Callison, 1987, p. 132).

This is further supported in the work of Cohen (1983, p. 17), Haycock and Callison (1984, p. 12), and Talmage (1985, p. 31).

The acquisition of appropriate software is a continuing problem for the educator. One method would be to produce the instructional materials for themselves, but this of course presents some difficulties.

In the past, it was highly unlikely that effective educational software programs could be easily developed by teachers, since producing educational software materials was a laborious process, requiring much in terms of time, effort, computing skills and creative abilities (Akahori, 1988). These days authoring tools have been developed which have alleviated the problems somewhat but it is still unlikely that the classroom teacher would be much interested in the production of their own educational materials. Therefore the teachers are usually reliant on others to produce

the materials. The teacher then can sieve out the materials which do not suit them, and select the software that is applicable to their situation.

At the time of the Beazley recommendations of 1984 the Government of Western Australia decided that the introduction of computers into the classroom was of importance (even though the financial 'push' didn't come until 1987). It was somehow assumed at that time by those introducing computers into schools (perhaps through expediency or perhaps lack of thought) that the general teaching population in Western Australian primary schools, had either developed or could develop a pragmatic understanding, of the criteria that determines educationally sound software. Maybe this assumption was made due to the fact that teachers have in the past had to assess textbooks and other instructional materials and consequently are familiar with this task (Davis, Redmann and Seaward, 1988). It may have been assumed that the selection skills gained, were transferable.

Through many years experience, due in part to the importance placed on the proper selection of texts (Liebert and Poulos, 1973) and well-delineated selection criteria, books and other forms of instructional materials can be closely scrutinised and assessed concerning their effectiveness. In fact it could be reasonably stated that printed textual material would not reach any school until it had been thoroughly vetted for suitability by the Education Department or the District Office staff or individual school staffs, representative citizens or a combination of these agencies (American Library Association, 1985). There is also a large enough quantity of printed instructional material available for the selection to be made on a sound comparative basis.

The linear nature of written material also makes it easier and quicker to compare than computer software which is interactive in nature and consequently less linear. In order to proceed through all levels of a software package there is a far larger

expenditure of time than is needed for the written material (Squires & McDougall, 1994).

Part of the educational program in Teacher Training courses has been directed at instructing the prospective teacher about how to assess the quality of one piece of printed text over another. This can be achieved through giving a selection of different texts available and assessing their differences and expressing ideas based on experience and informed opinion, that is, recommendations from an informed source.

Further, the writers and publishers of instructional texts have been in the business long enough to have a strong understanding of the needs of the educational institutions that they are targeting with their books. Not only do they have a good deal of experience in order to select what material will 'work' and be found suitable by the educationalists, but they also have a large and experienced teaching population on whom to test their materials for suitability.

However, although Schueckler and Shuell (1989) claim that in a sense, the review of software is analogous to the view of a new textbook or other instructional resource, they also state that a textbook review is a far from exact process, and that most educators would have to admit that the evaluation and selection of software frequently is done with far less care than would be the selection of a textbook.

If the software is then being chosen through some pragmatic understanding of what makes 'good' software, how is this understanding developed ? If, there is not sufficient 'training' to develop this pragmatism then a second, and perhaps possibly just as misguided assumption, comes into play. That assumption being that there is enough expertise in the community to judge the software and/or that there could be a central source through which recommendations could be made.

When asked to select software what are the methods/strategies that teachers employ? They range from selecting software through: self trailing; scanning the supporting documentation within the package; the advertising on the package (Schueckler and Shuell, 1989); seeking the opinion of peers; seeking 'expert' opinion (usually someone designated by an educational body, such as District Office staff member); or, reading articles on software selection (Callison, 1987).

Are these strategies always advisable ?

> Marketing strategies such as glossy packaging do not ensure that the instructional software inside will be of high quality. Likewise, technically sound, sophisticated software which incorporates detailed graphics, sound and informative directions does not necessarily mean the material is presented in a manner consistent with either viable principles of the curriculum design or an appropriate instructional model (Schueckler and Shuell, 1989, p. 25).

So, if you can't judge a package by its cover, can you expect an outside source to give you suitable information ? For instance, there is always the consideration of whether the people who are making the recommendations to buy software, apply any of the same criteria in judging software that the purchasing teacher would ? As Callison (1987) states:

> What actually takes place, however is often not systematic and may be controlled by the forces of budget deadlines, commercial hype, and decisions based on the reviews found in the many professional review sources without consideration being made for local needs and local educational objectives (p. 133).

Do the people providing the recommendation have the same needs of the package that the potential purchaser has ? Do the people making the recommendation know the intended audience and if the software will work for that group ? Do the people recommending the package know the intended use of that program by the purchaser?

What if the people recommending the program have used the program in a full class situation and the potential purchaser wishes to incorporate it into a remedial situation ? (Davis, Redmann and Seaward, 1988). Indeed, colleagues may recommend particular software because they have never tried other programs, so their recommended program may not be the best available (Davis, Redmann and Seaward, 1988).

So does the general teaching population have the time in its busy day to stop and consider the effectiveness of the software it uses or wishes to purchase ? In 1986 there were about 7,000 commercially produced educational software packages available on the North American market, with a further 100 programs being published each month (Jolicoeur & Berger, 1986). Komoski estimated that by 1987 there were between 12,000 and 15,000 packages available (in Winship, 1988). By 1988 there were nearly 40,000 separate software packages to choose from (Davis, Redmann and Seaward, 1988). Further, if this software can be characterised overall as poor and often trivial (Bork, 1984; Jenson, 1985; Kontos, 1985) and we can immediately dismiss 95% of the software made available, as suggested by Komoski (1985), the number is greatly reduced. This is, as several studies suggest (Ring, 1993; Zahner, Reiser, Dick and Gill, 1992; Marshall, 1989; Winship, 1988), still far more than would allow a teacher to sit down and make meaningful comparison of all that is available to them.

There seems to be no doubt that good educational software continues to be in short supply (Anderson, Tolmie, McAteer and Demissie, 1993; Chin and Horton, 1993; Chan, 1989; Winship, 1988; Johnston, 1987; Preece & Jones, 1985). Without good software the potential of the computer as an instructional medium is extremely limited. " Is the software effective in teaching what it was designed to teach ? If not, there is no reason for continuing to use the software " (Jolicoeur & Berger, 1988, p. 8).

" Many of the programs on the market today are characterised by poor pedagogy, amateurish programming, and inadequate documentation" (Dudley- Marling, Owston and Searle, 1988, p. 241). So how does a teacher make a decision on the quality of an item of software and is that judgement sufficiently well informed ?

> Even though the range of software is limited, many educators are not aware of what is available. Information about effective pedagogical practices, whether in the forms of reviews or evaluation of software packages or in the form of 'good teaching practice' using the new information technologies is not generally readily available to teachers (Winship, 1988, p. 44).

Assessing software by evaluating (comparing with other media and other programs as to its effectiveness) and viewing (judging the suitability for a particular class) are not easy tasks and have many associated steps (Gradolf, 1988; Hodes, 1985; Clements, 1981; Steely, 1979) of which, many are not always employed in the purchase of software (Callison, 1987). Some assess software by checking for tailored feedback; frequent re-inforcement; the availability for remedial loops (Hodes, 1985). Others look for programs which; present information in small and concise steps and has questions and examples that are unambiguous (Clements, 1981). Whilst others make sure that responses to learner are varied and personalised and the program allows for more than a single opportunity for the correct response to be applied (Steely, 1979). Further, researchers have come to the conclusion that software evaluations tend to be normative, subjective and judgemental and are therefore limited in their usefulness (Zahner, Reiser, Dick and Gill, 1992; Dudley-Marling, Owston and Searle, 1988). Indeed an effective means of evaluating software is not always clear (Schueckler and Shuell, 1989).

"It is generally agreed that teacher training is the key to the implementation of computers in the schools" (Pipho, 1985, p. 100). Moursund (1992) cited in Pearson

(1994, p. 70) that "The need for our educational system to empower teachers to make appropriate and effective use of computer-related technology is well documented." Or as Sturdivant (1989, p. 31) confirms "... teacher training continues to be one of the most critical components in any educational technology program." However, despite these statements in 1989 it was reported, " the vast majority of teachers have little or no training in the use of technology " (Glenn and Carrier, 1989, p. 7).

In the U.S.A. at least, by 1993 the number of teacher education programs offering computer training to their students had risen to 89%, but only 29% of the respondents to a national survey, "saw themselves as prepared to teach with computers" (Handler, 1993 p. 147).

So how does a teacher as an 'authority' make a decision on the quality of an item of software and is that judgement sufficiently well informed ? According to research (Ring, 1993; Boe, 1989; Hatwood -Futrell, 1989; Fulton, 1989 Johnston, 1987) it is unlikely that the decision makers are sufficiently well informed given the lack of teacher education and the dearth of experienced users of computers in education. If this serious inequity is to be rebalanced then much time and effort must go into teacher training since new teachers are likely to be the keys to the effectiveness of any computer program in the classroom (Khalili and Shashaani, 1994; Abtan, 1989; Johnston, 1987). If this is so, and the emergence of computers in Australian schools is so apparent, then what could be the reason that graduating teachers are not getting more exposure to computers and computer software during their training ?

According to Oliver (1988) the reasons for the lack of training about computers and computer education during pre- service training stems from: computer education having to keep its place in the queue of programs that people see as essential to graduating teachers (a point echoed by Handler 1993, p. 148); that appropriate forms

of study in a training institution must develop gradually; and, the problem that many of the institutions are constrained by their lack of resources and a lack of suitably expert staff to teach these courses, a point Cuban (in Roberts and Ferris 1994, p.218) also supports. Winship (1988) also sees the problem as the lack of trained teacher educators with experience in teaching about computers and experience in using the computer across the curriculum. Cuban (in Roberts and Ferris, 1994) also includes the factors of:

1. lack of enough technology in the schools for it to 'make a difference,'
2. lack of adequate teacher education to have a role model for student teachers,
3. high degree of specialisation among college faculty,
4. faculty's ability to separate their personal and professional lives from their course content and teaching strategies,
5. speed of technological developments and increased energy required to 'keep up',
6. unwillingness of faculty (or probably most people) to face messy problems,
7. lack of clear, generally accepted, vision for the role of technology in education

(Roberts and Ferris, 1994, p. 218).

The problem is not just in the pre-service training of teachers but also in the in-servicing of teachers. Sturdivant (1989), isolates nine problems in the in- service training of teachers : financial incentives for entering such training is lacking; teachers who take on additional training are rarely recognised for this extra effort by their peers; teachers are already overburdened with paper work which leaves them very little time for staff development; teachers have very limited opportunity to see the theory in practical situations; teachers are isolated and their opportunities for

sharing their experiences are limited; access to software is limited; teachers don't get enough coaching, advice and assistance from other available sources; feedback and direction is missing on the teachers ability to work with the technology ; and, teachers can't provide quality training sessions for their peers because of time restraints (Sturdivant, 1989).

Then if this pre-service and in-service training was in place, would this be beneficial in helping teachers/reviewers to come to grips with meaningful software selection ? One would think that the short answer to this question would be 'yes' provided the training was 'good'. Two questions then need to be asked: what would constitute 'good' training and; is the effect of 'good' training truly beneficial for software selection ?

Bitter (1989) asserts that an 'ideal' technology curriculum in undergraduate teacher education would consist of the following topics (no suggested time frame is given to fulfil this timetable):

1. The microcomputer in education.
2. The history of computer use
3. The micro-computer system: Hardware and software
4. Methods, Curriculum and the Microcomputer
5. Word processing
6. Spreadsheets
7. Databases
8. Graphics
9. Telecommunications and integrating software
10. Computer Assisted Instruction
11. Choosing software for the classroom
12. Ethics and social concerns of computer use

13. Trends in teaching with computers
(Bitter, 1989, p. 34).

Given that training institutions would then run such programs would the results show benefits in the selection of software ?

In his study on experience and the investment of time in training teachers to evaluate software, Callison (1987) concluded that teachers who were experienced in the use of software: tended to look for more specific criteria to judge software on and tended to evaluate packages against others in a similar vein, which is a positive step (Shuell and Schueckler, 1989). This is further supported by Akahori (1988 , p. 62) when he wrote; "... teachers without sufficient experience in developing educational (software) materials are likely to fail in the accurate evaluation of its content." Evaluation of software can take place on many levels depending on the purpose of the review:

> ... formative, in improving program design; comparative, to determine a program's instructional effectiveness; direct observation to determine what actually happens when a program is used; and predictive, in evaluating program characteristics (Johnston, 1987, p. 41).

And again by Ring (1993, p. 197);" It was found that a high level of instruction in courseware preview methodology is likely to increase the predictive validity of the courseware preview ratings of primary school teachers."

In most cases, the issue of determining criteria for judging the quality of a piece of software is treated in broad terms to cover a wide variety of sub-elements, and therefore is open to different reviewers interpreting the criteria differently (Johnston, 1987).

Of course, the assessment of software need not be undertaken at all by teachers, there is always the possibility of having others evaluate the materials for them. Perhaps those employed are people who are seen as being expert in the field, for example the Computers in Education Project team which produced 'Software Focus' for the Education Department of Western Australia.

For those teachers who decide to make 'informed' selections for themselves, is there a list of criteria, from which people may draw, to make their software selection ? For the classroom practitioner or anyone else placed with the responsibility of ordering educationally and instructionally cohesive teaching aids, it is a persistent problem. Such persons want to obtain software that is supportive of the particular skills emphasised in their school and in the other available instructional materials. To do this they must use a tool for selection that is adequate and functional.

> Most of these evaluations, however, focus on technical aspects of the software rather than the instructional effectiveness, and those that have considered instructional factors generally have done so at a fairly superficial level or focussed exclusively on behavioural principles of learning Shuell and Schueckler (1989, p. 135).

According to Akahori (1988), when a teacher decides to assess a piece of software they should be looking for a tool that addresses questions on: content, teaching method, instruction and presentation; and, effectiveness
(see appendix 3).

Schueckler and Shuell (1989) have determined that software assessment should be addressed through the criteria: fundamental program characteristics; instructional concerns; principles of learning and teaching; and, overall rating (see appendix 4). It seems that there are quite a few sources for assessing software which can be drawn upon, Dudley-Marling, Owston and Searle (1988), state that there are at least 40 to 50 different approaches to software evaluation and review, of which Akahori's

(1988) and Schueckler and Shuell (1989) are only two examples. These range from simple checklists (Spille, Galloway and Stewart, 1985) , through Likert scales (Shuell and Schueckler, 1989) , to the more open ended evaluation (Caffarella, 1987). As seen by the two samples given above, the criteria are not always uniform across all approaches. As Schueckler and Shuell (1989, p. 8) write, " It is dubious that a single form could be developed that would be ideal in all situations. "

To alleviate the problem of determining what criteria should be used, the Education Department's computers in Education Project (C.E.P.) created a resource in the form of a file that was forwarded to all Government schools. This file, titled 'Software Focus', arrived with software reviews and ratings, and a promise that the raison d'etre for the file format which was adopted, was that more insertions would arrive at a later date. It described itself as a "clearing house of information on educational software and its use in schools" (Software Focus, 1990, overview). This appeared to be an excellent manner in which to set a standardised method by which all software would be evaluated and/or reviewed.

So a set of identified criteria (see appendix 5) were set and over a hundred packages assessed with the results being placed in the file. This created, what was and is potentially, an extremely useful resource. Certain questions present themselves at this point: Does everyone know that there are Education Department materials on software selection available ?; Are those materials being utilised by the people who select software for their class ?; and are the people who use these materials aware of the format (see appendix 6) by which the assessments took place ?

If teachers aren't using 'Software Focus' or some other Education Department approved materials in the selection of their software what selection procedures are they using ?

If teachers are not using Education Department materials on software selection and particularly 'Software Focus' at all, or are not using them 'properly', and instead using some other procedure, then it raises serious doubts about the validity of using a device such as 'Software Focus' for disseminating the important information about available software.

It also raises the question of whether we are getting the best available software in our schools ? If we are not, then we are not getting the best return for our 'investment' and such inefficiencies will add great ammunition to the arguments of those who would rather see the money that is spent on computer based education, go to other areas.

CHAPTER 3

ANALYSIS OF DATA

Total number of Primary Schools in W.A.	= 543
Number of questionnaires distributed	= 543
Number of questionnaires returned	= 327 (60.2%)
Number of questionnaires returned answered	= 301 (55.4%)

According to Krejcie and Morgan 1970 (p. 608) this represents a suitable sample size.

DEMOGRAPHIC INFORMATION

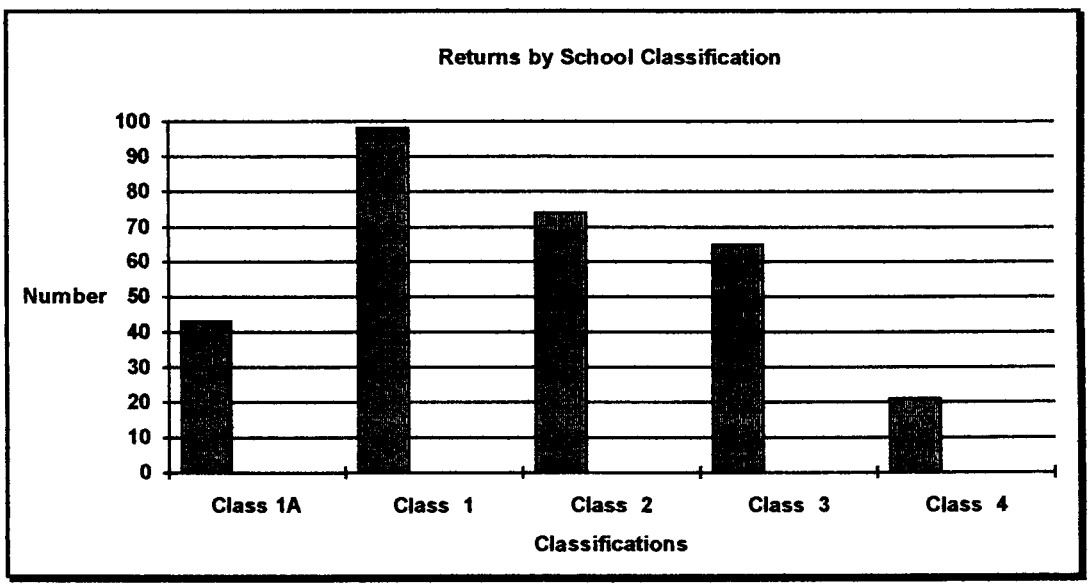


Figure 1. Returns by school Classification (as for Education Department's school classifications used in 1991)

Table 1
Distribution of respondents by teaching positions

TEACHING POSITION OF RESPONDENT	NUMBER OF RESPONSES	% OF RESPONSES
Classroom teacher	225	74.8
Deputy principal	31	10.3
Principal	45	14.9
Total	301	100.0

Table 2
Distribution of respondents by age

AGE GROUP OF RESPONDENTS	NUMBER OF RESPONSES	% OF RESPONSES
20 - 24 yrs	33	11.0
25 - 35 yrs	109	36.2
36 - 50 yrs	141	46.8
51 + yrs	18	6.0
Total	301	100.0

Table 3
Distribution of respondents by gender

GENDER OF RESPONDENTS	NUMBER OF RESPONSES	% OF RESPONSES
Male	125	41.5
Female	176	58.5
Total	301	100.0

Returns by District

Please see appendix 7.

Returns by teaching experience

See appendix 8

Returns by years of teacher training

See appendix 9

Returns by year level/s taught in 1991

See appendix 10

From the data above the following points were noted in relation to the demographic distribution of the respondents.

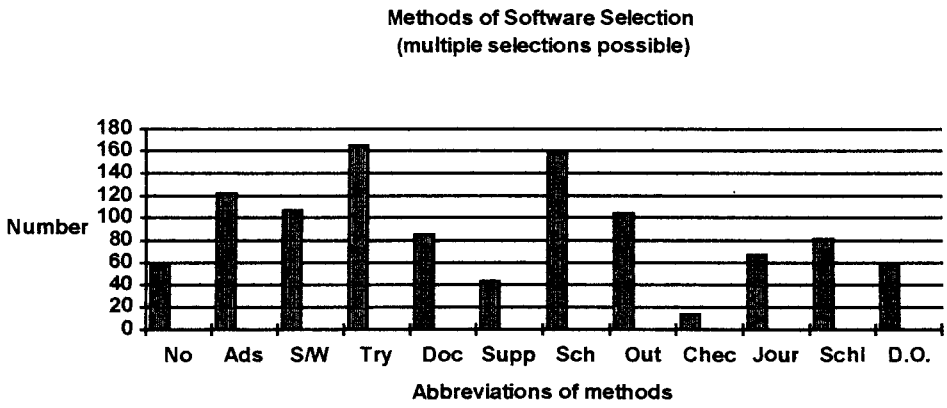
1. All school classifications were represented in the survey.
2. All school districts but Karratha were represented in the survey.
3. People employed solely as teachers rather than in teaching / administration or solely administration roles returned the greatest number of responses (approximately 3 : 1).
4. All year level teachers are represented in the survey.
5. 83.05% of respondents came from the age groups between 25- 50 years.
6. Nearly half (46. 84 %) of the respondents had been teaching between 11 and 15 years.
7. Just over half (52.15 %) of the respondents were 2 or 3 year trained. i.e. 47.85% were 4 or 5 year trained.
8. 58.47 % of the respondents were female.

ANSWERS TO RESEARCH QUESTIONS

PRIMARY RESEARCH QUESTION 1

(These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

What are the methods currently employed by W.A. Government primary school teachers in selecting the educational computer software for use in their classroom?



Abbreviations

No Do not select software
Ads Advertising
S/W Using Software Focus
Try Subjective opinion after trialing
Doc Subjective opinion from documentation supplied with package
Supp Opinion of commercial supplier
Sch Teaching peers in school
Out Teaching peers in other schools
Chec Checklist
Jour Journals & magazines other than Software Focus
Schl School co-ordinator of computing
D.O. District consultants (Number of respondents 267)

Figure 2. Method of software selection currently employed by W.A. Government primary school teachers in selecting the educational computer software for use in their classroom

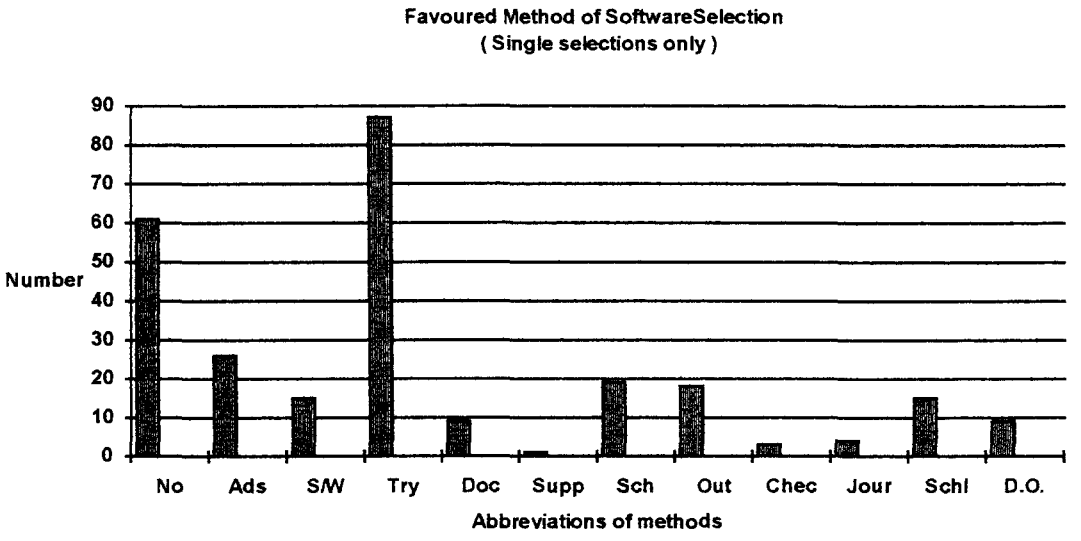
Respondents were given the methods (as listed in figure 2) on the questionnaire and asked to tick if these were methods which were used by them to select educational software. They were at liberty to make multiple selections if they required. A

separate space was left for any methods which had not been anticipated but this was not used by any of the respondents.

The top five methods of selecting software were: subjective opinion after trialing (61.7%) of respondents employed this method; using their teaching peers to suggest software (59.1%); using the advertising materials that are produced to sell software (45.6%); using the document "Software Focus"(40.0%); and fifth, using the recommendation of teachers from other schools (38.9%).

Use of "expert" opinion from school co-ordinators of computing or district office staff was not well supported being 7th (30.3% of respondents) and 10th (22.4% of respondents) respectively in terms of responses.

The respondents were then asked to indicate the single method they would most often favour in selecting software.



Abbreviations

No = Do not select software
Ads = Advertising
S/W = Using Software Focus
Try = Subjective opinion after trialing
Doc = Subjective opinion from documentation supplied with package
Supp = Opinion of commercial supplier
Sch = Teaching peers in school
Out = Teaching peers in other schools
Chec = Checklist
Jour = Journals & magazines other than Software Focus
Schl = School co-ordinator of computing
D.O. = District consultants

Total number of respondents = 267

Figure 3. Favoured method currently employed by W.A. Government primary school teachers in selecting the educational computer software for use in their classroom.

Subjective opinion after trialing proved to be the most often employed (32.6%) favoured method of selecting software. Second most often employed was using advertising materials with 9.7%, and then came taking advice from teaching peers at 7.1%, taking advice from teachers from other schools at 6.7% and then school based co-ordinator of computing and using "Software Focus" with 5.6 %. All other methods gained less than 5% of respondents using them as their favoured method of selection.

PRIMARY RESEARCH QUESTION 2
(These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

What are the factors which influence teachers in the selection of educational computer software ?

Respondents were asked to reply to this question using the terminology they chose in an open ended question. Using a synthesis of Akahori's Assessment of Educational Software (1988 , see appendix 3) and Schueckler and Shuell's Criteria to Evaluate Software (1989, see appendix 4) the responses were then categorised under the headings of : Instructional concerns;

Principles of learning/teaching ;

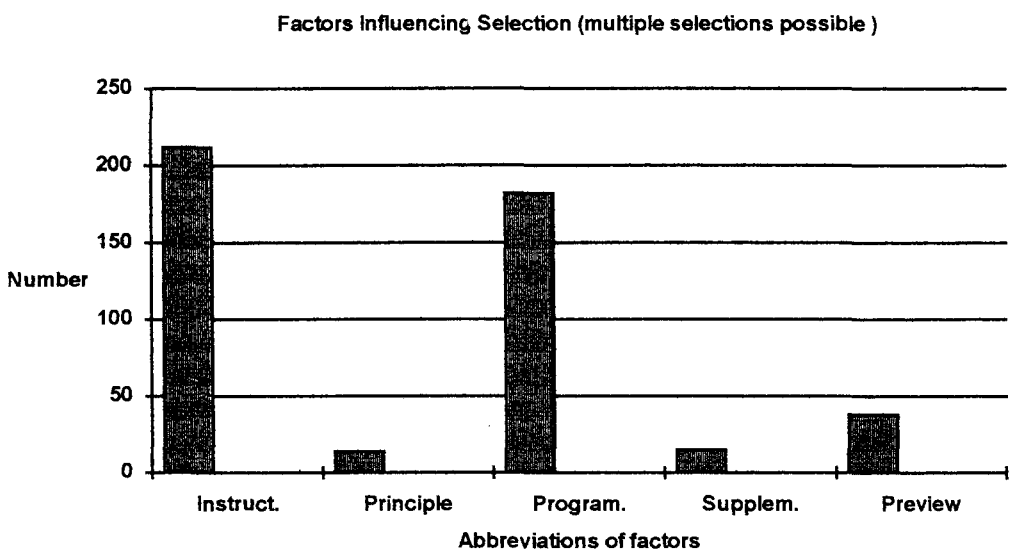
Fundamental program characteristics ;

Available supplementary materials ;

Opportunity to preview materials.

A full list of the actual responses that fit under these headings is available in appendix 11 .

One more heading was later included, " No response to question " for those questionnaires returned without this question being attended to.



Abbreviations

Instruct = Instructional concerns
Principle = Principles of learning/teaching
Program = Fundamental program characteristics
Supplem = Available supplementary materials
Preview = Opportunity to preview materials

N.B. 38 people made no response to this question.

Figure 4. Factors influencing W.A. Government primary school teachers in selecting the educational computer software for use in their classroom.

Each respondent was asked to list not more than five (5) criteria that would influence them most in their selection of software. These criteria were then synthesised into the headings given previously.

It is of interest to note that about 15% of the respondents to this question did not select five criteria and settled for one or two inputs. It is impossible to tell whether this was due to lack of thought or whether they did not consider other items of enough significance to include.

Primary Research Question 2 is further answered by considering each of the subsidiary research questions 2.1 to 2.7.

Subsidiary Research Question 2.1 (a)
What percentage of W.A. Government primary school teachers use computers in their classrooms ?

Table 4
Percentage of W.A. Government primary school teachers use computers in their classrooms.

USE COMPUTERS IN CLASSROOM	NUMBER	%
Yes	267	88.7
No	34	11.3
Total	301	100.0

Even after a concerted campaign in the late 1980's to introduce computers into the classroom, 11% of teachers are not using computers in their classroom.

There is no discernible pattern to the non use of computers; the respondents come from a variety of districts, both genders, and all age groups.

Subsidiary Research Question 2.1 (b)
What percentage of W.A. Government primary school teachers select educational software for their own use ?

Table 5
Percentage of W.A. Government primary school teachers who select educational software for their own use.
(These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

SELECT OWN SOFTWARE	NUMBER	%
Yes	208	77.9
No	59	22.1
Total	267	100.0

Of the people who use computers in their classroom 22.1% of them do not select their own software. There could be a number of reasons for this, of which four possibilities are: inherited software from other teachers; centralised selection

procedure within school (i.e. the principal does all of the selection and ordering; lack of interest/knowledge/time; lack of awareness of available software. Whatever the reason, nearly a quarter of all teachers have chosen to use software which was not initially selected by them, and so might not fit their teaching situation as closely as might be desirable.

Subsidiary Research Question 2.1 (c)
What percentage of W.A. Government primary school teachers assess educational software before its use ?

Table 6
Percentage of W.A. Government primary school teachers assess educational software before its use.

ASSESS SOFTWARE BEFORE USE	NUMBER	%
Yes	162	60.7
No	105	39.3
Total	267	100.0

Nearly 40% of W.A. primary school teachers will use a software package before assessing its viability in their own classroom situation. They have not either formally or informally assessed it using any criteria.

This of course could be due to 'inheriting the software from other members of the school staff and being the only available software, or due to the policy of some software producers in not allowing the preview of materials before their purchase. There seems to be a question here as to whether teachers would accept the same restrictions placed upon other forms of instructional materials.

Subsidiary Research Question 2.2
Do W.A. Government primary school teachers believe they have the necessary skills and resources to effectively select educational computer software ?

This question was answered through the asking of several questions.

Table 7
Perceived adequacy in training in selection of educational software
(I consider myself trained to select educational software : Question 28 in questionnaire)

RESPONSE	NUMBER	%
i) less than adequately	134	50.2
ii) adequately	108	40.4
iii) more than adequately	24	9.0
iv) no response recorded	1	0.3
Total	267	99.9

Table 8
Perceived competency in selecting educational software to use in the classroom.
(I feel I am competent in choosing software to use in my classroom. Question 43 in questionnaire)

RESPONSE	NUMBER	%
i) Strongly agree	19	7.1
ii) Agree	33	12.4
iii) Undecided	40	14.9
iv) Disagree	109	40.8
v) Strongly disagree	66	24.7
Total	267	99.9

Table 9
Perceived sufficiency of help from the District Office.
(I get sufficient help from the district consultant when selecting software. Question 44 in questionnaire)

RESPONSE	NUMBER	%
i) Strongly agree	26	9.7
ii) Agree	20	7.5
iii) Undecided	161	60.3
iv) Disagree	44	16.5
v) Strongly disagree	16	6.0
Total	267	100.0

Table 10
Belief in sufficiency of information Education Department supplies with regards to software selection.
(I believe the Education Department supplies enough information with regards to software selection. Question 45 in questionnaire)

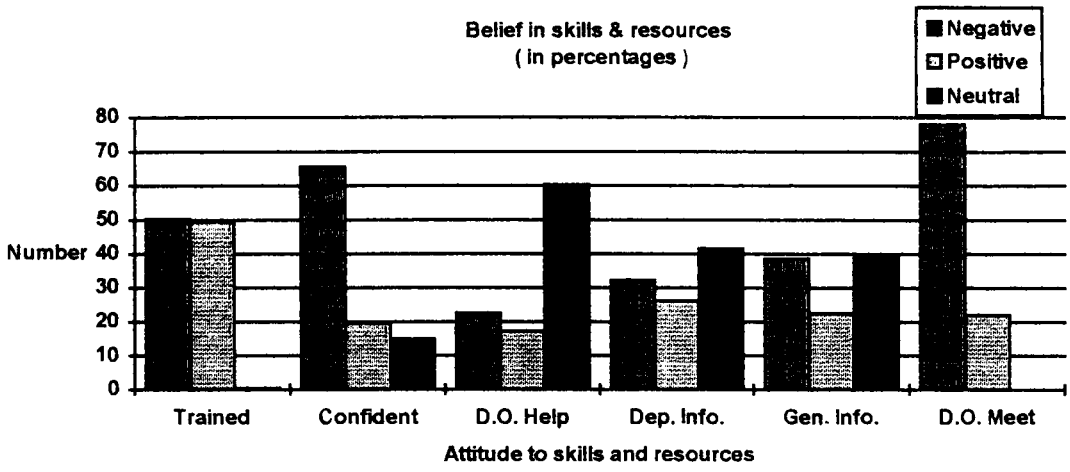
RESPONSE	NUMBER	%
i) Strongly agree	19	7.1
ii) Agree	51	19.1
iii) Undecided	111	41.6
iv) Disagree	75	28.1
v) Strongly disagree	11	4.1
Total	267	100.0

Table 11
Belief in sufficiency of information generally available on educational computer software selection.
(I believe there is enough available information on educational computer software selection. Question 46 in questionnaire)

RESPONSE	NUMBER	%
i) Strongly agree	11	4.1
ii) Agree	49	18.4
iii) Undecided	104	38.9
iv) Disagree	90	33.7
v) Strongly disagree	13	4.9
Total	267	100.0

Table 12
Perceived sufficiency of number of District meetings on computers in education.
(I have attended enough District meetings on computers in education to feel comfortable with software selection. Question 47 in questionnaire)

RESPONSE	NUMBER	%
i) YES	59	22.1
ii) NO	208	77.9
Total	267	100.0



Trained = adequately trained
Confident = feels confident in software selection
D.O. Help = gets sufficient help from District Office
Dep. Info. = Department supplies enough information
Gen. Info. = generally available information
D.O. Meet = enough District Office meetings

Figure 5. Attitudes to skills and resources of W.A. Government primary school teachers in selecting the educational computer software for use in their classroom.

Less than half (49.4%) of W.A. primary school teachers feel that they are adequately trained to select software and only 19.5% feel confident when making the choices. Obviously there is a level of disparity in these figures, and what is perceived as adequate training does not necessarily give confidence.

Those that are lacking in software selection skills should then be availing themselves of the resources around them in order to make software selections. Yet, only 17.2% feel they are getting sufficient help from their District Office; only just above a quarter (26.2%) believe that there is enough Education Department documentation available to them to aid them in selection; only 22.5% of respondents feel there is enough available information emanating from outside the Department to help them; and only 22.1% of respondents feel that they have been to enough District Office inservices to feel comfortable with software selection. All in all only about a quarter of all the respondents claim to be given adequate resources to effectively select software.

W.A. primary school teachers do not seem to believe that they have the necessary skills and resources to select educational software.

Subsidiary Research Question 2.3
What training background have W.A. Government primary school teachers received in the selection of educational computer software ?

Table 13
Type of training in computer education

TYPE OF TRAINING IN COMPUTER EDUCATION	NUMBER	%
Pre-service only	26	8.6
Inservice only	156	51.8
Post service tertiary only	9	3.0
Pre + Inservice	42	13.9
Pre-service + Post service tertiary	3	1.0
Inservice + Post service tertiary	20	6.6
Pre -service, inservice + Post service tertiary	7	2.3
No Training	38	12.6
Total	301	99.8

It is important to note that even after the 'push' that was given to ensure that all teachers had some training in computers in education, some 12.6% have managed to 'slip through the net'. Of the others there is quite a disparity in the types of training they have undergone. 74.5% of teachers have had some in-service training in computers but few (at most 12.9%) have ventured further by attending post service tertiary classes in the subject.

In the following questions, "method of selection" refers to the method of software selection that the respondents chose from the list below.

1 = I do not select software

2 = Reading description of the software on the advertising materials

3 = Reading the Education Department supplied software selection guide (i.e. ' Software Focus')

4 = Subjective opinion after trialing the package myself

5 = Subjective opinion after scanning the documentation that comes with the package

6 = Seeking the opinion of the commercial supplier

7 = Seeking the opinion of peers teaching in my school

8 = Seeking the opinion of teachers in other schools

9 = Using a list of criteria to objectively rate the package as I trial it.

10 = Reading software selection articles available in journals and magazines (other than 'Software Focus')

11 = Seeking the opinion of the school co-ordinate of computing

12 = Seeking the opinion of the district computer consultant

Subsidiary Research Question 2.4
Does: age; gender; teaching position; year level taught; teaching experience; years of training; post service tertiary study; and perceived competence affect the way in which teachers select educational software ?
(All calculations are based on "favoured" method of selection.)

In all cases where a chi-square was applied to analyse this data, the three most commonly supplied responses were used. These responses were: number 4, " Subjective opinion after trialing the package myself" (32.6%); number 2, " Reading the description of the software on the advertising materials " (9.7%); and number 7 "Seeking the opinion of peers teaching in my school" (7.1%).
These numbers were also used in the application of the ANOVA.

Also tested was the response number 1, "I do not select software", which was one of the most popular of the responses. Because this is not a 'method' of software selection, no analysis was performed on it.

AGE OF RESPONDENT AND HOW SOFTWARE IS SELECTED FOR USE IN THE CLASSROOM

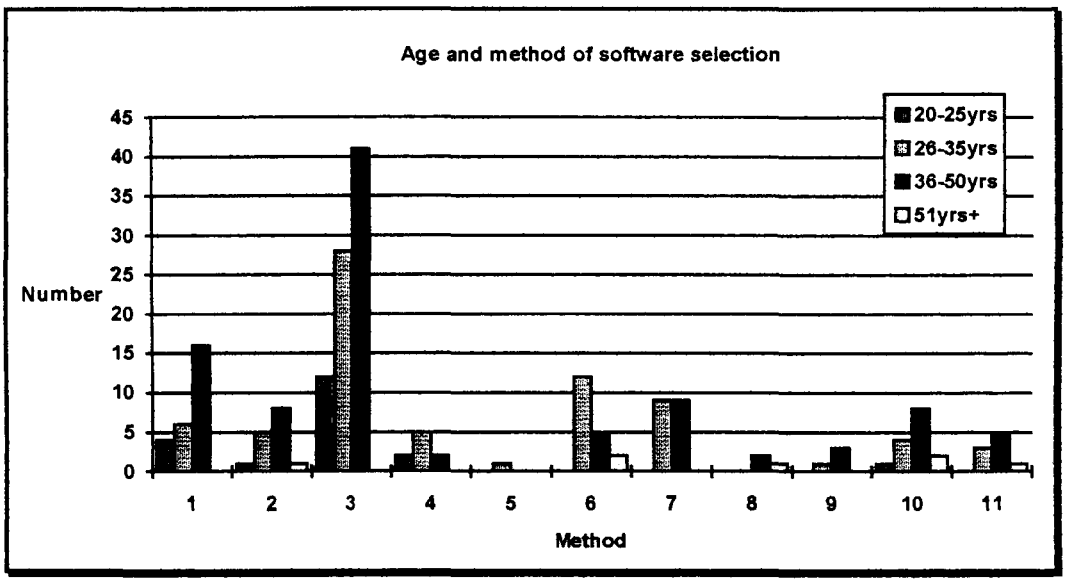


Figure 6. Age of respondent and how software is selected for use in the classroom.

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 14 a
ANOVA on age of respondents and how software is selected for use in the classroom.

X = Column (categories): Age of respondent
1 = 20 - 25 years, 2 = 26 - 35 yrs , 3 = 36 - 50 yrs ,4 = 51 yrs+
Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
4	9	4.667	1.323
3	64	4.000	1.574
2	47	4.043	1.474
1	16	3.250	1.000

One Way ANOVA

Source	SS	df	ms	F	p
Total	297.88	135		2.003	0.115
Between Groups	12.97	3	4.32		
Within Groups	284.91	132	2.16		

Scheffé tests

Groups	Mean difference	Scheffé F	p
4 vs 3	0.667	0.542	0.659
4 vs 2	0.624	0.454	0.718
3 vs 2	-0.043	0.008	1.000
4 vs 1	1.417	1.785	0.151
3 vs 1	0.750	1.112	0.347
2 vs 1	0.793	1.158	0.328

Therefore, group 1, the 20 - 25 year old group differs significantly to the other age groups.

A subsequent chi-square test was performed on these figures the result proved to be significant.

Age appears to be a significant factor in the manner in which software is selected. Although one might suspect that a younger, less experienced teacher might ask advice from their teaching peers it appears that in fact they tend not to. It is in the age bracket 25 - 35 years old that they are more likely to ask for advice when selecting software.

All age groups use trialing to select software significantly more than could be expected through chance alone.

Table 14 b
Analysis of 20 - 24 year old respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

20 - 24 Yrs age group			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	4	8.00	-4.00
Subjective opinion after trialing	12	8.00	4.00
Total	16	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

Method of selection 7 (Seeking opinion of peers) had no observed cases.

CHI-SQUARE = 4.000 df = 1 Significance = 0.046
Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference between the two methods of selection used by the 20 - 24 year old group of teachers.

Table 14 c
Analysis of 25 - 35 year old respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

25 - 35 Yrs age group			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	6	15.00	-9.00
Subjective opinion after trialing	27	15.00	12.00
Seeking opinion of peers	12	15.00	-3.00
Total	45	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 15.600 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software by this age group.

Table 14 d

Analysis of 36 - 50 year old respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

36 - 50 Yrs age group			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	16	20.33	- 4.33
Subjective opinion after trialing	40	20.33	19.67
Seeking opinion of peers	5	20.33	-15.33
Total	61	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 31.508 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software by this particular age group.

GENDER OF RESPONDENT AND HOW SOFTWARE IS SELECTED FOR USE IN THE CLASSROOM

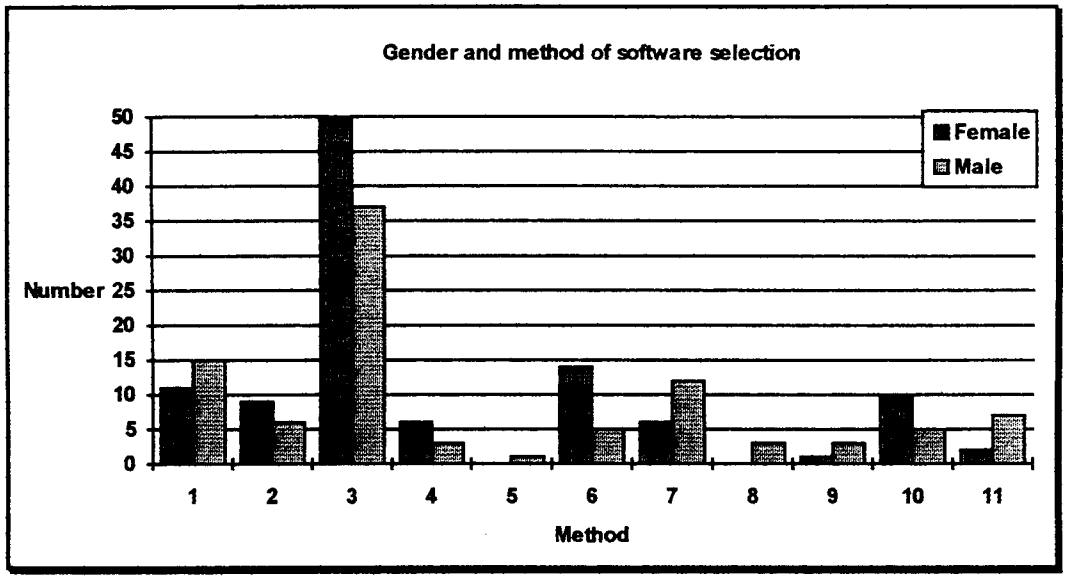


Figure 7. Gender of respondent and how software is selected for use in the classroom.

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 15 a
ANOVA on gender of respondents and how software is selected for use in the classroom.

X = column (categories): Gender of respondents
1 = male 2 = female
Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
1	57	3.831	1.487
2	75	4.078	1.485

One Way ANOVA

Source	SS	df	ms	F	p
Total	297.88	135			
Between Groups	2.04	1	2.04	0.926	0.340
Within Groups	295.84	134	2.21		

Scheffé tests

Groups	Mean difference	Scheffé F	p
1 vs 2	-0.247	0.926	0.340

Therefore there is a significant difference between the manner in which males and females select software.

When a chi-square was performed on this information it became clear that both males and females select software through trialing significantly more often than would be expected. Apart from this feature, the chi-square test showed that gender was not a significant factor in determining how software is selected.

Table 15 b
Analysis of Male respondents and how software is selected for use in the classroom. (Chi-square test of significance used)

Male respondents			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	15	19.00	- 4.00
Subjective opinion after trialing	37	19.00	18.00
Seeking opinion of peers	5	19.00	-14.00
Total	57	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 28.211 df = 2 Significance = 0.000

A significant difference was noted between the different methods in which males selected software.

Expected frequencies based on the proportion of total respondents in each category.

Table 15 c
Analysis of Female respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

Female respondents			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	11	25.00	-14.00
Subjective opinion after trialing	50	25.00	25.00
Seeking opinion of peers	14	25.00	-11.00
Total	75	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 37.680 df = 2 Significance = 0.000

A significant difference was noted between the different methods in which females selected software.

Expected frequencies based on the proportion of total respondents in each category.

POSITION HELD IN SCHOOL OF RESPONDENT & HOW SOFTWARE IS SELECTED

Table 16

Position held in school of respondent and how software is selected for use in the classroom.

	Position held in school			
METHOD OF SELECTION	TEACHER	DEPUTY PRINCIPAL	PRINCIPAL	ALL
1	54	6	1	61
2	13	3	10	26
3	9	4	2	15
4	64	10	13	87
5	7	0	2	9
6	0	0	1	1
7	17	1	1	19
8	10	1	7	18
9	1	1	1	3
10	1	1	2	4
11	13	2	0	15
12	3	2	4	9
Total	192	31	44	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 17 a

ANOVA on position of respondents and how software is selected for use in the classroom.

X = column (categories): Position of respondent
1 = Teacher 2 = Deputy Principal 3 = Principal
Y (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
1	94	4.061	1.491
3	24	3.417	1.213
2	14	4.286	1.1729

One Way ANOVA

Source	SS	df	ms	F	p
Total	297.88	135			
Between Groups	9.56	2	4.78	2.205	0.112
Within Groups	288.32	133	2.17		

Scheffé tests

Groups	Mean difference	Scheffé F	p
1 vs 3	0.645	1.847	0.159
1 vs 2	-0.224	0.142	0.865
3 vs 2	-0.869	1.540	0.216

The test confirms a significant difference in the items 1 and 3, and 3 and 2.

When the chi-square test was applied to this information the results were found to be significant.

Teachers and Deputy Principals are more likely to have selected software by trialing than are Principals. Conversely Principals are more likely to look to the advertising materials to make their software choices than teachers or Deputy Principals.

Table 17 b
Analysis of respondents who are solely teachers and how software is selected for use in the classroom.(Chi-square test of significance used)

Teachers as respondents			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	31.33	-18.33
Subjective opinion after trialing	64	31.33	32.67
Seeking opinion of peers	17	31.33	-14.33
Total	94	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 51.340 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

Therefore there is a significant difference between the methods used by teachers to select software.

Table 17 c
Analysis of Deputy Principals as respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

Deputy Principals as respondents			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	3	4.67	-1.67
Subjective opinion after trialing	10	4.67	5.33
Seeking opinion of peers	1	4.67	-3.67
Total	14	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 9.571 df = 2 Significance = 0.008

Three cells have expected frequencies less than 5. Minimum expected cell frequency is 4.7.

Chi-square statistic is questionable here.
Expected frequencies based on the proportion of total respondents in each category.

If the Chi-square is valid there is a significant difference between the methods used by Deputy Principals to select software.

Table 17 d
Analysis of Principals as respondents and how software is selected for use in the classroom.(Chi-square test of significance used)

Principals as respondents			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	10	8.00	2.00
Subjective opinion after trialing	13	8.00	5.00
Seeking opinion of peers	1	8.00	-7.00
Total	24	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 9.750 df = 2 Significance = 0.008

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the methods of selecting software employed by Principals.

YEAR LEVELS TAUGHT BY RESPONDENT & HOW SOFTWARE IS SELECTED

Teachers of years 1,2 and 3 where combined with "Junior Primary mixed", to gain a total for Junior Primary. Teachers of years 4 and 5 were combined with "Middle Primary mixed", and Teachers of years 6 and 7 were combined with "Upper Primary mixed." The classification of ALL, where a teacher taught all year levels at the same time were not included in the analysis as attribution was considered too difficult.

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 18 a
ANOVA on year level taught and how software is selected for use in the classroom.

X = columns (categories): Year level taught
1 = Junior primary 2 = Middle primary 3 = Upper primary
Y = (dependent variable) Method of selection

Column 6	Number	Mean	Std. Dev.
2	31	4.552	1.325
1	52	4.196	1.400
3	42	3.548	1.347

One Way ANOVA

Source	SS	df	ms	F	p
Total	240.60	121			
Between Groups	18.98	2	9.49	5.096	0.008
Within Groups	221.62	119	1.86		

Scheffé tests

Groups	Mean difference	Scheffé F	p
2 vs 1	0.356	0.628	0.541
2 vs 3	1.004	4.644	0.011
1 vs 3	0.648	2.600	0.077

There is therefore a significant difference in some of the groups.

When Chi-square test was applied to this information it was found to be significant.

Junior and middle primary teachers tend to be less influenced by advertising than upper primary teachers.

Table 18 b
Analysis of Junior Primary teachers and how software is selected for use in the classroom.(Chi-square test of significance used)

Junior Primary Teachers			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	7	17.33	-10.33
Subjective opinion after trialing	36	17.33	18.67
Seeking opinion of peers	9	17.33	- 8.33
Total	52	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 30.269 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by Junior primary teachers.

Table 18 c
Analysis of Middle primary teachers and how software is selected for use in the classroom.(Chi-square test of significance used)

Middle Primary Teachers			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	2	10.33	-8.33
Subjective opinion after trialing	23	10.33	12.67
Seeking opinion of peers	6	10.33	-4.33
Total	31	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 24.065 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by Middle primary teachers.

Table 18 d
Analysis of Upper primary teachers and how software is selected for use in the classroom.(Chi-square test of significance used)

Upper Primary Teachers			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	14.00	- 1.00
Subjective opinion after trialing	25	14.00	11.00
Seeking opinion of peers	4	14.00	-10.00
Total	42	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 15.857 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by Upper primary teachers.

YEARS OF TEACHING EXPERIENCE OF RESPONDENT AND HOW SOFTWARE IS SELECTED

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 19 a
ANOVA of years of teaching experience of respondent and how software is selected for use in the classroom.

X = column (categories): Years of teaching experience
1 = 0 - 5 yrs 2 = 6 - 10 yrs 3 = 11 - 15 yrs 4 = 16 yrs +
Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
3	68	4.071	1.591
1	28	3.414	1.181
4	12	4.000	1.651
2	25	4.320	1.314

One Way ANOVA

Source	SS	df	ms	F	p
Total	297.88	135			
Between Groups	12.77	3	4.26	1.970	0.120
Within Groups	285.12	132	2.16		

Scheffé tests

Groups	Mean difference	Scheffé F	p
3 vs 1	0.658	1.369	0.254
3 vs 4	0.071	0.008	1.000
1 vs 4	-0.586	0.450	0.721
3 vs 2	-0.249	0.176	0.912
1 vs 2	-0.906	1.701	0.168
4 vs 2	-0.320	0.128	0.942

The data indicates a significant difference between the groups, 3 and 1, and 1 and 2.

Only the 0 -5 years experience group of respondents proved to be significant when a chi-square was applied.

The amount that teachers in the 0 - 5 years category use trialing to select software is significantly higher in statistical terms than would be expected through chance alone. This is not reflected in the other age groups

Table 19 b
Analysis of respondents with 0 - 5 years teaching experience and how software is selected for use in the classroom.(Chi-square test of significance used)

0 - 5 Years teaching experience			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	5	9.33	-4.33
Subjective opinion after trialing	18	9.33	8.67
Seeking opinion of peers	5	9.33	-4.33
Total	28	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 12.071 df = 2 Significance = 0.002
Expected frequencies based on the proportion of total respondents in each category.
There is a significant difference observed between all three methods of selecting software employed by teachers with teaching experience between 0 and 5 years.

Table 19 c

Analysis of respondents with 6 - 10 years of teaching experience and how software is selected for use in the classroom.(Chi-square test of significance used)

6 - 10 Years teaching experience			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	6	8.33	-2.33
Subjective opinion after trialing	13	8.33	4.67
Seeking opinion of peers	6	8.33	-2.33
Total	25	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 3.920 df = 2 Significance = 0.141

Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between the three methods of selecting software employed by teachers with teaching experience between 6 and 10 years.

Table 19 d

Analysis of respondents with 11 - 15 years teaching experience and how software is selected for use in the classroom.(Chi-square test of significance used)

11 - 15 Years teaching experience			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	14	22.66	-8.66
Subjective opinion after trialing	48	22.66	25.33
Seeking opinion of peers	6	22.66	-16.66
Total	68	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 4.587 df = 2 Significance = 0.121

Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between the three methods of selecting software employed by teachers with teaching experience between 11 and 15 years.

DURATION OF TEACHER TRAINING ATTENDED BY RESPONDENT AND HOW SOFTWARE IS SELECTED

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 20 a
ANOVA on duration of Teacher training of respondent and how software is selected for use in the classroom.
X = column (categories): Training of respondent
1 = 3 yrs 2 = 4 yrs 3 = 5 yrs 4 = 6 yrs

Y (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
2	51	4.245	1.518
1	73	3.724	1.401
3	6	4.167	1.602
4	1	7.000	0.000

One Way ANOVA

Source	SS	df	ms	F	p
Total	297.88	135			
Between Groups	18.04	3	6.01	2.837	0.040
Within Groups	279.84	132	2.12		

Scheffé tests

Groups	Mean difference	Scheffé F	p
2 vs 1	0.522	1.336	0.265
2 vs 3	0.079	0.005	1.000
1 vs 3	-0.443	0.172	0.914
2 vs 4	-2.755	1.171	0.323
1 vs 4	-3.276	1.666	0.176
3 vs 4	-2.833	1.082	0.360

A significant difference between groups 1 and 2, 2 and 4, 1 and 4 and 3 and 4 were detected.

Duration of teacher training tended to show a significant effect in the selection of software when a chi-square test was applied to it.

Respondents who were three year trained tended to be more confident towards trialing than those who had more training. Respondents who were five year trained did not use advertising as a method of selecting software.

Table 20 b
Analysis of respondents with 3 years of teacher training and how software is selected for use in the classroom. (Chi-square test of significance used)

3 years of teacher training			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	12	24.33	-12.33
Subjective opinion after trialing	49	24.33	24.67
Seeking opinion of peers	12	24.33	-12.33
Total	73	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 37.507 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the three methods of selecting software employed by teachers with 3 years of teacher training.

Table 20 c

Analysis of respondents with 4 years of teacher training and how software is selected for use in the classroom. (Chi-square test of significance used)

4 years of teacher training			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	17.00	- 4.00
Subjective opinion after trialing	33	17.00	16.00
Seeking opinion of peers	5	17.00	-12.00
Total	51	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 24.471 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the three methods of selecting software employed by teachers with 4 years of teacher training.

Table 20 d

Analysis of respondents with 5 years of teacher training and how software is selected for use in the classroom. (Chi-square test of significance used)

5 years of teacher training			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	0		
Subjective opinion after trialing	4	3.00	1.00
Seeking opinion of peers	2	3.00	-1.00
Total	6	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 0.667 df = 1 Significance = 0.414

Expected frequencies based on the proportion of total respondents in each category.

Chi-Square statistics are questionable here. 2 cells have expected frequencies less than 5.

There is no significant difference observed between the three methods of selecting software employed by teachers with 5 years of teacher training.

POST SERVICE TERTIARY STUDY COMPLETED BY RESPONDENT AND HOW SOFTWARE IS SELECTED

Table 21
Post service tertiary study completed by respondent and how software is selected for use in the classroom.

	Post service tertiary study completed by respondents		
METHOD OF SELECTION	**YES**	**NO**	**TOTAL**
1	7	54	61
2	1	25	26
3	1	14	15
4	14	73	87
5	3	6	9
6	0	1	1
7	2	17	19
8	5	13	18
9	1	2	3
10	0	4	4
11	2	13	15
12	9	0	9
All	36	231	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 21a
ANOVA of completion of post service tertiary study by respondent and how software is selected for use in the classroom.

X = column (categories): Completion of post service tertiary study
0 = No 1 = Yes
Y (dependent variable) Method of software selection

Column	Number	Mean	Std. Dev.
0	115	4.009	1.490
1	17	4.235	1.147

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	0.76	1	0.76	0.361	0.557
Within Groups	274.05	130	2.11		

Scheffé tests

Groups	Mean difference	Scheffé F	p
0 vs 1	-0.227	0.361	0.557

Therefore there is no significant difference between the group items.

When a chi-square test was applied to these figures, the results were found to be significant.

Only 12.9% of the total respondents surveyed have been involved in post service tertiary education units to do with computer education. This translates to meaning, 87.1% of the respondents have rely upon inservicing and pre-service training to which to base their software selection.

Table 21 b
Analysis of completion of post service tertiary study by respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Yes - post service tertiary study completed			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	1	5.67	-4.67
Subjective opinion after trialing	14	5.67	8.33
Seeking opinion of peers	2	5.67	-3.67
Total	17	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 18.471 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the three methods of selecting software employed by teachers who have completed some post service tertiary study.

Table 21 c

Analysis of completion of post service tertiary study by respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

No - post service tertiary study not completed			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	25	38.33	-13.33
Subjective opinion after trialing	73	38.33	34.67
Seeking opinion of peers	17	38.33	-21.33
Total	115	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 47.861 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the three methods of selecting software employed by teachers who have completed no post service tertiary study.

CONFIDENCE OF RESPONDENT IN SOFTWARE SELECTION & HOW SOFTWARE IS SELECTED

Table 22

Confidence of respondent in software selection and how software is selected for use in the classroom.

Confident in software selection						
METHOD OF SELECTION	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE	ALL
1	13	12	14	13	9	61
2	0	2	5	14	5	26
3	0	1	1	10	3	15
4	0	4	9	39	35	87
5	0	0	0	8	1	9
6	0	1	0	0	0	1
7	4	5	2	4	4	19
8	0	5	3	6	4	18
9	0	0	0	0	3	3
10	0	2	0	1	1	4
11	2	0	4	8	1	15
12	0	1	2	6	0	9
ALL	19	33	40	109	66	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 22a

ANOVA of confidence in software selection of respondent and how software is selected for use in the classroom.

X (categories): Belief in competency
1 = strongly agree 2 = agree 3 = undecided 4 = disagree
5 = strongly disagree
Y (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
5	44	4.045	1.140
4	57	3.719	1.250
3	16	3.750	1.571
2	11	5.000	2.049
1	4	7.000	0.000

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	52.39	4	13.10	7.479	0.000
Within Groups	222.42	127	1.75		

Scheffé tests

Groups	Mean difference	Scheffé F	p
5 vs 4	0.326	0.377	0.826
5 vs 3	0.295	0.146	0.969
4 vs 3	-0.031	0.002	1.000
5 vs 2	-0.955	1.145	0.339
4 vs 2	-1.281	2.159	0.076
3 vs 2	-1.250	1.454	0.219
5 vs 1	-2.955	4.569	0.002
4 vs 1	-3.281	5.743	0.000
3 vs 1	-3.250	4.825	0.001
2 vs 1	-2.000	1.675	0.158

The figures indicate a significant difference between the groups; 5 and 2, 4 and 2, 3 and 2, 5 and 1, 4 and 1, 3 and 1 , and 2 and 1.

When a chi-square test is applied to these figures the following results are achieved:

Table 22 b
Analysis of confidence in software selection of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Agree			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	2	5.00	-3.00
Subjective opinion after trialing	4	5.00	-1.00
Seeking opinion of peers	9	5.00	4.00
Total	15	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 5.200 df = 2 Significance = 0.074

Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between the three methods of selecting software employed by teachers who feel they are competent in software selection.

Table 22 c
Analysis of confidence in software selection of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Undecided			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	5	5.33	-0.33
Subjective opinion after trialing	9	5.33	3.67
Seeking opinion of peers	2	5.33	-3.33
Total	16	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 4.625 df = 2 Significance = 0.099

Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between the three methods of selecting software employed by teachers who are undecided with regards to their competency in software selection.

Table 22 d
Analysis of confidence in software selection of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Disagree			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	19	33.67	-14.67
Subjective opinion after trialing	74	33.67	40.33
Seeking opinion of peers	8	33.67	-25.67
Total	101	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 74.277 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between the three methods of selecting software employed by teachers who feel they are not competent in software selection.

Not surprisingly, many of those who express a lack of confidence in their ability to select software choose not to do so. When they are in the position of having to select they generally adopt the procedure of trialing. What is surprising is that even those who claim to be confident about software selection do not always select their own software. This could be because there is a central purchasing scheme within the school or that the school is not in the position to purchase software and consequently only previously obtained software is available for classroom use. Hence there may be no need to select software.

Subsidiary Research Question 2.5
What is the relationship between teachers' perception of whether they have the skills and resources to select software and their method of selection ?

Subsidiary Research Question 2.5 (a)
Perceived Adequacy Of Training And The Method Of Selection

Table 23
Perceived adequacy of training of respondents in software selection and how software is selected for use in the classroom.

Perceived adequacy of training in software selection				
METHOD OF SELECTION	< THAN ADEQUATE	ADEQUATE	> THAN ADEQUATE	ALL
1	44	16	1	61
2	10	13	3	26
3	6	7	2	15
4	32	42	13	87
5	3	5	1	9
6	1	0	0	1
7	14	3	2	19
8	11	6	1	18
9	0	2	1	3
10	2	2	0	4
11	6	8	0	14
12	5	4	0	9
ALL	134	108	24	266

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 23 a
ANOVA on perceived adequacy of training of software selection and method of software selection for use in the classroom

X = column (categories): Perceived adequacy of software selection
1 = Less than adequate 2 = adequate 3 = more than adequate
Y (dependent variable) Method of selection

Column 28	Number	Mean	Std. Dev.
1	56	4.393	1.691
3	18	4.000	1.328
2	58	3.707	1.140

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	13.44	2	6.72	3.316	0.038
Within Groups	261.37	129	2.03		

Scheffé tests

Groups	Mean difference	Scheffé F	p
1 vs 3	0.393	0.519	0.602
1 vs 2	0.686	3.308	0.039
3 vs 2	0.293	0.291	0.751

Therefore the data indicates a significant difference between group 1 and 2.

When a chi-square test is applied to these figures the following results are achieved:

Table 23 b
Analysis of perceived adequacy of training of software selection (less than adequate) of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Less than adequate training in software selection			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	10	18.67	-8.67
Subjective opinion after trialing	32	18.67	13.33
Seeking opinion of peers	14	18.67	-4.67
Total	56	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 14.714 df = 2 Significance = 0.001

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they have had less than adequate training in software selection.

Table 23 c
Analysis of perceived adequacy of training of software selection (adequate) of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

Adequate training in software selection			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	19.33	- 6.33
Subjective opinion after trialing	42	19.33	22.67
Seeking opinion of peers	3	19.33	-16.33
Total	58	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 42.448 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they have had adequate training in software selection.

Table 23 d

Analysis of perceived adequacy of training of software selection (more than adequate) of respondent and how software is selected for use in the classroom.(Chi-square test of significance used)

More than adequate training in software selection			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	3	6.00	-3.00
Subjective opinion after trialing	13	6.00	7.00
Seeking opinion of peers	2	6.00	-4.00
Total	18	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 12.333 df = 2 Significance = 0.002

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they have had more than adequate training in software selection.

All groups employ trialing as a method of selecting software significantly more than through chance alone. Those who feel they have not had adequate training in software selection tend to use the advice from their peers more than those who feel they are adequately trained.

Subsidiary Research Question 2.5 (b)
Availability Of Resources And Method Of Software Selection

Subsidiary Research Question 2.5 (b1)
Table 24
Sufficiency of District Office help when selecting software and how software is selected for use in the classroom. (question 44 from questionnaire)

Sufficient District Office help						
METHOD OF SELECTION	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE	ALL
1	9	2	44	3	3	61
2	4	3	13	3	3	26
3	0	1	7	6	1	15
4	2	9	64	9	3	87
5	2	0	5	1	1	9
6	1	0	0	0	0	1
7	2	2	10	5	0	19
8	2	2	10	2	2	18
9	0	0	2	1	0	3
10	3	0	1	0	0	4
11	1	1	5	8	0	15
12	0	0	0	6	3	9
ALL	26	20	161	44	16	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 24a
ANOVA on sufficiency of District Office help and the method of software selection.

X = column (categories): Sufficiency of District Office help
1 = Strongly Agree 2 = Agree 3 = Undecided 4 = Disagree
5 = Strongly disagree

Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
3	87	4.046	1.284
5	6	3.000	1.095
4	17	4.529	1.807
2	14	4.000	1.519
1	8	3.750	2.188

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	11.26	4	2.81	1.356	0.252
Within Groups	263.55	127	2.08		

Scheffé tests

Groups	Mean difference	Scheffé F	p
3 vs 5	1.046	0.740	0.569
3 vs 4	-0.483	0.400	0.810
5 vs 4	-1.529	1.250	0.293
3 vs 2	0.046	0.003	1.000
5 vs 2	-1.000	0.506	0.734
4 vs 2	0.529	0.259	0.904
3 vs 1	0.296	0.077	1.000
5 vs 1	-0.750	0.232	0.920
4 vs 1	0.779	0.398	0.812
2 vs 1	0.250	0.038	1.000

This data displays no significant differences.

An application of the chi-square test showed little significance in the amount of help given by the district office and the method of software selection.

Table 24 b
Analysis of sufficiency of District Office help when selecting software and how software is selected for use in the classroom.(Chi-square test of significance used)

Sufficient D.O. help			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	7	7.33	-0.33
Subjective opinion after trialing	11	7.33	3.67
Seeking opinion of peers	4	7.33	-3.33
Total	22	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 3.364 df = 2 Significance = 0.186
Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between all three methods of selecting software employed by teachers who feel that they get sufficient District Office help in software selection.

Table 24 c
Analysis of sufficiency of District Office help when selecting software and how software is selected for use in the classroom.(Chi-square test of significance used)

Undecided on sufficiency of D.O. help			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	29.00	-16.00
Subjective opinion after trialing	64	29.00	35.00
Seeking opinion of peers	10	29.00	-19.00
Total	87	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 63.517 df = 2 Significance = 0.000

There is a significant difference observed between all three methods of selecting software employed by teachers who feel undecided as to whether they get sufficient District Office help in software selection.

Expected frequencies based on the proportion of total respondents in each category.

Table 24 d

Analysis of sufficiency of District Office help when selecting software and how software is selected for use in the classroom.(Chi-square test of significance used)

Insufficient D.O. help			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	6	7.67	-1.67
Subjective opinion after trialing	12	7.67	4.33
Seeking opinion of peers	5	7.67	-2.67
Total	23	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 3.739 df = 2 Significance = 0.154

Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between all three methods of selecting software employed by teachers who feel that they get insufficient District Office help in software selection.

Subsidiary Research Question 2.5 (b2)

Table 25
Perceived sufficiency of Education Department information in software selection and how software is selected for use in the classroom. (question 45 of questionnaire)

Enough Education Department information on software selection						
METHOD OF SELECTION	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE	ALL
1	4	5	39	11	2	61
2	2	4	13	4	3	26
3	0	5	2	6	2	15
4	8	21	28	28	2	87
5	1	2	1	5	0	9
6	0	0	1	0	0	1
7	2	5	8	4	0	19
8	0	5	8	4	1	18
9	0	1	0	1	1	3
10	0	1	1	2	0	4
11	2	1	7	5	0	15
12	0	1	3	5	0	9
ALL	19	51	111	75	11	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 25 a
ANOVA on sufficiency of Education Department help and method of software selection for use in the classroom

X = column (categories): Sufficiency of Department help
1 = Strongly Agree 2 = Agree 3 = Undecided 4 = Disagree
5 = Strongly disagree
Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
1	12	4.167	1.528
3	49	3.959	1.607
4	36	4.111	1.214
5	5	2.800	1.095
2	30	4.233	1.431

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	9.50	4	2.38	1.137	0.342
Within Groups	265.31	127	2.09		

Scheffé tests

Groups	Mean difference	Scheffé F	p
1 vs 3	0.207	0.050	1.000
1 vs 4	0.056	0.003	1.000
3 vs 4	-0.152	0.057	1.000
1 vs 5	1.367	0.789	0.537
3 vs 5	1.159	0.730	0.576
4 vs 5	1.311	0.903	0.466
1 vs 2	-0.067	0.005	1.000
3 vs 2	-0.274	0.167	0.957
4 vs 2	-0.122	0.029	1.000
5 vs 2	-1.433	1.054	0.383

A significant difference is only displayed between group 2 and 5.

Table 25b

Analysis of perceived sufficiency of Education Department information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Sufficient Education Department information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	6	14.00	-8.00
Subjective opinion after trialing	29	14.00	15.00
Seeking opinion of peers	7	14.00	-7.00
Total	42	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 24.143 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they get sufficient Education Department help in software selection.

Table 25 c
Analysis of perceived sufficiency of Education Department information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Undecided on sufficiency of Education Department information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	13	16.33	-3.33
Subjective opinion after trialing	28	16.33	11.67
Seeking opinion of peers	8	16.33	-8.33
Total	49	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 13.265 df = 2 Significance = 0.001

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they are undecided as to whether they get sufficient Education Department help software selection.

Table 25 d

Analysis of perceived sufficiency of Education Department information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Insufficient Education Department information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	7	13.67	-6.67
Subjective opinion after trialing	30	13.67	16.33
Seeking opinion of peers	4	13.67	-9.67
Total	41	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 29.610 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they get insufficient Education Department help in software selection.

The data gives no clear indication of a trend with regards to the sufficiency of the information that people receive, or perceive they receive from the Education Department and the manner in which they select software.

Subsidiary Research Question 2.5 (b3)

Table 26

Perceived sufficiency of generally available information on software selection and how software is selected for use in the classroom.

(question 46 of questionnaire)

Sufficiency of generally available information on software selection						
METHOD OF SELECTION	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE	ALL
1	3	7	37	13	1	61
2	1	5	5	13	2	26
3	0	2	5	5	3	15
4	5	22	30	28	2	87
5	0	2	3	3	1	9
6	0	0	1	0	0	1
7	1	2	9	7	0	19
8	0	5	4	7	2	18
9	0	1	0	1	1	3
10	1	0	1	2	0	4
11	0	3	5	7	0	15
12	0	0	4	4	1	9
ALL	11	49	104	90	13	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 26 a

ANOVA on sufficiency of generally available information on software selection and method of software selection for use in the classroom

X = column (categories): Sufficiency of available information
1 = Strongly Agree 2 = Agree 3 = Undecided 4 = Disagree
5 = Strongly disagree

Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
2	29	3.862	1.156
3	44	4.386	1.482
1	7	4.143	1.464
4	48	3.896	1.561
5	4	3.000	1.155

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	11.59	4	2.90	1.399	0.237
Within Groups	263.22	127	2.07		

Scheffé tests

Groups	Mean difference	Scheffé F	p
2 vs 3	-0.524	0.580	0.681
2 vs 1	-0.281	0.054	1.000
3 vs 1	0.244	0.043	1.000
2 vs 4	-0.034	0.002	1.000
3 vs 4	0.491	0.666	0.620
1 vs 4	0.247	0.045	1.000
2 vs 5	0.862	0.315	0.868
3 vs 5	1.386	0.850	0.498
1 vs 5	1.143	0.401	0.810
4 vs 5	0.896	0.357	0.840

A significant difference is displayed between group 3 and 5 only.

A chi-square analysis revealed the following:

Table 26 b
Analysis of perceived sufficiency of generally available information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Sufficient information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	6	12.00	-6.00
Subjective opinion after trialing	27	12.00	15.00
Seeking opinion of peers	3	12.00	-9.00
Total	36	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 28.500 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they get sufficient general information in software selection.

Table 26 c
Analysis of perceived sufficiency of generally available information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Undecided on sufficiency of information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	5	17.33	-12.33
Subjective opinion after trialing	38	17.33	20.67
Seeking opinion of peers	9	17.33	- 8.33
Total	52	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 37.423 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they are undecided as to whether they receive enough general information in software selection.

Table 26 d
Analysis of perceived sufficiency of generally available information on software selection and how software is selected for use in the classroom.(Chi-square test of significance used)

Insufficient information			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	14	16.67	-2.67
Subjective opinion after trialing	29	16.67	12.33
Seeking opinion of peers	7	16.67	-9.67
Total	50	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 15.160 df = 2 Significance = 0.001

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they get insufficient general information in software selection.

Those people who feel that there is enough information available with regards to the selection of software are tending towards using their peers as the source for their information. Those who are undecided as to whether there is enough information are tending not to select their own software; and those who feel there is not generally enough information are selecting software by trialing the materials themselves.

Subsidiary Research Question 2.5 (b4)

Table 27
Perceived sufficiency of number of District Office meetings on software selection and how software is selected for use in the classroom. (question 47 of questionnaire)

Sufficient number of District Office meetings			
METHOD OF SELECTION	YES	NO	ALL
1	2	59	61
2	4	22	26
3	5	10	15
4	32	55	87
5	1	8	9
6	0	1	1
7	6	13	19
8	3	15	18
9	3	0	3
10	1	3	4
11	2	13	15
12	0	9	9
ALL	59	208	267

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 27 a
ANOVA of sufficiency of number of District Office meetings and how software is selected for use in the classroom.

X = column (categories): Sufficiency of District Office meetings
1 = yes 2 = No
Y = (dependent variable) Method of selection

Column	Number	Mean	Std. Dev.
2	90	3.944	1.517
1	42	4.238	1.284

One Way ANOVA

Source	SS	df	ms	F	p
Total	274.81	131			
Between Groups	2.47	1	2.47	1.179	0.279
Within Groups	272.34	130	2.09		

Scheffé tests

Groups	Mean difference	Scheffé F	p
2 vs 1	-0.294	1.179	0.279

There is a significant difference noted between the two groups.

Applying a chi-square test revealed the following.

Table 27 b
Analysis of perceived sufficiency of number of District Office meetings and how software is selected for use in the classroom.(Chi-square test of significance used)

Sufficient number of meetings			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	4	14.00	-10.00
Subjective opinion after trialing	32	14.00	18.00
Seeking opinion of peers	6	14.00	- 8.00
Total	42	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 34.857 df = 2 Significance = 0.000
Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between all three methods of selecting software employed by teachers who feel that they get a sufficient number of District Office meetings.

Table 27 c

Analysis of perceived sufficiency of number of District Office meetings and how software is selected for use in the classroom.(Chi-square test of significance used)

Insufficient number of meetings			
Method of selection	Cases Observed	Expected	Residual
Reading advertising materials	22	30.00	- 8.00
Subjective opinion after trialing	55	30.00	25.00
Seeking opinion of peers	13	30.00	-17.00
Total	90	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 32.600 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category. There is a significant difference observed between all three methods of selecting software employed by teachers who do not feel that they get a sufficient number of District Office meetings.

If respondents feel that they have had a sufficient number of district meetings on computers in education to feel comfortable with software selection then they are tending not to ask peers for their opinion about software but instead, selecting through trialing. Whereas, those who feel they have attended insufficient numbers of meetings are trialing less and asking peers more.

Subsidiary Research Question 2.6
What percentage of W.A. Government primary school teachers have knowledge of and use the Education Departments' 'Software Focus' for selecting educational computer software ?

These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

Subsidiary Research Question 2.6 (a)
I am familiar with the Education Department document on software selection 'Software Focus.'

Table 28
Familiar with the Education Department document on software selection, 'Software Focus' .

Familiar with 'Software Focus'	Number	%
i) Yes	167	62.54
ii) No	100	37.45
Total	267	99.99

Subsidiary Research Question 2.6 (b)
I use the Education Department document on software selection, 'Software Focus' in selecting software.

Table 29
Use of the Education Department document on software selection, 'Software Focus' in selecting software for use in the classroom

Use of 'Software Focus'	Number	%
i) Frequent	24	8.98
ii) Sometimes	109	40.82
iii) Never	133	49.81
iv) no response to question	1	0.37
Total	267	99.98

Over a third of all the teachers that use computers in their classroom are not familiar with the preferred Education Department document on software selection 'Software Focus.'

The figures also indicate that only 49.8 % of teachers using computers in their classroom use 'Software Focus' in the task of selecting educational software. This

means that only 44.17 % of the total teaching population are using 'Software Focus' for selection of software.

Subsidiary Research Question 2.7
What is the relationship between teachers' perception in their ability to select software and their use of 'Software Focus' ?

When an ANOVA test was applied to the data to test the significance between the items in the group, the following information was determined.

Table 30a
ANOVA on use of 'Software Focus' and perceived adequacy of training in software selection.

X = column(categories): Perceived adequacy of training
1 = Less than adequate 2 = Adequate 3 = More than adequate
Y = (dependent variable) Use of 'Software Focus'

Column	Number	Mean	Std. Dev.
1	134	2.532	0.602
3	24	2.033	0.669
2	107	2.211	0.722

One Way ANOVA

Source	SS	df	ms	F	p
Total	126.65	268			
Between Groups	9.36	2	4.68	10.659	0.000
Within Groups	117.29	267	0.44		

Scheffé tests

Groups	Mean difference	Scheffé F	p
1 vs 3	0.498	6.851	0.001
1 vs 2	0.321	7.029	0.001
3 vs 2	-0.177	0.849	0.432

Significant differences were determined between all groups.

When a chi-square was applied to the information the following was determined.

Table 30b
Analysis of perceived ability to select software and use of 'Software Focus'.(Chi-square test of significance used)

Less than adequate ability to select software			
Use of "Software Focus."	Cases Observed	Expected	Residual
Frequently	5	44.67	-39.67
Sometimes	44	44.67	- 0.67
Never	85	44.67	40.33
Total	134	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 71.657 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between teachers use of 'Software Focus' in those people who feel less than adequate in their ability to select software.

Table 30 c
Analysis of perceived ability to select software and use of 'Software Focus'.(Chi-square test of significance used)

Adequate ability to select software			
Use of 'Software Focus.'	Cases Observed	Expected	Residual
Frequently	13	35.67	-22.67
Sometimes	52	35.67	16.33
Never	42	35.67	6.33
Total	107	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 23.009 df = 2 Significance = 0.000

Expected frequencies based on the proportion of total respondents in each category.

There is a significant difference observed between teachers use of 'Software Focus' in those people who feel adequate in their ability to select software.

Table 30 d
Analysis of perceived ability to select software and use of 'Software Focus'.(Chi-square test of significance used)

More than adequate ability to select software			
Use of "Software Focus."	Cases Observed	Expected	Residual
Frequently	6	8.00	-2.00
Sometimes	13	8.00	5.00
Never	5	8.00	-3.00
Total	24	**N.B. Only the three most commonly supplied responses on methods used in software selection, are used in analysis.**	

CHI-SQUARE = 4.750 df = 2 Significance = 0.093
Expected frequencies based on the proportion of total respondents in each category.

There is no significant difference observed between teachers use of 'Software Focus' in those people who feel more than adequate in their ability to select software.

The trend that becomes apparent is that those people who are using 'Software Focus' are generally more at ease with software selection than those who do not employ this document. This could mean one of two things; either only people who are already confident in software selection use 'Software Focus' or; by using 'Software Focus' people become more confident in their choice of software.

ANALYSIS OF DATA - COMPUTER CONSULTANTS IN DISTRICT OFFICES

Districts surveyed	29
Districts replied	25
Individual District Officers replied	20

In 16 cases one Officer is in charge of computing for 1 District.

In 3 cases one Officer is in charge of computing for 2 Districts.

In 1 case one Officer is in charge of computing for 3 Districts.

All Districts were surveyed but four (4) of the Districts did not reply even after repeated application to do so.

DEMOGRAPHIC INFORMATION

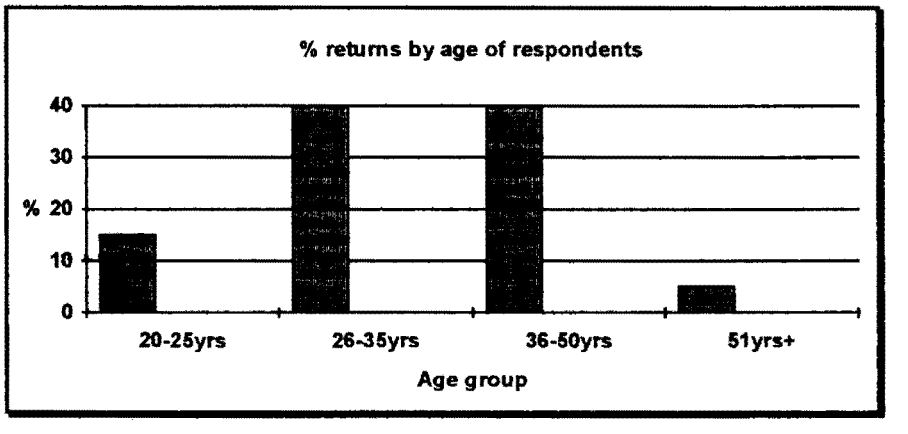


Figure 8. Returns by age of District Office respondents

Table 31
Distribution of respondents by teaching experience of District Consultants

Teaching Experience of District Consultants	Number of responses	%
0 - 5	1	5
6 - 10	9	45
11 - 15	6	30
15 +	4	20
Total	20	100

Table 32
Distribution of respondents by years of teacher training of District Consultants

Years of training of District Consultants	Number of respondents	%
2 OR 3	5	25
4	13	65
5	2	10
6	0	0
Total	20	100

Table 33
Distribution of respondents by gender of District Consultants

Gender of District Consultants	Number of responses	%
Male	18	90
Female	2	10
Total	20	100

Summary of ethnographic data collected on District Consultants.

1. All age groups are represented in the study.

2. All levels of experience in teaching are represented in the study.

3. None of the respondents were six (6) year trained

though all other categories were represented.

4. Of the respondents, 90% were male, and 10% were female, which bears little resemblance to the surveyed numbers of teachers, which emerged as approximately 42% male and 58% female.

PRIMARY RESEARCH QUESTION 3
What are the differences between District Consultants and W.A. Government primary school teachers in the process of selecting educational software ?

Subsidiary Research Questions related to Primary Research Question 3
Subsidiary Research Question 3.1 (a)

What are the methods currently employed by District Consultants in selecting educational computer software for use in their classrooms and how do they differ from W.A. Government primary school teachers?

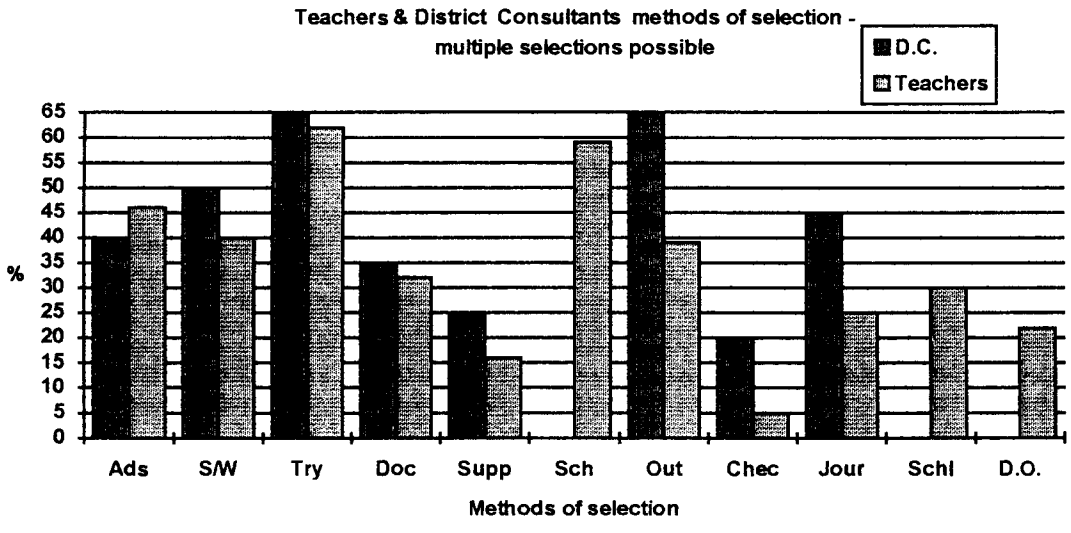
Table 34
Methods by which District Consultants select educational software.
Please note : more than one selection is possible

Method of software selection of District Consultants	Number	%
Do not select software	3	15
Subjective opinion after trialing	13	65
Opinion of other Teachers	13	65
Consulting the Department documents e.g. 'Software Focus'	10	50
Journals & magazines other than using 'Software Focus'	9	45
Advertising information	8	40
Subjective opinion from documentation supplied with the package	7	35
Opinion of commercial supplier	5	25
Checklist	4	20

Please note that 'Software Focus' was used as the principal example of the preferred Education Department document on software selection. This reflects the major source of information which was available to teachers and District Consultants at the time of the start of this study and mirrors the type of document that could be re-introduced to into schools.

District Consultants were asked to provide five responses to the question, some however declined to do so.

With 65% of the total response being directed at both selecting through subjective opinion after trialing and employing the opinions of other teachers, both were equally well represented as methods of selecting software. 'Software Focus', an example of a preferred Education Department document rated third at 50% and use of checklists rated last of the nine possibilities at 20%. It seems that District Consultants are more likely to accept subjective measures of selecting software ahead of the more formal and objective methods.



Abbreviations
Ads = Advertising
S/W = Using 'Software Focus'
Try = Subjective opinion after trialing
Doc = Subjective opinion from documentation supplied with package
Supp = Opinion of commercial supplier
Sch = Teaching peers in school
Out = Teaching peers in other schools
Chec = Checklist
Jour = Journals & magazines other than 'Software Focus'
Schl = School co-ordinator of computing
D.O. = District Consultants
In each case some respondents did not select software

Figure 9 Comparison of the manner in which District Consultants and teachers approach software selection.

A comparison of the manner in which District Consultants and teachers approach software selection was undertaken by testing the standard error of difference of two individual proportions.

Table 35
A comparison of the manner in which District Consultants and teachers approach software selection by testing the standard error of difference of two individual proportions.

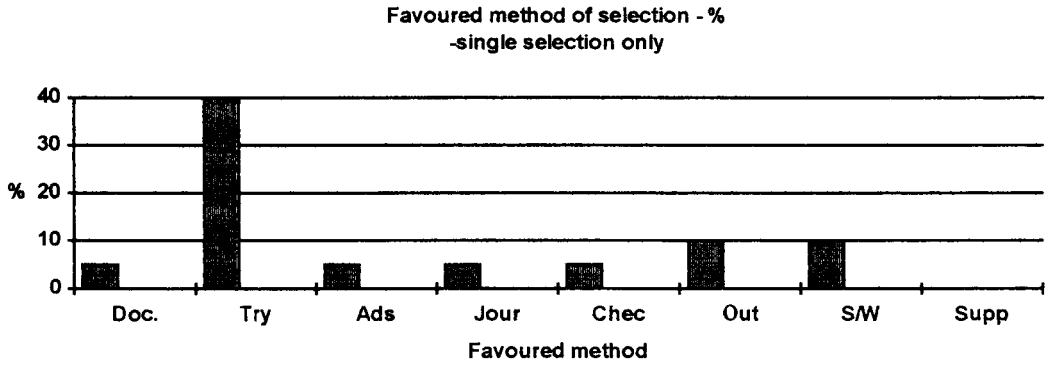
Method of selection	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Using advertising	4.27	2.34	Yes	Teachers
Using 'Software Focus'	7.69	2.34	Yes	District Consultants
Using Trialing	3.11	2.34	Yes	District Consultants
Using documentation supplied with package	2.73	2.34	Yes	District Consultants
Using opinion of the commercial supplier	12.02	2.34	Yes	District Consultants
Using peers outside school	20.19	2.34	Yes	District Consultants
Using checklists	52.20	2.34	Yes	District Consultants
Using journals other than 'Software Focus'	19.14	2.34	Yes	District Consultants

When a comparison of the manner in which District Consultants and teachers approach software selection was undertaken, it shows that both groups use the different methods of selection to a significantly varying degree. District Consultants tend to use 'Software Focus', trialing, referring to the documentation supplied with the package, use of outside peers, checklists and journals other than 'Software Focus', and Teachers tend to use advertising materials more. Of course, one must take into consideration that the teachers' percentages spread could have been effected by the increased number of options for choice they had over the District Consultants (the

use of District Officers to aid in selection and the use of a school based co-ordinator of computing).

Subsidiary Research Question 3.1 (b)
What are the favoured methods currently employed by District Consultants in selecting educational computer software for use in their classrooms and how do they differ from W.A. Government primary school teachers?

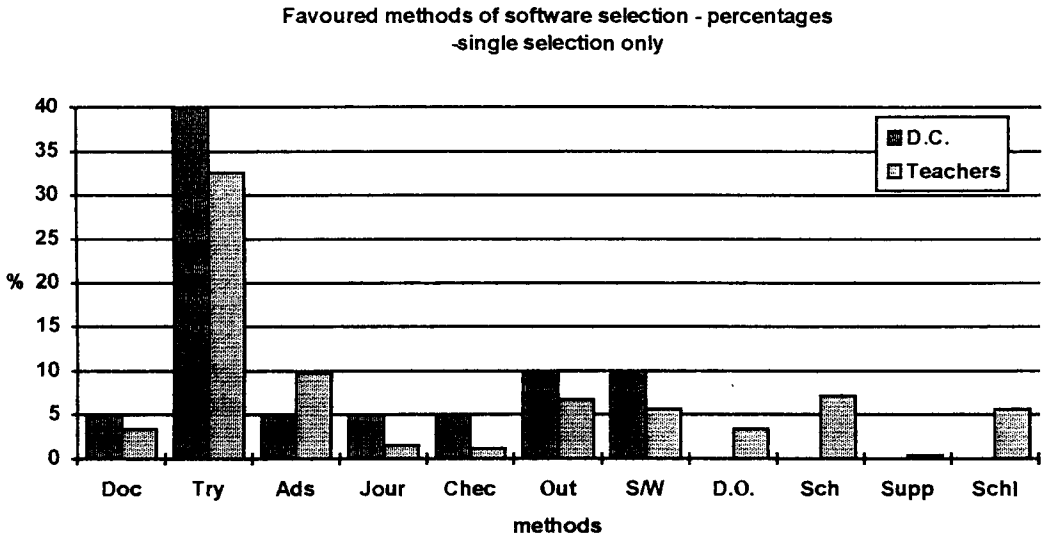
When asked to choose their 'favoured' method of selecting software the District Consultants responded in the following order: subjective opinion after trialing 40%; Opinion of teachers and 'Software Focus' both 10%; and, advertising, documentation from package and checklists all with 5%. None of the District Consultants chose journals other than 'Software Focus' as their preferred method of selecting software or opinion of commercial supplier.



Abbreviations
Doc = Subjective opinion from documentation supplied with package
Try = Subjective opinion after trialing
Ads = Advertising
Jour = Journals & magazines other than 'Software Focus'
Chec = Checklist
Out = Teaching peers in other schools
S/W = Using 'Software Focus'
Supp = Opinion of commercial supplier
Please Note: 10% of respondents do not select software.

Figure 10 District Consultants favoured method of selection.

When comparing software selection methods in general with 'favoured' software selection methods, District Consultants use self trialing of the packages most frequently in both instances.



Abbreviations
Doc = Subjective opinion from documentation supplied with package
Try = Subjective opinion after trialing
Ads = Advertising
Jour = Journals & magazines other than 'Software Focus'
Chec = Checklist
Out = Teaching peers in other schools
S/W = Using 'Software Focus'
D.O. = District Consultants
Sch = Teaching peers in school
Supp = Opinion of commercial supplier
Schl = School co-ordinator of computing

Figure 11 Favoured methods of software selection for teachers and District Consultants.

A comparison of the favoured manner in which District Consultants and teachers approach software selection was undertaken by testing the standard error of difference of two individual proportions.

Table 36
A comparison of the favoured manner in which District Consultants and teachers approach software selection by testing the standard error of difference of two individual proportions.

Favoured method of selection	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Using advertising	10.51	2.34	Yes	Teachers
Using 'Software Focus'	15.13	2.34	Yes	District Consultants
Using Trialing	8.21	2.34	Yes	District Consultants
Using documentation supplied with package	9.05	2.34	Yes	District Consultants
Using opinion of the commercial supplier	37.00	2.34	Yes	Teachers
Using peers outside school	9.58	2.34	Yes	District Consultants
Using checklists	22.40	2.34	Yes	Teachers
Using journals other than 'Software Focus'	39.00	2.34	Yes	District Consultants

When asked what is their favoured method of selecting software, some disparity between the teachers and District Consultants' responses became apparent. Teachers tend to use advertising more frequently in selection, where-as District Consultants are more likely to use journals other than 'Software Focus' to help in making their selections. Both sets of respondents chose trialing as their favoured method significantly more.

Subsidiary Research Question 3.1 (c)
What are the factors which influence District Consultants in the selection of educational computer software and how do they differ from W.A. Government primary school teachers?

Using a synthesis of Akahori's Assessment of Educational software (1988 , see appendix 3) and Schueckler and Shuell's Criteria to Evaluate Software (1989, see appendix 4) it was decided to categorise all responses under the headings of :

Instructional concerns;

Principles of learning/teaching ;

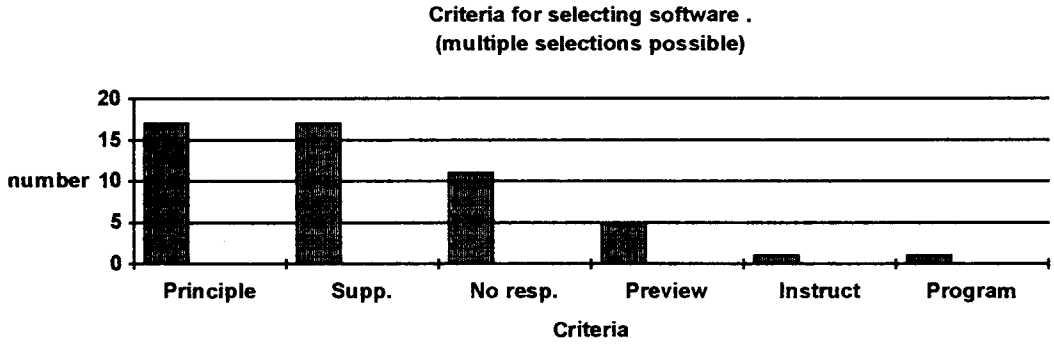
Fundamental program characteristics ;

Available supplementary materials ;

Opportunity to preview materials.

A full list of the actual responses that fit under these headings is available in appendix 11 .

One more heading was later included " No response to question " for those questionnaires returned without this question being attended to.



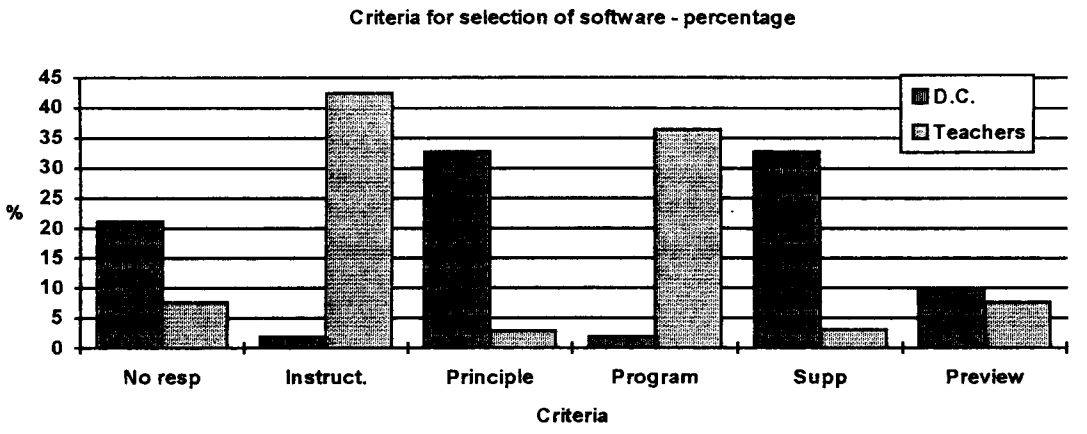
Abbreviations

Instruct	=	Instructional concerns
Principle	=	Principles of learning/teaching
Program	=	Fundamental program characteristics
Supp.	=	Available supplementary materials
Preview	=	Opportunity to preview materials
No resp.	=	No response to question

Figure 12 District Consultants criteria for selecting software.

Each respondent was asked to list not more than five (5) criteria that would influence them most in their selection of software.

Principles of learning/teaching and available supplementary materials both rated as the most popular choices for criteria for selecting software. Sixteen of the twenty respondents regarded these two criteria as important.



Abbreviations:

Instruct	=	Instructional concerns
Principle	=	Principles of learning/teaching
Program	=	Fundamental program characteristics
Supp.	=	Available supplementary materials
Preview	=	Opportunity to preview materials
No resp.	=	No response to question

Figure 13 Criteria used in selection of software by teachers and District Consultants.

Table 37
A comparison of the factors which influence selection of software with District Consultants and teachers by testing the standard error of difference of two individual proportions.

Factors which influence selection of software	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Principles of learning / teaching	156.39	2.34	Yes	District Consultants
Available supplementary material	149.79	2.34	Yes	District Consultants
Opportunity to preview material	15.83	2.34	Yes	District Consultants
Instructional concerns	72.94	2.34	Yes	Teachers
Fundamental program characteristics	50.93	2.34	Yes	Teachers

Teachers are significantly more influenced by instructional concerns and fundamentals of program characteristics as criteria for selecting software. District Consultants believe significantly more than Teachers that available supplementary materials, principles of learning/teaching, and opportunity to preview materials are paramount as criteria in the selection of software.

Subsidiary Research Question 3.1 (d)

What percentage of District Consultants assess educational software before its use and how do they differ from W.A. Government primary school teachers?

Table 38
Percentage of District Consultants assessing educational software before its use.

District Consultants assess software before use	**Number**	**%**
YES	15	75
NO	5	25
Total	20	100

Table 39
A comparison of whether District Consultants and teachers assess software before its use by testing the standard error of difference of two individual proportions.

Assessing software before use	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Yes	11.37	2.34	Yes	District Consultants
No	11.36	2.34	Yes	Teachers

The response of 75% of District Consultants assessing software before its use compares with a 60.7% "YES" response from teachers, which equates to a significant difference.

Subsidiary Research Question 3.1 (e)

Do District Consultants believe they have the necessary skills to select educational computer software and how do they differ from W.A. Government primary school teachers ?

Table 40
District Consultants consideration of their training in selection of educational software:

District Consultant's perception of training in selecting software	**Number**	**%**
LESS THAN ADEQUATELY	4	20
ADEQUATELY	8	40
MORE THAN ADEQUATELY	5	25
NO RESPONSE	3	15
Total	20	100

Nearly two thirds (65 %) of the respondents feel they are adequately, or more than adequately trained in software selection.

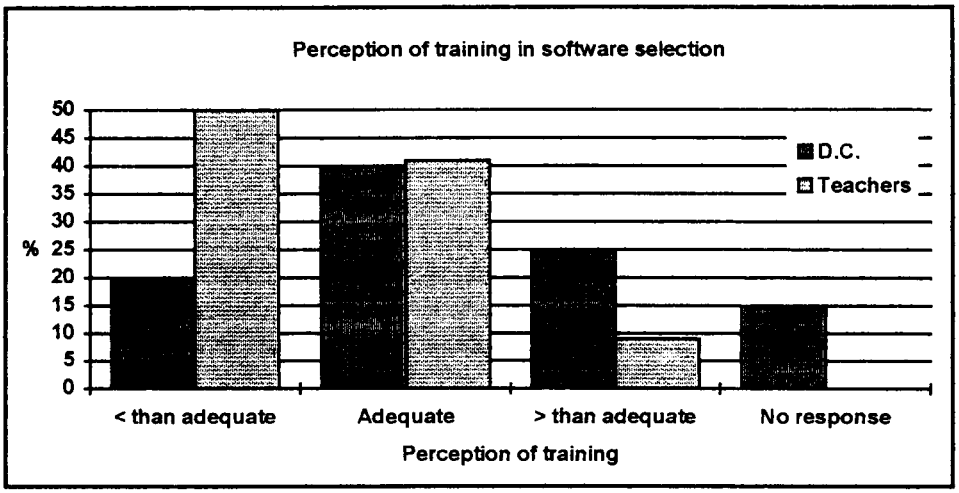


Figure 14 Perception of adequacy of teacher training by teachers and District Consultants.

Table 41

A comparison of the perception of adequacy of teacher training by teachers and District Consultants by testing the standard error of difference of two individual proportions.

Adequacy of training	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Adequate / more than adequately trained	11.61	2.34	Yes	District Consultants
Less than adequately trained	22.52	2.34	Yes	Teachers

Table 42

District Consultants confidence in choosing software to use in their district :

Confidence of District Consultants in selecting software	**Number**	**%**
STRONGLY AGREE	0	0
AGREE	1	5
UNDECIDED	2	10
DISAGREE	7	35
STRONGLY DISAGREE	6	30
NO RESPONSE	4	20
Total	20	100

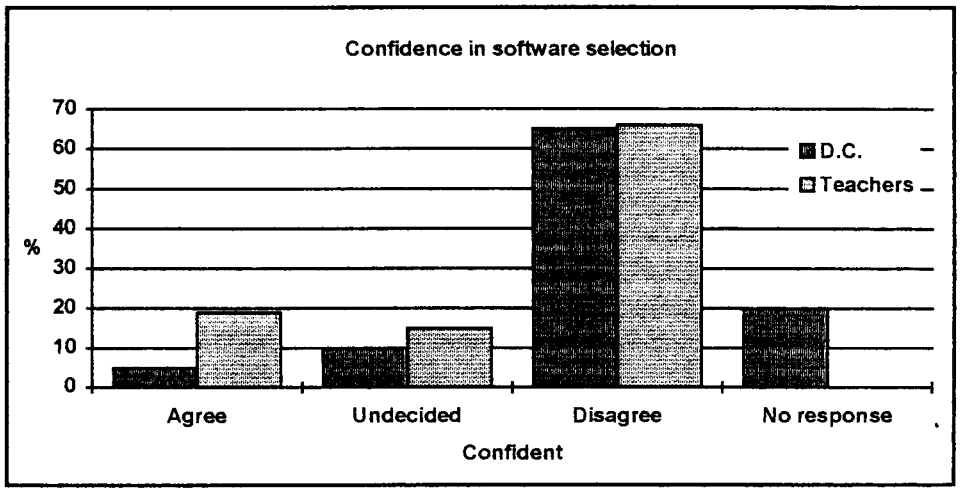


Figure 15 District Consultants and Teachers confidence in selecting software.

Table 43

A comparison of District Consultants and teacher's confidence in selecting software by testing the standard error of difference of two individual proportions.

Confident in selecting software	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Yes	18.08	2.34	Yes	District Consultants
Undecided	7.43	2.34	Yes	Teachers
No	0.75	2.34	No	------

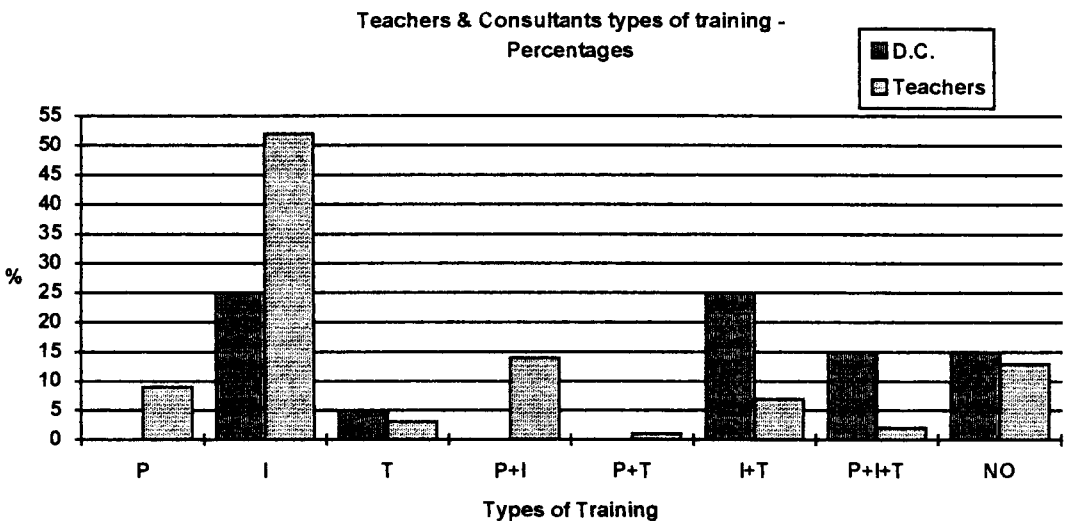
Although District Consultants feel they are adequately trained in software selection they lack confidence in doing so. It seems, training alone does not inspire District Consultants with confidence, but allied with other factors (experience, further study etc), makes for a confident chooser of software.

Subsidiary Research Question 3.1 (f)
What types of training in software selection have District Consultants been involved in and how do they differ from W.A. Government primary school teachers?

Table 44
Types of training in software selection in which District Consultants have been involved **Only one response from each consultant**

Type of training in Computer Education of District Consultants	Number	%
Pre-service only	0	0
Inservice only	5	25
Tertiary only	1	5
Pre & Inservice	0	0
Pre-service & Tertiary	0	0
Inservice & Tertiary	5	25
Pre-service, Inservice & Tertiary	3	15
No training	3	15
No response to question	3	15
	20	100

One must assume that the three people employed as District Consultants who have had no formal training in computer education have a keen interest in it, and are self taught. A greater proportion (65 %) of the respondents indicated they have been involved in some form of inservice in computer education but only 45% have done any study at tertiary level.



P	=	Pre-service only
I	=	Inservice only
T	=	Tertiary only
P+I	=	Pre & Inservice
P+T	=	Pre-service & Tertiary
I+T	=	Inservice & Tertiary
P+I+T	=	Pre-service, Inservice & Tertiary
NO	=	No training

N.B. No response to question by 15% of District Consultants

Figure 16 Comparison of methods of teachers and District Consultants training in selection of software.

Table 45
A comparison of the types of training in which District Consultants and teachers have been involved, by testing the standard error of difference of two individual proportions.

Type of training	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
No training	4.03	2.34	Yes	District Consultants
Preservice training	22.12	2.34	Yes	Teachers
Inservice training	20.16	2.34	Yes	Teachers
Further tertiary training	12.56	2.34	Yes	District Consultants
Preservice and Inservice	23.25	2.34	Yes	Teachers
Preservice and Tertiary	24.75	2.34	Yes	Teachers
Inservice and Tertiary	48.31	2.34	Yes	District Consultants
Preservice, Inservice and Tertiary	79.25	2.34	Yes	District Consultants

The significant difference between teachers and District Consultants is in the teachers reliance on inservice courses for their training. Where-as 52% of teachers have had only inservices as training, 25% of District Consultants have been trained in this single mode. 40% of the District Consultants have had more multiple methods of instruction, compared with 24% of teachers.

Subsidiary Research Question 3.1 (g)

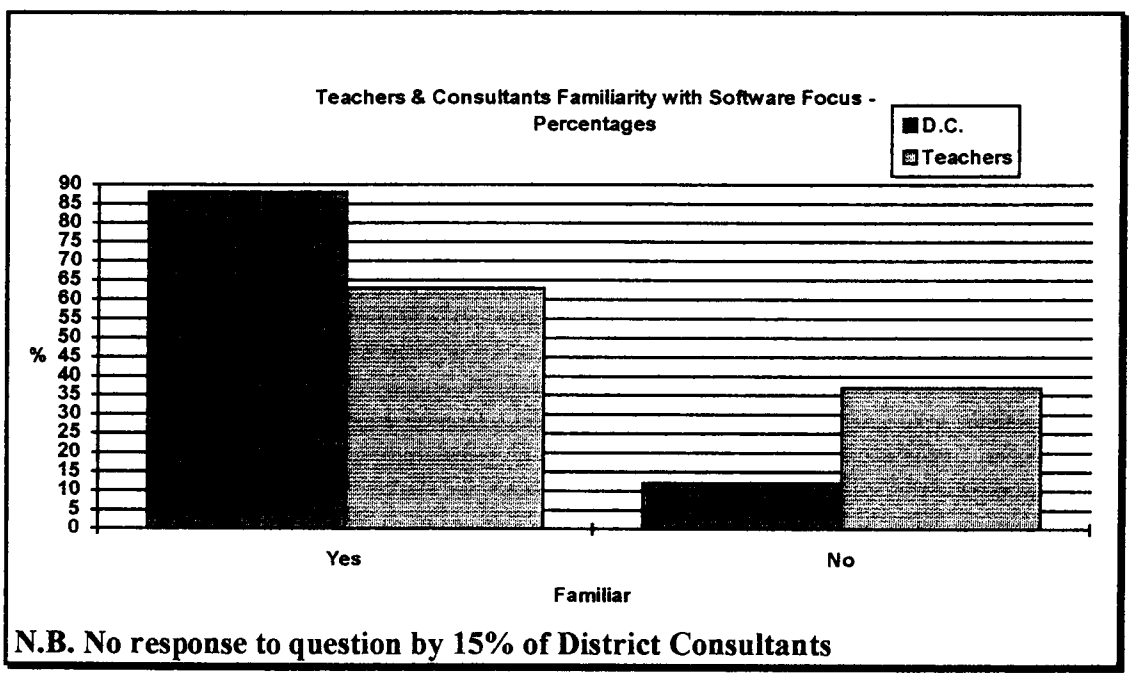
Do the District Consultants have knowledge of and use of the preferred Education Department documents on software selection, 'Software Focus' and how do they differ from W.A. Government primary school teachers

a) Are you familiar with the Education Department document on software selection, 'Software Focus' ?

Table 46
Familiarity with 'Software Focus', the Education Department document on software selection.

District Consultants familiar with 'Software Focus'	Number	%
YES	15	75
NO	2	10
NO RESPONSE	3	15
	20	100

Two of the respondents had no knowledge of 'Software Focus', the preferred Education Department document on software selection.



N.B. No response to question by 15% of District Consultants

Figure 17 Comparison of teachers and District Consultants and familiarity with 'Software Focus'.

Table 47
A comparison of the knowledge of 'Software Focus' of District Consultants and teachers by testing the standard error of difference of two individual proportions.

Knowledge of 'Software Focus'	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Yes	10.04	2.34	Yes	District Consultants
No	22.30	2.34	Yes	Teachers

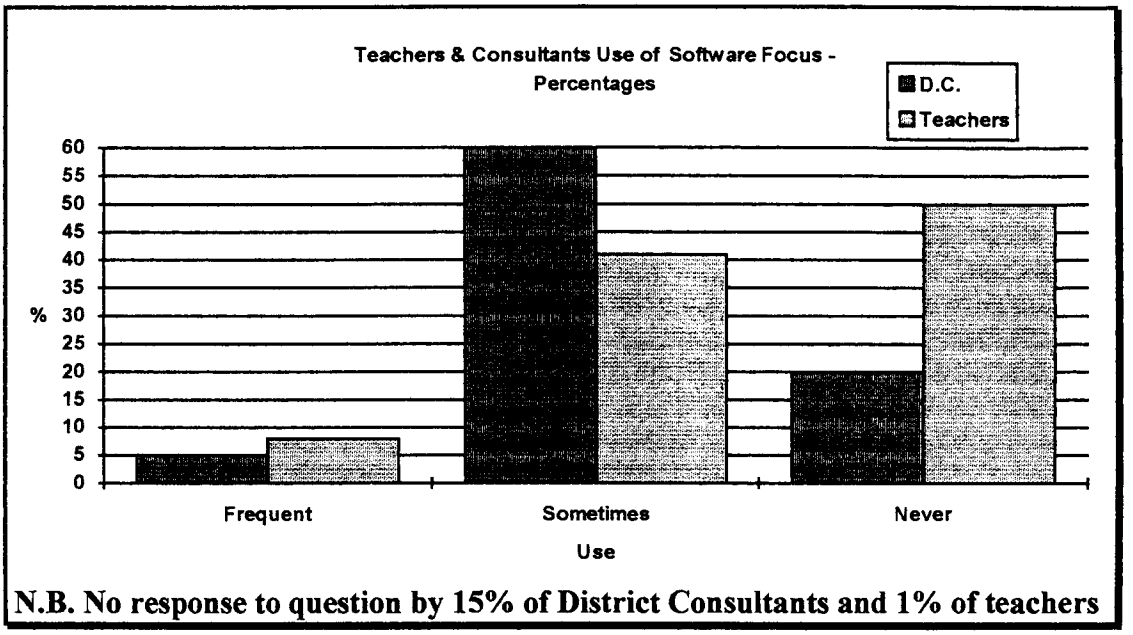
Although it would be desirable for all teachers to know of 'Software Focus' one would assume that it would be imperative for people who are in the position of advising on matters to do with computers to have an intimate knowledge of the document which was prepared by the very organisation they work for. Although District Consultants have a significantly better knowledge of 'Software Focus' it would have been desirable if all District Consultants were familiar with it.

b) I use the Education Department document on software selection, 'Software Focus' in selecting software :

Table 48
Use by District Consultants of Education Department document on software selection, 'Software Focus' in selecting software

District Consultant's use of 'Software Focus'	**Number**	**%**
FREQUENTLY	1	5
SOMETIMES	12	60
NEVER	4	20
NO RESPONSE	3	15
	20	100

Through the frequency of use, it would seem that District Consultants do not rate 'Software Focus' highly as a method by which to select software. Of course, three of the District Consultants have no access to, nor knowledge of 'Software Focus', and it seems that one Consultant who does, have access to it, declines to employ it.



N.B. No response to question by 15% of District Consultants and 1% of teachers

Figure 18 Use of 'Software Focus' by teachers and District Consultants.

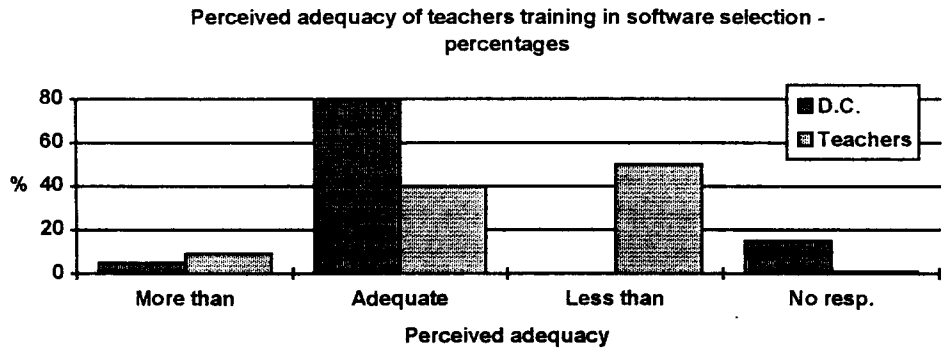
Table 49
A comparison of the use of 'Software Focus' of District Consultants and teachers by testing the standard error of difference of two individual proportions.

Use of 'Software Focus'	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Frequently	9.47	2.34	Yes	Teachers
Sometimes	14.75	2.34	Yes	District Consultants
Never	22.52	2.34	Yes	Teachers

District Consultants are overall significantly more likely to use 'Software Focus' than are teachers. However, neither group uses the document particularly frequently and there is quite a large group which doesn't use the document at all. Considering that this document is the preferred document regarding software selection this seems an under utilisation of a valuable resource.

Subsidiary Research Question 3.2
Do District Consultants differ from W.A. classroom teachers in rating the adequacy of training of teachers, and general competency in software selection by teachers?

Subsidiary Research Question 3.2 (a)
Do District Consultants differ from W.A. classroom teachers in rating the adequacy of training of teachers in software selection ?



Abbreviations:

More than selection.	=	Teachers are more than adequately trained in software
Adequate	=	Teachers are adequately trained in software selection.
Less than selection.	=	Teachers are less than adequately trained in software
No resp.	=	No response to question

Figure 19 Comparison of how District Consultants rate the adequacy of training of teachers in software selection and how the teachers rate themselves.

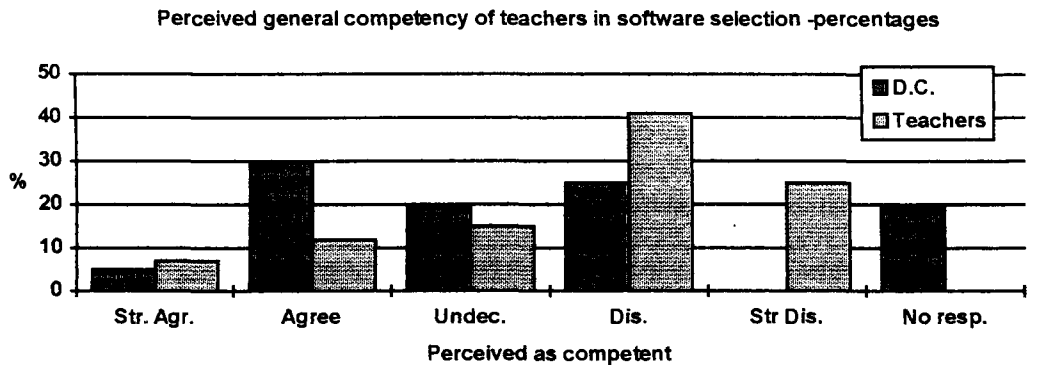
Table 50
Comparison of how District Consultants rate the adequacy of training of teachers in software selection and how the teachers rate themselves by testing the standard error of difference of two individual proportions.

Adequacy of training	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
More than adequately / adequately trained	26.54	2.34	Yes	District Consultants
Not adequately trained	38.01	2.34	Yes	Teachers

District Consultants tend to view teachers as being better trained in software selection than the teachers see themselves. Where-as, only 49% of teachers thought

they were adequately, or more than adequately trained in software selection, 72% of District Consultants thought that teachers were adequately or more than adequately trained. This is a significant difference.

Subsidiary Research Question 3.2 (b)
Do District Consultants differ from W.A. classroom teachers in rating the competency of teachers in software selection ?



Abbreviations:

Str. Agr.	=	Strongly Agree that teachers are competent in software selection.
Agree	=	Agree that teachers are competent in software selection.
Undec.	=	Undecided as to whether teachers are competent in software selection.
Dis.	=	Disagree that teachers are competent in software selection.
Str Dis.	=	Strongly disagree that teachers are competent in software selection.
No resp.	=	No response to question

Figure 20 Perceived general competency of teachers in software selection by teachers and District Consultants.

Table 51
A comparison of the perceived general competency of teachers in software selection by teachers and District Consultants by testing the standard error of difference of two individual proportions.

Perceived general competency of teachers	Z score	Critical value at 0.01	Significant difference Yes / No	Direction of difference
Teachers are competent	17.85	2.34	Yes	District Consultants
Undecided	7.27	2.34	Yes	District Consultants
Teachers are not competent	12.55	2.34	Yes	Teachers

Again, District Consultants had a greater regard for the competency of teachers in software selection than the teachers did for themselves. Of District Consultants 35% thought that teachers were competent with software selection, where-as the response by teachers indicated that only 19% thought themselves competent. This equates to a statistically significant difference.

Chapter 4

Summary and Conclusions

Primary Research Question 1

A. What are the methods currently employed by W.A. Government school teachers in selecting educational computer software for use in their classrooms?

Summary

In answering this question, respondents were at liberty to make multiple selections if so required.

In order, the top five methods of selecting software were:

- Subjective opinion after trialing (61.7% of respondents employed this method);
- Using their teaching peers to suggest software (59.1%);
- Using the advertising materials that are produced to sell software (45.6%);
- Using a document prepared by and preferred by the Education Department, in this case 'Software Focus' (40.0%);
- Using the recommendation of teachers from other schools (38.9%).

Conclusions

a) The predominant method of software selection was 'subjective opinion' (61.7%). With the lack of training that Teachers have received (referred to elsewhere in this study) this means that they are relying on some pragmatic understanding about what constitutes good software.

b) Many of the respondents use recommendations from teaching peers in selecting software. This is not necessarily going to give them an insight into how the software will work for them and the situation in which they operate.

c) Advertising materials are often used to assist in software selection which is not necessarily a good practice as the person who wrote the advertisement is doing so to sell the product and consequently may be inclined to de-emphasise any faults or areas of weakness it may possess.

d) Only 40.0% of teachers use 'Software Focus' and that brings into question the value of this Education Department publication as an intended aid in software selection. This may highlight a need to promote the publication more.

e) The fifth most selected method, 'recommendations of teachers from other schools', constitutes a questionable method because local classroom context is not necessarily taken into account.

B. What are the favoured methods currently employed by W.A. Government school teachers in selecting educational computer software for use in their classrooms?

Summary

In answering this question the respondents were asked to list only one choice as their favoured method of selecting software.

i) In order, the top five favoured methods of selecting software were:

- Subjective opinion after trialing (32.6% of respondents);
- Using advertising materials (9.7% of respondents);
- Taking advice from teaching peers (7.1% of respondents);
- Taking advice from teachers from other schools (6.7% of respondents);
- Using school based co-ordinator of computing and using 'Software Focus' tied with 5.6 % of respondents.

ii) All other methods gained less than 5% of respondents using them as their favoured method of selection (refer to figure 3).

Conclusions

a) The most commonly referred to favoured method of selection of software was trialing (n = 87, or 32.6 % of all respondents who use computers in their classroom), a method that requires more of the respondent than many of the other methods of selection.

b). Trialing (32.6 % of respondents) is significantly preferred over any other method, the next favoured method of using advertising materials rated only 9.7% of respondents.

c) 'School based co-ordinators of computing' and preferred resources from the Education Department on software selection, in this case 'Software Focus', are favoured by only 1 in 20 teachers (5.6%). This helps to confirm the conclusion from the previous question that 'Software Focus' either needs review and/or better promotion to achieve its intended purpose. A survey to find out why this number is so low would be of benefit.

Primary Research Question 2

What are the factors which influence teachers in the selection of educational computer software?

Summary

Each respondent was asked to list not more than five (5) criteria that would influence them most in their selection of software, these choices were not guided in any way. When grouped using a synthesis of Akahori's Assessment of Educational Software (1988 , see appendix 3) and Schueckler and Shuell's Criteria to Evaluate Software (1989, see appendix 4) the responses listed in descending order were:

- Instructional concerns (79.4%), includes criteria such as : social Interaction; instructional groups; user orientation; opportunities to change level of difficulty and speed of presentation; freedom from the need for external information and / or teacher supervision; pre-requisite skills stated; educational objectives stated; evidence that students attain stated objectives; content is accurate and has educational value; teaching / instructional style; content presented in small units; interspersed with questions to determine the students' understanding; and assets of computer are utilised;
- Fundamental program characteristics (68.1%) includes such criteria as : basic information which includes program name; subject area; publisher;

cost; technical aspects including, required hardware; additional hardware needed to run the software; type of program; operational concerns - including being bug free, 'user friendly,' allowing ease in correcting errors, help menus, uncluttered screen display, sound / graphics enhancements; directions for use - on the screen and / or documentation; and execution time - the estimated total number of minutes required to load, utilise the program and save completed work;

- Opportunity to preview materials (14.2%);
- Available supplemental materials (5.6%);
- Principles of learning/teaching (5.2%), these include: the aims of the package; motivation and feedback employed in software; and an evaluative or score component built into the package;
- Thirty eight people made no response to this question.

Conclusions

a) Instructional concerns and fundamental program characteristics are clearly of paramount importance to teachers.

b) Opportunity to preview materials, available supplemental materials, and principles of learning/teaching had only a low priority in the minds of the teachers. This could show that teachers may not understand the importance of looking at all aspects of software during the selection process.

c) The inability or disinclination of 38 people to answer the question was of some concern, and perhaps displays a lack of understanding of the importance of software selection. This would need to be further explored through another study.

Subsidiary Research Question 2.1 (a)

1a. What percentage of W.A. Government primary school teachers use computers in their classrooms?

Summary

The data showed that 89% of respondents use computers in their classroom. This means 11% of respondents are not using computers regardless of the priority 'push' it received from the Education Department in the late 1980's.

Conclusions

a) The 89% of respondents using computers is a reasonable return for the amount of time and effort that was invested by the Education Department in getting teachers to employ computers in their classrooms. It would have undoubtedly been hoped, that after the investment, all teachers would see the benefits of computers and consequently use them.

b) The 11% who did not employ computers in their teaching constitutes a meaningful percentage of the teaching profession.

Subsidiary Research Question 2.1 (b)

What percentage of W.A. Government primary school teachers select educational computer software for use in their teaching ?

(These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

Summary

Of the people who use computers in their classroom 77.9% of them select their own software, leaving 22.1% who don't initially select their own software.

Conclusions

Nearly a quarter of all respondents have been placed in the position of having to use software which was not initially selected by them, and so might not fit their teaching situation as closely as might be desirable.

Subsidiary Research Question 2.1 (c)

What percentage of W.A. Government primary school teachers assess educational computer software before its use in their teaching?

(These numbers do not include the 34 respondents who indicated they did not use computers in their classroom.)

Summary

Nearly 39.3% of respondents will use a software package before assessing its viability in their own classroom situation for themself. They have not either formally or informally assessed it using any criteria.

Conclusions

Nearly 40% of respondents are not assessing software before its use possibly due to one , or a combination, of the following reasons:

- Relying on others, (usually peers) to assess or simply recommend software;
- The software being the only available software, so a need to assess does not seem apparent;
- A lack of interest in assessing software;
- A lack of knowledge regarding methods of software assessment;
- A lack of knowledge regarding the need for software assessment;
- A lack of time to assess software;
- A lack of understanding of computers in terms of not just using it as a 'baby-sitting' tool.

This indicates a need for teacher training in assessment of software as part of a total training program in selection of software.

Subsidiary Research Question 2.2

Do W.A. Government primary school teachers believe they have the necessary skills to effectively select educational computer software?

Summary

Just less than half (49.4%) of respondents feel that they are adequately trained to select software but only 19.5% feel confident when selecting software.

Conclusions

There is a level of disparity in these figures, and what is perceived as adequate training does not necessarily give confidence. Two possible reasons for this disparity are, the time lag between the training they receive and when they get to select software, and the lack of opportunity to apply the training they get to the selection of software.

Subsidiary Research Question 2.3

Do W.A. Government primary school teachers believe they have the necessary resources to effectively select educational computer software?

Summary

i) Only one quarter of respondents claim to be receiving adequate assistance in software selection from resource people and available resources such as District Consultants, Education Department information, generally available information and adequate number of District Office meetings.

ii) Of all respondents using computers in their classroom, 17.2% feel they are getting sufficient help from their District Consultants.

iii) Of all respondents, 26.2% believe that there is enough Education Department documentation available to them to aid them in selection.

iv) Of all respondents using computers in their classroom, 22.5% feel there is enough available information emanating from outside the Education Department to help them in software selection.

v) Of all respondents, 22.1% feel that they have been to enough District Office inservice courses to feel comfortable with software selection.

Conclusions

a) W.A. primary school teachers do not generally believe that they have the necessary resources to effectively select educational computer software.

b) District Offices may not be supplying a suitable service with respect to software selection.

c) Not all District Offices have a District Consultant available and this clearly affects responses to subsidiary research question 2b.

d)If the services are available through District offices these services may not be advertised enough to make the teaching population aware of their availability.

e) Even though there is a plethora of information generally available on software selection (both generic selection and package specific), teachers are not aware of its existence (only 22.5% feel there is enough available information).

f) More District Office meetings and inservice courses are needed to make the teachers feel comfortable with software selection.

Subsidiary Research Question 2.3

What training background have W.A. Government primary school teachers received in the selection of educational computer software?

Summary

i) There is quite a disparity in the types of training teachers have undergone. 74.5% of respondents have had some in-service training in using computers in education but few (12.9%) have ventured further by attending relevant post service tertiary classes.

ii) There is a sizeable number (12.6%) of respondents who have received no training in computer education from any source.

Conclusions

a) The majority (74.5%) of respondents have had computer education inservicing as a part of their training, probably due to:

- time given out of school in the form of professional development days by the Education Department;
- this training being directly related to classroom practice and so the relevance was appreciated;
- no cost being associated with attending these courses.

b) It is important to note that even after the 1987 'push' that was given to ensure that all teachers had some training in using computers in education, some 12.6% have had no training. This group needs to be identified and offered the chance to attend some training.

Subsidiary Research Question 2.4 (a)

Does age affect the way in which teachers select educational computer software?

Summary

When a chi-square test was applied to the data, age appears to be a significant factor in the manner in which software is selected.

- Although one might suspect that a younger, less experienced teacher might ask advice from their teaching peers it appears that in fact they tend not to. It is in the age bracket 26 - 35 years old that they are more likely to ask for advice when selecting software.
- All age groups use trialing to select software significantly more than could be expected to occur through chance selection of method alone.

Conclusions

a) Any conclusions made about the selection practices of respondents with regards age have certain confounding factors that need to be appreciated. These factors include:

- The age of respondents is usually going to be greater amongst the more experienced teachers;
- The older a respondent is the less likely they are to have 'grown up' with computers and so may feel less comfortable with them;
- Many of the older teachers would have been trained at a time when computers were either non-existent or not prevalent in education.

The group of 26 - 35 year olds are more likely to seek advice when selecting software, which is a good trait if used in conjunction with trialing. Possible reasons for this are:

- they have taught for long enough to feel secure in their ability in teaching and consequently ask for advice without feeling inadequate;
- they are sufficiently well trained in software selection to realise that it is a difficult process and that from time to time they will require assistance to make informed decisions;

b) Although age is a significant factor in how software is selected it is not a significant factor as to whether someone will trial software before its use.

Subsidiary Research Question 2.4 (b)

Does gender affect the way in which teachers select educational computer software?

Summary

i) Chi-square tests show that both males and females select software through trialing significantly more often than could be expected to occur through chance selection of method alone. Yet, a relatively low number of males (32.7%) and females (32.4%) use trialing to select software.

ii) Males have a greater proclivity towards using advertising in software selection than females (13.2% of males and 7.1% of females).

iii) Using the three most commonly supplied responses on methods used in software selection, females (9.0%) are more likely to ask peers for advice on software selection than males (4.4%).

Conclusions

a) Gender does not have a significant affect the way in which teachers select software.

b) Teachers, particularly males, need to be better educated in respect to the shortcomings of using advertising materials.

Subsidiary Research Question 2.4 (c)

Does teaching position affect the way in which teachers select educational computer software?

Summary

i) Chi-square testing shows that:

- Principals are significantly less likely to have selected software by trialing than are teachers and Deputy Principals:
- Principals are more likely to look to the advertising materials to make their software choices than teachers or Deputy Principals.

Conclusions

a) Teaching position has a significant affect in the way in which teachers select educational computer software.

b) Principals don't use trialing as a method of selecting software as regularly as teachers or Deputy Principals. This could be due to:

- not having attended the same number of inservice courses as the teachers and so not understanding the importance of trialing as a selection method;
- perhaps not fully understanding the interactive nature of software and how this differs from printed materials;
- not having the time to sit down with the packages due to other duties; or

- relying upon the teachers who use software to adapt the packages to their needs; or
- perhaps misconstruing the intent of the question and assuming that the act of purchasing equates to selection.

c) Principals are more inclined to use advertising to select software. They need to be reminded that although this may be expedient it is not necessarily the best single method of selection.

Subsidiary Research Question 2.4 (d)

Does year level taught affect the way in which teachers select educational computer software?

Summary

i) This study shows that junior and middle primary teacher respondents tend to be significantly less influenced by advertising than upper primary respondents.

ii) Upper primary teachers are less likely to accept the advice of peers when selecting software.

Conclusions

a) Year level taught has a significant affect in the way in which teachers select educational computer software.

b) Upper primary teachers could be employing advertising too often as a method of selecting software as they are reticent to use other methods at the same time to affirm the validity of their choices. There are perhaps two reasons why this might be so:

- the majority (65%) of Upper Primary teachers are males, which would fit with the males proclivity for using advertising to select software; or
- the software for Upper Primary classes is more sophisticated and consequently takes longer to assess, making using advertising materials seem a much more desirable method of selection.

b) Upper primary teachers need to be better educated in respect to the shortcomings of using advertising materials as a sole method of selecting software.

Subsidiary Research Question 2.4 (e)

Does teaching experience affect the way in which teachers select educational computer software?

Summary

- Teachers with 0 - 5 years experience use trialing to select software significantly more than would be expected through chance alone.
- Teachers with 6 - 10 years experience show no significant 'leaning' towards a particular method of software selection.
- Teachers with 11- 15 years experience show no significant 'leaning' towards a particular method of software selection.

Conclusions

a) Only with the 0 - 5 years experience groups is experience a significant factor in the way in which teachers select educational software.

b) As the inexperienced teaching group gains more experience it is probable that they will carry the trait of selecting software through trialing with them. It is reasonable to suppose that the group of teachers in training at the present will follow the trend shown by these teachers and also select more through trialing. This indicates that the teaching population of the future is more likely to employ trialing in selecting software.

Subsidiary Research Question 2.4 (f)

Does years of teacher training (3,4 or 5 years) affect the way in which teachers select educational computer software?

Summary

i) The small number of five year trained respondents (6) precludes significant analysis of this group.

ii) According to the ANOVA test applied, the duration of training has a significant effect on the manner of selection of software of teachers with 3 or 4 years of training.

iii) Application of a chi-square test shows respondents who were three year trained were more likely to use trialing than those who had four years of training.

Conclusion

a) Years of teacher training (3,4 or 5 years) has a significant affect in the way in which teachers select educational computer software.

b) Length of time spent in teacher training does not increase respondents willingness to trial software as a method of selection.

c) Those who have more training are less likely to use advertising to select software perhaps because the extra training has shown them that this method used on its own has inherent flaws.

d) These data perhaps illustrate a flaw in the tertiary training of teachers, in that it could be reasonably expected that greater length of training should have an impact on software selection practices, but this does not appear to be the case.

Subsidiary Research Question 2.4 (g)

Does post service tertiary study affect the way in which teachers select educational computer software?

Summary

i) Of the total number of respondents surveyed 12.9% have been involved in post service tertiary education units to do with computer education.

ii)People who have had post service tertiary education in computer education are less likely to employ advertising to select software.

iii) Application of a chi-square illustrates that both groups (those with post service tertiary study and those without) use trialing more than chance selection of this process would occur.

Conclusions

a) A relatively small number of respondents have had post service tertiary education in computer education.

b) Post service tertiary study does not significantly affect the way in which teachers select educational computer software, except that those who have had post service tertiary education in computer education generally avoid the use of advertising as their primary method of software selection. The avoidance of advertising materials could be due to an understanding of the possibility of bias in the material.

Subsidiary Research Question 2.4 (h)

Does confidence in choosing software affect the way in which teachers select educational computer software?

Summary

i) Of those who don't perceive themselves as confident in selecting software (65.5% of respondents), 12.5% of that group choose not to do so.

ii) Of those 19.5% of respondents who believe themselves competent in software selection, nearly half (48.1%) of that group do not select their own software.

iii) A group consisting of 14.9% of the respondents were undecided as to their confidence in selecting software.

iv) In the method of software selection, a chi-square test shows a significant difference only in the group that does not feel confident in selecting software .

v) Of those respondents who don't perceive themselves as confident in software selection (65.5 %), 42.2% employ trialing even though it requires the most work and knowledge from them. This is more than could be expected through chance alone.

Conclusions

a) Confidence in capability in software selection does not have a significant affect in leading the respondents towards selecting software. There needs to be further investigation applied to this strange finding to see if this is due to a lack of:

- need (the selection is done by another staff member);
- desire (they feel that self selection is not necessary);
- or opportunity, (no available money for software).

b) Those people who don't perceive themselves as confident in software selection employ trialing even though it requires the most work and knowledge from them.

Subsidiary Research Question 2.5

What is the relationship between teachers' perception of whether they have the skills and resources to select software and their method of selection ?

Summary

i) All respondents, whether they feel they have had adequate training in software selection (49.6%) or not (50.4%), employ trialing as a method of selecting software significantly more than through chance alone.

ii) Of all the respondents (50.4%) who feel they have not had adequate training in software selection, 10.4% tend to use the advice from their peers, this is more than those who feel they are adequately trained of whom 3.8% tend to use the advice from their peers.

iii) The data gives no clear indication of a trend with regards to the sufficiency of the information that people receive, or perceive they receive from the Education Department and the manner in which they select software.

iv) The data shows that sufficiency of general information is not a significant factor in selecting software.

v) If respondents feel that they have had a sufficient number of district meetings on computers in education to feel comfortable with software selection (22.1% of respondents) then they are tending not to ask peers for their opinion about software but instead, select through trialing. Whereas, those who feel they have attended insufficient numbers of meetings (77.9% of respondents) use trialing less and ask peers more.

Conclusions

a) There appears to be a limited relationship between the skills and resources the respondents perceive they possess and their method of selection.

b) Those who have attended insufficient District meetings are seeming to use peers in their schools as a substitute.

Subsidiary Research Question 2.6

What percentage of W.A. Government primary school teachers have knowledge of and choose to employ the Education Department's 'Software Focus' for selecting educational computer software?

Summary

i) Of all the respondents who use computers in their classroom, 62.5% are familiar with 'Software Focus', the document on software selection preferred by the Education Department.

ii) When asked in primary research question 1, what methods they employed in selecting educational computer software for use in their classrooms, 35.5% indicated they used 'Software Focus'. Yet when asked directly if they employed 'Software Focus' in selecting educational software 49.8% of all the respondents who use computers in their classroom, stated they did so. there seems to be no justifiable reason for this discrepancy

iii) Of all the respondents either using or not using computers in their classroom, 44.2% employ 'Software Focus' to help in selecting educational software.

Conclusions

a) It can be generalised from this study that 62.5% of W.A. primary school teachers have knowledge of 'Software Focus' and 44.2% use it to select software. The question that was not addressed by this study which should be asked is, why don't all of the people who are familiar with 'Software Focus' choose to employ it ?

b) 'Software Focus' is an under utilised resource that may need revising and/or has not been properly introduced into schools, in that over a third of teachers who use

computers in their classroom are not familiar with it, and 55.8% of all teachers do not use it.

Subsidiary Research Question 2.7

What is the relationship between teachers' confidence in assessing software and their use of 'Software Focus'

Summary

ANOVA and Chi-square application to the data indicates that those people who are using 'Software Focus' are generally more confident with software selection than those who do not employ this document.

Conclusion

In general respondents who use 'Software Focus' see themselves as more capable in selecting software.

Subsidiary Research Question 3.1

Do District Consultants differ from W.A. classroom teachers in respect to:

a) Their methods of software selection.

b) Their favoured method of software selection.

c) The factors which influence the selection of software.

d) If they assess software before its use.

e) Their belief in whether they have the necessary skills to select educational computer software.

f) The types of training in which they have been involved.

g) Their knowledge and use of 'Software Focus'.

Subsidiary Research Question 3.1 (a)

Do District Consultants differ from W.A. classroom teachers in respect to their methods of software selection?

Summary

i) Both 'selecting software through the opinion of teachers' and through 'subjective opinion after trialing' were equally popular at 65%, of respondents using them.

ii) 50% of District Consultants rated 'Software Focus', as a preferred aid to selecting software, making it the third most popular method for District Consultants.

iii) Use of checklists rated last out of nine possibilities at 20%.

iv) There was not a big difference between the use of any of the methods of software selection. This was due mostly to the small number of responses to the question, 72 in total, that were used.

In selection of software the top five responses for District Consultants were:

(multiple responses were possible)

- trialing (65%)
- opinion of other teachers (65%)
- use of 'Software Focus' (50%)
- journals and magazines other than 'Software Focus' (45%)
- advertising (40%)

For teachers the top five responses in descending order were: (multiple responses were possible)

- trialing (61.7%)
- using teaching peers (59.2%)
- advertising (45.6%)
- use of 'Software Focus' (40.0%)
- recommendation of teachers from other schools (38.9%).

Conclusions

a) Using the test of standard error of difference of two individual proportions a significant difference in the methods which District Consultants and teachers use to select software became apparent.

b) Comparing the top five responses to the question, District Consultants use 'Software Focus', 'trialing', and 'opinion of other teachers', significantly more than teachers as methods of software selection.

c) Comparing responses outside of the top five responses 'referring to the documentation supplied with the package', 'use of outside peers', 'checklists' and 'journals other than 'Software Focus' were all used significantly more by District Consultants than teachers as methods of software selection.

d) Teachers significantly use 'advertising' more than District Consultants in selecting software.

Subsidiary Research Question 3.1 (b)

Do District Consultants differ from W.A. classroom teachers in respect to their favoured method of software selection?

Summary

i) When asked to choose their ' favoured ' method of selecting software the District Consultants responded in the following order:

- Subjective opinion after trialing (40%);
- Opinion of teachers and 'Software Focus' both (10%);
- Advertising, documentation from package, using journals other than 'Software Focus' and checklists all with 5%;
- None of the District Consultants chose utilising the opinion of the commercial supplier as their preferred method of selecting software.

The top five favoured methods of selecting software by teachers were:

- Subjective opinion after trialing (32.6%);
- Using advertising materials (9.7%);

- Taking advice from teaching peers (7.1%);
- Taking advice from teachers from other schools (6.7%);
- Using school based co-ordinator of computing and using 'Software Focus' tied with 5.6 % of respondents.

Conclusions

a) Using the test of standard error of difference of two individual proportions a significant difference in the favoured methods which District Consultants and teachers use to select software became apparent.

b) Teachers use 'advertising' significantly more frequently than District Consultants as a favoured method of selection.

c) District Consultants are significantly more likely to use 'journals other than 'Software Focus", 'Software Focus', 'trialing', 'referring to the documentation supplied with the package', and 'use of outside peers', as favoured methods in making their selections.

d) Both sets of respondents chose 'trialing' as their favoured method significantly more than any other method.

e) Although 'trialing' ranks as the most favoured method of software selection for both groups, District Consultants are significantly greater users of trialing than Teachers.

Subsidiary Research Question 3.1 (c)

Do District Consultants differ from W.A. classroom teachers in respect to the factors which influence the selection of software?

Summary

i) Factors which influence District Consultants in software selection, in descending order:

- Principles of learning / teaching (85%)
- Available supplementary materials (85%)
- Opportunity to preview materials (25%)

- Instructional concerns (5%)
- Fundamental program characteristics (5%)

ii) Factors which influence teachers in software selection, in descending order:

- Instructional concerns (79.4%)
- Fundamental program characteristics (68.1%)
- Opportunity to preview materials (14.2%)
- Available supplementary materials (5.6%)
- Principles of learning / teaching (5.2%)

Conclusions

a) Using the test of standard error of difference of two individual proportions, it is noted that District Consultants do differ significantly from W.A. classroom teachers in respect to the factors which influence the selection of software.

b) Teachers are significantly more concerned than District Consultants with 'instructional concerns' and 'fundamental program characteristics' as criteria for selecting software.

c) District Consultants are significantly more concerned than teachers with 'available supplementary materials' and 'principles of learning/teaching' as criteria for selecting software.

d) Teachers are significantly more concerned with 'opportunity to preview materials' than District Consultants but the difference is less great than the difference between the groups with the other four factors.

e) District Consultants believe that 'available supplementary materials' and 'principles of learning/teaching' are of equal importance as criteria for selecting software.

f) District Consultants and teachers both had fairly definite predisposition regarding the factors which influence software selection. 'Principles of learning / teaching' (85%) and 'available supplementary materials' (85%) were the top two choices for District Consultants and 'instructional concerns' (79.4%) and 'fundamental program

characteristics' (68.1%) as the top two choices for teachers. All other factors, for both groups, rated less than 25%.

g) Neither group seemed to have a broad appreciation of the full range of factors that should be considered when selecting software.

Subsidiary Research Question 3.1 (d)

Do District Consultants differ from W.A. classroom teachers in respect to assessing software before using it ?.

Summary

i) Of District Consultants surveyed 75% assess software before its use and 60.7% of teachers who use computers in their classroom assess software before they use it.

Conclusions

a) Using the test of standard error of difference of two individual proportions a significant difference between teachers and District Consultants on assessing software before its use was noted. District Consultants are significantly more likely to perform this assessment.

b) Although District Consultants do assess software before using it (75%), more than teachers (60.7%), it would have been hoped that District Consultants would have been even more careful about assessing software before being placed in the position of recommending it, in order to maintain their professional reputation.

Subsidiary Research Question 3.1 (e)

Do District Consultants differ from W.A. classroom teachers in respect to their belief in whether they have the necessary skills to select educational computer software?

Summary

i) Nearly two thirds (65 %) of the District Consultants feel they are adequately, or more than adequately trained in software selection.

ii) This compares with the teaching population's response of only 49% for the same question.

iii) Although 65% of District Consultants feel they are adequately trained in software selection they lack confidence in doing so (only 5% agree that they are confident in choosing software and 0% strongly agree they are confident in choosing software).

Conclusions

a) On the question of whether District Consultants differ from W.A. classroom teachers in respect to their belief in whether they have the necessary skills to select educational computer software, the test of standard error of difference of two individual proportions showed a significant difference in the responses.

b) District Consultants do differ significantly to W.A. classroom teachers in respect to their belief in whether they have the necessary skills to select educational computer software.

c) The situation where District Consultants are not able, or at least do not feel they are able, to fulfil one of their major roles satisfactorily because of lack of training is untenable.

d) There is a disparity in that, even though 65% of District Consultants feel adequately trained in software selection, only 5% feel confident in doing so.

Therefore it is likely that one or more of the following apply:

- training in software selection could be improved;
- a connection between the training of consultants and the practical application needs to be re-inforced;
- District Consultants do not have the opportunity to select software and hence apply the training they have received in software selection;
- refresher courses for District Consultants need to be introduced to keep them up to date with software development.

Subsidiary Research Question 3.1 (f)

Do District Consultants differ from W.A. classroom teachers in respect to the types of training in software selection in which they have been involved?

Summary

i) Three people employed as District Consultants (15%) have had no formal training in computer education. A greater proportion (65 %) of the respondents indicated they have been involved in some form of inservice in computer education and 45% of the total sample then went on to do any study in computer education at a post service tertiary level.

ii) Approximately 13% of teachers have had no formal training in computer education , 74.6% have had some inservice component to their training with computer education and 13% have gone on further to post service tertiary study in computer education.

Conclusions

a) Using the test of standard error of difference of two individual proportions it has been determined that District Consultants significantly differ from W.A. classroom teachers in respect to the types of training in software selection in which they have been involved.

b) Inservice courses have been the major component of both teachers and District Consultants training with computers, with teachers having significantly more reliance on this form of training.

c) District Consultants have had significantly more tertiary training than have teachers in computer education.

Subsidiary Research Question 3.1 (g)

Do District Consultants differ from W.A. classroom teachers in respect to their use of 'Software Focus'?

Summary

i) Only 5% of District Consultants and 9% of teachers use 'Software Focus' frequently.

ii) Some 60% of District Consultants and 41% of teachers use 'Software Focus' sometimes.

iii) Some 15% of District Consultants and 38% of teachers do not use 'Software Focus'.

iv) Of the District Consultants 20% did not respond to the question on their use of 'Software Focus', where-as, all teachers did.

v) Familiarity with 'Software Focus' was 88% among District Consultants and 63% among teachers.

vi) Of the District Consultants 15% did not respond to the question on their familiarity with 'Software Focus', where-as, all teachers did.

Conclusions

a) District Consultants significantly differ from W.A. classroom teachers in respect to their use of 'Software Focus' as indicated by the test of standard error of difference of two individual proportions.

b) Of the respondents who use 'Software Focus' 'frequently', District Consultants are significantly better represented than teachers.

c) Of the respondents who use 'Software Focus' 'sometimes', District Consultants are significantly better represented than teachers.

d) Of the respondents who do not use 'Software Focus' , teachers are significantly better represented than District Consultants.

e) From the data on frequency of use, it would seem that District Consultants and teachers do not rate 'Software Focus' highly as a method by which to help select software.

f) District Consultants are significantly more familiar with 'Software Focus' than are teachers.

g) All Education Department school and District Office based employees should at least be familiar with the document 'Software Focus' This study shows that this has not been achieved and hence there is a problem in the manner in which 'Software Focus' was either; devised, introduced, marketed, supported , packaged, updated or made available.

Subsidiary Research Question 3.2

Do District Consultants differ from W.A. classroom teachers in rating the adequacy of training of teachers, and general competency in software selection of teachers?

Subsidiary Research Question 3.2 (a)

Do District Consultants differ from W.A. classroom teachers in rating the adequacy of training of teachers in software selection ?

Summary

i) District Consultants tend to view teachers as being better trained in software selection than the teachers see themselves.

ii) Only 49% of teachers thought they were adequately, or more than adequately trained in software selection.

iii) Of District Consultants, 85% thought that teachers were adequately or more than adequately trained.

Conclusions

a) District Consultants significantly differ from W.A. classroom teachers in respect to rating the adequacy of training for teachers as indicated by the test of standard error of difference of two individual proportions.

c) Either District Consultants are overrating the level of teacher training or teachers are underrating the level of teacher training in software selection.

d) Only 49% of teachers feel they are adequately trained and yet using peers to select software is one of the more commonly methods in which to select software. This is quite permissible if the peers that are being used as a resource are those who do fall into the category of feeling they are adequately trained. If they do not fall into this category then this proportion is of some concern and indicates that training in software selection needs attention.

Subsidiary Research Question 3.2 (b)

Do District Consultants differ from W.A. classroom teachers in rating the competency of teachers in software selection ?

Summary

District Consultants thought that 48% of teachers were competent with software selection whereas teachers indicated that only 19% thought themselves competent with software selection.

Conclusions

a) District Consultants significantly differ from W.A. classroom teachers in respect to their regard of the competency of Teachers in software selection, as indicated by the test of standard error of difference of two individual proportions.

b) District Consultants rate the competency of teachers in software selection significantly higher than teachers do themselves.

c) Either District Consultants are overrating the level of teacher competency or teachers are underrating the level of teacher competency in software selection. To find out which of these two possibilities it is a needs analysis is required in the different Districts.

Chapter 5

Recommendations

Recommendations for the Education Department of Western Australia:

1) A training program needs to be instigated that covers good practices for selecting software:

- Pre-service - as of Bitter (1989) and his 'ideal technology' curriculum for undergraduates;
- Inservice - by re-dressing the nine problems listed by Sturdivant (1989);
- Post Service (tertiary) - through offering financial and professional incentives.

2) A teacher training program in assessing software needs to be instigated and it should stress:

- the need and importance of self selection of software before its use, to best suit particular situations;
- pedagogical and design factors in assessing software;
- the variety of methods which can be used to assess software.

3) All Education Department employees should be instructed on the process and benefits of using trialing as a method of selecting software.

4) The Education Department should make software selection more of a priority by:

- making teacher training institutions more aware of the gaps in teacher's knowledge on software selection;
- getting the teacher training institutions to move the process of software selection into the curriculum areas from which the software comes, (e.g. good software selection procedures taught in science education when

showing the benefits of selecting and using good quality educational software for teaching science);

- making software selection a key competency requirement of the graduating teacher.

5) Those Education Department employees who do not perceive themselves as possessing adequate capabilities in software selection should be guided towards using an Education Department preferred document on software selection, such as 'Software Focus' as a useful source for information (See also recommendation 16 concerning the quality of 'Software Focus').

6) All persons should be encouraged to undergo some training in computer education, containing a significant component of software selection, as a foundation for the increasing prevalence of computers across all teaching areas.

7) Training in the assessment and selection of software should commence in pre-service training, but past experience has shown that the pressures on teacher training time is already great and subject to a variety of different foci. Hence, inservice training in software selection may be more effective as this is training done at the point of need.

8) In order to achieve the goal of recommendation 7, the Education Department should bring the educational uses of computers back as a system wide priority. After doing this the Education Department should make the funds available to provide the expertise and resources to properly support this priority.

9) The 11% of teachers who do not use computers in their classrooms is a concern. A further survey is recommended to find out what will be needed to encourage this group to use computers in their classrooms.

10) An outside training unit for inservicing teachers in software selection could be considered as a cost effective manner in which to supply this service and augment the service supplied through District Offices. These services could be supplied through private enterprise.

11) The small percentage of teachers that use computers without any training in the use of computers in education (1.6%) should be marked as a training priority.

12) All teachers, but in particular, more experienced teachers (i.e. the group of teachers who where trained when computer use was not so prevalent) should be offered the chance, through inservice training, to become more familiar with computers in general and software selection in particular.

13) The employment of District Consultants in computers and their use in schools for each district should be made a priority.

14) The lack of confidence expressed by District Consultants in the selection of software suggest that a survey should be conducted by the Education Department to find out what would make them confident in this area.

15) Persons selected to be District Consultants in the area of computers should be selected on the basis of training in a relevant area of computer education and encouraged to pursue tertiary education in the field of computer education.

16) 'Software Focus' should be revitalised and updated or replaced by some publication which deals with the same issues. Any publication should be produced with the understanding that it should be updated periodically to remain current.

17) If District Consultants are not to be brought back into all Districts, it should be noted that for a fraction of what it would cost to provide District support in helping teachers to select software, a comprehensive document could be established to partly compensate for this servicing role, especially with respect to software selection. This document could be a revitalised 'Software Focus' as referred to in recommendation 16.

18) Any information supplied by the Education Department needs to be seen as a document valued by that Department. The document should be advertised and established in schools and District offices. 'Software Focus' could fulfil this role if it were seen not as a new document, but rather as an updated and evolving document which has a history of value as an agent in software selection.

19) If 'Software Focus' is to be re-introduced it needs to have its funding priority returned and the focus needs to be the updating of the information and the inservicing of people in the use of the document. It should also be promoted not as an alternative for training in software selection but as a supplement to it.

20) Any information supplied by the Education Department needs to be made available to all persons in a location where it can be easily accessed, for example, District Offices, school library resource centres, school staff rooms or other places which are readily accessible to teachers. This is particularly applicable to preferred documents on software selection such as 'Software Focus'.

21) Any information supplied by the Education Department needs to be thoroughly inserviced among District Consultants. Whether the document be new, or an updating of 'Software Focus' there is a need that District Consultants be fully appraised of its format, audience and potential uses.

22) Journals which feature information on selection of software should be brought to the attention of District Consultants, or their value re-iterated to District Consultants by the Education Department. They in turn should establish a 'library' where this information can be accessed by teachers with-in their District.

Recommendations for District Consultants:

1) There should be a concerted effort by District Consultants to guide teachers who only use peers or advertising materials into a broader range of software selection procedures.

2) District Consultants should be encouraging Teachers to use the information supplied by the Western Australian Education Department, to make an initial selection of the software and then a more detailed assessment of the software by assessing the software for themselves.

3) District Consultants need to approach teachers who perceive they are not adequately trained in software selection skills. These teachers should be:

- instructed to avail themselves of the resources around them, such as journals and 'experts' outside of the Education Department;
- given the opportunity to avail themselves of further training;
- given greater access to District Consultants;
- given time and encouragement to look into the preferred Education department information on software selection.

4) District Consultants should be making Teachers more aware of the value of gaining the opinion of 'expert' teaching peers, but only as an adjunct to trialing. and using materials which are provided by the Education Department.

5) District Consultants should help to educate the 9 % of the teaching population that use advertising materials as their sole source of information in selecting software. These teachers need to be made more aware of good software selection procedures.

6) District Consultants need to indicate that it would probably be advantageous for members of staff other than Principals to be in charge of selecting software for schools, if:

- the Principal is not the person using the software;
- the Principal is not thoroughly familiar with the software already available in the school;
- the Principal is not fully conversant with the hardware available at the school;
- there are others on staff with more understanding of what constitutes 'good' software.

7) District Consultants should encourage the nomination of a school co-ordinator of computing and then promote the benefits of having such a person. Some of the duties which could be attached to this role are:

- gathering resources that give good information about software;
- being cost centre manager for computers in the school;
- being the person to whom all relevant correspondence is addressed;
- maintaining the information 'library' regarding computers in schools;
- receiving all advertising materials with regards to computers and disposing of information which is not relevant;
- acting as an adviser in software selection;
- being an avenue to gaining help and information from District Consultants.

8) District Consultants need to target Upper Primary teachers, with respect to:

- the value of using trialing as a method of software selection;
- educational software packages being subject to the same pedagogical concerns that face the selection of books, texts, or other learning materials.

9) District Consultants need to show Teachers that extra resources (quality help from district office staff, more Education Department information, more general information about selection, and; more district based meetings on how to make selections) may not be necessary if information sources such as 'Software Focus' are properly utilised.

10) District Consultants need to promote their servicing role as 'experts' in software selection. Many teachers seem aware of the District Consultants expertise with hardware and hardware problems but not with any expertise they may possess in software selection.

11) Computer support groups should be formed in school districts to take on some of the roles presently under the auspices of the District Office as this would be a more economical use of resources. The groups would be 'chaired' by the District Consultant. These groups should discuss and appraise such things as:

- the latest research into what constitutes 'good' software;
- the latest releases of software;
- tried and tested software and the environment it was used in;
- the criteria used in software assessment;
- a variety of software selection methods.

12) District Consultants should be encouraged to form or join a professional body that might influence the policy and practice of the Education Department. Such a body would be encouraged to promote information sharing between:

- District Consultants;
- District Consultants and teachers;
- District Consultants and bodies such as E.C.A.W.A. (Educational Computing Association of Western Australia).
- District Consultants and the Education Department.

13) District Consultants favour trialing and using information supplied by the Education Department in the form of 'Software Focus' in their selection of software, and should be encouraging the general teaching population to do the same.

14) District Consultants should conduct a needs analysis of the teachers in their Districts to find out amongst other issues:

- what software is in the schools;
- how teachers select software;
- what hardware is in the schools;
- how teachers feel about the training they have undergone in software selection;
- how teachers feel about their level of competency in software selection;
- the needs of teachers with regards to software selection; and
- who is selecting software in the schools.
- what are the priority training needs of teachers in the general area of computer education.

15) Any information on software selection needs to be made available to all persons in a location where it can be easily accessed. District Consultants need to play a role in the organisation of this material and making sure it is accessible and relevant, a District Office based resource centre might fulfil this role.

Chapter 6
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Appendix 1

CODE					

Section A
if you do not use computers in your classroom please place a cross in the box provided and fill in only 'Section A' of this questionnaire.

Where ever the word 'software' is used, educational computer software is meant.

Where ever the word 'Ministry' is used, Western Australian Ministry of Education is meant.

All responses to these questions, other than stipulated, are for your own class situation.

Section A

1. School classification (please circle) Class 1A 1 2 3 4

2. District _____

3. Position in school (teacher, deputy principal etc) _____

4. Year level(s) taught in 1991 _____

5. Age 20 - 24 years _____

25 - 35 years _____

36 - 50 years _____

51 + years _____

6. D.O.T.T. allowance per week specifically for dealing with matters in computers in education _____

7. Teaching experience (in years) 1 - 5 _____ 6 - 10_____

11 - 20_____21 + _____

8. Please circle years of teacher training 3 4 5 6

). Gender M F

10. a) Please indicate how many 1/2 days you have been involved in training in computer education through the following arrangements. A blank response will be taken as **NO** training through this method :

i) pre service (teacher training) _____
ii) pre service (other) _____
iii) inservice (Ministry or other educational authority) _____
iv) inservice (other) _____
v) further tertiary study (teaching) _____
vi) further tertiary study (other) _____
vii) other (please specify) _____

_____

Section B

1. a) Are you familiar with the Ministry document on software selection, 'Software Focus' ? YES / NO

b) Is there a copy of the Ministry document on software selection, 'Software Focus' in your school ? YES / NO

c) Is the Ministry document on software selection 'Software Focus', readily available to you ? YES / NO

2. Please tick the appropriate response.
I use the Ministry document on software selection, 'Software Focus' in selecting software :

i) frequently _____

ii) sometimes _____

iii) never _____

3. What criteria (e.g. errors, ease of use, flexibility, curriculum relevance etc) influence you most when selecting a piece of software ? Please enter a maximum of five responses.

_____
_____
_____
_____
_____
_____

4. Please tick the appropriate response. I consider myself trained to select educational software :

i) less than adequately _____

ii) adequately _____

iii) more than adequately _____

5. What are the methods you use to select educational software ? Please tick the correct response (s).

a) I do not select software _____
b) Reading the description of the software on the advertising materials _____
c) Reading Ministry supplied software selection guide (e.g. 'Software Focus') _____
d) Subjective opinion after trialing the package myself _____
e) Subjective opinion after scanning the documentation that comes with the package _____
f) Seeking the opinion of the commercial supplier _____
g) Seeking the opinion of peers teaching in my school _____
h) Seeking the opinion of teachers in other schools. _____
i) Using a checklist of criteria to objectively rate the package as I trial it _____
j) Reading software reviews available in journals and magazines (other than 'Software Focus') _____
k) Seeking the opinion of the school co-ordinator of computing _____
l) Seeking the opinion of the district computer consultant _____
m) Other, please give details _____

6. From the above list indicate the single method of software selection that you use most commonly. _____

Please indicate your answer to the following statements by circling the most correct response.

SA = Strongly Agree A = Agree U = Undecided D = Disagree
SD = Strongly Disagree

1. I feel I am competent in choosing software to use in my classroom

SA A U D SD

2. I get sufficient help from the district consultant when selecting software. Please leave blank if no consultant in your district.

SA A U D SD

3. I believe that the Ministry supplies enough information with regards to software selection.

SA A U D SD

4. I believe there is enough available information on educational computer software selection.

SA A U D SD

Section C

1. I have attended enough meetings on computers in education to feel comfortable with software selection. YES / NO

2. I assess all of the software I use YES / NO

3. I have attended courses specifically on selecting software. YES / NO

Thank you very much for answering this questionnaire. Could you return it as soon as it is completed (but not later that December 9th, 1991 please) in the self addressed envelope that has been provided for this purpose. A copy of the pertinent results will be forwarded to your school as soon as it is possible.

Appendix 2

CODE				

Where ever the word 'software' is used, educational computer software is meant.

Where ever the word 'Ministry' is used, Western Australian Ministry of Education is meant.

All responses to these questions, other than stipulated, are for your own district situation.

A consultant in a district is a person given the task of answering queries on computers, whether on a full or part time basis.

Section A

1. District _____

2. Title of position held _____

3. Age
20 - 24 years _____
25 - 35 years _____
36 - 50 years _____
51 + years _____

4. Teaching experience (in years) 1 - 5 _____ 6 - 10 _____
11 - 20 _____ 21 + _____

5. Please circle years of teacher training 3 4 5 6

6. Gender M F

7. Years as district computer consultant (any district) _____

8. Approximately what percentage of your time would be specifically regarding advising on software selection ? _____ %

9. a) Please indicate how many 1/2 days you have been involved in training in computer education through the following arrangements. a blank response will be taken as **NO** training through this method :

i) pre service (teacher training) _____
ii) pre service (other) _____
iii) inservice (Ministry or other educational authority) _____
iv) inservice (other) _____
v) further tertiary study (teaching) _____
vi) further tertiary study (other) _____

vii) other (please specify)_____

_____

Section B

1. a) Are you familiar with the Ministry document on software selection, 'Software Focus' ? YES / NO

   b) Is the Ministry document on software selection 'Software Focus', readily available to you ? YES / NO

2. Please tick the appropriate response.
I use the Ministry document on software selection, 'Software Focus' in selecting software:

i) frequently _____
ii) sometimes _____
iii) never _____

3. What criteria (e.g. errors, ease of use, flexibility, curriculum relevance etc) influence you most when selecting a piece of software ? Please enter a maximum of five responses.

_____
_____
_____
_____
_____
_____

4. Please tick the appropriate response. I consider myself trained to select educational software :

i) less than adequately _____
ii) adequately _____
iii) more than adequately _____

5. What are the methods you use to select educational software ? Please tick the correct response (s).

a) I do not select software _____
b) Reading the description of the software on the advertising materials _____
c) Reading Ministry supplied software selection guide (e.g. 'Software Focus') _____
d) Subjective opinion after trialing the package myself _____
e) Subjective opinion after scanning the documentation that comes with the package _____

f) Seeking the opinion of the commercial supplier _____
g) Seeking the opinion of teachers _____
h) Using a checklist of criteria to objectively rate the package as I trial it _____
i) Reading software reviews available in journals and magazines (other than 'Software Focus') _____
j) Other, please give details _____

_____

6. From the above list indicate the single method of software selection that you use most commonly. _____

7. Please indicate your answer to the following statements by circling the most correct response.

SA = Strongly Agree A = Agree U = Undecided D = Disagree
SD = Strongly Disagree

1. I feel I am competent in choosing software to use in my district.	SA	A	U	D	SD
2. I believe teachers are adequately trained in selecting software	SA	A	U	D	SD
3. I believe that teachers are generally competent in the selection of software	SA	A	U	D	SD
4. I believe that the Ministry supplies enough information with regards to educational computer software selection.	SA	A	U	D	SD
5. I believe there is enough available information on educational computer software selection.	SA	A	U	D	SD

Section C

1. I regularly run district meetings on software and software selection	YES / NO
2. I assess all of the software I recommend	YES / NO
3. I trial all software with children before I recommend it.	YES / NO
4. I have attended courses specifically on selecting software	YES / NO

Thank you very much for answering this questionnaire. Could you return it as soon as it is completed (but not later than December 9th, 1991 please) in the self addressed envelope that has been provided for this purpose. A copy of the pertinent results will be forwarded to your district as soon as it is possible.

Appendix 3

Akahori's assessment of educational software

Content

Is there a clear objective ?
Is the material appropriate ?
Is the material accurate ?
Is the material important ?
Is the material rational ?

Teaching Method

Is knowledge of results and feedback appropriate ?
Is it individualised ?
Is self study possible ?
Is gradual advancement possible ?
Are explanations appropriate and clear ?
Is the task appropriate ?
Does it reflect learners' development characteristics ?
Is it flexible ?
Does each learner participate freely ?
Are the volume and time sufficient ?

Instructions and presentation

Are instructions easy to understand ?
Are screens well constructed ?
Are movements smooth ?
Is music , sound effect appropriate ?
Are the flow and organisation natural ?
Is it entertaining ?
Is it repeatable without becoming boring ?
Is it easily operable ?
Is organisation extendable or expandable ?
Is it stimulating ?
Is presentation effective ?

Effectiveness

Are special skills and knowledge required ?
Is it enjoyable ?
Are the results of study correctly evaluated ?
Can a learner reach the pre-set goals ?
Is the study detrimental ?
Is the use of personal computers justified ?

Appendix 4

Schueckler and Shuell's criteria to evaluate software

Fundamental Program Characteristics

Basic information includes :

* Program name - title of the program and/ or a package containing several individual programs.
* Subject area - all subject-matter areas for which the application is relevant

(e.g., social studies, science, and/ or math).

* Publisher - Company which issues and distributes the software.
* Cost - price attached to the software program.

Technical aspects include:

* Hardware - Specification of computer make, model, memory capacity, and number of disk drives necessary to run program.
* Additional Hardware - Additional hardware needed to run the software such as a colour monitor, voice input/output, joystick, paddle , mouse.

Type of Program - E.g., authoring system, drill and practice, educational game, problem solving, simulation, tutorial, word processor, utility, or a combination of these types.

Operational Concerns - includes bug free, 'user friendly,' ease in correcting errors, help menus, uncluttered screen display, sound/ graphics enhancements.

Directions for Use - On the screen and/ or documentation.

Execution Time - Estimated total number of minutes required to load, utilise the program and save completed work.

Instructional Concerns

Social Interaction includes:

* Competition/ co-operation - Attitudes/ values elicited.
* Instructional groups - size of group for which program is designed, including a variety of group sizes.

User orientation may be either:

* Teacher - opportunity for teacher to alter level of difficulty, content, speed of presentation; teacher supervision and/ or intervention is required.
* Student - Opportunities to change level of difficulty, speed of presentation; also freedom from the need for external information and/ or teacher supervision.

Pre-requisite skills stated - Prior knowledge required to utilise the program to reach the stated objectives.

Educational Objectives Stated - Well defined objectives stated.

Educational Objectives Achieved - Evidence that students attain stated objectives.

Educational Content - Content is accurate and has educational value.

Teaching/ Instructional Style - Type of student involvement; guided discovery via leading questions, explanatory approach, etc.

Material Presentation (Small Steps) - Content presented in small units, interspersed with questions to determine the students' understanding.

Appropriate Use of Computer - Assets of computer are utilised.

Principles of Learning and Teaching

Motivation - program is stimulating and challenging; offers variety and interaction.
Feedback - Effective and appropriate responses to input from student.
Record/ score Keeping - Immediate information on accuracy of response and/ or summary total provided.
Cognitive Level Determined - Content based on one or several cognitive levels, such as knowledge, application, evaluation, etc.
Evaluative Teaching Methods Used - Assessment of students' work via a management system, a comparison of users' scores, a diagnostic test, a formal test at the end of the lesson, etc.

Overall Rating

Overall Evaluation of Software - May consist of compiling scores assigned to each criteria or a subjective rating.

Appendix 5

Software Focus Rating System

LEARNING QUANTITY

How much learning has taken place or will take place.

LEARNING QUALITY

Is the material being learned from this package :
i) meeting the needs of the students for whom it was intended ?
ii) meeting the accepted standards of the discipline for which it was developed ?

EXTENT OF THE TARGET AUDIENCE

Extent to which software may be utilised across different subject areas, age groups and levels of student abilities.

VALUE FOR MONEY

The price of the software in absolute terms, in terms of student learning and in the size and nature of the market served by the software.

COMPETITIVENESS

Competitiveness with other software packages of a similar type and with other non-computerised resources and methods.

Appendix 7

Returns by Districts

DISTRICT	NUMBER OF RESPONSES	% OF RESPONSES
ALBANY	14	4.65
ARMADALE	8	2.65
BALGA	8 4	6.5
BAYSWATER	13	4.31
BUNBURY nth	9	2.99
BUNBURY sth	11	3.65
COCKBURN	13	4.31
MELVILLE	9	2.99
WILLETON	12	3.98
DARLING RANGE	13	4.31
DIANELLA	13	4.31
ESPERANCE	7	2.32
GERALDTON nth	12	3.98
GERALDTON sth	10	3.32
HEDLAND	11	3.65
JOONDALUP	11	3.65
KALGOORLIE	9	2.99
KARRATHA	0	0.00
KIMBERLEY	11	3.65
MANJIMUP	6	1.99
MERREDIN	13	4.31
MOORA	10	3.32
NARROGIN	13	4.31

Returns by Districts (continued)

DISTRICT	NUMBER OF RESPONSES	% OF RESPONSES
NORTHAM	5	1.66
PEEL	8	2.65
PERTH sth	11	3.65
SCARBOROUGH	15	4.98
SWANBOURNE	11	3.65
THORNLIE	9	2.99
TOTAL	301	99.87

Appendix 8

Returns by teaching experience

YEARS IN TEACHING	NUMBER OF RESPONSES	% OF RESPONDENTS
0 - 5	66	21.92
6 - 10	69	22.92
11 - 15	136	45.18
15 +	30	9.96
	301	99.98

Appendix 9

Returns by Years of teacher training

TRAINING OF RESPONDENTS	NUMBER OF RESPONSES	% OF RESPONSES
2 OR 3	157	52.15
4	125	41.52
5	16	5.31
6	3	0.99
	301	99.97

Appendix 10

Returns by Year level Taught

YEAR LEVEL	NUMBER OF RESPONSES	% OF RESPONSES
1	24	8.0
2	22	7.3
3	17	5.6
4	32	10.6
5	22	7.3
6	26	8.6
7	26	8.6
Junior Prim. mixed	40	13.2
Middle Prim. mixed	28	9.3
Upper prim. mixed	49	16.3
Whole school (1-7)	15	5.0
Total	301	99.8

Appendix 11

Groupings for responses to question 3,

Criteria for influencing the use of a piece of software

1. 30. No response to question

2. Instructional Concerns

1. Curriculum relevance
3. Flexibility
5. Suitability
10. Fun to use
13. Problem solving
14. Various group size use
15. Interesting to child's teacher
18. Able to be used with little teacher help
20. Good range of ages
21. Grade level appropriate
22. Content outside normal curriculum
23. Appropriate language
25. User relates to content
28. Cultural adaptability
29. Application to school's computer priority
31. What will benefit the children
32. Interactiveness with user
33. Quality of instructional component
34. Limited responses needed
35. Educational value
42. Challenging
43. Wide skills
46. Ability to adapt content
47. Co-operation between students
48. Effectiveness
50. Amount of use it will get
51. Clarity of questions asked

3. Principles of learning/teaching

7. Motivation and feedback
16. Has an evaluation/score component
40. Aims are achievable

4. Fundamental Program Characteristics

2. Ease of use
4. Cost
6. Graphics and presentation
8. Reliability
9. Error free
12. Ability to backup disks
24. Simple operating instructions
26. Length of operating time
36. Computer compatibility
37. Program depth/ detail
38. Teacher comfort
39. Choice of levels within program
45. Relates to peripherals - concept keyboard
54. Ability for network use
55. Company reputation

5. Supplementary Materials

17. Good supporting materials
44. Attractive packaging

6. Preview of Materials

11. Recommended by others
19. Access through 'appro'
49. Advertising
53. Demonstrated

Appendix 12

Tests of the standard error of difference of two individual proportions.

Method of software selection : Use of advertising

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=122 / 267 - 8 / 20= 0.4569 - 0.4= 0.0569
p	=122 + 8 / 287 = 0.4529
q	=1 - p= 1 - 0.4529 = 0.5471
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4529 x 0.5471 x 0.0537 = 0.0133
z	= 0.0569 / 0.0133
z	**= 4.27**

Method of software selection : Use of Software Focus

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=10 / 20 - 107 / 267 = 0.5 - 0.4007 = 0.0993
p	=10 + 107 / 287 = 0.4076
q	=1 - p= 1 - 0.4076 = 0.5924
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4076 x 0.5924 x 0.0537 = 0.0129
z	= 0.0993 / 0.0129
z	**= 7.69**

Method of software selection : Use of trialing

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=13 / 20 - 163 / 267= 0.65 - 0.6104 = 0.0396
p	=13 + 163 / 287 = 0.6132
q	=1 - p= 1 - 0.4529 = 0.3868
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.6132 x 0.3868 x 0.0537 = 0.0127
z	= 0.0396 / 0.0127
z	**= 3.11**

Method of software selection : Use of documentation.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=7 / 20 - 85 / 267= 0.35 - 0.3183 = 0.0317
p	=7 + 85 / 287 = 0.325
q	=1 - p= 1 - 0.3205 = 0.6795
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.3205 x 0.6795 x 0.0537 = 0.0116
z	= 0.0317 / 0.0116
z	**= 2.73**

Method of software selection : Use of opinion of commercial supplier.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=5 / 20 - 43 / 267 = 0.25 - 0.1610 = 0.0890
p	=5 + 43 / 287 = 0.1672
q	=1 - p= 1 - 0.1672 = 0.8328
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1672 x 0.8328 x 0.0537 = 0.0074
z	= 0.0890 / 0.0074
z	**= 12.02**

Method of software selection : Use of peers outside of school

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=13 / 20 - 104 / 267= 0.65 - 0.3895= 0.2605
p	=13 + 104 / 287 = 0.4076
q	=1 - p= 1 - 0.4076 = 0.5924
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4076 x 0.5924 x 0.0537 = 0.0129
z	= 0.2605 / 0.0129
z	**= 20.19**

Method of software selection : Use of checklists

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=4 / 20 - 13 / 267= 0.2 - 0.0486= 0.1514
p	=4 + 13 / 287 = 0.0592
q	=1 - p= 1 - 0.0592 = 0.9408
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0592 x 0.9408 x 0.0537 = 0.0029
z	= 0.1514 / 0.0029
z	**= 52.20**

Method of software selection : Use of journals other than Software Focus

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=9 / 20 - 67 / 267 = 0.45 - 0.2509= 0.1991
p	=9 + 67 / 287 = 0.2648
q	=1 - p= 1 - 0.2648 = 0.7352
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.2648 x 0.7352 x 0.0537 = 0.0104
z	= 0.1991 / 0.0104
z	**= 19.14**

Favoured method of software selection : Use of advertising

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=26 / 267 - 1 / 20= 0.0973 - 0.05= 0.0473
p	=26 + 1 / 287 = 0.0940
q	=1 - p= 1 - 0.0940 = 0.9060
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0940 x 0.9060 x 0.0537 = 0.0045
z	= 0.0473 / 0.0045
z	**= 10.51**

Favoured method of software selection : Use of Software Focus

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=2 / 20 - 15 / 267 = 0.1 - 0.0561 = 0.0439
p	=2 + 15 / 287 = 0.0592
q	=1 - p= 1 - 0.0592 = 0.9408
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0592 x 0.9408 x 0.0537 = 0.0029
z	= 0.0439 / 0.0029
z	**= 15.13**

Favoured method of software selection : Use of trialing

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=8 / 20 - 87 / 267= 0.4 - 0.3031 = 0.0969
p	=8 + 87 / 287 = 0.3310
q	=1 - p= 1 - 0.3310 = 0.6690
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.3310 x 0.6690 x 0.0537 = 0.0118
z	= 0.0969 / 0.0118
z	**= 8.21**

Favoured method of software selection : Use of documentation

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=1 / 20 - 9 / 267= 0.05 - 0.0337 = 0.0163
p	=1 + 9 / 287 = 0.0348
q	=1 - p= 1 - 0.0348 = 0.9652
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0348 x 0.9652 x 0.0537 = 0.0018
z	= 0.0163 / 0.0018
z	**= 9.05**

Favoured method of software selection : Use of opinion of commercial supplier.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=1 / 267 - 0 / 20 = 0.0037 - 0.0 = 0.0037
p	=1 + 0 / 287 = 0.0034
q	=1 - p= 1 - 0.0034 = 0.9966
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0034 x 0.9966 x 0.0537 = 0.0001
z	= 0.0037 / 0.0001
z	**= 37.00**

Favoured method of software selection : Use of peers outside of school.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=2 / 20 - 18 / 267= 0.1 - 0.0674= 0.0326
p	=2 + 18 / 287 = 0.0696
q	=1 - p= 1 - 0.0696 = 0.9304
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0696 x 0.9304 x 0.0537 = 0.0034
z	= 0.0326 / 0.0034
z	**= 9.58**

Method of software selection : Use of checklists.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=3 / 267 - 0 / 20= 0.0112 - 0.0 = 0.0112
p	=3 + 0 / 287 = 0.0104
q	=1 - p= 1 - 0.0104 = 0.9896
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0104 x 0.9896 x 0.0537 = 0.0005
z	= 0.0112 / 0.0005
z	**= 22.4**

Favoured method of software selection : Use of journals other than Software Focus

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=1 / 20 - 4 / 267 = 0.05 - 0.0149= 0.0351
p	=1 + 4 / 287 = 0.0174
q	=1 - p= 1 - 0.0174 = 0.9826
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0174 x 0.9826 x 0.0537 = 0.0009
z	= 0.0351 / 0.0009
z	**= 39.00**

Criterion used in selection of software : Principles of learning / teaching

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=17 / 20 - 14 / 267 = 0.85 - 0.0524= 0.7976
p	=17 + 14 / 287 = 0.1080
q	=1 - p= 1 - 0.1080 = 0.8920
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1080 x 0.8920 x 0.0537 = 0.0051
z	= 0.7976 / 0.0051
z	**= 156.39**

Criterion used in selection of software : Available supplementary materials.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=17 / 20 - 15 / 267 = 0.85 - 0.0561= 0.7939
p	=17 + 15 / 287 = 0.1114
q	=1 - p= 1 - 0.1114 = 0.8886
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1114 x 0.8886 x 0.0537 = 0.0053
z	= 0.7939 / 0.0053
z	**= 149.79**

Criterion used in selection of software : Opportunity to preview material.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=5 / 20 - 38 / 267 = 0.25 - 0.1423= 0.1077
p	=5 + 38 / 287 = 0.1498
q	=1 - p= 1 - 0.1498 = 0.8502
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1498 x 0.8502 x 0.0537 = 0.0068
z	= 0.1077 / 0.0068
z	**= 15.83**

Criterion used in selection of software : Instructional concerns.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=212 / 267 - 1 / 20 = 0.7940 - 0.05= 0.7440
p	=212 + 1 / 287 = 0.7421
q	=1 - p= 1 - 0.7421 = 0.2579
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.7421 x 0.2579 x 0.0537 = 0.0102
z	= 0.7440 / 0.0102
z	**= 72.94**

Criterion used in selection of software : Fundamental program characteristics.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers, p2 = District Consultants
p1 - p2	=182 / 267 - 1 / 20 = 0.6816 - 0.05= 0.6316
p	=182 + 1 / 287 = 0.6376
q	=1 - p= 1 - 0.6376 = 0.3624
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.6376 x 0.3624 x 0.0537 = 0.0124
z	= 0.6316 / 0.0124
z	**= 50.93**

Assessing of software before use - Yes

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=15 / 20 - 162 / 267 = 0.75 - 0.6067= 0.1433
p	=15 + 162 / 287 = 0.6167
q	=1 - p= 1 - 0.6167 = 0.3833
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.6167 x 0.3833 x 0.0537 = 0.0126
z	= 0.1433 / 0.0126
z	**= 11.37**

Assessing of software before use - No

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=105 / 267 - 5 / 20 = 0.3932 - 0.25= 0.1432
p	=105 + 5 / 287 = 0.3832
q	=1 - p= 1 - 0.3832 = 0.6168
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.3832 x 0.6168 x 0.0537 = 0.0126
z	= 0.1432 / 0.0126
z	**= 11.36**

Adequacy of training - More than adequate / adequate

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=13 / 20 - 132 / 267 = 0.65 - 0.4943= 0.1557
p	=13 + 132 / 287 = 0.5052
q	=1 - p= 1 - 0.5052 = 0.4948
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.5052 x 0.4948 x 0.0537 = 0.0134
z	= 0.1557 / 0.0134
z	**= 11.61**

Adequacy of training - Less than adequate

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=134 / 267 - 4 / 20 = 0.5018 - 0.2= 0.3018
p	=134 + 4 / 287 = 0.4808
q	=1 - p= 1 - 0.4808 = 0.5192
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4808 x 0.5192 x 0.0537 = 0.0134
z	= 0.3018 / 0.0134
z	**= 22.52**

Confident in selecting software - Yes

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=52 / 267 - 1 / 20 = 0.1947 - 0.05= 0.1447
p	=52 + 1 / 287 = 0.1846
q	=1 - p= 1 - 0.1846 = 0.8154
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1846 x 0.8154 x 0.0537 = 0.0080
z	= 0.1447 / 0.0080
z	**= 18.08**

Confident in selecting software - Undecided

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=40 / 267 - 2 / 20 = 0.1498 - 0.1= 0.0498
p	=40 + 2 / 287 = 0.1463
q	=1 - p= 1 - 0.1463 = 0.8537
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1463 x 0.8537 x 0.0537 = 0.0067
z	= 0.0498 / 0.0067
z	**= 7.43**

Confident in selecting software - No

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=176 / 267 - 13 / 20 = 0.6591 - 0.65= 0.0091
p	=176 + 13 / 287 = 0.6585
q	=1 - p= 1 - 0.6585 = 0.3415
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.6585 x 0.3415 x 0.0537 = 0.0120
z	= 0.0091 / 0.0120
z	**= 0.75**

Type of training: No training

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=3 / 20 - 38 / 301 = 0.15 - 0.1262= 0.0238
p	=3 + 38 / 321 = 0.1277
q	=1 - p= 1 - 0.1277 = 0.8723
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1277 x 0.8723 x 0.0533 = 0.0059
z	= 0.0238 / 0.0059
z	**= 4.03**

Type of training: Preservice training

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=26 / 301 - 0 / 20 = 0.0863 - 0.0= 0.0863
p	=26 + 0 / 321 = 0.0809
q	=1 - p= 1 - 0.0809 = 0.9191
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0809 x 0.9191 x 0.0533 = 0.0039
z	= 0.0863 / 0.0039
z	**= 22.12**

Type of training: Inservice training

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=156 / 301 - 5 / 20 = 0.5182 - 0.25= 0.2682
p	=156 + 5 / 321 = 0.5015
q	=1 - p= 1 - 0.5015 = 0.4985
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.5015 x 0.4985 x 0.0533 = 0.0133
z	= 0.2682 / 0.0133
z	**= 20.16**

Type of training: Tertiary

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=1 / 20 - 9 / 301 = 0.05 - 0.0299= 0.0201
p	=1 + 9 / 321 = 0.0311
q	=1 - p= 1 - 0.0311 = 0.9689
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0311 x 0.9689 x 0.0533 = 0.0016
z	= 0.0201 / 0.0016
z	**= 12.56**

Type of training: Preservice and Inservice.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=42 / 301 - 0 / 20 = 0.1395 - 0.0= 0.1395
p	=42 + 0 / 321 = 0.1308
q	=1 - p= 1 - 0.1308 = 0.8692
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.1308 x 0.8692 x 0.0533 = 0.0060
z	= 0.1395 / 0.0060
z	**= 23.25**

Type of training: Preservice and Tertiary.

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=3 / 301 - 0 / 20 = 0.0099 - 0.0= 0.0099
p	=3 + 0 / 321 = 0.0093
q	=1 - p= 1 - 0.0093 = 0.9907
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0093 x 0.9907 x 0.0533 = 0.0004
z	= 0.0099 / 0.0004
z	**= 24.75**

Type of training: Inservice and Tertiary

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=5 / 20 - 20 / 301 = 0.25 - 0.0664= 0.1836
p	=5 + 20 / 321 = 0.0778
q	=1 - p= 1 - 0.0778 = 0.9222
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0778 x 0.9222 x 0.0533 = 0.0038
z	= 0.1836 / 0.0038
z	**= 48.31**

Type of training: Preservice, Inservice and Tertiary

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants, p2 = Teachers
p1 - p2	=3 / 20 - 7 / 301 = 0.15 - 0.0232= 0.1268
p	=3 + 7 / 321 = 0.0311
q	=1 - p= 1 - 0.0311 = 0.9689
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0311 x 0.9689 x 0.0533 = 0.0016
z	= 0.1268 / 0.0016
z	**= 79.25**

Knowledge of Software Focus: No

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=100 / 267 - 2 / 20 = 0.3745 - 0.1= 0.2745
p	=100 + 2 / 287 = 0.3554
q	=1 - p= 1 - 0.3554 = 0.6446
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.3554 x 0.6446 x 0.0537 = 0.0123
z	= 0.2745 / 0.0123
z	**= 22.3**

Knowledge of Software Focus: Yes

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=15 / 20 - 167 / 267 = 0.75 - 0.6254= 0.1246
p	=15 + 167 / 287 = 0.6341
q	=1 - p= 1 - 0.6341 = 0.3659
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.6341 x 0.3659 x 0.0537 = 0.0124
z	= 0.1246 / 0.0124
z	**= 10.04**

Use of Software Focus: Frequently

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=24 / 267 - 1 / 20 = 0.0898 - 0.05= 0.0398
p	=24 + 1 / 287 = 0.0871
q	=1 - p= 1 - 0.0871 = 0.9129
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.0871 x 0.9129 x 0.0537 = 0.0042
z	= 0.0398 / 0.0042
z	**= 9.47**

Use of Software Focus: Sometimes

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=12 /20 - 109 / 267 = 0.6 - 0.4082= 0.1918
p	=12 + 109 / 287 = 0.4216
q	=1 - p= 1 - 0.4216 = 0.5784
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4216 x 0.5784 x 0.0537 = 0.0130
z	= 0.1918 / 0.0130
z	**= 14.75**

Use of Software Focus: Never

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=134 / 267 - 4 / 20 = 0.5018 - 0.2= 0.3018
p	=134 + 4 / 287 = 0.4808
q	=1 - p= 1 - 0.4808 = 0.5192
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4808 x 0.5192 x 0.0537 = 0.0134
z	= 0.3018 / 0.0134
z	**= 22.52**

Adequacy of training: Adequate

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=17 / 20 - 132 / 267 = 0.85 - 0.4943= 0.3557
p	=17 + 132 / 287 = 0.5191
q	=1 - p= 1 - 0.5191 = 0.4809
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.5191 x 0.4809 x 0.0537 = 0.0134
z	= 0.3557 / 0.0134
z	**= 26.54**

Adequacy of training: Not adequate

	H0: p1 = p2, H1: p1 > p2
	p1 = Teachers , p2 = District Consultants
p1 - p2	=135 / 267 - 0 / 20 = 0.5056 - 0.00= 0.5056
p	=135 + 0 / 287 = 0.4703
q	=1 - p= 1 - 0.4703 = 0.5297
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.4703 x 0.52979 x 0.0537 = 0.0133
z	= 0.5056 / 0.0133
z	**= 38.01**

Perceived general competency of teachers in software selection.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=7 / 20 - 52 / 267 = 0.35 - 0.1947= 0.1553
p	=7 + 52 / 287 = 0.2055
q	=1 - p= 1 - 0.2055 = 0.7945
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.2055 x 0.7945 x 0.0537 = 0.0087
z	= 0.1553 / 0.0087
z	**= 17.85**

Perceived general competency of teachers in software selection.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=7 / 20 - 52 / 267 = 0.35 - 0.1947= 0.1553
p	=7 + 52 / 287 = 0.2055
q	=1 - p= 1 - 0.2055 = 0.7945
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.2055 x 0.7945 x 0.0537 = 0.0087
z	= 0.1553 / 0.0087
z	**= 17.85**

Perceived general competency of teachers in software selection.

	H0: p1 = p2, H1: p1 > p2
	p1 = District Consultants , p2 = Teachers
p1 - p2	=7 / 20 - 52 / 267 = 0.35 - 0.1947= 0.1553
p	=7 + 52 / 287 = 0.2055
q	=1 - p= 1 - 0.2055 = 0.7945
Sp1 - p2	=p x q (1/n1 + 1/n2) = 0.2055 x 0.7945 x 0.0537 = 0.0087
z	= 0.1553 / 0.0087
z	**= 17.85**