AN ASSESSMENT OF THE COMPUTER LITERACY STATUS OF NURSE MANAGERS IN A PRIVATE HOSPITAL GROUP IN THE NELSON MANDELA METROPOLITAN AREA

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ABSTRACT

There has been an increase in the use of information technology in the hospital environment over the past decade and the use of computers by Nursing Managers is rapidly increasing. The latter poses a challenge to Nurse Managers, as their computer literacy status is unknown. This is evident from the fact that prior to 1996 there was only four computers at one of the private hospitals used in this study. Computer skills were never a requirement when applying for the position of Nurse Manager; and there is still currently no formal computer training provided for Nurse Managers or Acting Nurse Managers. Resources are however available in the hospitals to assist the managers with various computer problems but it is not known if these resources equip managers with the appropriate tools to become efficient in their role. The lack of formal training and lack of assessment of resources to determine whether the computer needs of Nurse Managers are met results in a lot of time being wasted and many frustrations experienced among Nurse Managers.

The researcher was therefore motivated by the latter problem to explore and describe the computer literacy status of Nurse Managers in order to make recommendations to management regarding the research findings.

The researcher selected a quantitative, explorative, contextual and descriptive survey design. The research population was made up of all Nurse Managers and Acting Nurse Managers at the time of the study. A 100% sample was utilised and comprised thirty-four respondents who made up the entire group of Nurse Managers and Acting Nurse Managers at the time of the study.

A structured, self-administered questionnaire was used in Phase One of the research and in Phase Two a data observation sheet was used to test the respondents and to collect the necessary data. This data was manually processed and analysed by the
researcher. All ethical considerations were honoured throughout the research process.

The main findings of the research study reflected that the respondents had a below average ability to use various software packages such as Microsoft Word, EXCEL and Power Point. Findings further revealed that the respondent’s literacy levels were average with regard to the use of peripheral components of the computer such as the use of the mouse and keyboard. The respondents rated their competency level as average with regard to using a computer.

Due to the limitations and small sample size used in the study the researcher recommends that further research using a larger sample by expanding the research into the other private hospitals in the group through out South Africa should take place in order to produce more constructive results than this study.

KEY WORDS

Nurse Managers
Computer literacy status
Information Technology
Computer software
Computer hardware
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CHAPTER 1

ORIENTATION TO THE STUDY AND PROBLEM STATEMENT

1.1 INTRODUCTION

Information technology plays a major role in globalisation trends around the world. In order for any organisation to be globally competitive in the market place, it is imperative that managers become fully computer literate in order to function effectively in their roles (Grobler, 2004:7).

Over the past twenty years, computers and the sharing of information that they facilitate have penetrated nearly every aspect of day-to-day life. The reliance on computers grows every day, from shopping at grocery stores and filling in tax forms to driving a car and communicating with relatives and business associates. As the world increasingly moves towards an information society, computerised information and its use will play a leading role in this transformation (Johnson, 2000:11).

Africa, the second largest continent of the globe, with a population of over 500 million, is said to be the least computerised continent (Darkwa, 1996:4) Internet connectivity is very low as is the man-computer density ratio so prospects of information technology for Africa are tremendous. It is in fact now becoming increasingly difficult to run an institution without using computers; for they have become and are beginning to become part of everything we do. The computer is no longer a luxury but is now becoming a necessity in order to keep up and cope with our ever-changing world and its technology (Darkwa, 1996:4).
It is generally accepted that we live in a technological age. Information and Communication Technology (ITC) are all pervasive to the extent that our economy and quality of life depend on it. The increase in availability, use of computer networks and the Internet are producing a changing climate in education as well as in healthcare. This increased use of computers in healthcare prompts a need to increase nurses’ computer knowledge (Fisher, Sawyer and Yocum, 1996:237-248).

Since the 1970s computers have revolutionised the way in which healthcare is delivered, practised and managed. Evaluating nurses’ attitudes towards computer use is an area that has received much attention in the literature. The focus has been on nurses being a predominantly female group and their attitudes to computers, as well as the need to include the teaching of informatics in nursing curricula. Although Information Technology is a critical resource for managing healthcare organisations, it has been found that the Healthcare Industry has been slow to embrace computerisation and to provide sufficient funding for current computer hardware, software, technical support or employee development (Pelletier, 2004:4).

Nurses have been intimately involved with technology in patient care for decades, from intravenous therapy in post-war years and the advent of the Intensive Care Units in the early sixties, to the current use of compact digital patient care devices. Since the collision of healthcare and technology has created an industry that now drives the cost and the standard of healthcare, the key to the information systems of any kind is the existence of a skilled and motivated workforce with the competence to use this technology (Kearns, 2000:1).

Computers can be used, abused, under-used or exploited. Computers if used correctly can extend productivity or they can paralyse, frighten and even threaten the user. But because computers have become a way of life both personally and professionally, it will eventually become impossible to avoid using them. Acceptance of information technology in the workplace is a key determinant in fostering positive attitudes and facilitating successful learning. Information systems are critical
resources for providing information essential to supporting patient care, administrative operations and strategic decision-making. The development of computer technology has paralleled the evolution from performing the dull routine tasks to challenging the entire range of human abilities (Delaney, 1989: 601).

Because nurses as a group are unsophisticated about the potential represented by computers (Hebert, 1994:369), their perceived lack of computer skills is a major drawback when one is trying to meet the high-technological challenges of the professional nursing domain. The healthcare industry has been slow to embrace computers or provide sufficient funding for current computer software, hardware, technical support or staff member development. Therefore to capitalise on the power of information technology in healthcare organisations, executives must be committed to fully supporting the acquisition and maintenance of an adequate information system and thus computer-literate staff (Barr, 2002:1).

Since nurses have been typically used to managing complex machines, mechanical feeding pumps, computerised intravenous and pain control pumps, heart monitors, even respiratory ventilators pose little challenge for today’s registered nurses. Nurses are found to be competent at using various kinds of technical equipment because they are trained to do so; yet nurses have been trained in the use of computers (Barr, 2002:1).

Nurse Managers are required as part of their administrative functions to spend a large part of their day on the computer inputting data, analysing this data and collecting and inputting statistics. The 2000 Health Council report in New South Wales and the Center for Health Online both signal a move towards more effective information management relying heavily on Information Technology; therefore such directions will reinforce the need for nurses to be effective information managers (Frey, 1997:2).

Anderson (1992:3) wrote that medical technology had advanced more in the past ten years than in the previous one hundred. This has challenged medical professionals
to acquire and use information-processing skills. He suggests that computer literacy has the following three dimensions:

- understanding what the computer is and does, including basic terminology and systems capabilities;
- performing basic operations on a computer system to complete professional tasks and
- having awareness of the impact of computers on the quality of human life.

There have been many studies with regard to the concept and attainment of computer literacy. These have focused on many different aspects of the perception of computer literacy and much effort has been put into sets of skills which adequately describe a computer-literate person. Other efforts have focused on devising assessment tools to measure the levels of these skills, a difficult task in such a multi-faceted and complex area. Through the 1980's, computer literacy tended to be considered a “grab bag” of different skills and attributes. A widely accepted definition of computer literacy is that of Simonson, Mauer, Montag-Torardi and Whitaker (1987:232) who define computer literacy as: “An understanding of computer characteristics, capabilities and applications, as well as an ability to implement this knowledge on the skilful and productive use of computer applications suitable to the individual roles in society.” This definition divides the knowledge and skills of a computer-literate person into four components, namely, computer attitudes, computer applications, computer systems and computer programming.

In the past ten years, computer technologies have diffused into many aspects of everyday life and in recent years this diffusion was accelerated and exaggerated by the convergence of computer and communication technologies. The renewed interest in computer literacy appears to be driven not only by those in education and industry but also by governments looking to maintain or upgrade their world competitiveness through leadership in an activity set to dominate trade and the corporate world in the new millennium (Oliver, 1999:1).
Although a lot of research has taken place regarding computers and nurses in the clinical setting for the purpose of this study, the researcher focused on the computer literacy status of Nurse Managers and Acting Nurse Managers. Research has shown that nurses’ attitudes towards computerisation have been found to vary according to age, gender, level of education, level of job satisfaction and past experiences with computerisation and the internet usage (Whiting-O-Keefe, Simborg and Warger, 1985:1185).

The two hospitals in this study do not use computers to capture patient information at the bedside. Computers are currently only being used in various departments such as accounts, pharmacy, case management and the admissions office. The nursing department uses computers at Nurse Manager level only. Computer skills at the Nurse Manager level are important, as they are required to communicate with various departments via the intranet, write reports, capture nursing hours, analyse reports, and collect statistics on a daily basis. Acting Nurse Managers perform the function of Nurse Managers in their absence.

1.2 PROBLEM STATEMENT

The use of computers by Nursing Managers at the aforementioned two hospitals is rapidly increasing. This poses a challenge, as the computer literacy status of Nurse Managers in this private hospital group is unknown. This is evident from the fact that prior to 1996, there was only four computers at one of these private hospitals. The total number of computers from 2005 to date is eighty throughout the hospital including the nursing departments. The four computers, which in 1996 were terminals only, drove the hospital admissions system. The system hardware was called the International Business Machines (IBM) 36 and was only used to generate various reports that were first done manually by the Nurse Managers. Departments that had access to these computers were the reception area and the pharmacy. In
1996, the system was upgraded to a Personal Computer (PC)-based system run on Microsoft Windows. Nursing Managers did not have secretaries, so they were responsible for all nursing correspondence, inputting and correlating statistics and writing letters of appointment. Nursing Managers always compiled and processed reports manually prior to the introduction of computers. These included determining staffing requirements; leave requests and the gathering of statistics. In 1997; all Nursing Managers were given computers, but these were used as a form of communication intra-departmentally via the intranet.

In 1998 the Ward Resource Management System (WRMS) was introduced in the hospital. This started as a Microsoft Excel spreadsheet which is a system used to determine staffing levels and numbers needed to deliver patient care by inputting different data into the system such as patient acuity and activity for a given period. This was done manually by the Nurse Managers and then entered into the computer by a designated data capturer. The WRMS system today has been written in Microsoft Access and uses Microsoft Excel programme to produce its reports.

In 2003 a new nursing model was introduced, which looked at different roles played by individuals in the organisation. Some of these roles were redefined. For example, the Nurse Managers were empowered and given full autonomy to run their own units, which included, among many other things, being responsible for budgets. This meant that the Nurse Managers would need to communicate with many different departments locally and nationally and they also now had to be responsible for the WRMS system. Computers were introduced gradually starting with the specialised units. The first programmes that Nurse Managers had to use were Microsoft Outlook, Word, Excel and WRMS. It is not clear how many formal hours were spent on training since senior management decided that the Nurse Managers would use an identified resource person with all the necessary qualifications to teach them the basic computer skills. Training was done out of work hours and at a pace they felt comfortable with. No computer literacy assessment was done with the Nurse Managers prior to the introduction of computers into their departments.
In 2005, a computer-based payroll system incorporating Workflow Systems was introduced throughout the organisation. Prior to the introduction of the Workflow System, overtime and leave were being collated manually in the hospitals by the Nurse Managers who were responsible for overseeing their own budgets. This information was then sent to a payroll clerk who uploaded it into the system, the benefit of which was to alleviate capturing errors. A one-hour long training session was received on the initial introduction of the new system, a help desk was established for any queries a person might have, and a systematic guide was provided to all end users.

The organisation’s Information Management Services set up the Gateway (portal?), which gives access to users to visit the different functional department sites of the company to gather information, download forms and read the latest happenings. The gateway (portal?) can be accessed on the company’s intranet, for example, to find policies and job advertisements.

Most recently a new on-line ordering system has been introduced into the organisation. This system is an application spreadsheet that allows the Nurse Manager to order anything from stationery to capital expenditure items as long as it is within their budget. All end users attended a three-hour training session prior to implementation, and a help desk was also set up for any queries or problems that the Nurse Managers might experience.

With quality being one of the organisation’s main Critical Success Factors, the Nurse Managers are required to collect data from various sources such as the Q-evaluator device, which measures customers’ perception of the quality of service they experienced while in hospital. The Nurse Managers collate this data over a period of time and trend the main areas of concern in order to put corrective actions in place. This is achieved by trending events on graphs using Microsoft Power Point or Excel.
Computer skills were previously not a requirement for application for the position of Nurse Manager, but the job advertisement has subsequently changed to read that computer skills would be beneficial. There is currently still no formal computer training provided for Nurse Managers or Acting Nurse Managers, although resources are available in the hospitals to assist the managers with various computer problems. It is not known, however, whether these resources equip managers with the appropriate tools to become efficient in their role. The lack of formal training and lack of assessment of resources to determine whether the computer needs of Nurse Managers are being met, results in time wasting and intense frustration among Nurse Managers.

In view of the above discussion the researcher intends through this study to address the following questions:

- What is the computer literacy status of Nurse Managers and Acting Nurse Managers at a private hospital group?

1.3 PURPOSE

The purpose of this research is to establish the computer literacy status of Nurse Managers and Acting Nurse Managers in order to make recommendations to the management regarding the research findings

1.4 RESEARCH OBJECTIVES

The objectives of this study are:

- to explore and describe the computer literacy status of Nurse Managers in a private hospital group in the Nelson Mandela Bay and
- to make recommendations to management regarding the research findings
1.5 CONCEPT CLARIFICATION

The following computer terminology will now be clarified.

1.5.1 Information Technology

Information technology can be defined as the development, implementation, and maintenance of computer hardware and software systems to organise and communicate information electronically. Information technology includes technologies used to create, store and exchange information into formats such as computer data, telephony, instant messaging, graphics and video (Parsons and Oja, 2005:40).

1.5.2 Computer Hardware

Computer hardware includes the mechanical, magnetic, electronic, and electrical devices comprising a computer system, such as a central processing unit that executes the programme instructions so that data can be read, stored, written or processed. Input devices such as modems, keyboards, and monitors are all examples of computer hardware (Grobler, 2004:567).

1.5.3 Computer Software

Computer software is the set of programmes used for directing the operation of a computer or processing of electronic data. These are programmes that can be added and removed from the computer depending on the programmes used (Grobler, 2004:568).
1.5.4 Technical Support

Technical support refers to specialised knowledge, which in this instance would be computer technology or to a person with the ability to solve problems experienced with computers, whether it be hardware or software, (Grobler, 2004:573).

1.5.5 Computer Literacy

There are many different definitions of computer literacy as noted in Chapter 2. For the purpose of this research the definition by Vermaak (1990:3) will be applied, i.e., that computer literacy means knowing just enough to start using a computer to the extent that it begins to make a difference. It is the basic understanding of computer hardware, software terminology and systems operation and also includes the use of application programmes.

1.5.6 Nurse Manager

A Nursing Manager is a registered nurse in charge of a nursing unit in a hospital varying in size, specialty and number of staff. A Nurse Manager is a person of authority who assumes accountability in implementing the managerial functions of planning, organising, leading, delegating and controlling (Blais, 2002:159).

1.5.7 Management

Management is often referred to as a group of managers in an organisation, for example, the managing director and other high-level executives (Hellriegal, Jackson, Slocum, Staude and Associates, 2001:8). For the purpose of this study Management
will refer to the regional manager, the hospital managers and chief nursing mangers of both private organisations.

1.6  RESEARCH AND DESIGN METHODS

The research design and methods will be briefly defined in this section and discussed in detail in chapter 3.

1.6.1 Research design

Mouton (2001:55) defines a research design as a plan or a blue print of how one intends to conduct research. The research design for this study is a quantitative, explorative, descriptive and contextual survey which will be discussed in detail in Chapter 3.

1.6.2 Research methods

Research methods are the techniques used by researchers to structure a study and to gather and analyse information relevant to the research question (Burns & Grove, 1995:13). An in-depth discussion of the research methods will be given in Chapter 3 and only a summary of the research methods is depicted in the table below.
Table 1.1  Summary of Research Methods

<table>
<thead>
<tr>
<th>Phases</th>
<th>Research design</th>
<th>Research method</th>
<th>Data analysis</th>
</tr>
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</table>
| Phase 1  | Quantitative Explorative Descriptive Contextual Survey | **Population**  
  *All Nurse Managers & Acting Nurse Managers employed at the two identified private hospitals*  
  **Sampling**  
  *No sampling method will be implemented because 100% of the population will be selected for the research sample*  
  **Data-collection method**  
  *Self-administered structured questionnaire will be used to collect data*  
  **Pilot study**  
  *Two participants in management positions from another private hospital with a similar management structure will be used to conduct a pilot study* | A statistician will be utilising the Statistica Computer Software package to process and analyse the data. |
| Phase 2  | Quantitative Explorative Descriptive Contextual Survey | **Population**  
  *The research population for this phase will be the same participants as indicated in Phase 1, that is. all the Nurse Managers and Acting Nurse Managers* | The Courseware Sam package generates its own data analysis. |
### Sampling

*The same sampling procedure will be implemented as in Phase 1.*

### Data collection instrument

*Depending on the research findings of Phase 1, the plan is to utilise a Courseware Sam Package to collect data in this phase in order to verify the data that has been collected and analysed in Phase 1. If the findings of phase 1 indicate that the computer literacy level of the respondents is low, then an alternative method will be used to verify the data collected in Phase 1.*

### Pilot study

*The same two participants will be used for the pilot study as in Phase 1.*

<table>
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<tr>
<th>1.6.3 Reliability and Validity</th>
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Reliability and validity are fundamental to the measurement of an instrument to ensure that the findings are credible and trustworthy (de Vos, 2002:168). The researcher will attempt to ensure the reliability and validity in both phases of this research study. Reliability refers to the extent to which independent administration of the same instrument or a highly similar instrument consistently yields the same or similar results under comparable conditions (de Vos, 2002:168). Validity refers to whether the instrument measures what it is expected to measure. Reliability and validity will be discussed in detail in Chapter 3.
1.7 ETHICAL CONSIDERATIONS

Participants need to be informed about the research goals, process, and outcomes. Ethics is a set of moral principles that are widely accepted and that offer rules and behavioural expectations about the most correct conduct towards experimental subjects and respondents. Ethical guidelines not only serve as standards but also as the basis on which each researcher ought to evaluate his/her own conduct (de Vos, 2002:63). The ethical principles will be adhered to throughout the study. A detailed discussion of the ethical considerations will be described in Chapter 3.

1.8 DISSEMINATION OF RESULTS

According to Yardley (2000:203), the researcher has an obligation to communicate the results to individuals who can contribute to ensuring that Nurse Managers are computer-literate.

The research findings will be disseminated through:

- a publication in an accredited professional journal;
- formal presentations to both private hospitals in and
- a copy of the research report given to relevant authorities.

1.9 CHAPTER DIVISION

Preliminary outline of the chapters of the study will be as follows:

Chapter 1
- Orientation to the study and problem statement
Chapter 2
- Literature review

Chapter 3
- Research methodology

Chapter 4
- Data analysis and discussion of results

Chapter 5
Summary, conclusion and recommendations

1.10 CONCLUSION

This chapter focused on an overview of the study, problem statement and research objectives. The following chapter will be a detailed description of the literature review.
CHAPTER 2

REVIEW OF LITERATURE AND RESEARCH

2.1 INTRODUCTION

Chapter two will describe an information management system with its various hardware and software components. It will review the impact Information Technology has had on organisations and professions, in particular on nursing, and define computer literacy in depth. The relationship between computer literacy and age, gender, years of service and professional qualification will also be explored. Chapter two will also look at the importance of training and support with regard to Information Technology and also the various methods of testing computer literacy.

2.2 DESCRIPTION OF TYPICAL SOFTWARE CURRENTLY IN USE

Computer software is instructions that tell a computer how to carry out a task and referred to as a computer programme. These programmes form the software that prepares the computer to do a specific task, such as documentation and production video editing. Software is categorised as system software and application software (Parsons and Oja, 2005:3).

For the purpose of this study the following software applications and systems will be reviewed and literacy levels determined:

- Microsoft Word
- Microsoft EXCEL
- Microsoft POWER POINT
• Use of a Browser package such as Internet Explorer to access both the Intranet and Internet

• **Microsoft Word**

Microsoft word is the component of Microsoft Office Suite best suited for creating documents such as letters and reports. As word-processing software, Microsoft Word provides a set of tools for entering and revising text; adding graphical elements such as colour and tables; and then formatting and printing the completed documents. Word-processing software such as Microsoft Word has replaced typewriters for producing documents such as reports, letters and memos. Word-processing software gives one the ability to create spell-check, edit and format a document on screen before one commits it to paper (Parsons and Oja, 2005:98).

• **Microsoft EXCEL**

Microsoft Excel, which is the component of Microsoft Office, is best suited for working with numbers and formulas as it provides tools to create electronic spreadsheets. As spreadsheet software, Microsoft Excel provides a set of tools for simple or complex calculations, such as creating a budget, estimating expenses and creating an income and expense projection. A worksheet is similar to a “smart” piece of paper that automatically adds up the columns one writes on it (Parsons and Oja, 2005:138).

• **Microsoft POWER POINT**

Microsoft Power Point is the component of the Microsoft Office Suite best suited for creating visual backdrops for speeches and oral presentations. As presentation software, Microsoft Power Point provides a set of tools to help the user script, organise and display a presentation. Presentation software supplies the tools needed for combining text, photos, clip art, graphs, animations and sound clips into a serious of electronic slides. Presentation software includes templates, master slides
and themes that can be used to ensure that all presentations created by an organisation, person or department have uniform style (Parsons and Oja, 2005:174).

2.3 DEFINING COMPUTER LITERACY

Computer literacy is a person’s knowledge and ability to use computers and technology efficiently. Computer literacy can also refer to the comfort level someone has with using computer programmes and other applications that are associated with computers. Since another valuable component of computer literacy is knowing how computers work and operate, the precise definition of "computer literacy" can vary from group to group. Generally, "literate" denotes people who can read any book in their native language[s], looking up new words as they are exposed to them. Likewise, an experienced computer professional may consider the ability to self-teach (i.e. to learn arbitrary new programmes or tasks as they are encountered) to be central to computer literacy. Computer literacy often means little more than the ability to use several very specific applications (usually Microsoft Word, Microsoft Internet Explorer, and Microsoft Outlook) for certain very well-defined simple tasks. Real problems can therefore arise when such a "computer literate" person encounters a new programme for the first time, and large degrees of "hand-holding" may well be required (en.wikipedia.org/wiki/computerliteracy).

Computer literacy means knowing just enough to start using a computer to the extent that it begins to make a difference. It is the basic understanding of computer hardware, software terminology and systems operation and also includes the use of application programmes (Vermaak, 1990:3).

The result of a study conducted among allied health students to test the attitudes towards computers and self-assessment of actual and desired computer literacy, suggested that specific remedial computer course work might be needed to bridge the gap between actual and desired computer literacy. At the National Educational
Computing Conference, Keiffer (1995:436) promoted the idea that computer literacy be viewed as a “dynamic” rather than “static” term. The Southern Council on Collegiate Education in Nursing conducted a survey in which they defined literacy as “knowledge, skills and positive attitudes toward computer technology”. They also identified the need for allied health educators to develop measures to assess computer-literacy skills and pointed out that one of the major factors limiting the clinical use of microcomputers was inadequate user preparation, (Frey, 1997:3).

Many studies have been done over the past two decades on both the concept and attainment of computer literacy. Much effort has been put into defining sets of skills, which adequately describe a computer-literate person. Other efforts have focused on devising assessment tools to measure levels of these skills, a difficult task in such a multi-faceted and complex area. The rapid development in communications technologies, which has occurred over the past ten years, has seen a broadening in the range of skills that are considered to be imperative to the constantly evolving notion of computer literacy. Where once basic computer literacy was narrowly defined and could be used to identify students that were deficient, the move toward broader terms of information and communication technology (ICT) literacy has occurred (Eisenburg & Johnson 1996:63).

Frey (1997:3) uses the definition of Moursund to define a computer-literate nurse as one who has basic understanding of computer hardware, software terminology and system operation. This definition includes use of application programmes with both personal computers and hospital-wide information systems. It has been further noted that “Computers are a new powerful aid to problem solving; they exert the capability of the human mind”.

Frey (1997:3) uses the results from a survey conducted at the Georgetown University School of Nursing by Bryson in 1989 to define further a computer-literate: a nurse is considered computer-literate if he or she has knowledge about the computer, is able
to learn by using the computer; and is able to use the computer as an effective tool in the nursing profession.

2.4 METHODS OF EVALUATING COMPUTER LITERACY

According to Fraser (2007:1) there is variety of approaches to surveying individuals each with their particular strengths and weaknesses with regard to their computer-literacy status. One of most common approaches includes structured or semi-structured questionnaires that could be used to conduct a self-assessment of one’s computer-literacy level. The advantages of questionnaires are that they allow for the collection of information from a large number of individuals relatively inexpensively and they also contribute to reliability by promoting consistency in eliminating the variation in questioning that can occur when several different interviewers are used. They also reduce the introduction of bias by eliminating the ability of interviewers to influence answers either intentionally or inadvertently. The disadvantages of the use of questionnaires on the other hand are that they do not allow the researcher to clarify questions or verify that answers are understood (Fraser, 2007:1).

Le Bold (1988:1) developed a test called the Computer Self-appraisal Survey (CDS) to measure computer literacy, knowledge and competency. The CDS scales have high reliability and differential validity. There have been decades of studies conducted with regard to the development of self-concepts, which revealed that self-reports were especially valuable in assessing cognitive abilities including computer literacy, knowledge and competency. The aforementioned results convinced the researchers that “self reports” were especially valuable in assessing cognitive abilities, including computer literacy, knowledge and competency.

There are also various online interactive computer-testing programmes such as the online computer adaptive testing tutorial (CAT). When an examinee is administered a test via the computer, the computer can update the estimate of the examinee's
ability after each item and then that ability estimate can be used in the selection of subsequent items. With the right item bank and a high examinee ability variance, CAT can be much more efficient than a traditional paper-and-pencil test. Paper-and-pencil tests are typically "fixed-item" tests in which the examinees answer the same questions within a given test booklet. Since everyone takes every item, all examinees are supplied with items that are either very easy or very difficult for them. These easy and difficult items are like adding constants to someone's score, providing relatively little information about the examinee's ability level. Consequently, large numbers of items and examinees are needed to obtain a modest degree of precision. With computer-adaptive tests, the examinee's ability level relative to a norm group can be iteratively estimated during the testing process and items can be selected based on the current ability estimate. Examinees can be given the items that maximise the information (within constraints) about their ability levels from the item responses. Thus, examinees will receive few items that are very easy or very hard for them. This tailored item selection can result in reduced standard errors and increased precision with only a handful of properly selected items. Despite the above advantages, computer-adaptive tests have numerous limitations, and they raise several technical and procedural issues:

- CATs are not applicable for all subjects and skills. Most CATs are based on an item-response theory model, yet item-response theory is not applicable to all skills and item types.
- Hardware limitations may restrict the types of items that can be administered by computers. Items involving detailed artwork and graphs or extensive reading passages, for example, may be difficult to present.
- CATs require careful item calibration. The item parameters used in a paper and pencil testing may not hold with a computer-adaptive test.
- CATs are only manageable if a facility has enough computers for a large number of examinees and the examinees are at least partially computer-literate. This can be a big limitation.
• The test administration procedures are different, which may cause problems for some examinees.
• With each examinee receiving a different set of questions, there can be perceived inequities.
• A clever examinee could intentionally miss initial questions, as they are not usually permitted to go back and change answers. The CAT programme would then assume low ability and select a series of easy questions. The examinee could then go back and change the answers, getting them all right. The result could be 100% correct answers, which would result in the examinee's estimated ability being the highest ability level (Rudner, 1998:1).

Usability testing is another method of testing the ease of use or ease of learning on an interactive system. There are two observation methods for usability testing namely unobtrusive and obstructive observation method. Unobtrusive observation means the researcher observes what the respondents do and refrains from interacting with them. The latter means the researcher will interact with the respondents by asking them questions (d'Hertefelt, 1999: NP*).

There have been various interactive programmes developed over the years to assess the learners' computer-literacy levels, one of which is known as Skills Assessment Manager (SAM), which has brought hands-on assessment and training combined with objective-based questions to computer concepts and application courses. It enables one to evaluate fully the learners' knowledge in one particular application instead of assuming the full installation of all applications. SAM has many features such as open stimulation, flexible scheduling and serving as a powerful administrative system. Using SAM's integrated scheduling and grading system allows the assessor to track the progress of testing and training (SAM, 2003).

Self-measure is a relatively direct form of measurement of self-behaviour, of which self-perception is part. A question remains as to the relationship of self-perception of knowledge, experience and confidence to actual levels of these dimensions as
determined by objective measures. While subjects themselves perhaps more accurately measure confidence, knowledge and experience can be measured externally. The result has proved that the relationship between knowledge and skills gains measured in a workshop setting and actual job performance is problematic. Other studies, using similar self-reported self-measurement instruments, have indicated that respondents tend to be conservative in estimating their own levels of knowledge, experience and confidence, as contrasted with outside assessments. There are also additional factors that may contribute to increased perceptions of knowledge and confidence; for it is believed that participants in a study can be sensitive to a variety of influences, including the behaviour they think is expected of them (Berger, 1988:6)

2.5 The impact of Information Technology (IT) on organisations and on employees

Over the past 20 years, computers and the sharing of information that they facilitate have penetrated nearly every aspect of life. Reliance on computers grows every day, from shopping at grocery stores and filing taxes to driving an automobile and communicating with relatives and business associates (Johnson, Cullen and Patsios, 2000:11).

Human Resource Managers are distressingly aware that more than half the Nurse Managers in their organisation are 50-year-olds. Age plays a role in the level of literacy of employees, because the older generation has not embraced computers as the younger generation has. As organisations introduce Information Technology into the business, computer-literacy levels are still not assessed and end users are not involved with the planning phases. The truth with regard to the computer-literacy status of prospective employees is often only uncovered during an interview when the candidates’ responses would be that they are familiar with widely used computer software such as Excel, MS Word or Power Point. They use correct terminology, but
then their limited skills are exposed when they are tested on these programmes (Kennedy, 1999:1).

In the past ten years, computer technologies have diffused into many aspects of everyday life and in recent years the diffusion has been accelerated and exaggerated by the convergence of computer and communications technologies. The place of computer technologies in schools has evolved from objects of study or specialist applications to tools for teaching, learning and administration. Computer literacy disappeared from the main focus of attention as the stand-alone computer lost its novelty, but today the concept is reclaiming attention as the new technologies once again gain public attention through the next phase of their development. This renewed interest appears to be fuelled by the Internet and communications technologies, which are revolutionising their use and growing influence on life and society (Oliver, 1999:1).

Turban, MacLean and Wehterbe (1999:7) states that information technology (IT) has become a major facilitator of business activities in the world today and is also a catalyst of fundamental changes in the structure, operations and management of organisations.

While new electronic technologies shape the organisation, how it is managed provides the architecture that supports and reinforces the new workplace. An example that Daft and Marcic (2007:27) uses is Enterprise Resource Planning (ERP) systems, which weave together all of a company’s major business functions, such as order processing, product design, purchasing, inventory, manufacturing, distribution, human resources, receipts of payments and forecasts of future demands. Part of the nursing administrative function is to order products, take inventories, deal with human resource issues and process salaries. The EPS if used correctly can streamline these processes and reduce administrative hours spent on paper-generated orders (Daft, et al, 2007:27).
The world is being reshaped by technologies such as genetic engineering, automated manufacturing and communication technologies, which provide new opportunities for managers. These technologies should improve efficiency but they can also have a negative impact and become a burden. In the case of communication technology, for example, people may spend too much time responding to and communicating via electronic mail, while other areas of their work are being neglected. Nevertheless, the Internet also increases the capability of organizations to expand their business activities through electronic-commerce. In a survey conducted on management’s top 10 challenges in a changing environment, countries that participated were Australia, France, Germany, Italy, Japan, Spain, the United Kingdom and the United States of America. Out of the 8 countries that were surveyed, only Australia did not reflect information technology as being one of their challenges. The other 7 countries surveyed reflected that Information Technology was one of their biggest challenges in a changing environment (Smit & Cronje, 2002:26).

Information technology allows senior management to gain on-line real-time access to operations without consulting many layers of middle management, which allows organisations to speed up decision-making processes (Smit & Cronje, 2002:197).

According to Smit and Cronje, (2002:463), the three elements of information technology that have changed the way in which contemporary organisations function are:

- the internet and other forms of globally connected networks, which provide the ability to share information on a world-wide basis;
- electronic commerce, including electronic data interchange systems, which enable managers to reshape their business processes to improve response time and efficiency and reduce costs both within and beyond their organisations; and
- mobile computing, which enables individuals to access information and communicate with others from remote cites across the globe. (This has a tremendous impact on both where and how people do their work).
Advances in technology have dramatically changed the world and will continue to do so in the future. Thus, modern managers need to appreciate and understand the power of technology and maximise the benefit of this technology as it is in the best interests of the organizations they work for.

2.6 The impact of Information Technology (IT) on the nursing profession

Medical terminology, which has also advanced more in the past ten years than in the previous one hundred, has challenged medical professionals to acquire and use information-processing skills. It has been suggested that computer literacy has the following three dimensions:

- understanding what the computer is and does, including basic terminology and systems capabilities;
- performing basic operations on a computer system to complete professional tasks; and

Much has been written about nurses, with particular reference to their being predominately a female group and their attitudes to computers, as well as the need to include the teaching of informatics in nursing curricula. It is well known that a positive attitude towards the use of computers is likely to facilitate introduction and use of IT. Nurses embarking on university studies are entering environments which are likely to be experiencing substantial pressure to adopt the latest developments in information technology. Pressure exists for nursing to take advantage of this and other innovations. The literature shows that many practising nurses lack computer competencies and tend to not access and use information adequately to enhance knowledge-based practice. This may be because nurses have rigid work routines and the limited extent to which information seeking is valued or encouraged in the workplace creates major obstacles to pursuing information (Pelletier, 2004:2).
Several studies, which have been conducted to measure nurses’ attitudes towards computers and computerisation, have yielded generally positive results. There is a need, however, to understand how the diffusion of new information technology occurs among nurses and how their attitudes are translated into the behaviour of adoption and use (Friel, Reznikiff and Rosenberg, 1993:127-133).

Pelletier, (2004:4) found that Australian Nurses entering university graduate studies were entering environments in which they were likely to experience substantial pressure to adopt some of the latest developments in information technology. Regardless of these pressures Pelletier found that attitudes to computers were more unfavourable than favourable. There were significant differences among five different groups of nurses with nurse administrators reporting the most positive attitudes towards computer technology were found. In a study conducted by Miller and Jeffcote (1997: 10-16), the opposite was found with regard to nurses’ attitudes towards computers. It was found that 98% of the 77 respondents working with computers in a clinical environment had a positive attitude towards the clinical and administrative use of computers. Eighty-four percent (84%) of practising nurses had a computer terminal where they saw patients and 70% used the computer to gain access to clinical information. However, three-quarters of the respondents felt that their training on computers was either missing or inadequate. Seventy-four percent (74%) of the nurses surveyed when the computers were introduced into their practice were either hardly consulted prior to installation or not at all. Despite positive feelings about computerisation, practice nurses appear to be getting insufficient or inadequate training and support to utilise the technology fully. Personal computer use, length of nursing experience and the number of seminars, conferences and workshops related to computer technology attended by the participants were positively correlated with nurses’ attitudes toward computer technology.

In a peer-review research paper studying nursing students’ experiences and attitudes towards computers involving a single cohort of registered nurses undertaking a Bachelors Degree in Nursing Studies at the School of Nursing and Midwifery, Trinity
College Dublin, it was found that the positive attitudes reported by respondents would suggest an interest in learning about computers and an understanding of the importance the role ICT would play in the future of health-care. Seventy-five-point three percent (75.3%) reported a medium or high level of skill in using hospital-based systems while only 2.7% declared that they were at an expert level of skill in using hospital information systems. The limited experience in this study reflects the lack of use of ICT in health care and emphasises the importance of integrating computer teaching at nursing undergraduate level (Curtis, Hicks and Redmond, 2002:15).

Coover and Delcourt (1992:1) used the tool developed by Delcourt in 1985, to conduct a study among 210 professional nurses to explore the attitudes of nurses towards computers. The results of the aforementioned study revealed that environments such as technical versus non-technical had a slightly negative impact on the interest in computers, but not on comfort levels with computers. Accessibility to computers at work or at home had a predictive impact on the interest in computers, while demographic factors such as age and years in nursing were not predictive factors of attitudes towards computers.

Nursing has always been in the business of processing information from as early as 1857, when Florence Nightingale recommended that a statistical department be established in the army. Miss Nightingale compiled and processed data to complement her reports, justifying the need for specific reforms. However, it was another 100 years before computers were introduced into the healthcare industry and since the 1950s have become an integral part of the nursing profession. Advances in computer hardware, computer software and communication technology, have been revolutionary during the past five decades in which computer technology transformed the Industrial Age into the Information Age. Even though computer technology has advanced in the past 50 years to levels beyond comprehension, however, the health care industry has been slow to utilise this technology in healthcare. The challenge in nursing is what can be done to advance nursing informatics in the 21st century and
how to achieve it. Nursing professionals must ensure that computer technology remains an integral part of professional nursing practice (Saba, 2001:178).

In a paper presented at the Applied Research Center of the Liverpool Hope University College in The United Kingdom, “Assessing the management training needs of Independent Care Home Managers”, it was found that managers might lack the IT skills which could be important for the successful running of a care home. According to recent reports, the healthcare sector suffers from the lack of appropriate training and effective computer use often fuelled by lack of enthusiasm or even fear of IT systems. Studies have revealed that more that 50% of the managers lacked management training, having “worked their way through the ranks”. Promotion to management occurred quickly once experience of working in the care setting had been acquired. But according to mainly anecdotal evidence, many of the managers lacked basic literacy, numeracy and computer skills, which in turn might undermine their confidence in succeeding in the job. Among the managers studied only 31% possessed any qualifications and even a lower number have qualifications that are directly related to the job (Griffiths, 2003:2).

The 2000 Health Council report in New South Wales and the Center for Health Online (http://www/health.gov.au/healthonline/2000) both signal a move towards more effective information management relying heavily on Information Technology. Such directions will reinforce the need for nurses to be effective information managers.

Health care is never static; it has always been in the forefront of research, looking for ways to improve and develop medicine as we know it. Procter (1992:3) asks the question why nurses should concern themselves with computers. The amount of paper work at ward level is often overwhelming, and as changes in the overall structure of health care continue, administrative duties do not decrease. Is it in this area that information technology can help? Traditionally information regarding staff is maintained in written format requiring manual retrieval and updating. The retrieval aspect can be long and laborious, time-consuming and frequently inaccurate whereas
computers have a passion for numbers and statistics and can be easily accessible. Information can be displayed and formatted to suit individual requirements, thus permitting ease of identification of required information and presentation of the information in an understandable form. Where such a system is in operation the Manager can maintain a complete picture of the staff at all times. If the question of why nurses should understand computers was answered positively then why has it taken so long for nurses to harness the technology? There are a number of reasons for this, including (Procter, 1992:3):

- lack of computer knowledge among nurses;
- historically poor or non-relevant computer systems used and
- fear of computers

Since 1982, the use of computers and information systems in daily work has become commonplace. Because of this and because implementation of these systems was accomplished so rapidly there is often little time spent on evaluating or researching the impact on job performance. Is this why there is such a deficiency in research on recent technology, such as e-mail, et cetera? Are nurse’s slower adapters to this type of technology? Are there barriers that prevent nurses using these technologies? It is felt that more research specifically addressing nurses’ unique needs would highlight more clearly the impact of technology on the work of nurses and shed light on how nurses use (or don’t use) these technologies in their work (Coover and Delcourt, 1992:1).

Historically, organisations have certain storage areas that are used for the placement of data. Examples of such storage areas are books, files, and pieces of paper, ledgers and the minds of people. It can be very time-consuming trying to retrieve this information because a particular file may be missing; a person may be busy and not available which may result in incomplete or misleading information on which decisions are based. Computerised information systems give accurate, up-to-date and complete data and information. There are, however, certain requirements for the successful implementation of computers (Booyens, 2001:627-641) namely that:
• nurses must be included in committees when assessing what system is needed;
• an integrated system must be planned beforehand;
• adequate training must be provided; and
• nurses must be able to articulate both the reason for requesting a system and its implications for nursing.

The use of computers in nursing administration vary but often include some of the following (Finkler 1985:18):
• development and utilisation of patient classification systems;
• budgeting for unit and departmental expenses;
• budgeting for the staffing of units;
• monitoring current staffing needs;
• preparation of reports; and
• inventory purposes

In the hospital of the future, technology will probably be the foundation for how care is planned, organised and delivered. Underuse, overuse and misuse of resources are cited by the Institute of Medicine in the report, “Crossing the Quality Chasm” as widespread in the U.S. health system. Many leaders in the healthcare systems also see technology as a means to improve efficiency and therefore decrease costs; for if it is appropriately deployed and fully integrated, it has the potential to improve the practice environment for nurses and the safety of patients, (Parker, 2005:123-124).

Nurses are knowledgeable workers who need data and information to do their jobs effectively. Knowledge work is non-repetitive and non-routine work that requires considerable levels of cognitive activity. The core activity of knowledge work is critical thinking; and the outcome shared expertise. Nurse who tend to be knowledge workers need the support from information technologies for data and information to be accurate, reliable and presented in an understandable format. Information technologies should also facilitate and extend the nurses’ decision-making abilities.
Informatics is at present in a stage of constant change and it highlights two roles that have prevailed for nurse managers: educator and research translator, both of which have become easier to fulfill through, for example accessibility and use of the Internet. The nurse manager must however be an early adapter of the technology to demonstrate its value and performance (Yoder-wise, 2007:54).

Computer information systems may change the patterns of social interaction within organisations. The computer provides a medium for rich interpersonal collaboration across departmental boundaries because the network supplies access to new, timely and relevant information for each section, department or unit. This type of communication encourages participation on an improved basis by removing personality factors such as a very timid nurse or an overpowering nurse manager. Effective planning and control is also made much easier than before. Another effect of computer information is the diffusion of knowledge throughout the organisation because the computer, in assuming repetitive, routine functions, frees the nurse to attend to more direct patient care and nursing management tasks. The individual has improved control over her job performance when the computer is used extensively to take over non-nursing and routine tasks, which should lead to an increased sense of accomplishment and job satisfaction (Sinclair, 1990:72).

Information is considered to be a key resource of the National Health Services and many argue that at ward level the information technology resources do not meet the demands of healthcare professionals. In an article by McGuire (1995:1-2) it is considered whether nursing information systems have yet to come of age and suggests that the onus is on the profession to foster a positive attitude towards computers. It is expected that a good Ward Nursing Information System should support:

- care planning,
- clinical audit,
- staffing and rostering duties and
- workload estimation and patient costing
Ward Nursing Information System has been used in Scotland since 1973. Used efficiently such an integrated system should promote and develop a quality service, achieved by reducing the time spent on routine administration such as ordering stores, staffing, budgeting and writing of reports. The time can then be devoted to nursing activities, which would enhance patient care. It is doubtful whether there is a clear understanding among nurses as to the concept of nursing information, so potential users must be given time and tuition in using software and then encouraged to evaluate it. Successful implementation and use is more likely if staff understand the system. If nursing staff are well motivated and allowed to see the benefits of the computer as a tool to help care, management and provide educational support, then they are far more likely to accept this change than previously, (McGuire, 1995:1-2)

Frey (1997:561) states that hospitals throughout the world are experiencing the impact of technological advances in health information systems. One such advance is an electronic nursing information system that measures the level of illness. To use the system, a registered nurse must choose critical factors to assess a patient’s level of acuity. A patient’s acuity will provide the relevant information the Nurse Manager needs to determine the care the patient will require and also the staffing mix to carry out this care. A competent nurse quickly identifies the relevant factors, but often searches for the right keys to make appropriate entries, used correctly while the nurse information system assigns an acuity level based on nurse’s input. A workload statistic report then guides staff assignments for the next shift based on the patient acuity report. Although these electronic patient classification systems are an integral part of efforts to provide adequate staffing for patient care, the use of such equipment is often inefficient due to a lack of computer knowledge and skill by the end user.

Frey (1997:3) mentions that nursing literature includes numerous guidelines regarding competencies of practising professional nurses. For example, the National Council of State Boards of Nursing (1997:1) has defined competence as “the application of knowledge and the interpersonal, decision-making, and psychomotor skills expected for the nurse’s practice role, within the context of public health, welfare and safety”.

Computer experience is not defined; and the statement was made that extensive research was needed related to computer competency of professional nurses.

In a study done on nursing informatics educational needs of professional nurses, the sample included nurses from a list of computer conference attendees. Three sub-samples were identified: informatics nurses, nurse educators and nurse managers. Basic computer literacy skills for these groups were found to include the use of word processing, electronic mail, databases and spreadsheets. It was also found that skill in the use of presentation graphics would also be desirable, (Frey, 1997:3).

Knapp and Miller (1985: 344-346) and Whiting-O'Keefe, et al (1985: 1185-1192) concluded that computer implementation enhanced medical care yet there has been a history of non-use and resistance to computers by healthcare workers. Some of the causes of this negatively stem from technical, organisational and lack of consultation in the change process leading to poorly designed systems and individual psychological factors such as attitudes. Research has shown that nurses attitudes towards computerization have been found to vary according to age, gender, level of education and level of job satisfaction.

2.7 The importance of Information Technology training and support

Barr (2002:1) stated that a massive communication paradigm shift associated with information-systems technology is currently occurring in healthcare. She also indicates that the healthcare industry has been slow to embrace computers or provide sufficient funding for current computer software, hardware, technical support or staff member development. Improving healthcare effectiveness through patient-driven, cost-sensitive ventures requires a co-ordinated approach that ensures best practices are achieved through data-driven and evidence-based practices. Staying focused on quality, cost-effective patient care requires collecting and interpreting data that translates into patient care activities. Computers can provide the means to collect
and interpret this data; but leaders also must educate staff members about new technology. This is an additional investment that must accompany any computer system purchase. To capitalise on the power of information technology in health care organisations, executives must be committed to fully supporting the acquisition and maintenance of an adequate information system and consequently computer-literate staff.

Multiple factors facilitate or impede diffusion and adoption of various innovations and technology; but two factors seem critical to successful implementation, namely, commitment and preparedness. Commitment in this context refers to the person’s support of adoption of the computer system. Preparedness refers to the structural changes made on the part of the administrator to assign authority, accountability and creativity to teams charged with creating dissemination plans. These changes also empower persons to take risks and embrace change. If trust in the organisation’s leaders is the foundation on which successful healthcare organisations build the environment necessary for social change and inspire people to achieve excellent clinical outcomes, then to create a sustained trusting environment, leaders must act in ways that produce constancy, congruity, reliability and integrity when interacting with those being led. Steps taken to establish and sustain this trust include providing computer updates and other pertinent information at regular meetings (Barr, 2002:5).

A long-range plan for computer training does not begin and end with the keyboard: it starts with each person’s acceptance of computerisation, which can lead to improved practice through the study of outcomes. In order for persons to use evidence-based decision-making they must be skilled in searching, evaluating, storing and using information and knowledge. To do this, they must embrace the computer as a tool of their trade (Barr, 2002:7).

An organisation’s technology methods and techniques used to produce goods and services profoundly affect the skills and abilities that an organisation’s employees must possess. Technology has increased skills and training necessary to perform
many of the jobs in today’s organisations but unfortunately South Africa is faced with fewer skilled workers entering the labour market than previously and an increase in under-prepared workers. The answer to this problem, of course, is an increase in worker re-education and training programmes (Grobler, 2002:25).

Virtually every process in today’s hospital environment can be and is being impacted by software. Programmes available to expedite timeliness reduce errors, improve compliance and aggregate data for decision support. Traditional hospital business processes impacted include admissions, billing and collections and ancillary systems. Understanding the role various types of software play in the continuum of work processes enhances the selection, use and ultimate success of the software but the software is only as effective as the way in which it is used. Users will drive its success and failure, (Walsh and Cisna, 2002:2).

Walsh, et al (2002: 5) highlights the psychological aspects of change imposed by new software as being unpleasant and frightening to many people because it disrupts normal activities and necessitates giving up comfortable old habits for new procedures, which may be slow and awkward at first. Extra time and energy are needed to learn new steps and social alterations are often required. People who experience change in the work place may exhibit symptoms of grief, which may include shock, disbelief, denial or anger. Fears associated with automating work processes include fear of embarrassment, ineptitude or outright failure. Since learning patterns differ widely among users, every user responds in his or her own way and time. Furthermore, the uncertainty and stress caused by new software can retard the speed with which new information is assimilated. Concerns are sometimes exaggerated but are nonetheless very real to the user; so it is important that they are addressed from the user’s perspective with information, development of clear policies and procedures to support the changes and formal training, (Walsh, et al, 2002:9).
There has been a common theme identified when Information Technology (IT) assessments have been done. Significant inefficiencies exist because an organisation’s software is not used effectively or has not been properly installed due to the organisation’s failure to implement work-process changes during software implementations. This impacts on end-user satisfaction and a reluctance to accept change. Walsh proved that to achieve successful implementation and utilisation of software in any organisation certain steps need to be followed the most important step in this process being end-user involvement from the start as well as end-user education/orientation, (Walsh, 2002:9).

Walsh presented a number of case studies from different hospitals. The one hospital presented in the case study has installed an integrated system resulting from the merger of two key hospitals. A re-engineering initiative begun in the mid-90’s realigned the organisation and identified information as one of the four key success factors. Although the rest of the organisation participated in activities and process changes the information systems (IS) department was not invited to participate, hence the end result was significant user dissatisfaction. Many systems were implemented by users without significant IS involvement. Projects and work organisation processes were not used; therefore many systems were not providing the benefits originally anticipated by users. Consequently, it was difficult for IS to meet user expectations.

In a final summary Walsh, et al, (2002:15) outlines the importance of a multi-disciplinary approach in understanding how technology impacts work processes. At any phase of technology planning, selection and implementation a triad of personnel must be involved. Each represents specific and important viewpoints and skill sets to successful systems implementation – management, technology professionals and users (management or staff, depending upon the level of activity). This involvement begins with the creation of the IT plan, which must be created for the purpose of supporting and enabling the organisation’s business plan. Technology does not exist for the purpose of having technology – a clear relationship to the business plan is
required, so that organised involvement of each group, such as participation in steering committees, selection teams and implementation teams will result in improved decision-making.

Literature has shown that many practising nurses lack computer competencies. Responses received from nurses with regard to their attitude towards computers were generally more unfavourable than favourable. The issues emerging related to both information literacy and information management; as there is likely to be a relationship between nurses’ capacity and performance with IT in the clinical or work environment and their actual or potential use of IT. Research has proved that nurses were not reaching the levels of computer literacy and information management at university likely to be needed for the professional life in the new millennium. Although the results from the study conducted seemed to indicate that the graduate students were relatively well equipped in terms of home computers and modems, they rated themselves not well equipped in terms of computer skills. Self-rating is acknowledged to be problematic; but it would seem that there is some relationship between what they feel their skills are and their willingness to tackle new IT initiatives and to accomplish set tasks or achieve goals. While there may be modesty factors in under-reporting their computer skills, the small percentage claiming good skills is of concern (Pelletier, 2004:6).

Understanding the factors that influence individuals’ use of information technology has been researched since the mid-1970, when organisations and researchers began to find that adoption of new technology was not living up to expectations. The first theoretical perspective to gain widespread acceptance in this research was the Theory of Reasoned Action developed by Fishbein and Ajzen in 1975. This theory maintains that individuals would use computers if they could see that there would be positive benefits associated with using them (Compeau, 1995:189).

Compeau (1995:189) describes the role of individuals’ beliefs about their abilities to use computers competently as computer self-efficacy, which is the belief that one has
the capability to perform a particular behaviour. In a Canadian survey using managers and professionals to develop and validate a measure of computer self-efficacy and to assess both its impacts and antecedents, computer self-efficacy was found to exert a significant influence on individuals’ expectations of the outcomes of using computers, their emotional reactions to computers (affect and anxiety) and their actual computer use. An individual’s self-efficacy and outcome expectations were found to be positively influenced by the encouragement of others in his/her work group as well as others’ use of computers. Thus self-efficacy represents an important individual trait, which moderates organisational influences (such as support and encouragement). Understanding self-efficacy then is important to the successful implementation of systems in organisations. Since research has shown that support of the organisation for computer users can influence individuals’ judgments of self-efficacy, organisations need to be aware of the concept of self-efficacy and the means for encouraging it (Bandura, 1986:191-215).

There are four sources of self-efficacy information, namely:

- **Guided mastery:**

  Guided mastery is the source of information, since the more successful interactions individuals have with computers, the more likely they are to develop self-efficacy. This has strong implications with respect to training. Firstly it suggests that hands-on practice is a key component of training, so that people can build their confidence along with their skill. More importantly, however, the need for successful experience in order to foster self-efficacy is a strong argument for why software training is so important to new users. If users are working with new software without adequate training they are likely to experience problems, which may lead to lowering of their sense of self-efficacy and reluctance to use the technology, thus defeating the purpose of introducing new technology.
• **Behaviour modelling:**

  Behaviour modelling involves observing someone else performing the behaviour as a means of learning.

• **Social persuasion:**

  By means of reassurance to the end users that they are capable of mastering the technology and using it successfully can help them build confidence, argues that individuals sometimes ascribe their feelings of anxiety to a lack of ability.

• **Physiological states:**

  If an individual feels anxious when using a computer, he or she may decide that the reason for the feelings of anxiety is a lack of ability (Bandura, 1986:191-215).

As technology develops and information becomes increasingly more available to the community, healthcare demands change. Technology has democratised information and in the process shifted the points of access and control from the professional to the educated public, which influences the way in which healthcare providers are educated. That changed relationship to information then results in reform, which happens by means of a process that includes lecturers, students, and healthcare consumers. With this shift then, the focus of education shifts from content to critical thinking skills, collaboration and shared decision-making (Nugent & Lambert, 1994:227).
2.8 Exploring the relationship between computer literacy levels, age, gender, years of experience and professional qualifications

It has been found that in most western countries, the participation of females in ICT professional careers is not only low but is also still falling (Anderson, Lankshear, Timms and Courtney, 2006:1304.)

One of the major concerns of modern societies today is to ensure increased access to higher education, and to include members of formerly under-represented social groups and categories, such as people of various age groups and women, etcetera...It has been recently pointed out that the simple distinction between those who have and those who do not have access to the Internet does not address the essential issue, because this distinction assumes that mere access to a computer, whether at home, at work or in a public library will automatically generate learning and development. But this is not always the case: one person may own a computer and have unlimited access to the Internet yet never uses it; whereas another person will travel a great distance in order to use a computer at a public facility. The key issue is not unequal access to computers but rather the unequal ways that computers are used. The distinction between access and use is undoubtedly an important addition to the discussion of the digital divide and its implications for web-based instruction. Previous studies of “access” tend to have concentrated their analyses on structural factors (e.g. age, gender, ethnicity, social class, etcetera.) while differences in “use” were generally explained in terms of subjective and personal characteristics. In other words, whereas the discussion of the digital divide in terms of access concentrated mainly on the macro, the analysis at structural and societal level in terms of use tended to focus on micro, situational and subjective factors. In our view the question, which still deserves further attention, is whether structural variables may also contribute to the explanation of differences in use. Do men and women, different age groups and people of different ethnic or class origin show different rates of Internet use? When a study was done to explore the effects of social factors such as age, ethnicity and gender on university students, use of the web-based instruction, it was
found that the younger students tended to profit from the growing proportion of study activities on the net while the adult students did not avail themselves of this facility. Although the results showed an increase in Internet use by females over the years, the differences between the two gender categories remained significant and quite large (Soker, 2005: 1198 3655).

Raja, Mahal and Masih conducted an explorative study among nurses in health care settings of a selected hospital in Ludhiana, Punjab, India to assess, identify and examine deficient areas of computer knowledge, attitudes and skills among nurses working in a hospital environment. Computer knowledge, attitudes and skills were measured by means of a self-structured computer knowledge questionnaire, computer attitude and skill scale respectively. Data analysis showed that the majority, 75% of staff nurses, had good computer knowledge; fifty-eight percent (50.8%) and 30.8% had average and fair computer skills respectively. The relationship of computer knowledge, attitude and skill was analysed among nurses with selected variables like age, sex, designation, years of nursing service and professional qualification, area of nursing service, type of computer training received and frequency of computer usage. It was found that age, years of service and professional qualification had no influence on the overall computer knowledge (Raja 2002:3).

The need for skilled technical workers to support the global economy is significant; yet it is notable that a disproportionate number of women choose to pursue technical careers. These career choices are influenced by early childhood experiences including those in the home and society. Computers are not inherently biased, yet in the contexts they are used they can often take on characteristics that reinforce gender bias. That is to say that the machine itself does not cause inequity but various factors related to its use can. One's background and environment can have a tremendous influence on how one approaches technology use. The extent to which computers are available and used in the home can also have an effect on the person's willingness and commitment to using them in the workplace. Research has
shown that fewer females have computers at home because they may not have the support from their parents, educators and others who view the use of technology as a male pursuit (Silver, 2001:610).

Studies have shown that gender significantly influences many attributes related to computer use. Ocak (2005:1303) quotes Woodrow (1992) as saying that there is strong evidence of gender differences in attitudes towards computers, particularly when other factors such as age, experience and curriculum are included in the equation. Ocak (2005:1303) conducted a study using Maths teachers to prove his hypothesis that attitudes towards the use of computers were affected by age, gender, racial and ethnicity factors. His findings showed that there was a significant difference for gender according to age and race, the men consistently showing the largest level of confidence. There was a marked difference in the female age groups in that the females under the age of 38 years were by far more confident in the use of computers than those over the age of 38 years.

The antecedents to the differences between males and females in the area of information technology have been the source of some controversy. The debate has focused on whether the disparities are a function of cognitive and psychosocial differences between the sexes or a consequence of a socialisation process and experience base. Unfortunately, answers to this “nature-nurture type” question appear to be predicated more on assumption and opinion than evidence, which rather than resolving the controversy, actually fuels the debate (Hattie and Fitzgerald, 1987:3-26).

Contemporary perspectives suggest that gender differences should be viewed more from the socialisation-experiential perspective as opposed to one based upon assumptions about innate differences in psychological processing. This focus on contextual factors and social experience of women provided a compelling rationale for research which examined the ways in which school experience could contribute to or diminish the disparities between genders in the area of information technology use.
The research found that overall the males did score higher than females in computer knowledge and experience, although not to the extent that those differences were statistically significant (Bain, Hess, Jones, and Berelowitz, 1999:72-79)

2.9 Conclusion

In view of the aforementioned discussion it can therefore be concluded that computer literacy can be defined in many different ways and on different levels. For the purpose of this study it is defined as the basic understanding of computer hardware, software terminology and systems operations.

The aforementioned discussion also reveals that research has shown that information technology has become a major facilitator in business activities and that nurses’ attitudes towards computers are generally positive even though the training and support that is needed to ensure successful implementation and use of information systems is lacking in organisations. In order for managers to embrace technological changes, leaders need to support employees and create a positive learning environment.
CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In Chapter one a brief orientation was given regarding the purpose and objectives of this study as well as a brief overview of the research methodology used. This chapter will present a detailed description of the research methodology utilised to facilitate the study.

3.2 RESEARCH DESIGN AND METHOD

The research design and method is a plan that provides the framework according to which data is collected and analysed in order to investigate the research question in the most economical way (Holloway and Wheeler, 1996:110). Design is described as a plan or blue print of how one intends conducting the research (Mouton, 2001:55)

3.2.1 Research Design

Huysamen (1994:10) defines design as “the plan or blueprint according to which data is collected to investigate the research hypothesis or question in the most economical manner”. A quantitative, explorative, descriptive and contextual survey research design was used to conduct this research.
• **Quantitative Research**

According to de Vos (1998:15), quantitative research is an approach to research in the social sciences that is highly formalised and explicitly controlled. Quantitative research has a range that is exactly defined and which, in terms of the method used, is close to physical science. A quantitative approach was chosen because quantitative methodology deals with numerical values and because in this regard it assisted the researcher in investigating and quantifying the status of computer literacy among Nursing Managers and Acting Nurse Managers. The data was then used to make recommendations to Management regarding the computer literacy status of Nurse Managers.

• **Exploratory Research**

The computer literacy levels of Nurse Managers and Acting Nurse Managers were not known at the time the researcher decided to conduct the survey. The researcher discovered new ideas and deepened her understanding of the level of computer literacy amongst Nurse Managers and Acting Nurse Managers by using the exploratory approach of research. Exploratory research leads to insight and comprehension by also making use of a literature review method (Mouton, 2001:80).

• **Descriptive Research**

Mouton (2001:80) states that the major purpose of a descriptive study is to observe and then describe what is observed. It is conducted with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident or trends that are developing. It is primarily concerned with the present, although it often considers past events and influences as they relate to current conditions. In quantitative study the researcher analyses the data reflected through questionnaires to understand the subjects’ essential meaning and understanding of the study.
The data obtained from this data-collection process was described in Chapter 4.

**Contextual Research**

Since human behaviour does not occur in a vacuum, it is necessary to provide a comprehensive description and analysis of the environment or social context of the participants (Struwig & Stead, 2001:12). The phenomenon is being studied within its immediate contextual setting.

This survey focused on Nurse Managers in their work place at two private hospitals in the Nelson Mandela Metropolitan area in their natural surroundings. The Nurse Managers were a diverse group in terms of culture, age and experience.

**Survey**

A Survey is designed to obtain information from populations regarding the prevalence, distribution and interrelationships of variables within those populations (Polit and Hungler, 1995:179). This survey looked at the computer-literacy status of Nurse Managers and Acting Nurse Managers at two hospitals in a private group in the Nelson Mandela Metropolitan area. Variables studied were the biographical data that included gender, age and language. The researcher selected a survey design because she intended to quantify the results.

**3.2.2 Research Methods**

Mark (1998:225) refers to the term “methods”, when discussing the way a researcher goes about developing rich insights. Methodological triangulation was used in the data-collection process. Cresswell (1994:174) quotes Jick, (1979) as stating that the concept of triangulation was based on the assumption that any bias inherent in
particular data sources, investigators and method would be neutralised when used in conjunction with other data sources, investigators and methods. This was evident in that a self-administered questionnaire and interactive computer test were used to collect data, explore and describe the computer-literacy level of Nurse Managers and Acting Nurse Managers in order to make recommendations to senior management of both private hospitals. Therefore the research method utilised in this study is described in two phases detailing the research population, sampling, data collection and analysis processes.

3.2.2.1 PHASE ONE

This phase included data collection and analysis by means of a structured, self-administered questionnaire in order to obtain data to meet the research objectives (See annexure A).

3.2.2.1.1 Population and Sampling

A population refers to individuals who possess specific characteristics, such as doing the same tasks or having the same job description and responsibilities. A sample comprises the elements of the population considered for actual inclusion in a study, (Arkava and Lane, 1983:27). The research population is the potential subjects who possess the attributes in which the researcher is interested (Mouton, 2001:110).

For the purpose of this study the population included Nurse Managers and Acting Nurse Managers employed at two private hospitals in the Nelson Mandela Metropolitan Region. The size of the research population was 34.

The research sample comprised 100% of all Nurse Managers, including nurses that were in an Acting Nurse Manager position at the time the research was conducted,
from two private hospitals in the Nelson Mandela Metropolitan Region. A list of all Nurse Managers and Acting Nurse Managers was compiled from information provided by the Chief of Nursing at both hospitals. The total number of Nurse Managers and Acting Nurse Managers presently employed in this position at both hospitals at the time of the research was 34. The researcher requested from the Nursing Services Manager that she use the Nurse Managers’ meeting as a forum to inform the Nurse Managers and Acting Nurse Managers of her intention to conduct the research and request they participate in the research. The Nurse Managers’ meeting was selected because all the Nurse Managers and Acting Nurse Managers are present as this is a compulsory monthly meeting.

The following inclusion criteria were considered when the sample size was selected. Nurse Managers had to be:

- employed at either one of the hospitals at time of the study,
- employed in the capacity of Nurse Manager or in an acting capacity as Nurse Manager,
- using a computer on a daily basis and
- well versed in the English language.

### 3.2.2.1.2 Data Collection Instrument

Phase One of this study involved data collection by means of a structured self-administered questionnaire (See Annexure A). De Vos (2002:181) quotes the New Dictionary of Social Work (1995) as defining a questionnaire as a "set of questions on a form which is completed by the respondent in respect of a research project". The structured self-administered questionnaire was developed by the researcher and piloted before distribution to all respondents. This phase also involved the analysis of the data collected.
The structured self-administered questionnaire was distributed to all Nurse Managers and Acting Nurse Managers at their monthly Management meeting. The questionnaire consisted of two sections, namely, section A and section B. Section A comprised questions that focused on all the biographical data such as gender, age, language and years in current position. The questions in section A of the questionnaire were posed to obtain information that enabled the researcher to describe the research population as well as detect patterns and trends regarding the computer literacy status of Nurse Managers. Therefore the questions in section A included questions on gender, age, language, and years in current position of Nurse Manager and Acting Nurse Manager.

Section B consisted of a number of different closed-ended questions. An advantage of using closed-ended questions was that participants understood the meaning of the questions properly; questions were answered within the same framework; and responses were consequently compared with one another (de Vos, 2002:180). Section B was divided into sub-sections consisting of dichotomous and ordinal questions. Dichotomous questions only have two response possibilities, “Yes or No” and “True or False”. Ordinal questions have a scale of one to five and “not applicable”.

Section B1 covered the participants' background history. Questions asked determined whether or not the Nurse Managers owned personal computers and whether they had any computer experience prior to acquiring their current positions.

Section B2 looked at current experience. The researcher made use of a scale of one to five and “not applicable”, one being never and five being daily. In their current positions they are required to use Processing packages, Spreadsheets and the Internet. The data collected in this section determined how computer literate the Nurse Managers were when they participated in this survey.
Section B3 looked at an individual’s self-assessment of ability. It had a scale of one to five, one being poor and five being excellent. The participants were given an opportunity to assess themselves on their ability to use a computer, the mouse, the keyboard, windows objects and various software such as Microsoft word, EXCEL and Power Point.

Section B4 assessed comfort levels of Nurse Managers and Acting Nurse Managers with regard to using a computer, working with the keyboard and mouse, and reading and understanding information on the monitor. It had a scale of one to five, one being difficult and five being very easy.

Section B5 consisted of a number of questions for which the answers were “true” or “false”. This section tested the Nurse Managers’ knowledge regarding Computer terminology and various components of the computer.

3.2.2.1.3 Data-collection Process

The researcher obtained permission from the Regional Hospital Manager of both private hospitals in the Nelson Mandela Bay area to conduct the study (see Annexure B and C)). The Nurse Managers and Acting Nurse Managers were approached by the researcher and asked about their preparedness to participate. All participants were required to complete an informed consent form prior to participating in the survey (See Annexure D).

The researcher requested from the Nursing Services Manager that she use the Nurse Managers’ meeting as a forum where the following information was given to the participants by the researcher; an explanation and brief overview of the study including the aims and objectives; how the data would be managed to ensure the safety of the information; a date for the distribution of the questionnaires to the respondents, which were hand-delivered by the researcher to each participant at her
place of work; the two-week time limit given in which to complete the questionnaires and the instruction to the participants to put their completed questionnaires in a sealed envelope and placed them in an envelope marked with the researcher's name. This envelope was left with the Hospital Managers secretaries. Confidentiality and the agreed date on which the sealed envelope had to be returned to the researcher was discussed with each of these secretaries.

3.2.2.1.4 Data Analysis

Data analysis which is the process of bringing order, structure, and meaning to the mass of collected data (de Vos, 2002:339), is concerned with the process of making sense of the data collected in order to answer the research questions. The purpose of data analysis is to shift, sort and organise raw data obtained during data collection in such a way that themes and interpretations that emerge from the process address the original research problem (Tutty, Rothery and Grinnell, 1996:90). Data analyses of the frequency with which responses occur, were used throughout the data-analysis process of the structured self-administered questionnaire.

The data was processed and analysed by the researcher. An EXCEL Spread-sheet was devised in which all data from the questionnaires was inputted once the data had been converted to a percent. Descriptive statistics was utilised to analyse and describe the research data. The data-analysis phase assisted the researcher to organise the data in ways that gave meaning and insight into the phenomenon being studied, which then also assisted with describing the Nurse Managers’ response to the questionnaires. Frequency tables and graphic presentations were used to organise and display the data in a concise way. Therefore tabulation of the frequency with which responses occur was used throughout the process. The data was then taken to a statistician in order to determine whether there was a significant relationship between the predetermined variables. This was achieved by using Chi square tests.
3.2.2.1.5 Pilot Study

A pilot study forms an integral part of the research process. Its function is the exact formulation of the research problem, a tentative planning of the modus operandi and range of the investigation and it also gives the researcher an opportunity to ensure that the chosen procedures are suitable, valid, reliable, effective and free from problems and errors (de Vos 2002:210).

The pilot study was done randomly, selecting two participants meeting the same inclusion criteria from another hospital within the private hospital group. Once the data obtained from the pilot study was analysed, changes were made to the questionnaire. These changes were mainly grammatical.

3.2.2.1.6 Reliability and Validity

In order to obtain valid and reliable data the measurement procedures and the measurement instruments must have acceptable levels of reliability and validity (de Vos, 2002:166). Reliability refers to the extent to which independent administration of the same instrument (or a highly similar instrument) consistently yields the same (or similar) results under comparable conditions. Validity refers to the instrument measuring what it is expected to measure (de Vos, 2002:168). The researcher attempted to ensure the reliability and validity of the questionnaire by ensuring the questions stayed focused on the objectives. The questionnaire was presented in an acceptable format, with easy-to-use understandable terminology. The questionnaire was reviewed by both supervisors from NMMU and approved prior to conducting the pilot study.
**Reliability**

de Vos (2002:168) writes that Bostwick and Kyte (1981:113-120) define reliability as referring to precision or accuracy of an instrument. Reliability, therefore, is concerned with how consistently an instrument measures the phenomenon of interest, or accuracy of the data in the sense of their stability or repeatedness. This means that reliability of the questionnaire refers to the consistency with which respondents understood and responded to all questions. Reliability was assured by conducting a pilot study to identify any potential problems in order to correct them prior to commencing the actual survey.

**Validity**

De Vos (2002:166) writes that, according to Bostwick and Kyte (1981: 104-105), a valid measuring instrument has been described as doing what it is intended to do, as measuring what it is supposed to measure and as yielding scores whose differences reflect the true differences of the variable being measured rather than random or constant errors. Thus the definition of validity has two parts: the instrument actually measures the concept in question and measures it accurately. The questionnaire, which addressed the computer-literacy status of Nurse Managers, determined whether the Nurse Managers had a basic understanding of computer hardware and software packages/programmes.

**Content Validity**

This is concerned with the representativeness or sampling adequacy of the content (for example, topics or items) of an instrument (de Vos 2002:167). Literature review was done to assist in drawing up the questionnaire, which was discussed with an Information Technology Specialist who advised on the type of questions to be included in the questionnaire. The content validity of the questionnaire was ensured with the assistance of the supervisors, information technology specialist and a
The literature review also assisted with the development of the questionnaire. De Vos (2002:167) states that to determine content validity two questions must be asked:

- Is the instrument really measuring the concept we assume it is?
- Does the instrument provide an adequate sample of items that represent that concept?

**Face Validity**

Face validity refers to what an instrument “appears” to measure; therefore it appears relevant to those who will be completing the questionnaire (de Vos, 2002:167). The researcher clearly sharing the objectives with the respondents assured face validity. The questionnaire was structured to address and measure accurately the computer-literacy status of Nurse Managers and Acting Nurse Managers.

### 3.2.2.2 PHASE TWO

As stated in chapter one, the researcher planned to supplement the self-administered questionnaire with a computerised testing programme called Courseware SAM if the results in Phase One reflected that the respondents were competent enough to perform the test. The findings at this stage acted as an indicator for the researcher to use a contextual enquiry, which is an interview using a structured observation sheet. The aforementioned decision was discussed with the supervisor from the IT department at the Nelson Mandela Metropolitan University.

The contextual inquiry is a specific type of interview for gathering field data from users. One interviewer speaking to one interviewee at a time conducts this contextual inquiry. For the purpose of phase two the researcher will be conducting the contextual enquiry herself. The aim is to gather as much data as possible from
the interviews for later analysis. The benefits of this type of interview are that the interviewees are interviewed in their context, when doing their tasks, with as little interference from the interviewer as possible. There are three basic approaches to conducting interviews (de Vos, 2002:297) namely:

- Informal conversational interview – this resembles a chat, during which participants may sometimes forget that they are being interviewed. Most questions asked will flow from the immediate context.

- General interview-guide approach, also known as the guided interview - a basic check-list is prepared to make sure all the relevant topics are covered. This type of interview approach is useful for eliciting information about specific topics.

- Standardised open-ended interview – a set of open-ended questions are prepared, which are carefully worded and arranged for the purpose of minimising variation in the questions posed to the participants. This method is often preferred for collecting interviewing data when two or more researchers are involved in the data-collection process.

For the purpose of this phase the researcher used the interview-guide approach in the form of a structured observation sheet. Observation means that the users are the masters and they ‘run the show’. The interviewer should only be watching and occasionally interrupt when feasible to ask questions about things that occurred, (Beyer and Holtzblatt, 1998:1). The participants were required to demonstrate their skills by carrying out instructions given by the researcher.

This was done in order to triangulate the results obtained from the data analysis of the self-administered questionnaire. This phase was implemented once all the data from the self-administered questionnaires had been collected and analysed.
### 3.2.2.2.1 Population and Sampling

The same research population and sample was used for this phase of the research study. Phase Two of the research consisted of 32 participants because two persons refused to participate in the contextual enquiry.

### 3.2.2.2 Data-collection Process

This phase was implemented once all the data from Phase One had been collected and analysed. A contextual inquiry in the format of an interview using the observation sheet was used for Phase Two (see Annexure E). A recognised researcher from the School of Information Technology at the Nelson Mandela Metropolitan University assisted with the compilation of the observation and data collection.

The observation sheet was subdivided into the different sections. Section A covered the same biographical data as in phase one, namely: age, gender, language and years in current position in order to match it with the self-administered questionnaire.

The focus in section B of the observation sheet was to determine whether the research findings of Phase One differed in any way from the research findings of Phase Two since the structured questionnaire used in Phase One was a self-assessment exercise. The researcher either ticked a yes, no or not sure response depending on the respondent’s ability to execute the questions on the computer as the researcher posed them.
3.2.2.3 Data Analysis

The researcher conducted a data analysis from the observation sheet on completion of the computerised test which measured the same phenomena as in the self-administered questionnaire. As in phase one of the data analysis, frequency tables and graphic presentations were used to organise and display the data in a concise way. Tabulation of the frequency with which responses occurred was used throughout the process.

3.2.2.4 Pilot Study

As in Phase One a pilot study was conducted using the same two randomly selected participants in order to confirm the reliability of the measuring instrument.

3.2.2.5 Reliability and Validity

As in Phase One reliability and validity are fundamental to measurement of an instrument to ensure that the findings are credible and trustworthy. To ensure triangulation was achieved the observation sheet was based on the structure as the first questionnaire.

The researcher ensured that the respondents clearly understood the nature of the research, namely, why the researcher was there, what was being studied; how data would be collected and what would ultimately happen to the collected data.
3.3 ETHICAL CONSIDERATIONS

Ethics is a set of moral principles that are widely accepted and offer rules and behavioural expectations about the most correct conduct towards experimental subjects and respondents. The research proposal was therefore submitted to the Facility of Health Science and the Faculty Research Technology Initiatives Committee for approval (Annexure F and G). Permission was also obtained from the Nelson Mandela Metropolitan University Ethics Committee (Annexure H). The participants where informed about the research goals, process and outcomes.

Parahoo (1997:53) states that subjects participating in any research have:

- the right not to be harmed,
- the right to full disclosure,
- the right of self-determination (subjects’ right to decide to take part or to withdraw at any time) and
- the right to privacy, anonymity and confidentiality.

Ethical guidelines also serve as standards and as the basis on which researchers ought to evaluate their own conduct.

3.3.1 Privacy, Anonymity and Confidentiality

Singleton et al (1998:454) explain that the right to privacy is the individual’s right to decide when, where, to whom and to what extent his or her attitudes, beliefs and behaviour will be revealed. Privacy implies the element of personal privacy, while confidentiality indicates the handling of information in a confidential manner. It is imperative that the researcher safeguards the privacy and identity of all participants.

Information given anonymously ensures the privacy of participants; so the participants were neither required to submit names on the questionnaires nor with the
computerised testing programme thus ensuring the privacy of all participants. Confidentiality was assured by requesting that the participants place their completed questionnaires in a sealed envelope and leave it at a predetermined area.

According to de Vos (1998:28), anonymity means that nobody, including the researcher, should be able to identify any participants after the research. The researcher knew the participants as the researcher is employed at the same private hospital group; but anonymity was ensured by the manner in which the research was conducted and the names of the participants and the hospitals at which the research was conducted were not required.

3.3.2 Informed Consent

Babbie and Mouton (2001:471) state that informed consent means that participants must base their voluntary participation in research projects on understanding the risk involved. According to de Vos (1998:24), informed consent is only obtained after all possible or adequate information has been revealed to the participants. Parahoo (1997:79) goes on to say that informed consent is the process by which researchers ensure that potential participants understand the potential risks and benefits of participating in a study: they are informed about their rights not to participate, and they are presented with this information in a manner that is free from coercion.

The goal of the research, procedures that were followed and the advantages of the research were explained to all participants. Participants were also informed that there was no risk involved in participating in the research and that they would be doing so voluntarily. All participants signed a consent form after all information about the purpose of the research had been discussed with them.
3.3.3  Autonomy

According to de Vos (2002:65), accurate and complete information must be imparted so that the subjects will fully comprehend the investigation and consequently be able to make a voluntary, thoroughly reasoned decision about their participation. Participants must also be aware of the fact that they can withdraw from the research at any time without fear of victimisation.

3.4  DISSEMINATION OF RESULTS

According to Yardley (2000:203), the researcher has an obligation to communicate the results to individuals who can contribute to ensuring that Nurse Managers are computer-literate. The research findings can be disseminated through:

- publication in accredited professional journals and
- formal presentations to both private hospitals to which the Hospital Managers and all Nurse Managers will be invited.

The researcher will document findings and copies will be given to relevant authorities. An article for publication in a peer-review nursing can also be prepared.

3.5  CONCLUSION

This chapter focused on the research method and design of the study. The following chapter will be a detailed data analysis and discussion of the results.
CHAPTER 4

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

In the previous chapters the research objectives and research methodology were described. The focus of this chapter is on the presentation of data, the data analysis and a discussion of the results obtained from the data collected from the respondents during Phases One and Two of the research study.

Phase One is a subjective analysis consisting of data collected from the structured, self-administered questionnaire completed by the respondents. Phase Two is an objective analysis consisting of data obtained from the observation sheet used by the researcher to observe the respondents' ability to execute the command posed by the researcher. Data collected in phase one will be used to triangulate data in Phase Two.

In phase one and two frequency distributions will be displayed in the form of bar graphs, doughnut/pie graphs and tables. When the independent variable is studied bar graphs will be used. When variables are studied collectively doughnut/pie graphs will be used to display the various components and their relationship to the whole. All data will be expressed in percentages.

4.2 DATA PRESENTATION

The data-collection process comprised Phases One and Two, using the same respondents in both the aforementioned phases to obtain the necessary data for this
research study. Therefore the demographic data for both phases is the same. The presentation of data, the data analysis and discussion of the research results will thus be described under the following headings:

- Demographics of participants
- Phase One data
- Phase Two data

4.2.1 DEMOGRAPHICS OF PARTICIPANTS

The response rate for the demographic section of the research project was 100%. Thirty-four (34) questionnaires were distributed among Nurse Managers and Acting Nurse Managers and all 34 questionnaires were completed and returned as arranged with the respondents.

The demographic section of the structured self-administered questionnaire and the contextual enquiry were exactly the same because the same respondents were used in Phase One and Phase Two. The questions posed in this section related to the respondents' gender, age, language, number of years in current position, qualifications and official computer courses completed. These questions were posed in order to describe and identify the demographic traits of the respondents.

4.2.1.1 Gender distribution

This question was posed in order to establish the gender distribution of the respondents. A total frequency of 34 (100%) indicated their gender as being female, probably because nursing is a predominately female profession with very few males practising nursing. However, much has been written about nurses, with particular reference to their being a predominately female group and their attitudes to computers. Literature has shown that many practising nurses lack computer
competencies and tend not to access and use information adequately to enhance knowledge-base practice. Personal use, length of nursing experience and the number of seminars, workshops and conferences related to computer technology attended by the participants were positively correlated with nurses' attitudes towards computer technology (Pelletier 2004:2).

A comparison between genders with regard to computer literacy levels could not be explored as all the respondents were female.

4.2.1.2 Age distribution

The respondents were requested to indicate their ages in order to establish whether age had any influence on the computer literacy levels of Nurse Managers. A total frequency of thirty-four (34), that is 100% of respondents, indicated their ages. Figure 4.1 reflects the research findings.
Figure 4.1 Age distributions of the respondents (N=34)

Figure 4.1 reflects that the majority (59%) of the respondents indicated that they were between the ages of 35 and 44 (n=20) years while 30% of the respondents indicated that they were between the ages of 45 and 54 (n=10) years. Significant low percentages of 9% and 3% were between the ages of 25-34 (n=3) years and 55-59 (n=1) years respectively. The significance of the age and the role it plays in the level of computer literacy will be determined when describing the results in Phase One and Two.
4.2.1.3 Home Language

This question was posed in order to establish whether ethnicity played a role in the level of computer literacy among Nurse Managers and Acting Nurse Managers. Figure 4.2 reflects the research findings below.

Figure 4.2 Language spoken by respondents (N=34)

Figure 4.2 reflects that 61% (n=21) of the respondents indicated that their first language was English, while 36% (n=12) indicated that their first language was Afrikaans and a significant 3% (n=1) indicated that their first language was Xhosa. Only 2% of the respondents indicated that they spoke two languages, namely English and Afrikaans or English and Xhosa. English is the official language spoken in both private hospitals where this research was conducted.
4.2.1.4 Number of Years in Current Position

The question about the number of years in the current position of Nurse Manager or Acting Nurse Manager was asked to determine how many managers were in their position prior to the introduction of computers at unit level in the two selected private hospitals. Figure 4.3 reflects the research findings.

![Figure 4.3 Number of years in current position (N=34)](image)

The above figure reflects that 65% (n=22) of all respondents have been in their current positions for 0-9 years. This implies that the aforementioned Nurse Managers and Acting Nurse Managers were appointed in their current positions after the introduction of computers in 1997 at Unit Management level. A total of 35% of the respondents indicated that they had occupied their current positions from 10 to
16+ (n=12) years. The latter finding thus reflects that these respondents were appointed in their current positions prior to the introduction of computers at Nurse Manager level. The researcher did not determine whether any form of literacy testing was done prior to the introduction of computers.

4.2.1.5 Qualifications of the Respondents

This question was asked to determine the qualifications of the Nurse Managers and Acting Nurse Managers who participated in the research. Figure 4.4 reflects the research findings below.

![Figure 4.4: Qualifications of the respondents (N=34)]

<table>
<thead>
<tr>
<th>QUALIFICATIONS</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Psychiatry</td>
<td>34</td>
</tr>
<tr>
<td>Midwifery</td>
<td>15</td>
</tr>
<tr>
<td>Community</td>
<td>30</td>
</tr>
<tr>
<td>Administration</td>
<td>15</td>
</tr>
<tr>
<td>Education</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 4.4 Qualifications of the respondents (N=34)
According to figure 4.4, the results reflect that n=15 (44%) of the respondents have completed the four-year integrated nursing diploma and n=2 (6%) had completed the Baccalaureus Curationis Degree in Nursing Science. The remaining 50% of respondents indicated that they only had a qualification in General nursing and Midwifery. The research findings reflected in the table above revealed that 6% of the respondents indicated that they had completed some post-basic studies in Nursing Administration and Nursing Education. Fifteen (55.6%) of Nurse Managers and Acting Nurse Managers indicated that they had only completed a Diploma in General nursing and Midwifery.

4.2.1.6 Number of Respondents who Completed Computer Courses

Questions were also posed to establish whether any of the respondents had completed any form of computer training. The research findings revealed that none of the respondents indicated that they had received any training in computers. Therefore it can be concluded that Nurse Managers and Acting Nurse Managers should be adequately equipped with the necessary computer skills for executing their management function, because IT skills are important for the successful management of hospitals.

In a study done by Miller and Jeffcote (1997) it was found that even though 84% of staff in the clinical and administrative setting worked with computers, three quarters of these respondents indicated that their training was either nil/non-existent. The study also indicated that they either hardly consulted or not at all. Despite positive feelings about computerisation practice nurses appear to be getting insufficient or inadequate training and support to utilize the technology fully.
4.2.1.7 Number of Respondents who own a Personal Computer

This section posed the questions related to whether or not the respondents owned a personal computer. It would be assumed that the levels of computer literacy might vary from respondent to respondent if they owned personal computers. Figure 4.5 reflects the research finding below.

![Pie chart](image)

**Figure 4.5:** Number of respondents who own a personal computer (N=34)

According to Figure 4.5 a significant 68% (n=23) of respondents indicated that they had computers at home. One would expect to find that the average competency levels of the respondents when tested to be above 50% as more that half of the respondents indicated that they had computers at home.
There are many variables that can influence these findings that have not been explored in this study, such as how frequently they use their computers at home and what applications they use. The variables such as how frequently they use their computers at home and what applications they use will be explored in Phase One and Two of the data analysis.

4.2.1.8 Number of respondents who used a computer prior to appointment in current position

This section posed the question whether or not respondents had used a computer prior to their appointment in their current position in order to establish whether the respondents were knowledgeable about computers prior to their appointment as a Nurse Manager or Acting Nurse Manager. Figure 4.6 reflects the research finding below.
Figure 4.6 Number of respondents who had used a computer prior to their current position (N=34)

Figure 4.6 revealed that more than half 53% (n=18) of the respondents had never used a computer prior to occupying their current positions, even though 68% (n=23) of the respondents in figure 4.5 indicated that they owned personal computers prior to the introduction of computers in their work place. It is not known whether the respondents acquired the computers prior to being appointed in their current positions or after being appointed in the current positions. In Figure 4.3 it was found that 65% (n=22) of the respondents were appointed in the current position after the introduction of computers in 1997 at Unit Manager level.
4.2.1.9 Number of year’s respondents had used a computer prior to appointment in current position.

This question was posed to determine the extent of experience the respondents had prior to their appointment as Nurse Managers and Acting Nurse Managers. Figure 4.7 reflects the research findings below.

According to figure 4.7 eight percent 80% (n=28) of respondents indicated they had been using computers prior to their current positions as Nurse Managers and Acting Nurse Managers for 1-4 years, while 7% (n=2) of the respondents indicated they had used computers for 5-6 years and 13% (n=4) indicated that they had used computers for 7 years and more prior to their appointment. These finding are incongruent with
the previous figure, where 53% (n=18) of the respondents indicated that they had never used a computer prior to occupying their current positions.

The fact that 80% of the respondents had owned computers prior to their current positions as Nurse Managers and Acting Nurse Managers does not mean that they have received any formal training or that they have a higher level of computer literacy than the other 20% percent who had only acquired their own computers after acquiring their positions as Nurse Manager and Acting Nurse Manager. In section 4.2.1.6 a 100% the respondents indicated that they had never received any formal computer training.

4.2.1.10 Use of Software

The questions in this section were posed to establish whether the respondents used the following software packages: MS Word, Excel, Internet and Electronic email and also how often the respondents used the aforementioned packages. A linkert sliding scale was used to illustrate how often the respondents used various software packages. Table 4.1 below illustrates the research findings.
Table 4.1 Number of respondents indicating the frequency of use of the software packages

<table>
<thead>
<tr>
<th>SOFTWARE PACKAGES</th>
<th>NEVER</th>
<th>ABOUT ONCE PER MONTH</th>
<th>SEVERAL TIMES PER MONTH</th>
<th>ONCE PER WEEK</th>
<th>DAILY</th>
<th>NO RESPONSE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>8(23.53%)</td>
<td>5(14.7%)</td>
<td>9(26.47%)</td>
<td>2(8.82%)</td>
<td>8(23.53%)</td>
<td>2(5.88%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Excel</td>
<td>10(29.41%)</td>
<td>3(8.82%)</td>
<td>7(20.59%)</td>
<td>4(11.76%)</td>
<td>6(17.65%)</td>
<td>4(11.76%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Internet</td>
<td>10(29.41%)</td>
<td>3(8.82%)</td>
<td>7(20.59%)</td>
<td>4(11.76%)</td>
<td>6(17.65%)</td>
<td>4(11.76%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Electronic email</td>
<td>1(2.94%)</td>
<td>3(8.82%)</td>
<td>6(17.65%)</td>
<td>2(5.88%)</td>
<td>20(58.82%)</td>
<td>2(5.88%)</td>
<td>34(100%)</td>
</tr>
</tbody>
</table>

Table 4.1 reflects that MS word was used several times a month by 26.47% (n=9) of the respondents while 23.53% (n=8) said “daily” and “never” respectively. Twenty nine point forty one percent (29.41%) said they never use EXCEL or the Internet while 20.59% said they used EXCEL and the Internet several times per month. Electronic email was used by 58.82% (n=20) of respondents daily, making this the most used software packages on a daily basis.

This data will be used in Phase One to correlate the data collected with regard to the respondents' perceived competency levels in order to determine if there is any relation between their competency levels and how frequently they use the different software packages.
4.2.2 DATA ANALYSIS: PHASE ONE

Phase One of the data-collection process comprised the collection of data by means of a self-administered questionnaire so that the researcher could establish:

- to what extent the respondents considered themselves computer literate;
- the degree of difficulty experienced by respondents when using computers; and
- the respondents’ understanding of computer terminology

This data will be used to triangulate the data in Phase Two.

4.2.2.1 Self-assessment Ability – Computer Literacy Levels

In this section the respondents were requested to rate their computer literacy level with regard to the use of a computer when using software such as Microsoft word, EXCEL, Power Point, Internet and the Intranet. They were asked to rate their computer literacy level with regard to the use of peripheral components of the computer such as the typing cursor on the keyboard, and the mouse and windows objects such as buttons and check boxes. A self-anchored rating scale was used in that the respondents were asked to rate themselves on a continuum from one to five, one being very poor and five being excellent. The self-anchored rating scale is used in order for the respondents to measure their own perceptions of their levels of computer literacy. The advantage is that they do not have to compare themselves with other respondents (de Vos, 2002:18).

- Computer literacy level with regard to using a computer

The researcher requested the respondents to rate their computer literacy level with regard to the use of a computer in general. This question was posed in order for the researcher to obtain baseline data that would indicate the respondents’ literacy levels
with regard to the use of a computer in general. This data was used as a database to measure further results in Phase One and Phase Two. Figure 4.8 below illustrates the research findings.

![Figure 4.8](image)

**Figure 4.8** Respondents’ self-assessment, rating their own computer literacy level (N=34)

Even though 68% of the respondents own personal computers as reflected in figure 4.5, figure 4.8 reflects that 47.06% of the respondents rated their computer literacy
level with regard to the use of a computer as average, while 14.71% rated their literacy level as very poor and 17.65% of the respondents rated their literacy level as good. The aforementioned results could imply that the majority of the respondents are comfortable using the computer. However, research has shown that respondents tend to be conservative in estimating their own levels of knowledge. Berger (1998:6) believes that participants can be sensitive to a variety of influences, including the behaviour they think is expected of them.

The aforementioned results will now be cross-tabulated with the variable age in order to establish whether all the respondents from different age groups have the same computer literacy levels.

Figure 4.9 illustrates the comparison of age and computer literacy levels of the respondents.
Figure 4.9 reflects that 100% of the respondents who were between 55-59 years rated their computer literacy level as being average while 80% of the respondents who were between the ages of 45-54 years rated their computer literacy level as average. The remaining 20% of the respondents in the later age group indicated that their computer literacy levels were poor. The research results of the respondents from younger age groups revealed that their computer literacy levels were better than those of the respondents in the older age groups.
Further analysis was done with the assistance of a statistician using the chi\(^2\) test to determine whether there was a relationship of statistical significance between the age groups and the levels of computer competency, the following was found:

The chi-squared value is 25.05, df =20 and p-value = 0.1997. Therefore no significant relationship was found. However due to the relatively big number of age levels (6) for the small sample, there are quite a few empty cells. Because of this, and also because the last three age levels are similar in respect of the second variable, they were combined into one level. For this data where age has four levels, 30-34, 25-39, 40-44 and 45+, the chi-squared value = 24.76, df = 12, and the p value = 0.0160. This confirmed that there was significant difference in computer literacy levels among the various age groups.

The aforementioned is evident from the following:

- The respondents between the age group 30 to 34 (n=3) years of age rated their levels of computer literacy as being average (33.3%), good (33.3%) and excellent (33.3%). This was the only age group of respondents in which some of the respondents indicated that their computer literacy level was excellent.

- Five point nine percent (5.9%) of the respondents between the age group 35 to 39 (n=8) years of age rated their levels of computer literacy as very poor while 8.8% rated their computer literacy level as poor. Five point eight percent (5.8%) of the of the respondents between the ages of 35 to 39 (n=8) rated their computer literacy level as good and only 2.8% rated their computer literacy level as average. This is incongruent with the study done by Ocak (2005:1303) where it was found that females under the age of 38 years were by far more confident in the use of computers than those women over the age of 38 years. The study done by Ocak (2005:1303) was not a nursing group whereas in this study nurses comprised 100% of the respondents. The findings of this study could also be incongruent with the findings from the study
conducted by Ocak (2005:1303) due to the fact that this is a South African study. According to Darkwa (1996:4) people from Africa are the least computer literate.

- Respondents between the ages of 40 to 44 (n=12) years of age indicated that their computer literacy rating varied from very poor to good, with 14.7% rating their computer literacy level as average, 8.8% as very poor and good respectively and 2.9% as poor.

- Respondents between the age groups 45 to 49 and 50 to 54 years of ages rated their computer literacy levels the same. Eleven-point-eight percent (11.8%) rated their compute literacy level as average while 2% rated their computer literacy level as poor.

Overall the computer literacy level for the total population was indicated as average (46.8%). When Raja, Mahal and Masih (2002:3) conducted an explorative study to assess, identify and examine deficient areas of computer knowledge, attitudes and skills among nurses working in a hospital environment, they found that 75% of the staff nurses had good computer knowledge and 50.8% and 30.8% had average and fair computer skills respectively. The respondents from the younger age groups appeared to rate their computer literacy levels at a higher level than that of the older respondents.

- Competency level with regard to the use of Software Packages

The researcher requested the respondents to rate their computer literacy level with regard to the use of software packages such as MS Word, Excel, Power Point, the Intranet and the Internet. This question was posed in order for the researcher to obtain baseline data that would indicate the respondents’ computer literacy levels with regard to the use of software packages. This information will be used in Phase Two’s
data analysis in order to triangulate the findings. Table 4.2 below illustrates the research findings.

Table 4.2 Respondents’ computer literacy ratings with regard to the use of software packages (N=34)

<table>
<thead>
<tr>
<th>SOFTWARE PACKAGES</th>
<th>VERY POOR</th>
<th>POOR</th>
<th>AVERAGE</th>
<th>GOOD</th>
<th>EXCELLENT</th>
<th>N/A</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>6(17.6%)</td>
<td>3(8.8%)</td>
<td>18(52.9%)</td>
<td>5(14.7%)</td>
<td>2(5.9%)</td>
<td>0 (0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Excel</td>
<td>9(29.4%)</td>
<td>12(35.3%)</td>
<td>9(26.5%)</td>
<td>3(8.8%)</td>
<td>0(0.0%)</td>
<td>0 (0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Power Point</td>
<td>10(29.4%)</td>
<td>11(32.4%)</td>
<td>9(26.5%)</td>
<td>4(11.8%)</td>
<td>0(0.0%)</td>
<td>0 (0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Internet</td>
<td>9(26.5%)</td>
<td>5(14.7%)</td>
<td>12(35.3%)</td>
<td>4(11.8%)</td>
<td>3(8.8%)</td>
<td>0 (0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Electronic mail</td>
<td>10(29.4%)</td>
<td>2(5.9%)</td>
<td>10(29.4%)</td>
<td>5(14.7%)</td>
<td>7(20.6%)</td>
<td>0 (0.0%)</td>
<td>34(100%)</td>
</tr>
</tbody>
</table>

Table 4.2 reflects that 52.9% of the respondents were most comfortable using software packages such as MS Word, rating their computer literacy level as average. This is incongruent with the findings in Table 4.1 where the respondents were asked to indicate the frequency and whether they used various software packages. Even though MS Word was the most frequently used software package it was found that only 26.47% the respondents indicated that they used MS Word several times a month and 23.53% indicated that they used MS Word on a daily basis.

The Internet was the second highest average, with 35.3% of respondents rating their computer literacy level as average. In Table 4.1 twenty point five nine percent (20.59%) of the respondents indicated that they used the Internet several times a
month and 17.65% of the respondents indicated that they used the Internet on a daily basis.

Twenty-point-six percent (20.6%) of the respondents rated their computer literacy level as excellent when it came to the use of electronic mail, while in table 4.1 fifty-eight point eight two percent of the respondents said that they used electronic mail on a daily basis.

The researcher viewed the respondents’ computer literacy rating collectively with regard to the use of the various software programmes. Findings are reflected in figure 4.10 below.

![Figure 4.10](image_url)

**Figure 4.10** Respondents’ computer literacy rating with regard to the use of software programmes collectively (N=34)
While 34.1% of the respondents rated their overall computer literacy levels as average with regard to the use of various software packages, in Figure 4.8, 47.06% of the respondents rated their computer literacy level with regard to the use of a computer in general as average.

- **Computer literacy level with regard to the use of peripheral components of the computer**

The researcher requested the respondents to indicate their computer literacy levels with regard to the use of peripheral components of the computer. This question was posed in order for the researcher to establish a baseline understanding of the respondents’ computer literacy levels with regard to the use of peripheral components of the computer. Table 4.3 below illustrates the research findings.

**Table 4.3**  
Respondents’ computer literacy ratings with regard to the use of peripheral components of the computer (N=34)

<table>
<thead>
<tr>
<th>PERIPHERAL COMPONENTS</th>
<th>VERY POOR</th>
<th>POOR</th>
<th>AVERAGE</th>
<th>GOOD</th>
<th>EXCELLENT</th>
<th>N/A</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typing cursor on keyboard</td>
<td>3(8.82%)</td>
<td>8(25.53%)</td>
<td>12(35.29%)</td>
<td>8(23.82%)</td>
<td>3(8.8%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Mouse</td>
<td>2(5.88%)</td>
<td>3(8.82%)</td>
<td>11(32.35%)</td>
<td>10(29.41%)</td>
<td>8(23.53%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Windows objects</td>
<td>10(29.41%)</td>
<td>6(17.65%)</td>
<td>12(35.29%)</td>
<td>4(11.76%)</td>
<td>2(5.88%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
</tbody>
</table>

Table 4.3 reflects that more than 30% of the respondents rated their computer literacy levels as average with regard to the peripheral components of the computer. Thirty –
five-point-two-nine percent (35.29%) of the respondents indicated that their computer literacy level with regard to the typing cursor on the keyboard and windows objects was average and 32.35% of the respondents indicated that their computer literacy level was average with regard to using the mouse.

This data will be used in order to triangulate the findings in Phase Two’s data analysis.

4.2.2.2 Range of Difficulty

In this section the respondents were requested to indicate the range of difficulty that they experienced when working with a computer, the keyboard and mouse. The results of this section enabled the researcher to establish the extent of difficulty experienced by the respondents when they used a computer.

- Computers in general

Figure 4.11 below reflects the researcher’s findings with regard to the range of difficulty experienced by the respondents when working on the computer in general.
Figure 4.11 Degree of difficulty experienced by the respondents when using a computer (N=34)

Figure 4.11 reflects that 38.24% (n=13) of the respondents indicated that they found it fairly easy to work on the computer. Figure 4.8 where 47.06% (n=16) of respondents indicated that their ability to use a computer was average. Seventeen point sixty five percent (n=6) of the respondents indicated that they found it difficult to use a computer. This was in line with figure 4.8 where 17.65% (n=6) of the respondents rated their computer literacy level with regard to the use of the computer as poor. In the demographic data respondents were asked whether they had ever received any formal computer courses and all indicated “no” by not responding to the question. In figure 4.1 the majority (59%) of the respondents indicated that they were between 35 and 44 years of age. In figure 4.3 sixty five percent (65%) of the respondents have been in their current positions of Nurse Managers and Acting Nurse Managers for 0-9 years. This could be why only 23.53% find it easy to work on a computer.
Figure 4.12 below will compare the number of respondents who had owned a computer prior to their position as Nurse Manager or Acting Nursing Manager to their degree of difficulty experienced when using a computer in general.

Figure 4.12  The number of respondents who had owned computers prior to their current position in relation to their degree of difficulty when using a computer (N=34)
The figure above reflects that 11.8% (n=4) of the respondents who had not owned a computer prior to their position as Nurse Manager or Acting Nurse Manager found it difficult and not too difficult respectively to work on a computer. Seventeen-point-six percent found it fairly easy (n=7). None of the respondents that had not owned a computer prior to their current positions found it easy or very easy to work on computers. Five-point nine percent (n=2) of the respondents that had not owned a computer prior to their current positions found it difficult and not too difficult respectively. The above graph shows those that had owned on a computer prior to the positions as Nurse Manager or Acting Nurse Manager found it easier to work on computers than those who had not owned on computers prior to their positions as Nurse Managers or Acting Nurse Managers.

Further analysis was done with the assistance of a statistician using the chi² test to determine whether there was a relationship of statistical significance between the age groups and the levels of computer competency, the following was found:

For the data; the number of respondents who had owned a computer prior to their current position in relation to their degree of difficulty when using a computer the chi-squared value is 9.65, df (degrees of freedom) is 4 and the p-value is 0.0467. This means there is a statistically significant relationship between the number of respondents who had owned a computer prior to their current position in relation to their degree of difficulty when using a computer – difficulty levels are different for those who own and do not own a computer.

- **Peripheral components**

Table 4.4 below reflects the researcher's findings with regard to the range of difficulty experienced by the respondents when working with the keyboard, mouse and interpreting information on the screen.
Table 4.4  Respondents’ degree of difficulty experienced with regard to the use of peripheral components of the computer (N=34)

<table>
<thead>
<tr>
<th>PERIPHERAL COMPONENTS</th>
<th>DIFFICULT</th>
<th>NOT TOO DIFFICULT</th>
<th>FAIRLY EASY</th>
<th>EASY</th>
<th>VERY EASY</th>
<th>N/A</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typing cursor on keyboard</td>
<td>4(11.76%)</td>
<td>4(11.76%)</td>
<td>11(32.35%)</td>
<td>12(35.29%)</td>
<td>3(8.82%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Mouse</td>
<td>4(11.76%)</td>
<td>1(3.4%)</td>
<td>9(26.47%)</td>
<td>15(44.12%)</td>
<td>6(17.65%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
<tr>
<td>Interpreting information on the screen</td>
<td>4(11.76%)</td>
<td>5(14.71%)</td>
<td>6(17.65%)</td>
<td>11(32.35%)</td>
<td>8(23.53%)</td>
<td>0(0.0%)</td>
<td>34(100%)</td>
</tr>
</tbody>
</table>

Table 4.4 reflects 44.12% (n=15) of the respondents rated their degree of difficulty with regard to the use of the mouse as easy, while in table 4.3 twenty nine point four on percent (n=10) respondents rated their computer literacy levels with regard to the use of the mouse as easy. Thirty-five-point-twenty-nine percent (n=12) of the respondents indicated that they found the keyboard easy to use, while in table 4.3 only 23.82% (n=8) of the respondents rated their computer literacy level with regard to the use of typing cursors on the keyboard as good.

An average of 36.46% of the respondents rated the degree of difficulty with regard to the use of peripheral components of the computer as easy compared to Table 4.3 where an average of 21.66% of the respondents rated their computer literacy levels with regard to the use of peripheral components as good.

The inconsistency reflected in the data collected in tables 4.3 and 4.4 could be attributed to the respondents’ self-perception of knowledge, experience and confidence. This will be tested in Phase Two by means of triangulating data.
collected from an observation sheet used to test the respondents’ computer literacy levels.

4.2.2.3 Understanding Computer Terminology

The questions in this section were posed to establish whether or not the respondents understood computer terminology. This was achieved by testing the respondents’ knowledge on computer terminology and various components of the computer by their answering a number of true or false questions. Table 4.2 illustrates the research findings.
Table 4.5  Percentage of right and wrong answers to true and false questions on computer terminology (N=34)

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>TRUE</th>
<th>FALSE</th>
<th>RIGHT ANSWERS %</th>
<th>WRONG ANSWERS %</th>
<th>TOTAL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  A central processing unit can be described as the computer brain</td>
<td>TRUE</td>
<td>27(79.41%)</td>
<td>7(20.59%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>2  The series of instructions that tell a computer how to carry out a processing task is referred to as a computer programme</td>
<td>TRUE</td>
<td>21(61.76%)</td>
<td>13(38.24%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>3  The modem is used for connecting a computer to a local network area</td>
<td>TRUE</td>
<td>28(82.35%)</td>
<td>6(17.65%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>4  Storage devices include: hard disk drive, floppy disk drive, CD drive, flash disc and/or DVD drive</td>
<td>TRUE</td>
<td>33(97.06%)</td>
<td>1(2.94%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>5  RAM refers to the capacity of software</td>
<td>FALSE</td>
<td>30(88.24%)</td>
<td>2(11.76%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>6  Kilobytes is used when referring to the size of small computer files</td>
<td>TRUE</td>
<td>27(79.41%)</td>
<td>7(20.59%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>7  RAM is a temporary holding area for data, application programme instructions and the operating systems</td>
<td>TRUE</td>
<td>21(61.76%)</td>
<td>13(38.24%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>8  ROM (read only memory) instructions are temporary and can be changed without changing the ROM chip</td>
<td>FALSE</td>
<td>20(58.82%)</td>
<td>14(41.18%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td>9  The mouse is the primary pointing device for a standard desktop computer</td>
<td>TRUE</td>
<td>28(82.35%)</td>
<td>6(17.65%)</td>
<td>34(100%)</td>
<td></td>
</tr>
<tr>
<td><strong>AVERAGE</strong></td>
<td></td>
<td>25(73%)</td>
<td>9(27%)</td>
<td>34(100%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.5 reflected that 73% (n=25) of all respondents answered the questions correctly indicating that the respondents’ understanding with regard to computer terminology and components of computers were above average. Seventy-nine-
point-forty-one percent (n=27) of the respondents answered correctly to the questions “A central processing unit can be described as the computer brain” and “Kilobytes is used when referring to the size of small computer files while 38.24% (n=7), answered wrongly. Sixty-one-point seven-six percent (n=21) of the respondents knew that a series of instructions that tell a computer how to carry out a processing task is referred to as a computer programme. Eight-two-point-thirty-five percent (n=28) of the respondents knew that a modem is used for connecting a computer to a local network as well as that the mouse is the primary pointing device for a standard desktop computer. The question with the highest percentage answered correctly was “storage devices include: hard disk drive, floppy disk drive, CD Drive, flash disc and/or DVD drive” with a percentage of 97.06% (n=33).

A definition by Vermaak (1990:3) states that computer literacy means knowing just enough to start using a computer to the extent that it begins to make a difference. This also includes the basic understanding of computer hardware, software terminology and systems operation as well as the use of application programmes; therefore it can be assumed, by looking at the above results that the respondents know enough to start using a computer even though they were not comfortable in various software packages such as power point and Excel as indicated in Table 4.2%. It was found the only 26.5% of the respondents rated their competency level as average. However, the researcher does not know whether or not the respondents made use of help in order to answer this section

4.2.3 DATA ANALYSIS: PHASE TWO

This phase of the data-collection process was conducted 2 weeks after Phase One. Only 32 of the respondents were available for this phase of the data-collection process because one of the respondents refused to be tested despite the benefits of the research explained to her and the second respondent had resigned before Phase Two of the research was implemented. By this time the researcher had already
obtained all the demographic data described under 4.2.1 with the self-administered questionnaire

As mentioned earlier, Phase Two was an objective analysis based on data obtained from the observation sheet used by the researcher for conducting the interactive computer test on a one-on-one basis. The researcher observed the respondents while they were executing the verbal commands posed. D'Hertefelt (1999) describes this method of testing as usability testing. There are two observation methods for usability testing namely unobtrusive and obtrusive methods. “Unobtrusive” observation means the researcher observes what the respondents do and refrains from interacting with them. The latter means that the researcher interacts with the respondents by asking them questions. The method used in phase two is an “obtrusive” observation method. This was done in order to triangulate the results obtained from the data analysis of the self-administered questionnaire.

4.2.3.1 SELF ADMINISTERED QUESTIONNAIRE

The user-interaction observation consisted of four sections, which assessed the respondents’ ability to execute commands provided by the researcher on the computer using a standard observation data sheet. The following software capabilities were assessed: Microsoft word, Power Point, Intranet and EXCEL. The researcher would either mark the respondents as “YES” if they knew how to carry out the command or “NO” if they had no idea, and “NOT SURE” if they needed to be prompted.

This section of the user observation addressed the respondents’ ability to execute ten commands in Microsoft word; the second section was EXCEL, consisting of six commands; the third section was Power Point, consisting of nine commands and the final section of the data observation sheet was the Intranet, consisting of nine commands. Throughout each of these sections the researcher was also observing
the respondents’ ability to use the mouse, keyboard and windows objects such as buttons and checkboxes.

Table 4.6 below reflects the researcher’s findings with regard to the respondents’ ability to use software such as Microsoft word, Power Point, EXCEL and the Intranet as instructed by the researcher using the standard observation sheet.

Table 4.6 Interactive observation of respondents’ ability to use Software such as Microsoft word, Power point, EXCEL and the Intranet/email. (N=32)

<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICROSOFT WORD</td>
<td>11(34.38%)</td>
<td>15(46.87%)</td>
<td>6(18.75%)</td>
<td>32(100%)</td>
</tr>
<tr>
<td>EXCEL</td>
<td>7(21.88%)</td>
<td>25(78.12%)</td>
<td>0(0.00%)</td>
<td>32(100%)</td>
</tr>
<tr>
<td>POWER POINT</td>
<td>7(21.88%)</td>
<td>16(51.00%)</td>
<td>9(28.40%)</td>
<td>32(100%)</td>
</tr>
<tr>
<td>INTRANET/EMAIL</td>
<td>17(53.13%)</td>
<td>7(21.87%)</td>
<td>8(25.00%)</td>
<td>32(100%)</td>
</tr>
</tbody>
</table>

Phase two has proven that the respondents have a below average ability to use most of the software packages. Table 4.6 reflects that 34.38% of the respondents were able to execute commands from the MSWord observation sheet and 18.75% were not sure while in Table 4.2 52.9% of the respondents rated their competency as average. Seventy-eight-point-twelve percent (78.12%) and 51% of the respondents could not execute commands given from the EXCEL and Power Point observation sheets respectively. In table 4.2, 35.3% and 32.4% of the respondents rated their computer competency levels as poor for EXCEL and Power Point respectively. In table 4.2 and table 4.6 the data reflected that the respondents were the least comfortable with
EXCEL and Power Point. This coincides with the demographic data in Table 4.1 where the results reflected that EXCEL and Power Point were the least frequently used software packages. Fifty-three-point-thirteen percent (53.13%) of the respondents were able to execute commands using the internet/email which is in line with the result from table 4.1. Table 4.1 reflected that the Intranet/email was the most frequently used as 58.82% of the respondents indicated that they used the Internet/email daily.

Figure 4.13 below reflects the researchers finding with regard to the respondents’ ability to use software collectively.

![Observation of respondents' ability to use software collectively](image)

Figure 4.13  Observation of respondents' ability to use Software collectively (N=32)
Figure 4.13 reflects that a percentage of 51.47% collectively did not have the ability to execute the commands given by the researcher from the data observation sheet. Thirty-one-point-zero-eight percent (31.08%) had the ability to execute commands given collectively from the data observation sheet that measured the respondents’ ability to use software. In Phase One the researcher looked at the respondents’ computer literacy level rating collectively with regard to the use of software programmes and the following was reflected in figure 4.10. Thirty-four-point-one percent (34.1%) of the respondents rated their computer literacy level as average. In Phase Two the researcher found a higher percentage of the respondents competent in that they were able to execute commands given by the researcher from a data observation sheet testing their knowledge in the various software packages.

The fact that only 34.1 % of the respondents rated their computer literacy level as average with regard to the use of software packages could be due to the fact that the respondents were conservative in estimating their own ability. This is supported by Berger (1988) who concluded that respondents tended to be conservative in estimating their own levels of knowledge, experience and confidence, as contrasted with outside assessments. There are additional factors that may contribute to increased perceptions of knowledge and confidence. It is believed that participants in a study can be sensitive to a variety of influences, including the behaviour they think is expected of them.

In phase two respondents were required to use the cap lock key, shift key, delete key and space bar. The respondents appeared comfortable using sections on the keyboard. Table 4.7 below reflects what the researcher observed during the second phase of testing.
Table 4.7   Interactive observation of respondents’ ability to use the components of the keyboard. (N=32)

<table>
<thead>
<tr>
<th>Components of the Keyboard</th>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAP LOCK</td>
<td>18(56.25%)</td>
<td>8(25.00%)</td>
<td>6(18.75%)</td>
<td>32(100%)</td>
</tr>
<tr>
<td>SHIFT KEY</td>
<td>21(65.63%)</td>
<td>5(15.62%)</td>
<td>6(18.75%)</td>
<td>32(100%)</td>
</tr>
<tr>
<td>TYPING CURSOR</td>
<td>16(50.00%)</td>
<td>10(31.25%)</td>
<td>6(18.75%)</td>
<td>32(100%)</td>
</tr>
</tbody>
</table>

Table 4.7 reflects that more than fifty percent of the respondents indicated that they were able to use various components of the keyboard such as the cap lock (56.25%) and the shift key (65.63%). In Phase One 30% of the respondents rated their computer literacy level with regard to the use of peripheral components of the computer as average. It can therefore be concluded that the research results of Phase Two were not congruent with the findings in Phase One because the performance of the respondents with regard to the observation data sheet was significantly better than the findings from Phase One where the respondents rated themselves in the Self-assessment test.

4.3 Conclusion

The findings in this research study reflect that the respondents rated themselves as mostly average with regard to computer literacy levels and experienced various degrees of difficulty when using various software packages and peripheral components of the computer. The researcher found similar results in Phase Two in that the respondents’ ability to execute commands on various components such as
the mouse and keyboard was above average whereas the respondents were found to be below average in their ability to execute commands using software packages such as EXCEL and Power Point. A summary of the research findings and recommendations will be made in Chapter 5.
CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This final chapter of this research report will focus on the summary and conclusions of the research results, limitations experienced and the recommendations for management.

5.2 SUMMARY AND CONCLUSIONS

The demographic data reveals that 100% (n=34) of the respondents were female. Sixty-one percent of the respondents indicated that their first language was English which is the official language spoken in both private hospitals where this research was conducted. It can be assumed that the respondents did not have any difficulty understanding the questionnaires, which were written and posed in English in Phase One and Two.

The research findings revealed that none (n=0) of the respondents had ever received any formal training in computers and 53% (n=18) indicated that they had never used a computer prior to occupying their current positions as Acting Nurse Managers and Nurse Managers. Sixty-five percent (n=22) of the respondents were appointed to their positions as Nurse Manager and Acting Nurse Manager after the introduction of computers.

Sixty-eight percent (n=23) of the respondents owned personal computers at the time the research was conducted; statistical analysis using the Chi square test showed
that there is a statically significant relationship between the number of respondents who had owned a computer prior to their current positions in relation to their degree of difficulty when using a computer – difficulty levels are different for those who own and do not own a computer

Research findings further revealed a significant difference in computer literacy levels among various age groups. The younger age groups revealed that their computer literacy levels were better than those of the respondents in the older age groups

Data analysis from the questionnaires in Phase One and the data analysis contextual enquiry in Phase Two revealed that the respondents’ level of computer literacy level was either just below average or average with regard to the use of peripheral components of the computer such as the mouse and keyboard. Forty-seven point zero six percent (n=16) of the respondents rated their computer literacy level as average with regard to using a computer. The majority 73% (n=25) of the respondents indicated that they had a good understanding of computer terminology.

The data analysis from interactive observation conducted in Phase Two revealed that the respondents had a below average ability to use various software packages such as Microsoft Word, EXCEL and Power Point. This is evident from the following results:

- Fifty-two-point-nine percent (n=18) of the respondents rated their computer literacy level with regard to the use of Microsoft Word as average while only 34.38% (n=11) of the respondents were able to execute commands given from the MS Word observation sheet.

- Seventy-eight-point-twelve percent (n=25) and 51% (n=16) could not execute commands given from the EXCEL and Power Point observation sheets respectively. In Table 4.2 thirty five point three percent (n=11) and 32.4% (n=10) of the respondents rated their computer literacy levels as poor for
EXCEL and Power Point respectively. The data reflected that the respondents were the least comfortable with EXCEL and Power Point. This coincides with the fact EXCEL and Power Point were the least frequently use software packages by the respondents.

- Fifty three point one three percent (n=17) of the respondents were able to execute commands using the internet/email; this is in line with the result from table 4.1. Data reflected that the intranet/email was the most frequently (58.82%) used, on a daily basis. More than 50% of the respondents scored were capable of executing the commands on the interactive observation sheet with regard to their ability to use various components of the keyboard such as the cap lock, shift key and typing cursor. In Phase One 30% of the respondents rated their computer literacy levels with regard to the use of peripheral components of the computer as average. The researcher found this to be significantly higher when testing the respondents' with the observation data sheet, seeing that more than 50% of the respondents were able to execute the commands given by the researcher.

In view of the above findings it can be concluded that the objectives for this study has been achieved because the researcher did succeed in exploring and describing the computer literacy status of Nurse Managers and Acting Nurse Managers. It can also be concluded that the respondents thought themselves to be far less computer literate than was found with the structured observation computerised test. The research findings from the structured observation computerised test were average.

5.3 LIMITATIONS

The following limitations were experienced with regard to this study:
Because the findings of this study are limited to two private hospitals in Port Elizabeth, the results cannot be guaranteed because of the small sample size and the fact that it was restricted to two private hospitals.

In the second phase of the data-collection process all Nurse Managers and Acting Nurse Managers were on their desktop computers in their workplace. They were not tested on their Internet knowledge as in phase one since none of them has access to the Internet as per company rules.

In Phase Two, two of the participants were not interviewed as one refused to participate despite the benefits of the research having been explained to her and assuring her that the information from each participant remained confidential. The participant did not give a reason for refusing; so the researcher can only assume her discomfort with being tested. The second respondent had resigned.

5.4 RECOMMENDATIONS

In view of the research findings, which highlight the computer literacy status of Nurse Managers and Acting Nurse Managers as ranging from poor to average, the following recommendations are hereby made:

5.4.1 RECOMMENDATIONS FOR NURSING PRACTICE

It is hereby recommended that a more extensive needs analysis be conducted by the Human Resources (HR) Department in collaboration with the Information Technology Department (IT) at head office level based on user performance requirements and function of all Nurse Managers and Acting Nurse Managers. The analysis should be conducted throughout the
organisation to establish the computer literacy status of all Nurse and Acting Nurse Managers.

- The aforementioned departments involving all Nurse Managers and Acting Nurse Managers should conduct a further investigation to assess the training needs, including current levels of comfort and skill with technologies needed for their positions.

- The HR and IT departments should then establish a network of training focal points, which take account of the organisations health units’ requirements and undertakings. The aim of these training focal points should be to ensure that all Nurse Managers and Acting Nurse Managers are equipped with the necessary computer knowledge and skills to ensure that they competently carry out the necessary computer tasks related to their positions as Nurse Manager and Acting Nurse Manager.

- An on-line core competency test should be created by the IT department at head office, which can be used by current Nurse Managers and Acting Nurse Managers to assess their competency levels.

- This on-line core competency test can also be used as an ongoing assessment every two years to ensure that all managers keep abreast of changes in the company information technology.

- Technical support systems should be provided at hospital levels which are easily accessible to all Nurse Managers and Acting Nurse Managers when they experience difficulty with any aspects of the computer.

- The HR and IT departments at head office should test all applicants with regard to their computer literacy level when these nurses apply for the position of Nurse Manager. It should not be presumed that they have the level of
literacy required to carry out the computer functions of a Nurse Manager competently.

5.4.2 RECOMMENDATIONS FOR NURSING EDUCATION

The following recommendations could be made to the training schools:

- to initiate computer-training programmes for incoming students;

- include computer training courses in the nursing curriculum of all undergraduate nursing programmes;

- make computer literacy test compulsory for all post-graduate students and if they are found not to be competent, they should then register for a basic computer course; and

- encourage nursing students to use the Internet to conduct searches for latest research articles to complement their notes and also for their assignments.

5.4.3 RECOMMENDATIONS FOR NURSING RESEARCH

Further research is recommended with regard to this topic. The private hospital at which the research was conducted funds the annual Frontline Management Course (FLM) as part of the management development programme. Participants get to select from various topics chosen by senior management which are key to improving the quality and financial success business. Further research into computer literacy within the business should be one of the selected topics.
5.5 CONCLUSION

The purpose of this study was to establish the computer literacy status of Nurse Managers and Acting Nurse Managers at two private hospitals in the Nelson Mandela Metropolitan area. The findings of the research can be seen as inconclusive as the results from the structured questionnaire and the structured observation sheet varied when triangulation was done during the data analysis phase.

It can be therefore concluded that Nurse Managers and Acting Nurse Managers will benefit from a structured training programme ensuring the same level of literacy as well as boosting their self confidence and attitudes towards the use of computers.

The final chapter provided a summary of the research findings, highlighting the limitations of study and recommendations. The researcher believes that with adequate needs analyses and computer training the computer literacy status of all Nurse Managers and Acting Nurse Managers could be improved and thus improving their productivity.


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ANNEXURE A
PHASE ONE - QUESTIONNAIRE

Questionnaire on the computer literacy of Nurse Managers and Acting Nurse Managers

Please complete the following questionnaire on the computer literacy of Nurse Managers by circling the appropriate block (see example below).

1. Gender

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

All information is confidential. Please do not write your name anywhere on the questionnaire.

THANK YOU FOR YOUR TIME AND CO-OPERATION

-----------------------------

Mary Booysen
Master’s Student at NMMU
Department of Nursing Science
The Nelson Mandela Metropolitan University
SECTION A

QUESTIONNAIRE ON COMPUTER LITERACY LEVEL
OF NURSE MANAGERS AND ACTING NURSE MANAGERS
(All information is confidential)

Example:

1. Gender

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Biographical data:

1. Gender:

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

2. Age:

<table>
<thead>
<tr>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45-49</th>
<th>50-54</th>
<th>55-59</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>
3. Language:

<table>
<thead>
<tr>
<th>Language</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>1</td>
</tr>
<tr>
<td>Afrikaans</td>
<td>2</td>
</tr>
<tr>
<td>Xhosa</td>
<td>3</td>
</tr>
<tr>
<td>Zulu</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
</tbody>
</table>

4. Years in current position as Nurse Manager:

<table>
<thead>
<tr>
<th>Years</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 3</td>
<td>1</td>
</tr>
<tr>
<td>4 - 6</td>
<td>2</td>
</tr>
<tr>
<td>7 - 9</td>
<td>3</td>
</tr>
<tr>
<td>0 - 12</td>
<td>4</td>
</tr>
<tr>
<td>13 - 15</td>
<td>5</td>
</tr>
<tr>
<td>16+</td>
<td>6</td>
</tr>
</tbody>
</table>

5. Indicate if you have the following qualifications.

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Diploma</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>General nursing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Psychiatry nursing</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Midwifery</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Community nursing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Administration</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

6. Indicate any official computer courses completed.

<table>
<thead>
<tr>
<th>COURSE</th>
<th>WHERE</th>
<th>WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION B

Computer literacy level of Nurse Managers

Section B1: Background History

Please circle the number, which is most appropriate.

YES          NO = 2

1.1 Do you own a Personal Computer (PC)?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Did you ever use a PC before acquiring your current position?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

1.3 If yes, for approximately how many years?

<table>
<thead>
<tr>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7+</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
**Section B2: Current experience**

Please circle the number which is most appropriate.

1 = never, 2 = about once a month, 3 = several times a month, 4 = once a week, 5 = daily, NA = not applicable

| 2.1  How often do you use a Processing package, e.g. MS Word? |
|---|---|---|---|---|---|---|
| Never | Daily | Office use |
| 1 | 2 | 3 | 4 | 5 | NA | |

| 2.2  How often do you use a Spreadsheet package, e.g. EXCEL? |
|---|---|---|---|---|---|---|
| Never | Daily | Office use |
| 1 | 2 | 3 | 4 | 5 | NA | |

| 2.3  How often do you use the internet? |
|---|---|---|---|---|---|---|
| Never | Daily | Office use |
| 1 | 2 | 3 | 4 | 5 | NA | |

| 2.4  How often do you use email facilities: |
|---|---|---|---|---|---|---|
| Never | Daily | Office use |
| 1 | 2 | 3 | 4 | 5 | NA | |
Section B3: Self-assessment of ability

Please circle the numbers which most appropriately reflect your impressions:

Very Poor = 1 and Excellent = 5

3.1 How would you rate your ability to use a computer in general?

Very Poor | Excellent | Office use  
---|---|---
1 | 2 | 3 | 4 | 5 | NA | [ ]

3.2 How would you rate your ability to use the typing cursor sections of the keyboard?

Very Poor | Excellent | Office use  
---|---|---
1 | 2 | 3 | 4 | 5 | NA | [ ]

3.3 How would you rate your ability to use the mouse?

Very Poor | Excellent | Office use  
---|---|---
1 | 2 | 3 | 4 | 5 | NA | [ ]

3.4 How would you rate your ability to use Windows objects such as buttons, checkboxes, and radio buttons?

Very Poor | Excellent | Office use  
---|---|---
1 | 2 | 3 | 4 | 5 | NA | [ ]

3.5 How would you rate your ability with regard to the following software?

3.5.1 Microsoft Word

Very Poor | Excellent | Office use  
---|---|---
1 | 2 | 3 | 4 | 5 | NA | [ ]
3.5.2  EXCEL

<table>
<thead>
<tr>
<th>Very Poor</th>
<th>Excellent</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

3.5.3  Power Point

<table>
<thead>
<tr>
<th>Very Poor</th>
<th>Excellent</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

3.5.4  Internet

<table>
<thead>
<tr>
<th>Very Poor</th>
<th>Excellent</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

3.5.5  Intranet

<table>
<thead>
<tr>
<th>Very Poor</th>
<th>Excellent</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 3 4 5</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
Section B4: Range of difficulty when using a computer and its components

Please circle the number most appropriate.

1=difficult, 2=not too difficult, 3=fairly easy, 4=easy, 5=very easy, NA=not applicable

| 4.1 How do you find working on a computer in general? |
|---|---|---|---|---|---|
| Difficult | Very easy | Office use |
| 1 | 2 | 3 | 4 | 5 | NA |

| 4.2 How do you find working with the keyboard? |
|---|---|---|---|---|---|
| Difficult | Very easy | Office use |
| 1 | 2 | 3 | 4 | 5 | NA |

| 4.3 How do you find working with the mouse? |
|---|---|---|---|---|---|
| Difficult | Very easy | Office use |
| 1 | 2 | 3 | 4 | 5 | NA |

| 4.4 How do you find reading and understanding information on the computer screen? |
|---|---|---|---|---|---|
| Difficult | Very easy | Office use |
| 1 | 2 | 3 | 4 | 5 | NA |
Section B5: Indicate if the following questions are true or false:

Please circle the appropriate number.

1=true, 2=false

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>A central processing unit can be described as the computer brain.</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.2</td>
<td>The series of instructions that tell a computer how to carry out a processing task is referred to as a computer programme.</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.3</td>
<td>The modem is used for connecting a computer to a local network area.</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.4</td>
<td>Storage devices include: a hard disk drive, floppy disk drive, CD drive, flash disc, or/and DVD Drive.</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.5</td>
<td>RAM refers to the capacity of software.</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
5.6 Kilobytes are used when referring to the size of small computer files.

<table>
<thead>
<tr>
<th>True</th>
<th>False</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

5.7 RAM is a temporary holding area for data, application program instructions, and the operating systems.

<table>
<thead>
<tr>
<th>True</th>
<th>False</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

5.8 ROM (read only memory) instructions are temporary and can be changed without changing the ROM chip.

<table>
<thead>
<tr>
<th>True</th>
<th>False</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

5.9 The mouse is the primary pointing device for a standard desktop computer.

<table>
<thead>
<tr>
<th>True</th>
<th>False</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
ANNEXURE B
APPLICATION TO CONDUCT RESEARCH

October 2005

Mr. B. Barfknecht
Regional Manager
Life Health Care Hospital Group
Nelson Mandela Metropolitan area
Port Elizabeth
6001

Dear Mr. Barfknecht

Application to conduct research for a Master’s Degree in Health and Welfare Management

I am in the process of conducting a research project entitled “An assessment of Nurse Managers in a Private Hospital group in the Nelson Mandela Metropolitan area. Dr. S. Carlson and Mrs. E. Ricks are supervising the study. By completing this study I would like to gain a deeper understanding of the computer literacy status of Nurse Managers. I will make recommendations to senior Management of the hospital group participating in the research.

The method of data collection utilised for this purpose is by means of a self-administered questionnaire. If there are any ethical concerns related to the study, Professor I. Wannenburg of the Ethics committee may be contacted at the Nursing Science Department.

Thank you for considering my request.
Yours sincerely…………………..
Mary Booysen
ANNEXURE C
Thursday, 06 October 2005

The Faculty of Health Sciences
Nelson Mandela Metropolitan University
Port Elizabeth

To Whom It May Concern:

RE: AN ASSESSMENT OF THE COMPUTER LITERACY STATUS OF NURSE MANAGERS IN A PRIVATE HOSPITAL GROUP IN THE NELSON MANDELA METROPOL.

I, Beau Barfknecht, Regional Hospital Manager – PE herewith grant permission for Mary Booyse to do research on the above mentioned assessment for the degree Magister Curationis in the Faculty of Health Sciences in our hospital.

Yours faithfully

BEAU BARFKNECHT
REGIONAL HOSPITAL MANAGER - PE
ANNEXURE D
INFORMED CONSENT

INFORMATION AND INFORMED CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

An assessment of the computer literacy status of Nurse Managers in a private hospital group in the Nelson Mandela Metropolitan area:

REFERENCE NUMBER: 203042871

PRINCIPAL INVESTIGATOR: Mary Booysen

ADDRESS: 28 Perth Street
          Kabega Park
          Port Elizabeth
          6001

CONTACT TELEPHONE NO: Cel phone: 0732127494
                        Work: 042-2004250
DECLARATION BY OR ON BEHALF OF PARTICIPANT:

I, .......................................................... the undersigned, employed at.......................................................... in my capacity as the participant,  

A. HEREBY CONFIRM AS FOLLOWS:

The participant was invited to participate in the above mentioned research project which is being undertaken by Mary Booysen, Master’s student in the Department of Nursing in the Faculty of Health Sciences at the Nelson Mandela Metropolitan University.

1. The following aspects have been explained to me, the participant:

   **Aim:**
   The investigator is studying for a Master’s in Health and Welfare Management. The information will be used to construct recommendations aimed at ensuring Nurse Managers have optimal computer skills to function effectively in their roles.

   **Procedures:**
   I understand that I will have to answer an in-depth questionnaire.

   **Risks:**
   It has been explained to me that there are no foreseeable risks that I will incur by participating in this study.

   **Possible benefits:**
   Through answering the questionnaire and participating in the structured observation computerised test I will be assisting in development of recommendations to management in order to optimise Nurse Managers’ computer literacy skills.

   **Confidentiality:**
   My identity will not be revealed in any discussion, description or scientific publications by the investigator.

   **Access to findings:**
   Any new information / or benefit that develops during the course of the study will be shared with me.
Voluntary participation / refusal / discontinuation:
My participation is voluntary. My decision whether or not to participate will in no way affect my present or future employment / lifestyle.

2. Mary Booysen explained the information above in English to me, the participant. I am in command of this language.
I was given the opportunity to ask questions and all these questions were answered satisfactorily.

4. No pressure was exerted on me to consent to participation and I understand that I may withdraw at any stage without penalisation.

5. Participation in this study will not result in any additional cost to me, the participant.

B. I HEREBY CONSENT VOLUNTARILY TO PARTICIPATE IN THE ABOVEMENTIONED PROJECT.

Signed / confirmed at: ……………………… on …………………… 20……
(place) (date)

……………………………………………………………
Signature of participant

……………………………………………………………
Signature of witness
ANNEXURE E
PHASE TWO

STRUCTURED OBSERVATION COMPUTERISED TEST

SECTION A - Biographical data:

1. Gender:

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

2. Age:

<table>
<thead>
<tr>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45-49</th>
<th>50-54</th>
<th>55-59</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

3. Language:

<table>
<thead>
<tr>
<th>English</th>
<th>Afrikaans</th>
<th>Xhosa</th>
<th>Zulu</th>
<th>Other</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

4. Years in current position as Nurse Manager:

<table>
<thead>
<tr>
<th>0 - 3</th>
<th>4 - 6</th>
<th>7 - 9</th>
<th>10 - 12</th>
<th>13 - 15</th>
<th>16+</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
5. Indicate if you have the following qualifications.

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Diploma</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>General nursing</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Psychiatry nursing</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Midwifery</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Community nursing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Administration</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>
### SECTION B

**Computer literacy status of Nurse Managers and Acting Nurse Managers**

**Section B1: Background History**

Please circle the number, which is most appropriate.

<table>
<thead>
<tr>
<th>YES</th>
<th>1</th>
<th>NO = 2</th>
</tr>
</thead>
</table>

1.1 Do you own a Personal Computer (PC)?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Did you ever use a PC before acquiring your current position?

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

1.3 If yes, for approximately how many years?

<table>
<thead>
<tr>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7+</th>
<th>Office use</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
# SECTION C

## STRUCTURED OBSERVATION COMPUTER TEST

### C.1 MS Word

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
<th>OFFICE USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Open document window</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Select print layout view</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Type Heading in capital letters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Computer literacy as a heading</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Center heading at top of page</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Bold and underline</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Type the following sentence (Hold down shift key to type upper case letter)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- You have been requested to participate in a computer literacy test</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Edit sentence and correct spelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Save document in my documents – name document</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Practice session 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Copy and paste sentence into a new word document</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Create a new Folder and name the folder “practice session 2”</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Drag pasted document into new file named practice session 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Open folder and access saved document</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Insert page number at top of page</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Open a new word document</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type the sentence in capital letters: You will be presented with an award at the annual small business lunch, which will be on the 7\textsuperscript{th} September</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Edit above sentence using the cut and paste function to read: On the 7\textsuperscript{th} September you will be presented with an award at a small business lunch.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Undo command by using undo button</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Select whole document, change font to 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Use the justify button to align text so that both margins are straight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### C.2 MS EXCEL

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
<th>OFFICE USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Open a Microsoft excel worksheet from the program list</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Click on cell to make it active</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Type following in cells – Income Expense Net income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Type values in cell opposite above – 5428.06 1806.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Add totals using auto sum key</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Save spread sheet in my documents under heading BUDGET JUNE 07</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### C.3 POWER POINT

<table>
<thead>
<tr>
<th>QUESTION</th>
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<th>NO</th>
<th>NOT SURE</th>
<th>OFFICE USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Open the power point window</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Select a design template</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Select a title slide form the layout</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Type in computer literacy in the space holder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Select new template called title and text</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Insert a bar chart</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Open data sheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Enter following data into data sheet Cross 2002, 2003,2004 Down USA,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Delete information in fourth column</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Insert the following values – under 2002 -10, 20, 30 2003-50, 40,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Close data sheet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Select light blue bars on graph and change colour to pink</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Save presentation in my documents and close</td>
<td></td>
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</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### C.4 INTRANET (EMAIL)

<table>
<thead>
<tr>
<th></th>
<th>QUESTION</th>
<th>YES</th>
<th>NO</th>
<th>NOT SURE</th>
<th>OFFICE USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open email</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Create new message – The meeting will be @ 14:00 on the 7th August 2007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Insert address</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Insert subject heading - MEETING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Save to drafts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Access mail in drafts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Do spell check</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Send mail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Create personal address book for Unit Managers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
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<td></td>
<td>TOTAL</td>
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</tr>
</tbody>
</table>
ANNEXURE F
A OFFICE OF THE DEAN
FACULTY OF HEALTH SCIENCES

FINAL RESEARCH PROPOSAL
MA, HEALTH AND WELFARE MANAGEMENT

Please be advised that your final research proposal was found to be acceptable and that it was recommended for approval. The following guidelines were proposed:

1. Ensure all ethical considerations were met.
2. Include a comprehensive literature review.
3. Conduct a pilot study to test the validity of the research instrument.
4. Ensure confidentiality of all participants.
5. Submit a final report within one month of approval.

Yours sincerely,

[Signature]

[Name]

Date: 30 November 2006

Contact person: Mr. G. Ethel

Address:

Ref: 2000/1231

Metropolitan
University

Tel: +27 (0) 11 604 2721
Fax: +27 (0) 11 604 2722

For tomorrow

Mandela Foundation
ANNEXURE G
Mary Booyson  
26 Perth Street  
Kabega Park

Dear Ms Booyson

PERMISSION TO PROCEED WITH RESEARCH TITLED: "An assessment of the computer literacy status of Nurse Managers in a private hospital group in the Nelson Mandela Metropolitan area."

You are hereby being granted permission to proceed with your research treatise since all the recommendations made by the FRTI with regard to your proposal have been addressed.

Good luck with your studies,

Yours sincerely

Professor J Stumpfer
ANNEXURE H
Ref: N111101279 [HumIRB-223/Approval]
Contact person: Mrs U Spies
17 July 2008

Ms M Booyzen
38 Perth Street
Kalgoorlie Park
8010

Dear Ms Booyzen,

TO EXPLORE AND DESCRIBE THE COMPUTER LITERACY STATUS OF NURSE MANAGERS IN A PRIVATE HOSPITAL GROUP

Your above-mentioned application for ethics approval served at the June 2006 ordinary meeting of the Research Ethics Committee (Human).

The Committee approved the above-mentioned application provided that the consent form be extended to include reference to the computerised testing programme that is required from the participant.

Please inform your co-investigators of the outcome. We wish you well with the project.

Yours sincerely,

[Signature]

Prof R du Randt
Chairperson: Research Ethics Committee (Human)

cc: Department of Research Management
Faculty Officer, Faculty of Health Sciences
ANNEXURE I
To Whom it May Concern

This is to certify that I, Reemay Batchelor, proofread and edited the master thesis for Mary Boag, for any queries please telephone me at 041 561-1231.

R. Batchelor