The Effective Use of Computer Systems at the University of KwaZulu-Natal

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Abstract

As Information Communication Technologies mature, it is expected that the use of powerful, multifunctional networked and wireless computer systems will form as an ubiquitous part of every-day life as the cell phone has become today (Klopper 2002, 2005), also in institutions of higher education. The case study conducted on the Westville Campus of the University of KwaZulu-Natal begins to provide answers regarding the effective use of the computer systems at residential tertiary institutions. Data was gathered by randomly selecting 90 persons, staff members and students of different Faculties at the University of whom eighty respondents completed and returned the questionnaires. The data was analysed and processed using the application software Microsoft Excel. Recommendations and conclusions drawn from the findings were the need for teaching and training in computer hardware, computer literacy and the need for computer access and print services facilities. The combination of the new educational technologies with traditional pedagogical models and the appointment of schools (as an important point of social integration), constitute important conclusions of this research.

Introduction

The sophistication and complexity of computer hardware has been growing exponentially, especially computer hardware in business. Hardware affects computer storage (data), communication and the output and input of data (on

which business depends). All educational grade levels use computer hardware to provide students and teachers with access to information in order to offer a range of exciting and innovative multidisciplinary courses that broaden perspectives, foster a capacity for independent critical thinking, and provide intellectual tools for development. Education management needs to know how effective the computer hardware being used, is.

Problem Statement

For the quality of education to be improved, instructors and students need to know how to use the hardware as it is a key issue when deciding how information is translated into comprehensible knowledge or if it is worthwhile application for education. Using traditional educational approaches is difficult when the costs and benefits of Information Systems (IS) technologies, are intangible. This does not mean that education should abandon them. On the contrary, caution should be applied to avoid the assumption that if something cannot be measured, it should be ignored.

Literature Review

The use of computers in education has changed the way that people learn. In the past, most computers were placed in computer laboratories (Barrett, 1996) where students were sent for self-paced tutorials. Barrett (1996) believed that this was not education and that technology should support the complex private and social activities that make up the learning process. With this in mind, MIT (Massachusetts Institute of Technology) created a fully distributed computing environment to support learners through the provision of electronic mail, access to software, personal file storage and other communications utilities. In this way, computers were used to aid students in the learning process (Barrett, 1996). Hodorowicz (2000) argued that computers and technology had enhanced the educational process in several key ways. The largest benefit of technology is easy and fast access to the Internet. Bengu (1996) notes that the move to on-line education via the Internet is likely to reduce the cost of education, thus it is creating new learning opportunities for students.

Computer Functionality

Ellington and Earl (1998) assert that educational technology is based on what is described as the 'technology in education' models. These models embrace all possible means by which information could be presented, namely hardware and software.

The hardware side is concerned with the actual equipment - overhead projectors, slide projectors, tape recorders, television equipment, computers and all its peripherals, etc. The software side was concerned with the various things used in conjunction with this equipment (overhead transparencies, slides, audiotapes, videotapes and computer programs). Ellington and Earl (1998) also assert that the first phase in the evolution of educational technology was the 'hardware phase'. This concentrated on the development of effective instructional equipment which was reliable, serviceable and within the budgets of schools, colleges and universities. However, when such hardware eventually became generally available, it was found that there was a shortage of suitable software to use with it. This triggered off a subsequent 'software phase', in which particular attention was paid to the development of suitable learning materials, based on the dominant theories of learning and perception. Thus, even within this early development of educational technology, modifications can be identified in the interpretation of the definition 'technology'.

The term hardware (Curtin *et al.*, 1998) refers to the physical equipment in a computing system, usually containing electronic components and performing some kind of function in information processing, input, output, storage and communication. Hardware includes computer devices such as screens, keyboards and printers and also peripherals (any physical equipment attached to computers) and the elements used to tie information systems together. The role of hardware is to enable all the process functions to perform properly.

Effective Use

An organisation can achieve benefits from computerization by automating existing jobs, thus lowering the cost of production and becoming more

efficient. For instance, switching from a manual system of stock accounting to a computerized inventory system, using computer application software, rather than the previous manual methods results in much faster rates and can be efficient methods of processing for the company (Erwin & Blewett, 1996).

Service Quality

To examine service quality in some section of an organisation, large survey samples are needed to verify whether the service lives up to users' expectations. Pitt *et al.*, (1997) point out that service plays an important role in any Information Systems department of organisations, and that most IS assessment measures have a product orientation. The article suggests the use of an IS version of a service quality instrument (modified for context) to assess the quality of service supplied by an information services provider.

System Quality

Measures of system quality typically focus on performance characteristics of the system under study. Some research has looked at resource utilization and investment utilization, hardware utilization efficiency, reliability, response time, ease of terminal use, content of the database, aggregation of details, human factors and system accuracy. This list has hardly changed since having first been introduced a quarter of a century ago. Hamilton *et al.* (1981) already provided one of the first lists of system quality measures (turnaround time, data accuracy, reliability, completeness, system flexibility and ease of use).

Response Time

Functionality refers to the ability of the chosen computer hardware and software package to handle the intended business requirements (Erwin & Blewett, 1996). If the business requires the latest version of hardware and software of computer equipment, it must acquire it. Education or business should evaluate the equipment (hardware) that runs the required software.

Referring to performance again Erwin and Blewett (1996), note that the performance of the computer refers to the 'throughput' (the amount of processing which the computer completes in a given time) and 'response time' (the delay in processing a single transaction from the time the transaction first enters the computer system to the time the transaction begins to produce a result).

The area of information systems reliability assurance is taking on increasing importance as several professional accountancy bodies have adopted standards and criteria for assurance practices. This importance is compounded by the inevitability of a shift in future audit models to an emphasis on information systems reliability. Conflicts occur in attempting to use structured analysis to evaluate development processes that are often dynamic rather than static. Discussion shifts to a consideration of the inexcusable absence, in both assurance models and development processes, of the impact of technology implementations on individuals and society (Sutton, 2000).

Networked Education

Networking technologies provide a data link layer function, thus allowing a reliable connection between one computer and another on the same network. The Internet is a set of interlinked networks (the same principle on a larger scale). Nowadays it links millions of networks, large and small, government and private, commercial and academic throughout the world. Originally, before personal computers, hardware for a mainframe computer was centralized in one room. Anyone wanting computer access had to go to where the computers were located. Today most large computers are decentralized. That is, the computer itself and some storage device may be in one place, but the terminals to access the mainframe computer, or even other computers, are distributed among users. On the Internet these devices are usually connected together by telephone lines (Capron, 1998).

Data communication (also called telecommunications) is the electronic collection and distribution of information from and to remote facilities. Data communication hardware is used to transmit digital information between terminals and computers or between computers. These

hardware components include the modem, the network interface card (NIC), the front-end processor, the multiplexer and the router. There are plenty of hardware devices that provide connectivity to a network. However, all the hardware does not have the same capacity. It depends on their manufacturers' quality and the material. Technology is used for a variety of applications in education. However, there are still some problems that need to be solved.

- What is the need for computer hardware at UKZN?
- What is the understanding of the university community of computer hardware?
- To what extent does the university community use computer hardware?
- How dependent is the university community on the computer hardware provided?

Concluding Remarks about Surveyed Literature

The most overlooked fact is that computers should be used as an educational tool, rather than a means of education. Nothing can replace the interaction between students and teachers. However, even though it is not implemented, some traces of distance education are emerging in UKZN. So, UKZN must learn from the problems they might encounter from the mistakes of others in teaching by distance education. Problems can result from the separation of teacher and learner, the planning and preparation of learning materials, the use of media (often print-based) to carry course content and to unite teacher and student. Some form of two-way communication (this implies interactivity) with students learning as individuals, is necessary.

Research Methodology

Overview

For the empirical part of this research project, which is intended as a trial survey to be followed by a more comprehensive one, a group of 80

respondents, from among an initial group of 90 prospective respondents that were randomly selected, completed the questionnaire that focuses on various aspects of computer systems usage on the Westville campus of the University of KwaZulu-Natal. Respondents were chosen by simple random selection techniques. This method was chosen as it gave each respondent an equal chance of being selected. The sample included respondents that are differentiated by gender, age, mode of study and level of study (undergraduate / postgraduate), but is not considered to be a fully representative sample. Questionnaire-based research was chosen as it would provide sufficient data cost-effectively in a short time span (Lubbe & Klopper, 2004).

Data Collection

Data was collected mainly from primary sources. A primary source reflects the individual viewpoint of a participant or observer. It is information that is obtained directly from first-hand sources by means of surveys, observation or experimentation (Lubbe & Klopper, 2004). Observation and survey methods were most applicable in the research method because surveys work best when questions are simple and easily understood by the respondent. A survey is cheaper if the researcher uses questionnaires. In the case of a survey, the observations are typically those of individual respondents and the variables are responses solicited from questions about attitudes, behaviours and traits. Primary data was gathered via a closed-ended questionnaire supplemented by observation and quantitative analysis to verify reported patterns of usage.

The Questionnaire

The questionnaire was designed to include all questions which would enable the researchers to determine whether the empirical research component would enable them to answer the research questions that were posed at the end of the literature survey. The data was analysed using the application software Microsoft Excel. A small number of partially completed questionnaires were not processed as they would have skewed the results of an already small sample. In a small number of cases where respondents initially made one response and subsequently changed their minds, and it

could not be established with confidence what their intended final response was, those questionnaires were also set aside. This process of data sanitation left 80 completed questionnaires with unambiguous responses that were captured, systematised and analysed.

Findings

In this section the researchers present a general demographic analysis of the demographic profile of the respondents that participated in the research project.

Eighty staff members and students on the Westville campus of the University of KwaZulu-Natal were randomly selected and asked to participate in the study. All who were approached participated. Of them 66% were male respondents and 34% were female respondents. The sample is therefore not representative with regard to the gender composition of staff and students.

The distribution of the respondents in terms of age groups is presented in Figure 1. The result indicates that 11 % of the respondents of the questionnaire were between the ages of 16 and 20, 81% were between the ages of 20 and 30% were between the ages of 31 and 40, one percent was between 40 and 50 and the remaining one percent was over 50 years old.

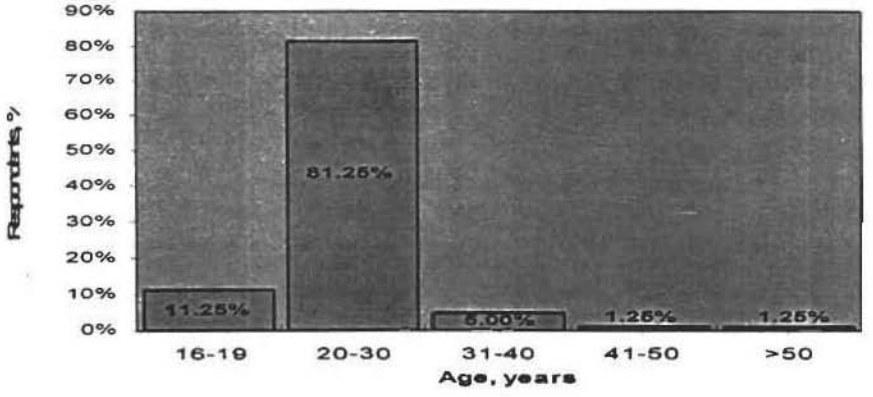

Figure 1: Age distribution of the respondents

Roughly more than three quarters of the respondents were young therefore it was anticipated that the understanding of the younger generation of computer technology would be at least on the same level as older respondents. Therefore, the study group can be regarded as reasonably homogenous and the differences in responses could be due to other reasons rather than an age gap.

Information Systems Users

The research indicated that UKZN IT resource users were students and staff members. The number of respondents who reside on campus is few (16%). Analysis of the data shows that 10 out of the 13 respondents residing on campus (77%) and 33 out of the 67 respondents residing off campus (49%), primarily depend on the IT resources provided by the UKZN. All on-campus residing respondents and 82% of the respondents residing off campus mentioned problems in accessing the IT resources of the University. More than 46% of the respondents residing on campus and 70 % of the respondents residing off campus own a private computer.

There is a need for improvement on the efficiency of access to the university's IT resources. One means toward resolving this potential problem is by extending access times. It is known that the postgraduate computer laboratory facilities on the Howard College Campus of UKZN are open 24 hours a day, seven days a week, with access regulated by means of swipe cards. From the experience of other universities (e.g. Williams *et al.*, 1999) it is possible to increase access to the university's IT resources on the Westville Campus for the students and staff by providing a means of free connection to their respective residences. There are departments giving computer hardware and network connections to their members of staff in their respective residences. Similarly, some campus residences are connected to university servers. It is a good idea to take such initiatives and make them available to the rest of university IT resource users, to minimize access problems. As displayed in Figure 2, 6% were staff members and 9% were both staff members and postgraduate students, the rest (85%) were students. Students are classified according to their year of study. Most respondents were second years (30%), followed by first years (24%), postgraduates

(19%), third years (9%) and fourth years (3%). Respondents were from six different faculties. This shows that almost all faculties use the computer.

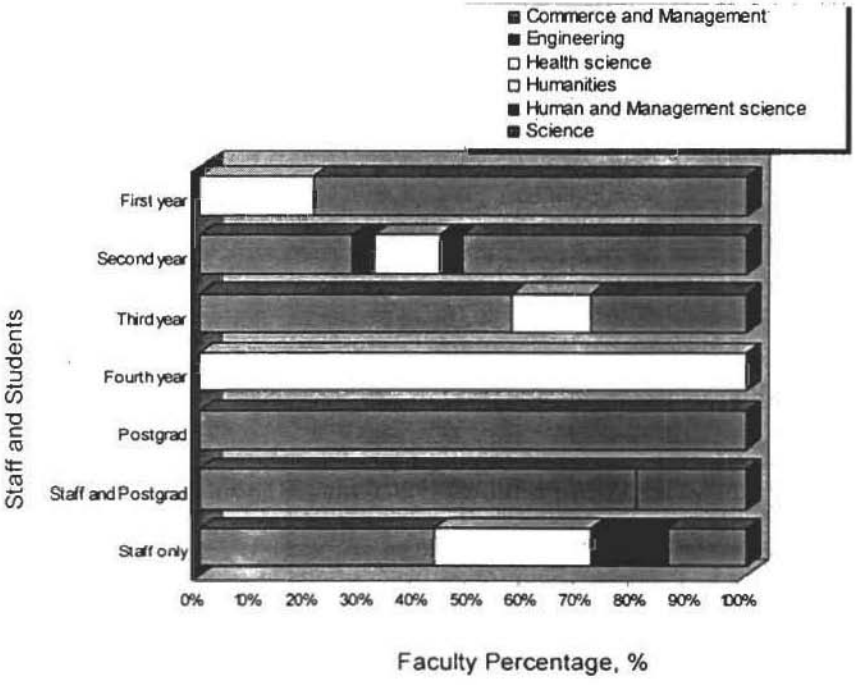

Figure 2: The demographics of the respondents in terms of Faculty

At the Westville campus of the university there are a number of computers available for registered students. Students who are not registered for computer courses might not have access because not all courses require computer access. Nevertheless, there are some centres, which provide computers to all students (engineering, library etc.). However, this would not be adequate to advance current technology. The scarcity of computer resources definitely has an effect on the learning process. Therefore, the university needs to improve computer access in every faculty. This will benefit every individual in the long run.

Answers to Research Questions

The demographic data obtained from the research was presented and interpreted. The first sets of questions asked in the questionnaire were geared toward analysing the correlation between the computer hardware provided by the UKZN and the learning process. The replies of the respondents on three questions asking about the need for computer hardware in the facilitation of the learning process of the university are tabulated in Table 1. Ninety-eight percent of the respondents agreed on the beneficial use of computers in the improvement of the quality of education at the university. More than 10% agreed that was little value in the university computers, due to difficulty of use, 13% agreed, 69% disagreed and the rest 19% neither agreed nor disagreed. Fifty-eight percent of the respondents agreed, 19% disagreed and the rest 24% neither agreed nor disagreed on the insignificance of the computer resources of the university. Most of the respondents agreed that hardware would be a useful tool for education and quality of lectures. However, nearly 40% noted that hardware was not helpful and the authorities should find out why it is not helpful. It could perhaps mean that people should be trained to use the hardware.

Rating	Computers are valuable tools	Computers have little value	Computers are not very valuable tools.
Totally agree	90.0%	7.5%	38.8%
Partially agree	7.5%	5.0%	18.8%
Indifferent	2.5%	18.8%	23.8%
Partially disagree	0%	16.3%	3.8%
Totally disagree	0%	52.5%	15.0%

Table 1: The need for computer hardware in the University

Some of the respondents even provided a reason why computers are valuable tools in improving the quality of education, by saying it was a valuable of source for education that uses the Internet to enhance learning.

The use of computers, technology applications and hands-on learning enables each student to make a connection with the global world where they will be working after studying. As the job market tightens, universities are looking to give their students a competitive edge. With computer knowledge becoming a job prerequisite for many positions, hundreds of first world universities have made the purchase of a personal computer a prerequisite for admission. Personal computers are versatile in that they can be used as stand-alone computers or they can be linked to the university's network, the Internet or other personal computers in a classroom (Long, 2000).

The Need for Computer Literacy Training at UKZN

The result from the finding indicates that 100% of the respondents agree that there is a need to learn how to use computer hardware (see Table 2). Ninety percent of the respondents agreed on the usefulness of computer literacy in the university. Most departments include a computer literacy course in their syllabus, where students are familiarized with computer applications software, especially the Microsoft product suite and web surfing. Besides these, there are a number of courses offered by the university based on advanced application software. As most of the respondents agreed, both students and staff members should be given separate hardware literacy courses and workshops to continuously update them with hardware technology and to make them appreciate the ways computers and societies have changed each other (Ryburn, 1997).

Frequency of Computer Usage at UKZN

The research found that 75% often use the computer hardware of the university. Some of the respondents (18%) sometimes use the resource. The students and staff members use the computers because they are mostly on campus during working hours. The students use the free time they have between their lectures to satisfy their academic and non-academic IT requirements. Most staff members need to use computers for their daily work. It is obvious from this, that all the respondents use computer hardware.

The need for general computer literacy in the university.	%
I feel strongly it will be beneficial	61.3
I feel that it may be useful	28.8
I haven't made up my mind	8.8
I'm sceptical that it will be useful	1.3
I am sure it will not be beneficial	0

Table 2: The need for general computer literacy in the university

All students and staff should learn how to use computer hardware.	%
Totally agree	95
Partially agree	5
Indifferent	0
Partially disagree	0
Totally disagree	0

Table 3: The need for staff computer literacy in the university

Hours of Usage

Table 3 shows the frequency of hours each respondent makes use of the university's computer systems every day. As given in the table, about 15% of the respondents use them more than 7 hours per day, 44% use them between 4 and 6 hours per day and the rest use them for less than 3 hours. On average, the respondents spend 2.7 hours on the computers of the university.

Usage Hours per day	Frequency	Percentage
0 -1	11	13.75
2 - 3	22	27.50
4 - 6	35	43.75
7 - 9	8	10.00
> 10	4	5.00

Table 4: Hours of usage of computer of the UKZN

The analysis shows that most respondents use computers between 2 and 6 hours per day. First year students (32%) use them for 0-1 hours, 26% use them for 2-3 hours and 37% use them for 4-6 hours. Second year students who are use them for 0-1 hours are 12%, 2-3 hours - 36% and 4-6 hours - 48%. Of the respondents who are third year, 29% use them for 0-1hours, 57% use them for 2-3 hours and 14% use them for 4-6 hours. All the fourth year students spend 2-6 hours using the computers. None of the postgraduates or staff members use less than one hour of computer services time. The percentage of postgraduates, staff members and staff who are also students of postgraduates (53%, 57% and 40% respectively) make use of them for between 2 and 6 hours. This may show that the computers are used mainly for academic purposes, as the hours of usage increase with advances in educational level. The higher hour usage in the first year students could either be explained by the fact that the first year is the year where most of the new incoming students take their computer literacy course. It could also be due to the fact that the service they are using is free and most want to use it to the maximum possible for academic and non-academic purposes.

Further analysis shows that those respondents, who use between 2 and 6 hours of the university's computer resources, used them for non-academic purposes [viz. private e-mail (55%), internet (61%), chatting (31%), games (29%), SMS (43%) and pornography (15%)]. For academic purposes the figures are Internet (61%), research (53%), application software (60%), programming (48%) and web design (11%). It is reasonable to assume that the computer service provided by UKZN, is used both for academic and non-

academic purposes. It can be argued that access efficiency to the computers might be improved by restricting the computers only to academics. This argument is debatable, as the whole tertiary learning process is to prepare the students for the working world that will require non-academic practices.

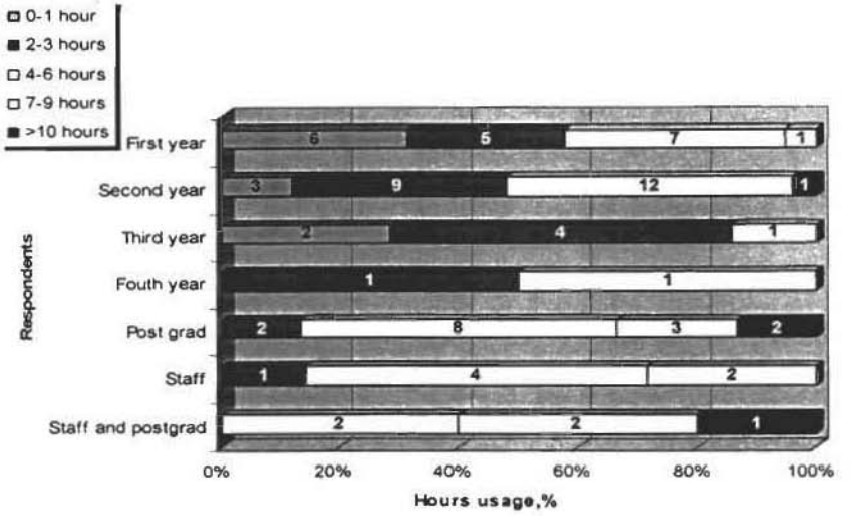

Figure 3 Hours of computer hardware usage

Personal Computer Resources that Affect On-campus Usage

Regarding the dependency on computer resources of the respondents, 61% own private computers. From those who did not own at the time this research was undertaken 13% are intending to buy in the near future. The rest (26%) do not have any intention of buying for different reasons, non-affordability and the adequacy of UKZN's computer resources were mentioned frequently.

The research showed that 54% of the respondents are entirely dependent on the computers provided by the university for their IT requirements. Of the students who own private computers, 42% still depend on the UKZN IT resource. From those who do not own private computers,

16% are totally dependent on the computers provided by the university. Most of the students and staff members rely on campus resources for different reasons. Even though some have their own computers, they do not have Internet access and rely on campus access. In addition, the university has application software, which they don't possess. Therefore, they depend on the campus's computing resources.

Accessibility

Of the responses, 85% experienced difficulty accessing the computer resources of the university. The reason is that most of the time the computer labs were fully occupied and there were not enough computers available for use or lack of time. Another problem is that the labs are reserved only for students who study computers. Obviously, there is the need for further research to find out the reasons for the poor access provided by the university and from which a reasonable recommendation should be extracted to better the service. As a number of authors agree (e.g.. Ainley *et al.*, 2002) in this computer dominated century, the learning process can only speeded up with the use of well managed and organized IT resources.

Types of Hardware Used

Nearly 75% of the respondents had an idea about the type of hardware they used. It is promising that the respondents know how to differentiate between computer hardware. It does not necessarily mean that the respondents know enough about computer hardware. The need for computer literacy has been proved. This is supported by the 25% who do know how to differentiate between computer hardware. Among the respondents who know about hardware, 73% specified that they use a Pentium and the remaining 3% respondents mentioned that they use a machine different from Pentium. Therefore, the students and the staff members are using more advanced computer systems. The statistical survey concludes that the majority of the UKZN members use mainly the Pentium product. Thirty seven percent (37%) of the UKZN members use Pentium III and 21% Pentium IV. About 20% of the respondents do not know what type of processor they are using.

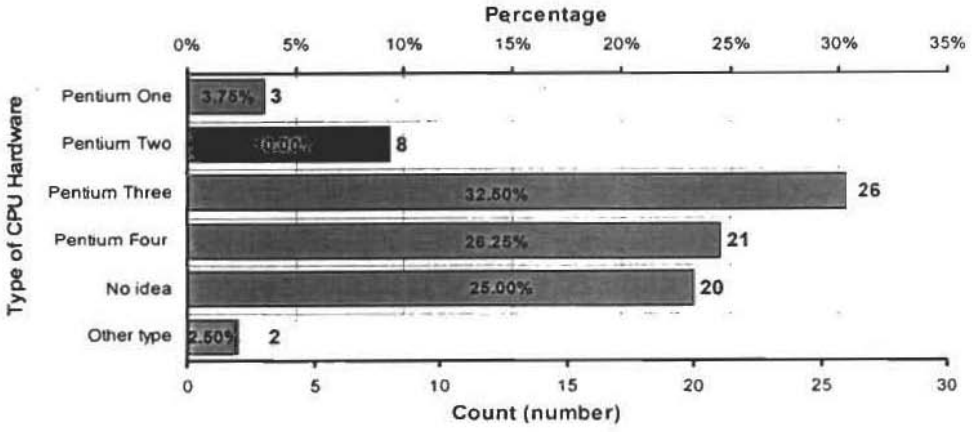

Figure 4 Types of CPU used by the respondents

Other Types of Hardware Used

The respondents specified that among the different kinds of hardware they commonly use were floppy disk drives, printers, data projectors, USB flash memories and scanner and digital cameras. Out of the hardware disk drive was the most commonly used (90%) followed by the printer (85%), data projector (30%), USB flash memory (25%), scanner (11%) and digital camera (9%), as shown in Figure 4.

Floppy diskette drives and USB flash memories are used as a means of transferring and storing information. The use of a large percentage of floppy diskettes by the respondents might be due to a number of reasons. One reason could be due to the small storage area provided by the university. The other reason is that the storage provided by the university is unreliable. There is also the possibility of using floppy diskettes to transfer information and their work elsewhere. The use of floppy diskette as a means of storing or transferring information is declining, as they are susceptible to damage. Technology provides a reliable and cheap way of storing and transferring information using other removable storage items such as CD disk and USB flash memories. The use of the CD disk at the university is minimal, as the

computer hardware provided lacks CD rewrite-able drives. The other removable storage that does not need any special drive and which is currently becoming popular is USB flash memory.

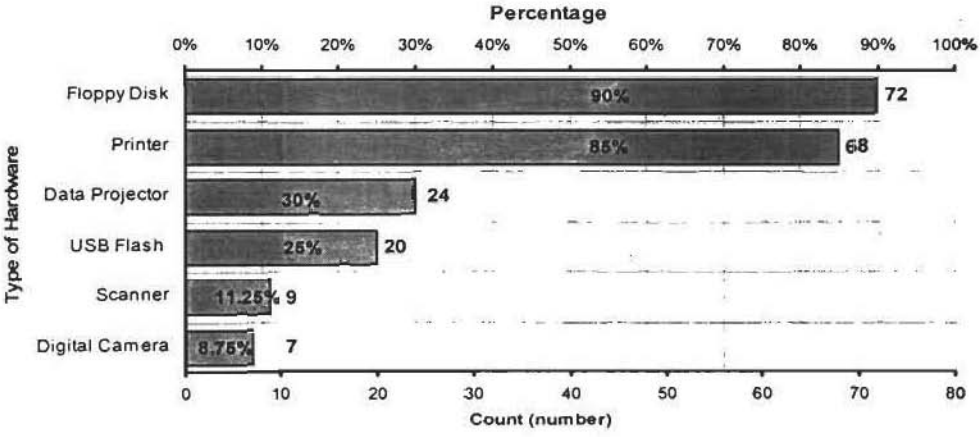

Figure 5 Types of hardware provided by the UKZN

USB flash memory, other than solving the storage problems of the respondents, is also reliable and portable. That is the reason why about 25% of the respondents have already started to use this technology, though it is recent (and thus expensive). More than 82% of the respondents who are using USB flash memories are fourth year students, postgraduates and staff members. Respondents, who can afford USB flash memories, are only at 25%, therefore it is suggested that the storage provided by the university for respondents, at this level of education, needs to be increased. The research also tries to analyse or 'pinpoint' the condition (working or not, out of order, faulty) of the computer outlets and peripherals provided by UKZN. As given in the table, 6% of the respondents stated that the provided hardware was excellent, 13% of respondents mentioned that they are great, 23% pointed that they are good, 31% specified that the hardware facilities were fair and the remaining 28% stressed that they were not so good.

Main Uses

It was found that the main uses of the computers are for Internet surfing (85%), software applications (84%), research (76%), e-mail (75%), programming (59%), SMS (48%), chat (38%), games (38%), pornography (21%) and web design (18%). UKZN computer hardware is used both for academic and non-academic purposes. Forty eight percent of the respondents totally disagreed with the use of the university computer hardware for non-academic purposes and considered it abusive. They also disagreed regarding the recommendation of the use of the resources only for academic purposes. Twenty-nine percent (29%) agreed on restricting it to academic use. On the need for regulations that enhance only academic use of the resources, 43% agreed and 38% disagreed and the remaining 20% neither agree nor disagree.

For some time games have been played on personal computers. These were played when the computers were offline. However, with the fast growth of Internet many other games are available. It can be said that the connection between education and games are growing rapidly. There are negative and positive aspects in using computers for games. The negative standpoint is that many students spend their time playing while other students are waiting desperately to do their assignments. The positive standpoint is that it gives a bit of relaxation after busy work and the view that games are not only for entertaining people, but are educational as well (Curtin *et al.* 1998). Forty-nine percent of the respondents stated that the maintenance provided is more than fair, 26% mention that the maintenance is not so good, and the rest 25% respondents agreed that the maintenance is only fair enough. So it is suggested that the IT department of the university improve on the maintenance they provide.

Availability of Assistance

The need for addressing common hardware problems of the UKZN is shown in Figure 6. As shown in the figure, more than 20% of the respondents pointed to the need for a great deal of assistance on all the computer hardware. More than 10% of the respondents stated the need for a fair to very little assistance in the maintenance of computer hardware. More than 30% of the respondents specified that there was no need of assistance.

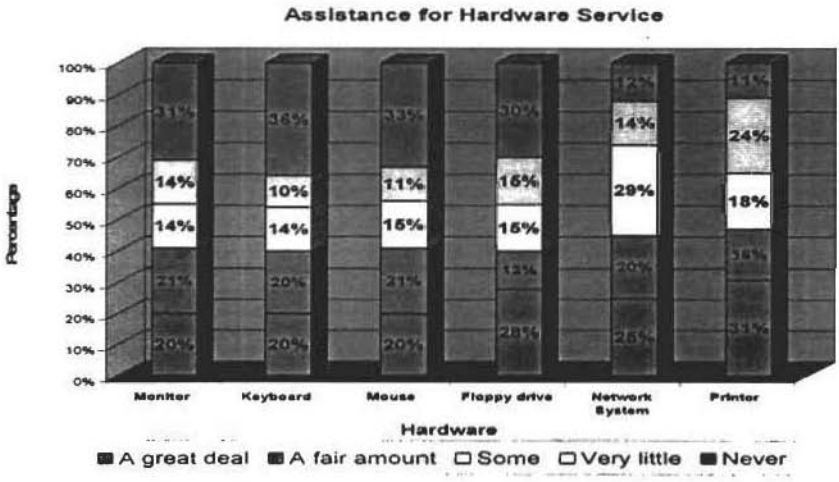

Figure 6 The need for assistance in the different hardware of UKZN.

Extended Hours of Computer Access

To check the extent of satisfaction on the computer access provided, three questions were asked in the questionnaire. Free access to computer hardware resources at universities can be a cause for student to misuse (or abuse) the resource and waste their own time. For instance, students use computers for non-academic purposes such as SMS (48%), chat (38%), games (38%) and pornography (21%). Some of the respondents were not happy about the extended open hours at the computes, probably because of misuse of time (chatting, playing games, looking at pornography and sending SMS's). They are wasting time and money that could and should be used for academic work. Free access and no restrictions cause the students to waste their time unnecessarily. Being unrestricted, students prevent other students from using the computer resources and doing their assignments. Most of the students are happy about the idea of increasing the open hour access as shown in Table 4.8. If they could be given extended access they could work more effectively. Therefore, extended open hours could help to ease the problem of access as students could choose times that suit them. Some students will abuse these privileges. So they should be controlled! University study is

expensive – the taxpayer's money is being used to subsidise lazy students.

Printing Facilities

Of the respondents, 44% felt that the existing printing systems of the university were not adequate and about 78% of respondents pointed out the need for free printing services in the future. Besides some offices and very few labs, the University of KwaZulu-Natal uses laser printers in providing service to the students. Laser printers are preferable for quality and speed. However, students are complaining about not having enough printers. Besides the small number of available printers, printers that are out of order need technicians to ensure proficiency in this sector. It is a common inconvenience for students to go and join a long queue to pay their printing credit. On some campuses (i.e. Howard College) the university provides outside machines where you can buy your printing voucher any time you wish and load your printing credit through the Internet. This approach should be more widespread throughout the other campuses of the university.

Compatibility

To assess the comfort and compatibility of hardware provided by the university, the response shows that 89% of the respondents feel that the available hardware is more than fairly comfortable. This shows that the university is considering the ergonomics of its user base while purchasing computer hardware products. This policy should continue for the future as well. Regarding the upgrading provided by the university, 53% of the respondents think it is more than fair. There is almost an equal response from the respondents (48%), in terms of the need for continual upgrading to stay abreast with fast growing computer hardware technology. In terms of the compatibility of the current computer hardware provided by the university, 89% of the respondents think that they are more than fairly compatible with modern technology.

Auditing System

To assess the auditing system of the university regarding computer

hardware, the given responses are summarized in Table 4. About 41% of respondents believe that the university is doing more than fair, consistent auditing and 31% of the respondents on the other hand believe that the auditing is inadequate. The rest (28%) think the auditing is fair enough. The need for the university to reconsider its auditing system to satisfy the needs of its IT users is obvious. Additionally, 25% of the respondents agree on the adequacy of the provision and administration of the computer facilities provided by the university. Thirty-one percent (31%) of the respondents totally disagree on the adequacy of the management system. This seems to emphasize the need for improvement in management systems to better the IT resources provided by the university.

Rating	Currently IT resources of UKZN have excellent provision and administration.		Rating	How consistent is auditing done on computer hardware as technology changes?	
	Frequency	Percent		Frequency	Percent
Totally agree	4	5.0	Excellent	15	18.8
Partially agree	16	20.0	Great	4	5.0
Indifferent	11	13.8	Good	14	17.5
Partially disagree	24	30.0	Fair	22	27.5
Totally disagree	25	31.3	Not so good	25	31.3

Table 5: Auditing system for computer hardware in UKZN

Conclusion

The respondents use the computer service provided by the university for academic and non-academic purposes. Forty eight percent of the respondents totally disagreed with the use of university computers for non-academic purpose as abusive and 43% disagreed on the need for regulations to force only academic use of the computer resources. This is a disturbing revelation.

Computers that are used for games and access to pornography should not be available to students in an academic setting. Ninety percent of the respondents agreed on the need for computer literacy. The respondents specified that among the different hardware they commonly use are floppy disks, printers, data projectors, USB flash memories, scanners and digital cameras. Forty-four percent of the respondents feel that the existing printing systems of the university are not adequate and 78% stressed the need for free printing services. Regarding the upgrading provided by the university, 53% of the respondents think it was more than fair. In terms of compatibility of the current computer hardware provided by the university, 89% of the respondents think that they are more than fairly compatible with modern technology. About 69% of respondents believe that the university is doing at least fair auditing on checking computer hardware (whether they are functioning properly or not). This means the students are satisfied regarding auditing systems.

Recommendations

Training and more training will be necessary for all students and staff members and especially for novices (first year students) who do not know how to use the computer properly and effectively. Even though there is a course of computer literacy, considering that the computer is used everywhere in education and business, 100% of the respondents agreed that it was important and there should be a compulsory computer literacy course for everyone. But it should not only focus on software. Preferably it should be comprehensive, because software is nothing without hardware and vice versa. There should be a perfect delivery of lessons concerning the use of computer hardware in such a way that every student becomes informed.

This research found that at UKZN some users have problems of access that should be taken seriously. Improvements should eradicate the shortage so that every user will have access when he or she needs it. Therefore, every faculty should have its own computer access point somewhere on campus. After dealing with the computer literacy course, it is not good for faculties to stop using the lab, because even though they are not majoring in computer courses, they need to use computer hardware for their research, access to the Internet, e-mail and research for their faculties. A solution to the access

problem is that the users should be prioritized according to their need. For instance, greater attention should be given to postgraduate students and staff members whose hours of computer usage are higher compared to the rest of respondents. Some first year computer science students pointed out in their recommendations questionnaire that as students of computer science the dept. does not have their own computer lab and it was difficult to get their work done on time. Some measures ought to be taken for them to use the UKZN computer hardware effectively, according to their assignment. Greater emphasis should be placed on managing time and access to university computers.

The computer access times provided by the university should be extended, for example, earlier open times in the morning and at night. On some campuses of the UKZN, like the Howard College and Pietermartizburg campuses, access is provided 24 hours a day throughout the year. This rule needs to be applied to the rest of the campuses in order to alleviate access problems and improve the learning process.

A university should provide free access to computers for academic and non-academic purposes. According to the response students believe that free access should also be available for non-academic purposes. This remains a moot point if one considers the high cost of the computers, hardware and software and the telephone cost in South Africa. If the university is not capable of providing free access it should give users limited access. If more access is required, the users either need to motivate for it through their departments or users need to be charged more to defray excess costs.

It was pointed out by a number of respondents that there is a need for more efficient printer service. This service should be extended to providing free printing services. If this is impossible for the university, average printing costs should be included in the student fees so that the users can have a free printing service. Those who need unlimited services (more than others) should know that they would have to pay more.

It is a value judgment as to which of the above recommendations are more important and such a judgment must be made in terms of the educational, financial and political aspects of the university. These aspects are not necessarily mutually exclusive, but it might be found that certain

measures that could well improve the quality of learning in a particular situation would also involve an increase in expenditure, so that a decision based on the likely cost-effectiveness of the measures would have to be made. Abuse or misuse of free services needs to be controlled strictly if free services are to be given. No service is entirely free – someone always has to pay so that others can have free goods or services. In this case it is the university and the taxpayer who subsidises the university.

Limitations and Recommendation for Further Research

The present analysis was based on the responses of only from eighty randomly chosen staff members and students. Nevertheless, the results obtained give a clear indication that the planning for future computer systems deployment at UKZN could benefit from a more extensive analysis and more regular analyses. There is a need for a more comprehensive questionnaire and more comprehensive sampling for detailed and dependable research findings. Furthermore, It would be more accurate to generalize if the sample population comes from different campuses. It is difficult to make generalizations from the results obtained from this research.

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