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Strategic IT Utilization in Private Tertiary Education: Enhancing Institutional Effectiveness

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Abstract

Advances in technology are often assumed to enhance convenience and improve daily life, yet in certain situations they may produce unintended negative outcomes. Mobile learning devices, designed to support education anytime and anywhere, raise important questions regarding their actual impact on students' learning experiences. This study investigated whether these tools genuinely promote learning and, if so, whether their influence is beneficial or detrimental. Using a survey research design, data were gathered from 215 randomly selected students through a questionnaires and a focus group discussions. Both qualitative and quantitative techniques were employed in analyzing the responses. Findings revealed that the most participants and by implication the wider student body—made minimal academic use of the tablets and the complimentary 10GB monthly data provided to them. Instead, many students were more engaged in downloading entertainment content, playing video games, or socializing online, activities that contributed to reduced study time, declining academic performance, and lower overall productivity. The study concludes with recommendations aimed at addressing this emerging challenge and promoting more effective use of mobile learning resources.

Keywords: *Strategic information technology, Mobile learning devices, Institutional effectiveness, Student academic performance, Private tertiary education, Technology utilization.*

INTRODUCTION

Computer hardware has been growing exponentially and in the business world has become an essential part of daily tasks. Tertiary education also uses IT to provide students and teachers with instantaneous access to information via online sources. As a result of this, the research needed to investigate the pros and cons of effective use of IT in private tertiary institutions to ensure academic excellent and innovative. For the quality of education to be improved, the academics and students need to know how to use computers properly as IT is a key.

The advent of technology has been transforming virtually all spheres of life, including the education sector. With computer and information technology [ICT] 160 http://www.i-jim.orgPaper Assessing the Effectiveness of Mobile Learning Devices in Tertiary Institutions: The Experience… there is a literal information explosion. The challenging fallout of this development, however, is that it appears there are some negative, almost debilitating effect of ICT, and especially the Mobile Learning Devices [MLD] like tablets. A student of mine recently reported that she engaged in online chatting for virtually ten hours on a Saturday while on campus. At times, the chat extended into the night. According to her, she just couldn't stop it. Further probing questions revealed that the online chat got extended predominantly because of the sexual undertone. The worst part of the experience was that she literally neglected all her pending academic assignments and personal studies in the process. One of her Lecturers popped up a Continuous Assessment test the following day and she performed poorly. Despite this result, the following day, my internet-addicted student still engaged in another round of extended online chat and browsing, which lasted almost four hours. An extrapolation of this scenario to the millions of youth, supposed leaders of tomorrow, spread all over the nations, and the concomitant long-term effect on national

development is better imagined than experienced. It is a situation that calls for urgent attention, hence this study.

Layout of the paper

LITERATURE REVIEW

IT in a Tertiary setup

Ellington and Earl (1998) explain that educational technology originated from what is now called the "technology in education" (ITE) approach, which includes all methods through which information can be delivered to learners.

According to Ellington and Earl (1998), the earliest stage in the development of educational technology, often referred to as the "hardware phase," focused primarily on creating instructional tools that were durable, easy to maintain, and affordable for educational institutions. Once these forms of equipment became widely accessible, educators soon realized that there was an insufficient supply of appropriate instructional materials to use with them. This shortage led to the emergence of a subsequent "software phase." These developments illustrate how the meaning and scope of the term "technology" have shifted even in the early history of educational technology.

Computers have become deeply embedded in modern education. While students continue to prepare written assignments, they now also rely heavily on tools such as email, collaborative platforms, and multimedia or virtual presentation software to enhance their learning experiences. Moreover, since familiarity with educational technology is increasingly expected in the workplace, having access to computers in the classroom has become essential.

On the traditional on-campus delivery system (Gajewski, 1996), paper based print materials are handed out. The use of computers is fairly low at some private universities. Students are required to engage in learning at a location, time and rate that someone else decides. It does, however, involve opportunity for interaction.

On the other hand, in traditional off-campus delivery (Gajewski, 1996), students get substantial amounts of paper-based materials; they have little or no face-to-face contact; there is no use of computer networks and limited use of the Internet based on access to the Internet; there may be some limited use of other media; students have control over the time, location and pace but there is limited interactivity.

The Effective use of IT

A company can achieve benefits from computerisation by automating existing jobs and thus lowering cost of production and becoming efficient. For instance, switching from a manual system of stock account to a computerized inventory system, using computer applications at a faster rate than manual methods can be an efficient method of processing (Erwin & Blewett, 1996).

ITE includes a service component. However, common measures of IS effectiveness focus on the products, rather than the services, of the ITE. Thus, there is the danger that IS researchers will incorrectly measure IT effectiveness if they do not include in their assessment package a measure of IS service quality. Service Quality, an instrument developed by marketing researchers, is offered as a possible measure of IS service. (Pitt *et al*., 1997).

The tertiary education sector should be aware of specific circumstances and requirements. For example, if the tertiary institution is in a large city, then support and service should not be a problem, because there are bound to be a number of companies providing support services.

System Quality measures emphasize how well a system performs. Various studies have examined factors such as how effectively resources and investments are used, the efficiency of hardware utilization, system reliability, response speed, user-friendliness of terminals, the quality and depth of database information, human–computer interaction, and overall system accuracy. Hamilton et al. (1981) identify several widely recognized indicators of system quality, including the timeliness of data, response and turnaround times, accuracy and completeness of information, reliability, system adaptability, and overall ease of use.

Functionality describes how well a particular information technology solution supports the business tasks it is meant to address (Erwin & Blewett, 1996). When an organization needs the most up-to-date technology to meet its objectives, it must obtain the appropriate version. Whether in education or business settings, the hardware used should be carefully assessed to ensure it can effectively support the software required.

The Benefits of Networked Hardware in Tertiary Education

Networked information technology equipment provides essential data link layer functions, enabling stable and dependable communication between computers within the same network. In the United States, many teenagers report that one of the greatest advantages of the Internet is its usefulness in completing schoolwork and discovering new information.

Using low-cost, expandable, and modular robotic systems in education is increasingly important for preparing future scientists and engineers. Such platforms allow students to apply theoretical knowledge to real-world devices, encouraging new ways of thinking and problem-solving.

A growing number of organizations recognize the importance of reducing training costs. Educators face similar pressures, as they must justify curriculum decisions based not only on learning benefits but also on financial considerations. Furthermore, the movement toward expanding educational access has stimulated renewed interest in computer-based training (CBT) as a viable approach to instruction and professional development (McNutt, 1994).

E-Learning

E-learning provides a wide range of tools and delivery channels for workplace training, including systems for assessing performance, offering product and skills training, supporting employee performance, enabling online and distributed learning, and managing organizational knowledge (Hartley et al., 2003).

The problem with the traditional classroom-based approach (Hartley *et al*., 2003) is that it is often uni-directional, relying on passive learning through which a teacher or instructor imparts knowledge to a receptive audience. Empowering a learner to be in charge of his or her own destiny leaves him or her with greater freedom, enabling him or her to study in his or her own time, at his or her own pace and wherever he or she wants. Those aside, there are many other advantages to e-Learning in both education and corporate training.

In addition, Kruse (2003) describes some benefits of e-Learning that can be possibly accessed anytime, anywhere, around the globe. Students always have access to a library of training and information whether they are working from home, in the office, or from a hotel room. As cellular smart phones become more popular, students will even be able to access training in a place that doesn't have a traditional phone line or network connection. Despite these benefits he explains some shortcomings such as the lack of human contact, which greatly impact learning.

McNutt (1994) notes that students and teachers are using computerized library systems to locate IT. Nowadays, almost in all the first world countries the old cataloguing system is transformed into an electronic system. In fact, the research done by the Pew International and American Life Project (Lenhart *et al.,* 2001) shows that teens use the Internet as an essential study aid outside the classroom, for doing research on significant projects and that the internet increasingly has a place inside the classroom. Of these 94% of youths use the internet for school work, 71% for their most recent major, 41% for e-Mail and instant messaging, 34% for downloading online study aid and 17% for creating a Web page for a school project.

Research Questions

The literature review highlights that technology serves numerous functions within educational environments, yet several challenges remain unresolved. These issues can be framed through the following research questions:

I. What factors create the need for information technology (IT) in the university context?

II. How well does the university community understand IT and its role?

III. To what degree do members of the university community make use of IT resources?

IV. How adequate is the availability of computer hardware provided by the university?

V. For what purposes is IT being utilized within the institution?

VI. How effectively is the university's IT infrastructure maintained?

VII. What are tertiary students' perceptions regarding the need for extended access to computer facilities?

RESEARCH METHODOLOGY

For this research study a group of 80 people were randomly selected to fill in the questionnaire. Respondents were given a questionnaire using simple random selection techniques. The sample is representative with respect to gender, age, mode of study, and level of study (undergraduate/postgraduate) (Lubbe and Klopper, 2004). Most of the questions were closed type of questions, to make sure those students and academics do not need much time to complete. The questionnaire was in descriptive way that includes demographic, gender, age and occupational categories (Lubbe and Klopper, 2004).

FINDINGS OF THE RESEARCH AND DISCUSSIONS

This chapter presents the data obtained from the research. It also gives the statistically processed data with discussion and interpretation. The data was gathered by randomly distributing eighty questionnaires to staff members and students of different faculties of the University. The researchers used both SPSS and Microsoft Excel software programs to analyse the data as.

Demographic Analysis

The gender distribution of respondents is presented in Figure 4.1. The imbalance in the sample, where the number of female respondents is significantly lower was not intentional. This disparity may reflect the limited educational opportunities available to women. If this interpretation is accurate, it highlights the need for

increased financial support for female education and for policy measures that specifically address this inequality.

Regarding age, the findings show that 11% (9 out of 80) were aged 16 to 20, 81% (65 out of 80) were aged 20 to 30, and 5% (4 out of 80) were aged 31 to 40. Since the overwhelming majority of respondents are relatively young, it can be assumed that they possess similar levels of familiarity with rapidly evolving computer technologies. This suggests that the study sample is generally homogeneous with respect to age, and that any differences in responses are likely due to factors other than age-related variations in technological perception.

Users of IT Resources

IT resources at the university are used by both students and staff. A closer examination of the data reveals that respondents rely heavily on the university's IT facilities. All participants reported having experienced previous difficulties accessing these resources, although 46% indicated that they own a personal computer.

These findings point to a clear need to improve accessibility and efficiency in the use of IT services. One possible solution is to extend the hours during which these facilities are available. Drawing from the experience of other institutions, such as those discussed in Williams et al. (1999), providing free network connections to student and staff residences can significantly enhance access to university IT resources.

Although such practices may not yet be fully implemented, some progress is being made within the university. For instance, certain private institutions already provide their staff with computer hardware and network access. The author recommends adopting similar initiatives university-wide to reduce access challenges for all users of institutional IT resources.

According to Figure 4.3, 6% of respondents were staff members, while 9% were both staff and students. Student respondents were further categorized by year of study: second-year students accounted for the largest proportion at 30%, followed by first-year students at 24%, third-year students at 9%, and fourth-year students at 3%.

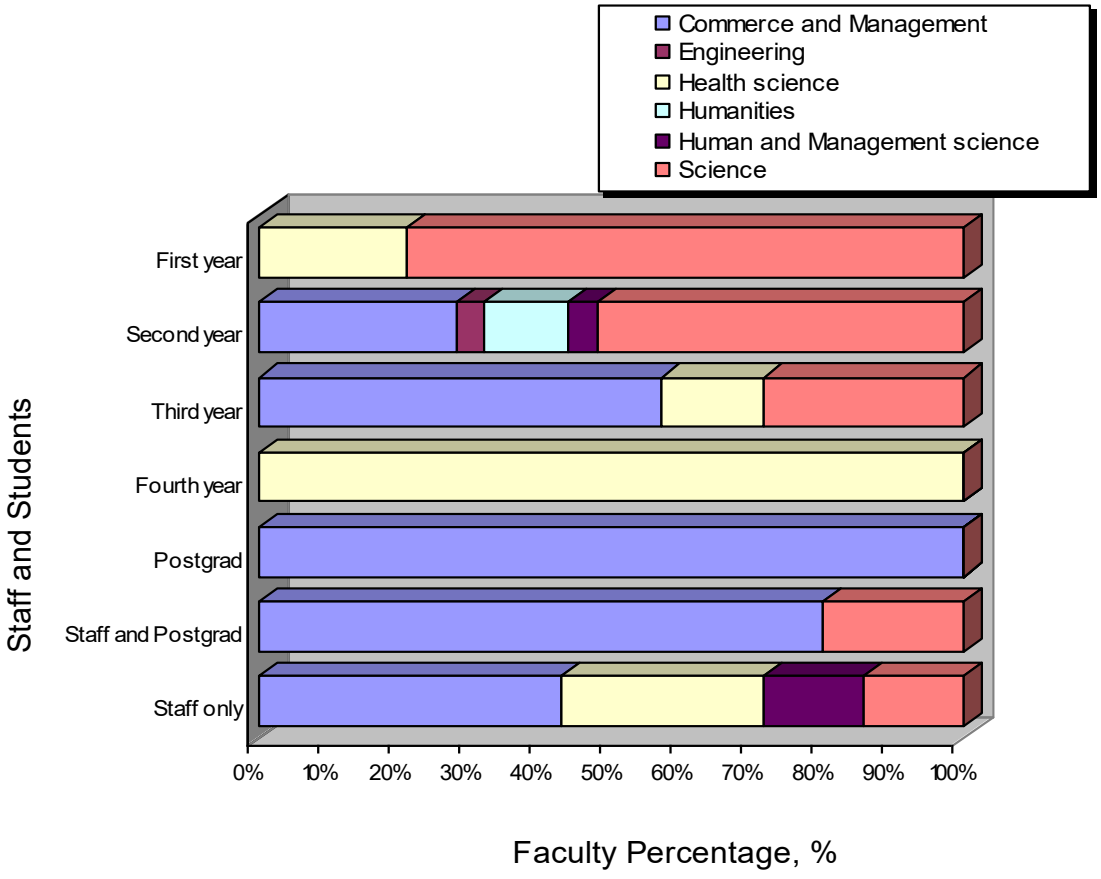

Figure 4.3. The Demography of Respondents by Faculty

The respondents represented a variety of faculties, indicating that nearly all faculties incorporate computers in some capacity for educational purposes. Computers have become ubiquitous in modern education, and students increasingly rely on them for both academic and personal activities.

At the university, numerous computers are available across different laboratories for students enrolled in specific

modules. Students registered in computer-related courses have access to dedicated labs with a larger number of computers. However, those not enrolled in these courses may have limited or no access to certain faculty computer facilities. Some students reported using computers within their faculties, while others indicated they did not, reflecting variations in access depending on module registration.

Statistical Analysis of the Data and Research Questions

The previous section presented and interpreted the demographic data collected in this study. The following section provides a more detailed analysis of the data, focusing on the main research questions.

The Need for Computer Hardware

The first set of questions in the questionnaire aimed to examine the relationship between the availability of computer hardware at the university and its impact on the learning process. Responses to three questions regarding the necessity of computer hardware in supporting students' learning are summarized in Table 4.1.

Rating	Computers are valuable tools to improve the quality of education in the University.	Computers have little value at the University as they are difficult to use.	Computer resources are not significantly useful at the University.
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 4.1: *The need for computer hardware in the University.*

Perceived Usefulness of Computer Hardware

Most respondents agreed that computer hardware is an important educational tool that enhances the quality of lectures. However, nearly 40% felt it was not helpful, suggesting that further investigation is needed to understand this perception. It may indicate a need for additional training to ensure effective use of hardware resources.

Some students emphasized the value of computers in improving educational quality, noting that they provide access to technology and the Internet, which enhances learning. The use of computers and technology applications allows students not only to engage with their course objectives but also to connect with the broader global context in which they will eventually work.

As competition in the job market increases, universities are striving to give students a competitive edge. With computer skills becoming a requirement for many positions, numerous universities require students to own personal computers as a condition of admission. Personal computers are versatile, functioning as standalone devices or being connected to university networks, the Internet, or classroom systems (Long, 2000).

The Need for Computer Hardware Literacy

Findings from the study indicate that all respondents (100%) agree on the importance of learning how to use computer hardware. About 90% of participants also recognized the usefulness of computer literacy within the university context, while 9% were neutral, and 1% were skeptical.

Most departments offer computer literacy courses as part of their curriculum, introducing students to software such as Microsoft Word, Excel, PowerPoint, Access, and basic Internet navigation. Additionally, the university provides more advanced courses in application software. Despite this, hardware literacy appears to receive less emphasis. The findings suggest that both students and staff would benefit from dedicated hardware literacy workshops or courses, which would help them stay updated on rapidly evolving technology and better understand the interaction between computers and society.

Frequency of Computer Hardware Usage

Table 4.3 shows that, of the 80 respondents, 75% regularly use the university's computer hardware, 18% use it occasionally, and 8% use it rarely. Notably, none of the respondents reported never using campus computers. Students typically use the computers during breaks between lectures for both academic and non-academic tasks, while staff rely on them for daily work activities. These findings indicate that all respondents make use of university computer resources to some extent.

Daily Usage Hours of Campus Computers

Table 4.4 presents the average daily hours respondents spend on university computers. Approximately 15% use

computers for more than 7 hours per day, 44% use them for 4–6 hours, and 41% use them for less than 3 hours, with an overall average of 2.7 hours per day.

A more detailed analysis by year of study reveals the following trends (Figure 4.4):

i. **First-year students:** 32% use 0–1 hours, 26% use 2–3 hours, 37% use 4–6 hours.

ii. **Second-year students:** 12% use 0–1 hours, 36% use 2–3 hours, 48% use 4–6 hours.

iii. **Third-year students:** 29% use 0–1 hours, 57% use 2–3 hours, 14% use 4–6 hours.

iv. **Postgraduates and staff-student respondents:** 53–57% use 2–6 hours, with the highest usage over 7 hours among postgraduates and those who are both staff and students.

These results suggest that computer usage generally increases with the level of study, reflecting the academic demands of higher education. The higher usage among first-year students may also be due to compulsory computer literacy courses and the availability of free access for academic and non-academic purposes.

Further analysis indicates that respondents using computers for 2–6 hours often spend some of that time on non-academic activities. This suggests that university computer services are used for both academic and personal purposes. While one could argue for restricting access to academic use only, it is also reasonable to recognize that preparing students for the professional world may require exposure to both academic and non-academic computing experiences.

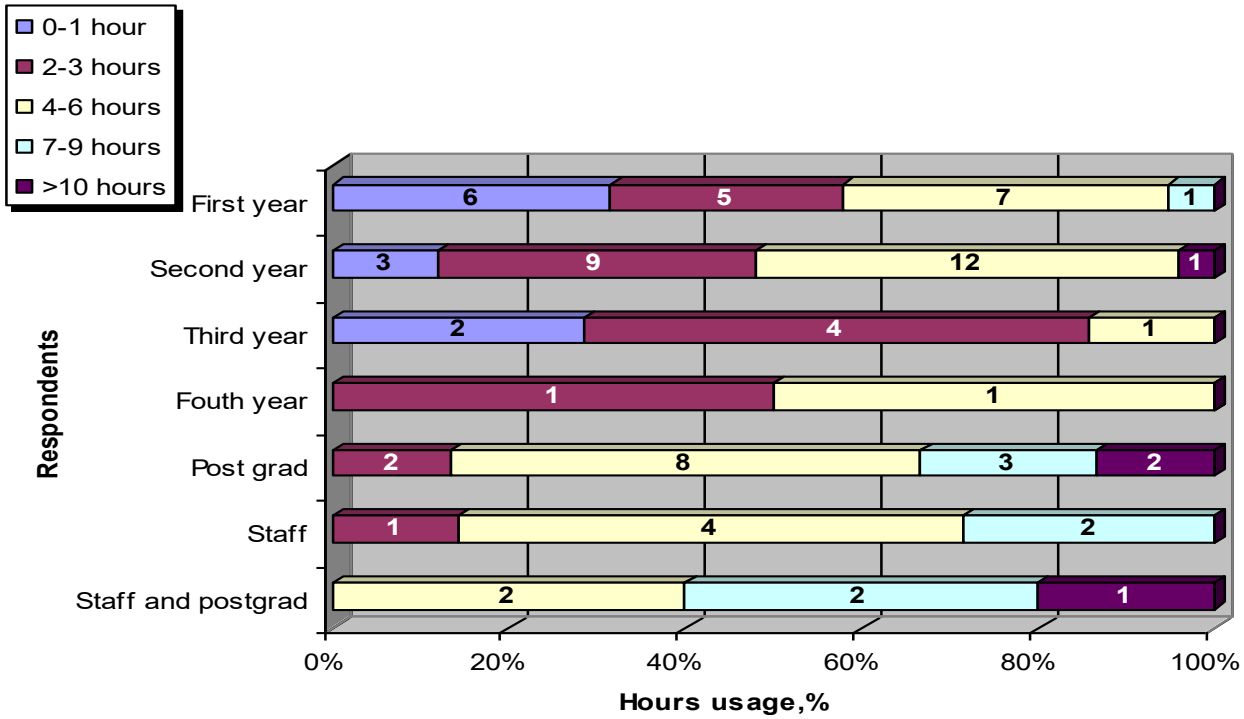

Figure 4.4. Computer Hardware Usage of Respondents in Terms of Hours

Dependency on Computer Resources

Figure 4.5 illustrates the respondents' reliance on university computer resources. The study found that 61% of respondents own private computers. Among those who did not own a computer at the time of the research, 13% planned to purchase one in the near future. Interestingly, only 54% of respondents rely entirely on university-provided computers for their IT needs. Among students with personal computers, 42% still depend on campus resources, while 16% of those without private computers are fully dependent on university facilities.

Students and staff rely on campus resources for several reasons. Even when they own personal computers, limited access to the Internet often necessitates using campus facilities. Additionally, many do not possess specialized software such as Pastel Accounting, SPSS, Mathematica, Visual Basic, Java, AutoCAD, or Prokon. Consequently, costs for infrastructure and computing resources often contribute to respondents' dependence on university-provided systems.

Types of Hardware Used by Respondents

Approximately 75% of respondents reported knowing the type of hardware they use, which is encouraging as it

demonstrates awareness of basic computer components. However, this does not necessarily reflect full hardware literacy, as noted in previous sections emphasizing the need for additional training. About 25% of respondents could not identify the hardware they use (Figure 4.7), indicating gaps in understanding.

Most students and staff use advanced computer systems. Nevertheless, around 20% of respondents are unsure of the type of processor in their systems, highlighting areas for improvement in hardware knowledge.

Other Hardware Used by Respondents

Respondents identified commonly used peripheral devices, including floppy disks, printers, data projectors, USB flash drives, scanners, and digital cameras. Among these, floppy disks are the most frequently used (90%), followed by printers (85%), data projectors (30%), USB flash drives (25%), scanners (11%), and digital cameras (9%) (Figure 4.7).

Floppy disks and USB flash drives are primarily used for data storage and transfer. The high use of floppy disks may result from the limited storage capacity provided by the university or potential reliability issues with campus storage systems. Floppy disks also enable students to transfer work for use elsewhere. USB flash drives, while newer and more expensive, offer greater reliability and portability. About 25% of respondents already use USB flash drives, primarily fourth-year students, postgraduates, and staff members who are also pursuing postgraduate studies (82% of USB users).

Given that only a small proportion of respondents can afford USB flash drives, it is recommended that the university expand storage facilities for students at advanced levels to better support their academic and research activities.

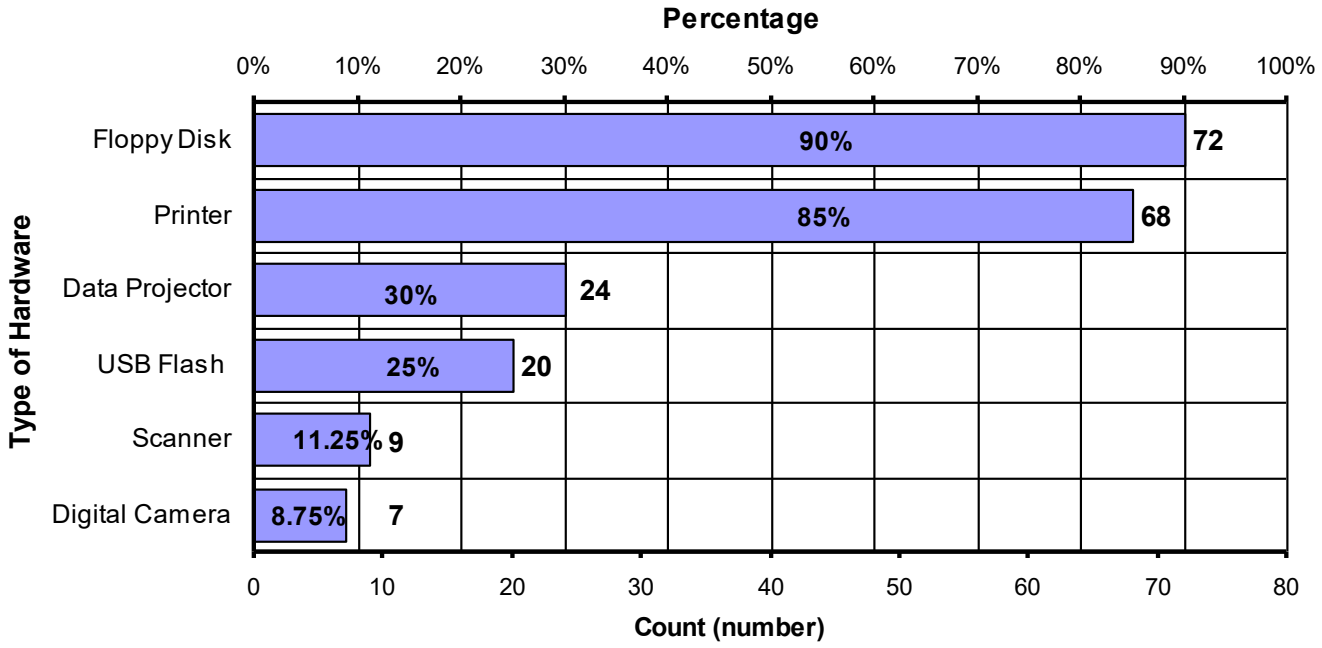

Figure 4.1. *Types of hardware provided*

In addition to examining the types of hardware used, the study also assessed the condition of the computer outlets and peripheral devices provided by the university, focusing on whether they were functional, faulty, or out of order. According to the survey results, 6% of respondents rated the hardware as excellent, 13% described it as great, 23% considered it good, 31% evaluated it as fair, and the remaining 28% felt that the hardware was below standard.

The Main Use of Computer

In Figure 4.9 the common use of the hardware is given. It is 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%).

As noted earlier, university computer hardware is used for both academic and non-academic purposes. Table 4.6 presents the respondents' views on the appropriate use of these resources. Forty-eight percent of respondents strongly disagreed with the notion that using university computers for non-academic purposes constitutes misuse. Similarly, they disagreed with the suggestion that the resources should be restricted exclusively to academic activities. Nevertheless, 29% of respondents supported limiting computer use to academic purposes. Regarding the implementation of regulations that promote primarily

academic use of university resources, 43% agreed, 38% disagreed, and 20% neither agreed nor disagreed.

Rating	The use of the University computer hardware for non-academic purpose is abusive.	The University computer hardware should only be used for academic purpose.	Regulation should be imposed on non-academic activities.
Totally Agree	13.75%	12.50%	16.25%
Partially Agree	7.50%	16.25%	26.25%
Indifferent	17.50%	7.50%	20.0%
Partially Disagree	13.75%	16.25%	11.25%
Totally Disagree	47.50%	47.50%	26.25%

Rating	How well are the computer outlets and peripherals (mouse, keyboard and speakers etc) equipped?	
	Frequency	Percent
Excellent	5	6.3
Great	10	12.5
Good	18	22.5
Fair	25	31.3
Not so good	22	27.5

Table 4.2: *Usage of the University computer hardware for academic purposes.*

For some time, games have been played on personal computers such as solitaire, free cell, hearts, pinball and minesweeper. This was playing especially when the computers are offline. However with the fast growth of Internet many other games are available too. It can be said that the connection between education and games are growing happily. Therefore, there are negative and positive aspects in using computers for games. The negative standpoint is that many students are spending their time in the lab playing while many other students are waiting desperately to do their assignments. The positive standpoint is that first of all it gives you a bit of relaxation after severe and busy work. Secondly games are not only entertaining people, but, some like flight simulator games allow students to experience being a pilot and to learn about the principles of flying (Curtin *et al*. 1998).

The need for Assistance in Computer Hardware Equipment

The analysis made regarding the need for the common hardware problems that require assistance for efficient use is shown in Figure 4.10. As clearly shown in the figure, more than 20% respondents pointed the need for a great deal of assistance on all the computer's hardware. More than 10% respondents also stated the need for a fair to very little assistance in the maintenance of all the computer hardware. On the other hand, more than 30% of the respondents specified that there is no need of assistance in monitor, keyboard, mouse, and floppy drive.

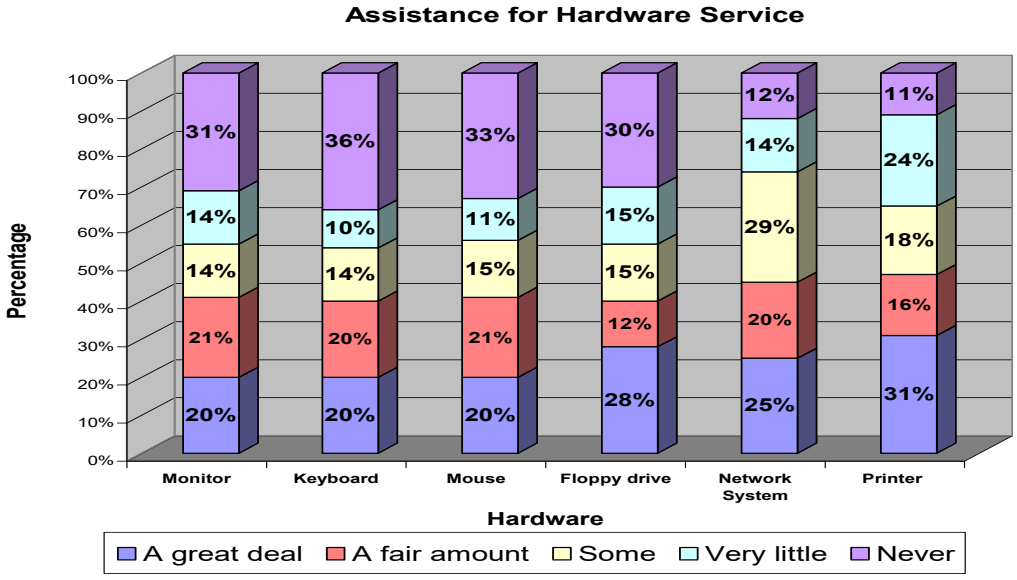

Figure 4.10. The Need for Assistance with Different Hardware

The Need for Extended Hours of Computer Access

To assess respondents' satisfaction with the current computer access, three questions were included in the questionnaire. The results are summarized in Table 4.8.

Providing free access to university computer resources can sometimes lead to misuse, where students spend time on non-academic activities rather than on learning. As illustrated in Figure 4.9, students reported using computers for activities such as SMS (48%), online chatting (38%), gaming (38%), and viewing pornography (21%). Some respondents expressed concerns about extended access hours, suggesting that such freedom could encourage misuse. They argued that time and resources might be wasted on non-academic activities instead of being focused on meaningful academic work.

Rating	How effectively would you make use of the hardware resource in extended hours?		How are you satisfied with the open hour access of computers in the University?		Rating	The open hours provided by the University must be increased.	
	Frequency	Percent	Frequency	Percent		Frequency	Percent
Excellent	36	45.0	14	17.5	Totally Agree	63	78.8
Great	26	32.5	11	13.8	Partially Agree	12	15.0
Good	9	11.3	20	25.0	Indifferent	4	5.0
Fair	6	7.5	15	18.8	Partially Disagree	1	1.3
Not good	3	3.8	20	25.0	Total Disagree	0	0

Table 4.3: *The need for extended access hours of computer use.*

Allowing completely unrestricted access to computers for non-academic activities can lead to time being wasted unnecessarily. In such cases, some students may selfishly prevent others from using the resources to complete their assignments.

Paradoxically, most students support the idea of extending access hours, as shown in Table 4.8. Extended hours would allow students to work more effectively at times that suit them, potentially easing the problem of limited access. However, there is a risk that some students might misuse these privileges, so appropriate controls should be implemented. University education is costly, and public funds are used to subsidize students, making responsible use of resources essential.

Printing Facilities

The responses to questions about the university's printing services are summarized in Table 4.9. According to the survey, 44% of respondents felt that the current printing facilities were inadequate, while approximately 78% highlighted the need for free printing services in the future.

Rating	What do you think about the existing printing services provided by the University?		What do you think if free printing facilities are provided by the University?	
	Frequency	Percent	Frequency	Percent
Excellent	4	5.0	43	53.8
Great	7	8.8	11	13.8
Good	9	11.3	8	10.0
Fair	25	31.3	9	11.3
Not so good	35	43.8	9	11.3

Table 4.4: *Printing services provided*

At the University of KwaZulu-Natal, laser printers are used in some offices and a few laboratories to provide printing services to students. Laser printers are preferred for their speed and high-quality output. However, students have raised concerns about the limited number of printers available. In addition to scarcity, printers that are out of order require prompt attention from skilled technicians to maintain efficiency and ensure smooth service delivery.

Paper feeding of the printer is also a common problem during weekends if the printers finish their paper load. To avoid potential problems such as being out of paper the hand feeding portion of the printers need to be left open incase of emergency and the charge for printing while using you own paper needs to be reduced.

Students often experience the inconvenience of waiting in long queues to top up their printing credits. At some campuses, such as Howard College, the University has installed external machines that allow students to purchase printing vouchers at any time and load their credits online. Expanding this system to other campuses would help alleviate the difficulties currently faced by students who still rely on manual top-ups.

Compatibility and Comfortability (user-friendliness) of the Available Hardware with the Current Technology

To evaluate the comfort and compatibility of the computer hardware provided by the University, three questions were posed to the respondents, with results summarized in Table 4.10. The findings indicate that 89% of respondents consider the available hardware to be more than fairly comfortable, suggesting that the University takes user comfort into account when procuring computer equipment—a policy that should continue in the future.

Regarding hardware upgrades, 53% of respondents rated the University's efforts as more than fair, while nearly an equal proportion (48%) highlighted the need for continual updates to keep pace with rapidly advancing computer technology.

When assessing compatibility, 89% of respondents felt that the current hardware aligns well with modern technology. This high rating may seem inconsistent with the previous responses about upgrading, possibly because respondents did not clearly distinguish between hardware upgrades and compatibility.

Rating	How compatible are the computer resources of the University in meeting the current technology?		How does the University do the upgrading on computer hardware?		How comfortable are you currently about using computer hardware?	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Excellent	5	6.3	15	18.8	28	35.0
Great	7	8.8	12	15.0	25	31.3
Good	27	33.8	15	18.8	18	22.5
Fair	20	25.0	20	25.0	2	2.5
Not so good	21	26.3	18	22.5	7	8.8

Table 4.5: *Compatibility of the available hardware with the current technology.*

Auditing System for Computer Hardware

To evaluate the auditing system for computer hardware, two questions were included in the questionnaire. About 41% of respondents believe that the University conducts more than fair and consistent audits, while 31% feel that auditing is insufficient. The remaining 28% consider the auditing system fair. These results indicate a clear need for the University to reconsider and improve its auditing system to better meet the needs of IT users.

Additionally, only 25% of respondents agreed that the provision and administration of computers by the University are adequate. Conversely, 31% strongly disagreed with the adequacy of the management system, emphasizing the need for improvements in managing IT resources to enhance the effectiveness of the University's computer facilities.

Conclusion

The benefits of computer use in improving the quality of education at the University of KwaZulu-Natal were strongly supported by 98% of respondents. Seventy-five percent reported frequent use of University-provided computers, yet only 54% are entirely dependent on these resources. Among respondents who own private computers, 42% still rely on University computers. A significant proportion of respondents reported that the number of computers available is insufficient, with 85% experiencing access difficulties, indicating a need for better management, control, and maintenance of IT resources to support serious academic work.

Respondents use University computer services for both academic and non-academic purposes, including Internet access, software applications, research, email, programming, SMS, chat, games, pornography, and web design. Forty-eight percent of respondents disagreed that non-academic use constitutes abuse, while 43% opposed restrictions solely to academic use—highlighting a concerning trend that may require stricter regulations in an academic setting.

Ninety percent of respondents agreed on the importance of computer literacy, despite being able to differentiate between computers and hardware. Commonly used hardware includes floppy disks, printers, data projectors,

USB flash drives, scanners, and digital cameras. Forty-four percent of respondents felt that existing printing facilities are inadequate, and 78% emphasized the need for free printing services in the future.

Regarding the condition of computer hardware, 72% rated it at least fair, and 74% considered maintenance to be adequate. Additionally, 89% felt that the available hardware is more than fairly comfortable. Concerning upgrades, 53% rated them more than fair, while 89% believed the current hardware is compatible with modern technology. About 69% of respondents indicated that auditing of computer hardware is at least fair, suggesting general satisfaction with the auditing process.

The recommendations and conclusions drawn from this chapter's findings are summarized in the following chapter.

RECOMMENDATIONS AND ANSWERING OF RESEARCH QUESTIONS

The Need for Teaching and Training in Computer Hardware Literacy

Training in computer hardware literacy is essential for all students and staff, particularly for novices such as first-year students who may not know how to use computers effectively. While the University offers an elective course in computer literacy (UDW 100S), the findings of this research show that 100% of respondents recognize the importance of computer literacy, suggesting that a compulsory, comprehensive course should be implemented. This course should cover both software and hardware, as they are interdependent: hardware enables input, processing, and output functions, but without appropriate software, it cannot operate effectively (Graham et al., 2003). Proper instruction in hardware usage will ensure that all students are informed and competent users.

The Need for Better Computer Access

Adequate computer access is crucial to support learning and research activities. This study identified access problems that need to be addressed to ensure that all users can utilize resources when needed. Each faculty should have dedicated computer access points on campus, and students should continue using labs even if they are not majoring in computer-related courses, as computers are essential for research, Internet access, email, and faculty-specific resources.

As an immediate solution, priority should be given to users with higher demands, such as postgraduate students, staff members, and students in computer-intensive courses like Computer Science, who often face challenges completing their work on time. Effective management of time and access is critical to ensure equitable use of University computers.

The Need for Extended Hours of Computer Access

University computer facilities should be accessible for longer hours, including early mornings and late nights. On some campuses, 24-hour access is already available, and this policy should be extended to all campuses to alleviate access problems and improve the learning process.

Considerations Concerning Academic and Non-Academic Use

The University should provide computer access for both academic and non-academic purposes, as students see value in having unrestricted use. However, considering the high costs of computers, hardware, software, and telecommunications in South Africa, the University may need to regulate access. Limited access could be implemented for general users, with the option for departments or individuals to request additional access or contribute financially to cover excess usage.

The Need for Better Printing Services

Respondents highlighted the need for more efficient printing services, ideally including free printing. If free services are not feasible, printing costs could be incorporated into student fees, allowing basic access for all users, while heavy users pay additional fees for extended services.

Balancing Recommendations with Practical Considerations

Prioritizing the above recommendations requires careful consideration of educational, financial, and political factors. Measures that improve learning quality may also increase expenditure, necessitating cost-effectiveness analyses. Abuse or misuse of free services must be strictly controlled, as all "free" services are ultimately funded by the University and taxpayers.

Summarized Answers for the Research Questions

What is the need for computer hardware?

In order to pace forward with the current technology the private institution's needs for computer hardware in different level of educations. There are no possible reasons why the academics do not make use of technology when teaching. The staff members and students are still looking for more computers and other technological innovations to facilitate the educational conditions in a very advanced process.

What is the understanding of the community of computer hardware?

Respondents commonly cited students' incompetence in the use of computer hardware as a problem. As the result of

this, 100% of the respondents recommend for computer hardware literacy. Many departments provide computer literacy skills during the first year of study for their students. However, it is a fear of the author that the literacy of the computer hardware provided is dominant on how to use software rather than having balanced knowledge of both. The author also noticed that there is a misunderstanding when it comes to computer hardware's terminology. This is one of the reasons for teaching computer literacy and technological terminology to all students in all subjects at university

To what extent is the University community uses computer hardware?

It is clear from the analysis done on the previous chapter most of the students and staff members use computer hardware provided for them between 2 to 6 hours per day. The reasons that users of having such long time for using computer hardware because it gives them reliable, consistent and faster means of education and information systems

How dependent is the University community on the computer hardware provided?

54% of the respondents depend entirely on the University IT resources for different reasons such as using university application software and access of surfing to the Internet. Generally, the cost of infrastructure and computing resources are considered as part of their depending on resources.

To what extent does the University community provide the computer hardware accessibility?

Seventy-Eight percent of respondents were eagerly looking for effective use of the hardware if they could get more extended access and 100% were recommending the open hours access of the University to be increased. That means, both students and staff members are not satisfied by what the University of KwaZulu Natal provides them. In other way the access has limitations. It is not even 24 hours per day or 7 days per week. Therefore, it seems that the university provides access to certain degree.

For what purpose is the computer hardware mainly used?

The university community uses computer hardware for different purposes to facilitate the learning process; In general, the University community uses computer hardware for academic such as researches, studies and assignments and non-academic purposes such as sending SMS, surfing pornographies, playing games and chatting. Even though the percent number of the respondents on using computer hardware for academic purpose is highly appreciated, but percent number of the respondents on using non-academic purpose such as pornography, games and SMSs are not so good.

How well the computer hardware of the University is maintained?

Almost half of the respondents stated that the maintenance provided by the University is more than fair. One quarter of the respondents agreed that the maintenance is only fair enough. The rest one quarter mentioned that the maintenance is not so good. So the University need to reconsider to improve on the maintenance they provide for efficient and long-term use of the computer hardware.

To what extent is the University community happy about the assistance provided in computer hardware equipment?

A major percentage of the respondents agreed on the need for assistance on all the computer's hardware. Some respondents, on the other hand, specified that there is no need for assistance in the monitor, keyboard, mouse, and floppy drive.

What is the feeling of Computer users on the need for extended hours of computer access?

Almost all users recommend extending the hours of computer access in the future, as the current availability is insufficient for staff and students to complete their assignments. However, some respondents expressed concerns about extended hours, citing potential misuse of time for activities such as chatting, gaming, and accessing inappropriate content.

Satisfaction with Printing Services

In general, users, especially students, are not satisfied with the current printing facilities provided by the University. They seek improvements, including an increased number of printers and prompt availability of technicians to service printers that are out of order.

Compatibility and Comfort of Computer Hardware

Given the rapid pace of technological development, continuous updating of ICT competencies is essential. Most respondents indicated that the hardware provided by the University is more than fairly comfortable. This suggests that the University of KwaZulu-Natal considers user comfort and ergonomics when procuring computer hardware, and this policy should continue in the future.

Conclusion

As noted in Section 5.3, it is difficult to generalize the results of this research. Nevertheless, the author believes the study provided valuable experience in conducting research and contributed practical and theoretical insights

that may help improve computer access, hardware provision, and ICT services at the University.

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