Factors Affecting Adoption and Use of New Operating Systems by University Students: A Survey Study in Moshi Co-Operative University, Tanzania

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Abstract - **There has been a continuous change in computer Operating Systems (OSs) from time to time. The same changes entail a shift from old to new OS among computer users so as to enjoy not only the enhanced user experience but also improved security features. University students are among primary users of computers. But little is known on the literature point of view on what factors affecting them in adopting and using new OSs. This study was therefore carried out to assess the factors affecting adoption and use of new OSs by university students. The Moshi Cooperative University (MoCU) was used as a case study. A total of 120 randomly selected students were involved in the study. Findings showed that most of these students use Windows OS, with Windows 7 used by more than 70% of them. The study also observed hesitation among respondents to shift from old to new OS. Some of the reasons for that was fear to take risk, presence of new complicated features in new OS, unawareness of the new OS, and economic factors. The study therefore calls for awareness creation among respondents on the importance of using newer OSs, amon other recommendations**

Key words: Operating System, Adoption, University students

1.0 INTRODUCTION

1.1 Background Information

Technological advancements have made most of the Information and Communication Technology (ICT) tools, particularly computers, easily available and affordable. The same advancements have steered to advancements in data storage and exchange, democratization of information, expansion of last-mile infrastructure and low cost of connecting to internet and mobile phones in developing countries as in all other parts of the world. As a result, many university students are now using computers as a means of accessing and sharing academic materials than ever before[1]. University students are defined by [2] as those students pursuing studies at higher learning institutions. According to the author, the phrase 'university students' includes students who are pursuing Certificates, Diplomas, Bachelor degree, Masters and PhD programmes

In line with other technological advancements new Operating Systems (OSs) are being released from time to time. An OS is software that manages computer hardware and software resources and provides common services for computer programs. This software is the essential component of the system software in a computer system. Application programs, system components and peripherals usually require an OS to work together to perform a specific task [3] and [4]. There is a number of OSs in use with modern computers; some examples are Disk Operating System (DOS), MacOS, Linux and Windows. Windows OS, such as Windows XP, Windows Vista, Windows 7, Windows 8 and Windows 10, are commonly used by most of the personal computer users [5]. There is also other OSs for mobile devices such as smart phones and tablets, which are out of scope of the present study.

Research indicates that apart from affordability and availability of computers and other ICT tools there are more other reasons that fuel their increased use among university students. For example, according to [6], the increased use of ICTs among university students is grounded on the fact that ICTs enhance academic and social life by providing conducive environments for students to access academic provisions and for interacting among themselves, with their lecturers, and with their family and friends. It is furthermore pointed out by [7] that ICTs has brought new opportunities like digital libraries which improve library resources management and services through improved information sharing, as well as wider access and preservation of library materials. This is why a survey by [6] showed that 97.1% of Moshi Co-operative University (MoCU) students are using computers among other ICT tools.

However, as it has already been stated, there is a number of OSs in use with modern computers. Newer OSs has also been released from time to time. This brings up the need for investigating on the factors that affect the adoption and use of the newly released OSs. The choice and use of MoCU students as a case study was based on the empirical evidence from research that they are among the vital and top users of computers.

1.2 Statement of the Problem

There have been a tremendous change in OSs in recent years; the technical reason is that there are so many underlying information systems architectures in which each works best with OS optimized for it. The changes in OS oblige users to adopt new versions since each version comes with its advanced features which are believed to be more convenient to users. But it have been said by [4] that effective use of computers with new OS depends on how conversant a user is on the advanced features of that new OS. Moreover, the author pointed out that adopting new OS is in some ways a process since user has to take time to learn new features. However, little is known on the literature point of view on the factors affecting university students in adopting and using new OSs. Because literature show an inclination to university students' reliance on computers in their learning process then effective use of computers implies a direct or indirect effect on their learning process. It is for this reason therefore that the present study was carried out to investigate on the factors affecting adoption and use of new OS amongst university students. Findings from this study will help stakeholders to put in place appropriate mechanisms as far as OS adoption among university students is concerned.

1.3 Objectives of the study

1.3.1 Main Objective

The study aimed mainly at assessing the factors affecting adoption and use of new OSs by university students at MoCU.

1.3.2 Specific Objectives

i. To identify operating systems which are commonly used by students at MoCU
ii. To determine students' attitudes towards OSs they are using
iii. To determine factors hindering students from moving to new OS

1.4 Research questions

i. Which operating systems are commonly used by students at MoCU?
ii. What are the viewpoints of students on OSs they are using?
iii. Which factors hinder students from switching to newly released OS?

2.0 LITERATURE REVIEW

2.1 Description of the key Concepts

2.1.1 The Meaning of Operating System (OS)

An Operating system is a program that controls the execution of application programs and acts as an interface between the user of a computer and the computer hardware[8]. It is concerned with the allocation of resources and services such as memory, processors, devices and information[9]. There are several OSs in use with computers; some of them are DOS, MacOS, Linux and Windows. Windows OS, such as Windows XP, Windows Vista, Windows 7, Windows 8 and Windows 10, are commonly used by most of the personal computer users [5].

2.1.2 Adoption Concept

Adoption has been defined differently by many authors, some of authors define adoption as the choice to acquire and use a new invention or innovation [10] while others define it as an acceptance and continued use of product, service or idea [11]. According to [12] consumer goes through a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a product or service. The authors added that potential adaptors pass through certain stage before making decision on whether to adopt or reject an innovation.

2.1.3 Benefit of migrating to a new version of the OS

Migrating to new OS always is the right decision as users come across improved things like enhanced security, broader device choice for a mobile workforce, higher user productivity, and lower total cost of ownership through improved management capabilities. Impacts of not migrating to new OS can be absence of security updates and technical support for the old OS [13]. Migration to a newer version of windows could be regarded as a defensive move, motivated purely by the desire to avoid un patched security threats [14].

2.1.4 Factors affecting organisation's decision to adopt new OS

Adoption of new technology in different countries has different barriers [15]. Different studies identified different factors that may affect an organisation's decision to adopt an innovation. These factors include culture, political, social, organisational, managerial, economic and technological characteristics[16].

Cultural Factor

The technology, particularly information technology is not culturally neutral[17]. Developing countries cannot easily grasp the new technology as quickly as developed nation does [18]. Culture of any organization is a blood stream, running in all directions. The reasons behind are logical that weight age is given to the values of workers in the developed world where rationalism and individualism are prevailing core concepts of culture. Developed worlds design the technology by keeping in view demands and aspirations of their culture[19]. Developing countries find it difficult to cope with the pace of changes generated by the adoption of new technology[20].

Individual Factor

Individuals play an effective and important role in technology adoption process [21]. Technology is not successful if its user does not accept it and adopt it [22]. Lack of user acceptance has been an impediment to the success of new technologies [23]. The effective application and adoption of new OS in the organization also requires competent staff and willing users, and this involves a substantial process of learning and knowledge sharing.

Organizational Structure Factor
Mechanistic organizations are bureaucracies, and rigid to adopt new changes. Organic organizations are highly adaptive to change as need arises. Therefore, the behaviours of organizations towards adoption of technology vary with their structure type [24]. Organic structure is most appropriate for new technology as it is flexible and maximizes adaptability [25]. An appropriate 'structure-fit' is necessary for adoption of technology. Moreover members' interactions and cooperation at all levels, among all departments, among all groups and teams are also necessary for success of the introduction of any new technology [26].

Economic Factors
Economic issues has great influence on the use of technology [27], in low and middle income countries, the funds available are often not sufficient to buy expensive technology [28]. These countries mostly rely on the technology donated to them and later problems are encountered when the project is over. Also, it was identified that the lack of awareness of available technologies and its uses, capabilities, and return on investment are greater barrier to technology adoption.

2.2 Technology Adoption Theories

2.2.1 Adoption theory
The consumer goes through a process of knowledge, persuasion, decision and confirmation before they are ready to adopt a product or service [29]. This means that a potential adopter passes through certain stages before a decision is made on whether to adopt or reject an innovation.

2.2.2   Perception Theory
On a straightforward view, we directly perceive the world as it is. The way that things look, feel, smell, taste, and sound is the way that they are [30]. We see colours, for example, because the world is coloured. This view of perception is called, somewhat dismissively, naive realism. How to change people's attitudes happens only when two factors are present which are; they are aroused, feeling the discomfort of dissonance and they attribute the cause of this to their own behaviours and attitudes [31].

3   METHODOLOGY

3.1 Description of the study area
The study was conducted at Moshi Co-operative University (MoCU) which is found in Moshi Municipal, Kilimanjaro region. Kilimanjaro is located in north-eastern part of the Tanzania Mainland. It lies south of the Equator between latitudes 20 25' and 40 15'. Longitudinally, the region is between 360 25' 30''and 380 10' 45'' east of Greenwich. MoCU is a public university with more than 4,500 students and it is among of the universities with higher number of students who are using computers in the country. This is

among of the reasons which made MoCU to be used as a case study.

3.2 Study design and data collection methods
The study used a cross–sectional survey research design to generate data from students. Primary data were collected through structured questionnaire and Focus Group Discussion (FGD). A structured pre-tested and self-administered questionnaire was used among selected students from the entire population. FGD was used with certificate, diploma and degree students who are studying Information and Communication Technology (ICT) programmes. The aim of using FGD was to gain deep insight on OS and usage challenges to users. All of the data used in this study were collected in May 2015.

3.3 Population, Sample size and sample selection procedure
The study population comprised of all students at MoCU. These are students from certificate, diploma and degree level. Two programmes from each category (level) were randomly selected giving a total of six programmes. The selected programmes were; Certificate in Accounting and Finance (CAF), Certificate in Information Technology (CIT), Diploma in Business Information Communication Technology (DBICT), Diploma in Enterprise Management and Accounting (DEMA), Bachelor of Science in Business Information Communication Technology (BSc–BICT) and Bachelor of Arts in Co-operative Management and Accounting (BA-CMA). In each programme, 20 students were selected randomly. A total of 120 students were therefore involved in this study.

3.4 Data Analysis
Quantitative data was processed and analysed by using Microsoft Excel 2007 and Statistical Package for Social Sciences (SPSS) version 20.0 package. Microsoft Excel 2007 was mainly used for presenting data into neat graphs and table.

3.0 FINDINGS AND DISCUSSIONS

4.1 Demographic information of the respondents
A total number of 120 respondents were involved in this study of which 73 (60.8%) were female and 47 (39.2%) were male. The study found that larger number of respondents (80 respondents which is equivalent to 66.7%) was aged from 18 to 25 years. Those with age of 26 and above occupied 26.6% followed by respondents with age of below 18 years which occupied only 6.7% of all respondents.

Table 1: Age and Sex of respondents

Variable	Category	Frequency	Percentage
Sex	Male	73	60.8
	Female	47	39.2
	Total	120	100.0
Age (Years)	Below 18	8	6.7
	18 – 25	80	66.7
	Above 25	32	26.6
	Total	120	100.0

4.2 OSs commonly used by students

The study found that there are several OSs which are currently used by students. Some OSs are recently released while others has more than 5 years and above since they were released. As shown in Figure 1, findings show that respondents mostly use Windows OS than other types of OS. Specifically, the mostly used OS was Windows 7 used by 70.5% of all respondents. Other OS which were commonly used by respondents were Windows 8 used by 17% of all respondents followed by Windows XP (9.0%), Windows vista (2.0%) and Other OS (non-Windows OS, 1.5%).
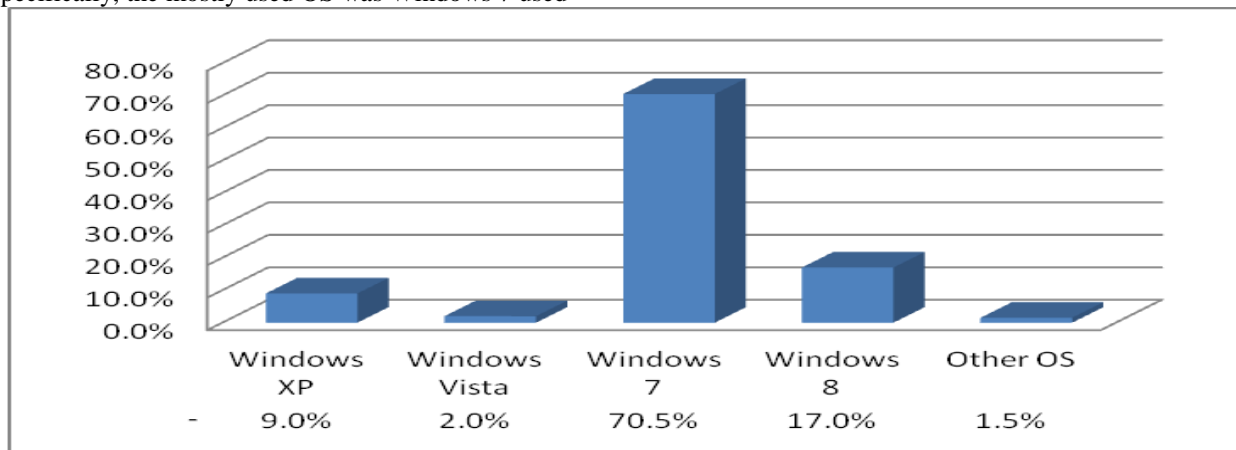

Figure 1: OSs and their extent of usage among respondents

As it can be observed in this finding, a substantial number of respondents are still using Windows XP which is no longer receiving security updates and technical support from the developer which impose a serious security risk to them as users. Moreover, it can be deduced from these results that there is no natural move from old OS to new OS after release of the new OS. Considering Windows XP and Windows Vista for example, it can be expected that since Windows Vista was released after Windows XP then more users could be using Windows Vista than Windows XP because they could have been shifted from XP to Vista just after Vista's release. But results are different; XP had more users than Vista. The same trend is observed between Windows 7 and Windows 8.

The study went further to investigate on when respondents started using the OS they mentioned to use. Findings showed that most of respondents (79.3%) were using the same OS that was bought with computer. The remaining portion of respondents (21%) was using OS which was installed after uninstalling (due to various reasons) the previously installed OS. This finding tells that there is a low tendency of shifting from old to new OS among respondents.

4.3 Students' perceptions on the OS they are using

The study went further to investigate on the perceptions or viewpoints of students on the OS they were using. In order to capture their perceptions, respondents were asked to indicate whether they are extremely satisfied with the OSs they were using, moderate satisfied, neither satisfied nor unsatisfied or extremely unsatisfied. Findings revealed that a significant portion of respondents (60.0%) indicated that they were extremely satisfied with the OS that they were using while 30.0% of all respondents were moderately satisfied but they were not thinking of looking for other OS. Only 8.9% of respondent were neither satisfied nor dissatisfied by the OS they were using, and 1.1% were completely unsatisfied. Figure 2 shows a summary of these findings.
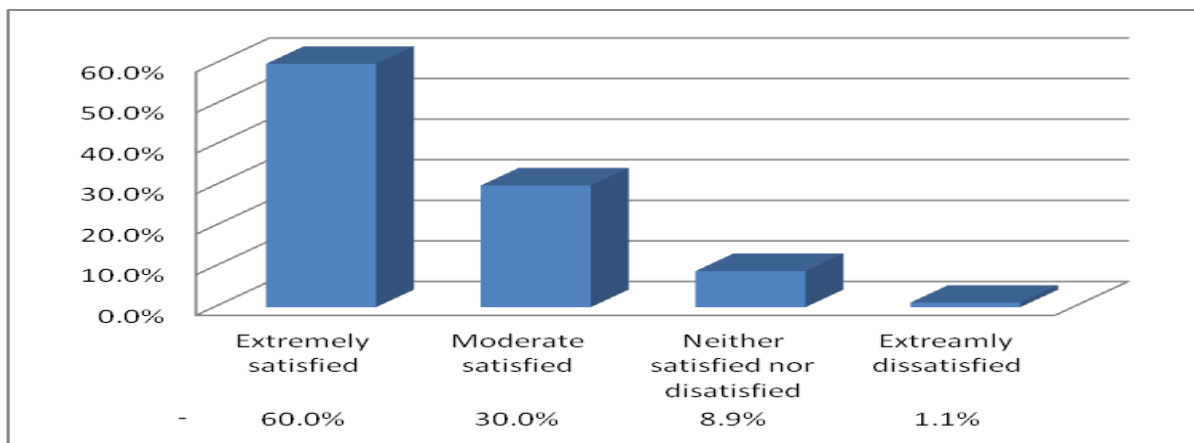
Figure 2: Satisfaction level to measure students' perceptions on the OS they are using

4.4 Factors hindering respondents from shifting to new OS
As it was observed in the findings in section 4.2 above, there is no natural shift from old OS to new OS after release of the new OS. This study sought to find out the underlying reasons or factors for that. Results indicated various reasons as shown in Figure 3. Most of respondents (65%) indicated that they only fear of taking the risk of shifting form the OS they are using to new OS. This can also be regarded as fear of change. They actually shift to new OS after they hear from others that the new OS is good. Further, 17 (14%) indicated that the new OS always come with new features which are complicated. Time to learn new features were another factor which covered 22 (18%) of all respondents. Other factors were comfortable with the existing OS which took 14 (12%). Moreover, the study observed that 19 (16%) of respondents do not move to new OS because they are not aware of the new OS and 3 (2%) do not move because of the economic factors, in other words, the new OS is expensive for them to afford buying.
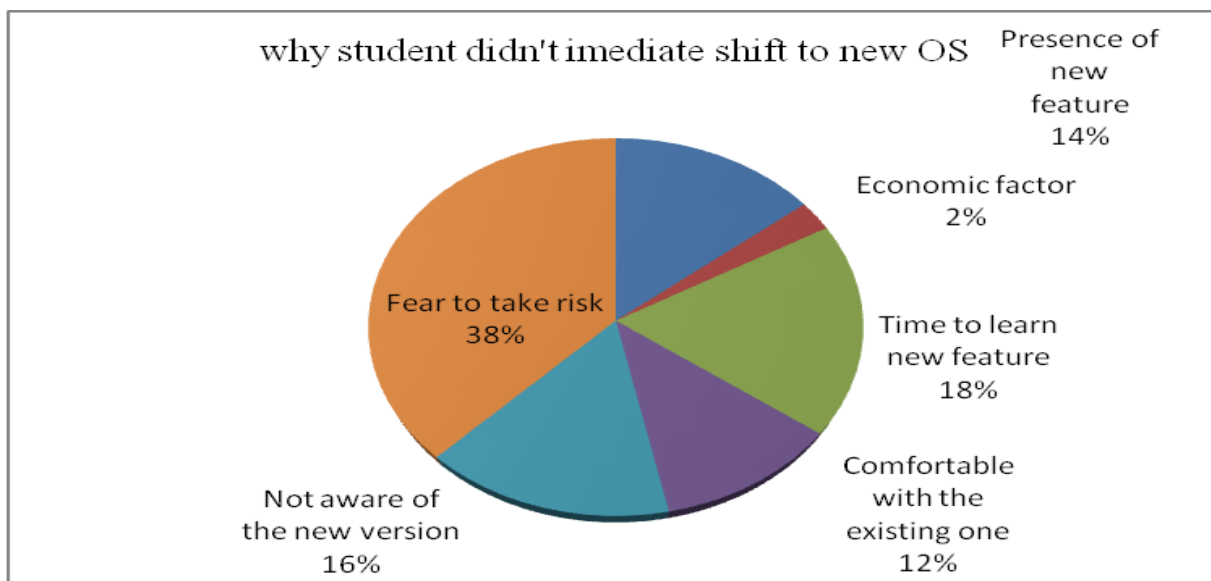

Figure 3: Factors hidering respondents from shifting to new OS

It was further observed that some of the respondents use new version of OS just because it came with PC already installed. However it was interesting to note that some of the respondents went far to uninstall the new version of OS that came with PC and install an old version

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion
Basing on the findings in this study, it can be concluded that although there are several OSs which are currently used by respondents but Windows OSs are used most as compared to other types of OS, with Windows 7 used by more than 70% of respondents. A significant portion of respondents considers the type of OS they are using suitable to them as they indicated to have been greatly

satisfied with the OS' user friendliness and features. Although it is believed, from developers point of view, that new versions of OS comes with improved features but there is no natural shift among respondents from old OS to new OS after release of the new OS. In other words there was an observed hesitation among respondents to adopt new OS. Some of the reasons for that was fear to take risk, presence of new complicated features in new OS, unawareness of the new OS, and economic factors.

5.2 Recommendations

The study therefore calls for awareness creation among respondents on the importance of using newer OSs. Also due to the low use of non-Windows OS the study recommends that there should be awareness creation on the importance of those non-Windows OS. However this can be achieved after researching on the reasons as to why university students prefer Windows OS than other OS, thus this study also recommends for an in-depth study on the same.

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