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The Impact Of Selected Instructional Factors On The Quantity And Quality Of Computer Skills Acquisition And Use By University Students

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Abstract: Zimbabwean universities incorporated Information and Communication Technologies (ICTs) into their curricula as a key aspect enabling students to improve ICT skills quality through Internet researching, communication and using software packages for learning and future employment. However, numerous factors influence computer skills acquisition and use among these students whose levels of computer literacy vary due to their divergent educational and social backgrounds. A qualitative case study was done to find out how particular factors influenced the quantity and quality of computer skills attained by students doing the *Introduction to Computers CS101* course and how this relates to students' final competence levels and ICTs usage. Findings of the study indicate that whilst lecturers have the requisite qualifications to teach the course, the shortage of resources, lack of differentiation of students as well as inconsistency in lecture attendance by both students and lecturers compromise the quality and quantity of skills attained by students. In addition time allocation during lessons, and the assessment procedure are strongly skewed in favour of the theoretical, rather than the practical component. Attachment and library services were very supportive in refining I.C.T. skills. Time allocation during lessons and the assessment procedure should reflect that the course is practical oriented. The government could also assist in the provision of ICT infrastructure in schools and tertiary institutions. It is imperative for the relevant education ministries to enforce educational policy changes which make it mandatory for pupils and students to have certain Information Technology (I.T) skills before they complete particular main education levels.

Keywords: Quality Assurance, Information and Communication Technologies, Computer Skills curriculum, Higher Education

Introduction

Defining ICT: In this digital era, students should be able to utilize e-resources and services in order to excel in academics as well as to fit in the demands of the labour market (Tella, Tella, Ayeni and Omoba, 2007; Anaza, 2008 cited by Oniye, Yahaya and Alawaye, 2010). Angello and Wema (2010) define ICTs as the techniques, methods and tools used to access electronic information and to communicate with others using computers. According to Aina (2004) cited by Angello and Wema (2010) information literacy (IL) is the ability to realise the need for information, the ability to identify information sources, locate, search, access, analyse, evaluate and use information. This information may have to be searched for using a computer; hence computer literacy becomes an important pre-requisite for any student in an institution of higher learning.

Eisenberg and Johnson (2002) observe that the concept of computer literacy is understood vaguely by most people as to mean knowing how to use a computer. However, educationists are now advocating for a more meaningful use of technology in schools. Eisenberg and Johnson (2002) argue that the end result of computer literacy is to use technology as a tool for organisation, communication, research and problem solving. On the other hand, ICT proficiency is the ability to use digital technology, communication tools and/or networks appropriately in order to function in an information society. The ability to use ICTs effectively and efficiently represents 'a competitive edge in an increasingly globalizing job market' (Sari, 2012:21).

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Some suggested curricula for IT literacy

Anaza (2008) cited by Oniye (et al) (2010: 307) also states that 'for a good foundation to be laid in ICT for students, sufficient ICT courses with practical orientation should be included in the Higher Education curriculum.' Training programmes provided by libraries to users also enable them to make more effective and competent use of information resources (Jian, 1999 cited by Kamar, 2008). Students should be able to use computers as part of the process of accomplishing their task. Eisenberg and Johnson (2002) suggested some relevant competencies as knowing the basic operation, terminology, maintenance of equipment, how to use computer-assisted instructional programs, computer programming and the impact of technology on careers, society and culture.

Some of the weaknesses noted include the fact that most IT curricula focus on isolated skills such as knowing the parts of a computer, using a word processor and searching for information on the Internet. Eisenberg and Johnson (2002) acknowledge that while it is good for students to learn these specific skills, this approach does not offer an adequate model for students to transfer and apply skills in various situations. They need an understanding of how the various skills fit together to work out problems and complete tasks (Eisenberg and Johnson, 2002).

Challenges in IT curricula implementation

Oniye (et al) (2010:309)'s study indicated that 'most lecturers are computer semi-literate if not out rightly illiterate just as most of the students,' a finding that has also been confirmed by Sari (2012: 21) who noted that 'neither students nor instructors are completely ICT proficient in many Higher Education (HE) institutes'. This is disturbing as these lecturers may not be in a position to promote the use of some student-centred learning strategies. Oniye (et al) (2010:305) state that 'child centeredness has been enhanced by new technologies in education which make it possible for students to study on their own and at their own pace'. There are also challenges in trying to teach both students and lecturers how to make use of IT in the teaching and learning process due to 'inadequate professional staff... and inadequate time allocated for user education' (Kamar, 2008:93).

Use of e-resources in universities

Kamar (2008: 89) states that electronic information resources are 'any hardware or software intended for the storage, transmission and use of information as well as the digital content files that may be stored, transmitted, or used with hardware/software'. Manda (2005) observed that there is underutilisation of electronic resources in Tanzanian institutions and 'even within institutions where there is significant use of these resources.....these are not used by a wide spectrum of users', (Manda, 2005:270). Manda (2005) noted that undergraduate students mostly use PCs for e-mail communication with friends. However, with the necessary training in ICT, students could 'explore high-level cognitive activities such as autonomy, creativity, problem solving and team work among students of higher institutions' (Oniye (et al), 2010: 306).

Students' training needs

Before any new technology can be effectively and efficiently utilised, those who are to use it should have the skills to operate and use the technology. Specific training on how to use e-journals is necessary in this respect rather than general training on the application of computers (Manda, 2005). Lwehabura (2008) also noted that though students in Tanzanian universities have access to electronic information resources they still lack adequate knowledge as well as searching and evaluation skills to effectively utilise them. Oniye (et al) (2010:309) emphasized the need for ICT training to promote its use stating that 'both lecturers and their students have a lot of areas demanding improvement in order to ensure effective integration of ICT into our institutions of higher learning'.

This study aimed to investigate university students' levels of background knowledge in ICT components and also to find out the factors that determined the kind of teaching and learning activities that were employed to teach the *Introduction to Computers* CS101 course. Since the 'relationship between the use of ICT and students' performance is not clear, and there are contradictory results in the literature' (Ben-Youssef, and Dahmani, 2008: 46), this paper also sought to get answers on how university students make use of the computer skills they acquire to enhance learning and prepare for employment in the technology driven world of work.

Objectives

1. To examine fourth year university students' background knowledge and literacy in computers.

2. To establish the factors influencing computer science instruction.

3. To determine the quality and quantity of computer skills attained by students who have

taken the basic computer skills course.

4. To assess the relationship between the content of the basic computer science course and ICT usage among students.

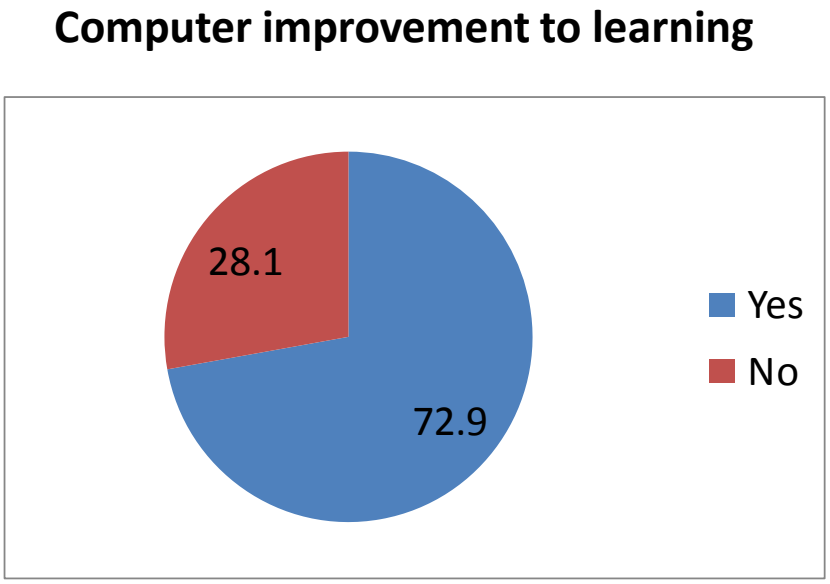
Methodology

Three hundred and four 4th year students were purposively sampled for this qualitative case study, which is nesting the quantitative paradigm (descriptive statistics) because they had done and completed the *Introduction to Computers* CS101 course and were back from industrial attachment to complete their studies. Data was collected through document analysis of the *Introduction to Computers* CS101 skills course outline for the institution in question, questionnaires with 304 students across 3 faculties, interviews with lecturers and library personnel and a students' focus group discussion. Eight Part 4 students whose ages ranged from 20 to 25 years involved in the discussion were assigned numbers according to their seating order for easy identification. Through a self administered questionnaire, students were asked about what they knew concerning computers before they did the *Introduction to Computers* CS101 course, what and how they learnt, their frequency of attending lectures and the skills they acquired upon completing the course.

Presentation of Results and Discussion

Introduction

It was noted that the majority (72.9%) of the students were of the opinion that the computer course helped them to improve the quality of university learning while the rest did not think that the course helped them to improve in anything.



Quite a number (96%) of the students asserted that the course was relevant to university education and it prepared them for their future at the work place in this age of advanced technological development. However, these students noted that industrial attachment played a big role in augmenting what was learnt in CS101. A few of them (3%) were not sure while 1% said that it was not relevant. This could be due to the fact that they already knew all that was taught theoretically and practically in this course.

Fourth year university students' background knowledge and literacy in computers

It was noted that fourth year students had different levels of computer knowledge, ranging from knowing nothing about computers to knowing more than the lecturers who taught them. This depended on the level of exposure to ICT prior to enrolment at the university. This was pointed out by one student in an interview:

> When I came to the university, I could use word processing, an experience from Kriste Mambo High. I couldn't even do data analysis using Excel.

> Up to now, I can't use Access, which is used to create data bases… My sister who is currently doing 'O' Level at Kriste Mambo can use computer Access while I can't.

One computer science lecturer realized that: *the students were a mixed bag, some have not even used a computer to the extent of not knowing anything. They did not know what clicking is, and how it is done.*

This was supported by some of the students who participated in the focus group discussion. One of them said:

Ndaingoziva [I only knew] computer word processing and typing.

while the other one confessed that she, *knew nothing about computers.*

It is however, important to note that this is a core course which is supposed to be done and passed by everybody in order for a student to graduate, but it sounded a waste of time for those who already knew all that was to be done in this course. Yet on the other hand, some students did not know anything about computers before coming to the institution of higher learning.

This serves to illustrate that doing computers at the lower levels of education can go a long way in equipping students with basic computer skills. At university they could then start learning about the use of software packages that are used specifically in their subject areas, thereby affording them enough time and opportunity to learn what they would meet and use in the real world of work when they graduate.

Factors influencing computer science instruction

The basic computer skills course is supposed to be done by all first year students across the three Faculties of Agriculture and Environmental Science, Science Education and Commerce. This is against a background of the general shortage of Computer Science lecturers visa-a-vis large student numbers. The few lecturers would then resort to mass lectures, which are not favourable to a practical oriented subject like Computer Science. The adequacy of students' practice could also be questionable as pointed out by one female student in an interview:

> We did it Part 1 first semester. We were 500 and mass lectures were conducted. We only learnt for exams without application. I remember doing only one practical. I never knew anything about Excel and Access (software packages) until I went for attachment. When I went for attachment, I failed to write a report and to draw graphs. I did not know how to cut and paste when I was asked to draw graphs showing January to December results of water analysis.

One lecturer also confirmed that they had large classes and said, *In 2010, I taught 600 students but the numbers were less than that in 2011.* It also came out that resources were generally inadequate and most computers were outdated as **Student 2** pointed out that,

E-learning yanga yakadhakwa [E-learning did not work for us] *because they wanted to implement modern things with old facilities e.g. uploading an assignment.*

Time, qualified lecturers, computer science laboratories, state of the art computers and other related ICT equipment were generally inadequate. Yet in Walker (2004) one study, results were statistically significant that small classes had a positive impact on student performance when there is controlled variation in instruction, lecture material and topic coverage by using the same instructors. A better Higher Education environment is correlated with small computer science classrooms (Walker, 2004). This concurs with Hanusek (2003) in Ben-Youssef and Dahmani (2008) who had similar findings. Nevertheless, the shortages mentioned above did not allow the division of pupils into small classes and with the overwhelming student numbers; lecturers had little choice in terms of varying instructional strategies. This led to some problems as noted by the students, some of whom had this to say:

I did one lecture per week which was too little. It was done between 4-6 but normally we ended before 6 because of power cuts.

We were not allowed to use the Education laboratory for practice. There were few computer resources and there was no access to those resources. There was no chance for students to use computers unless it was a lecture. **Student 4**

Lectures would clash since some CS101 lectures were not timetabled and lecture rooms were not

enough. **Student 2**

The large student numbers and inadequate computers resulted in a lot of group work during practical lessons and some students noted that:

- *Once you are put in pairs or in a group, the one who knows better always dominates the others and always manipulates it while others just look on, yet it is supposed to be a hands-on minds-on exercise.*

- *When they teach, they should separate students according to what they already know. This is because it will be the first time for some to see a computer let alone operate it while others can do the basics. There are others who may know more than the lecturers. Lecturers should use such students as resource persons.*

Since everybody had to pass this course in order to graduate, it appears the dominance by those students who were more capable of using computers was a consensus from group members so that they could pass the course without necessarily acquiring the knowledge and skills they were meant to have after the course. On the other hand, lecturers had good intentions as one lecturer stated that:

these groups were made up of mixed ability students so that those who know could assist those who did not know.

However, telling students that failing the course meant that they would not graduate resulted in exam oriented learning where students became more interested in marks at the expense of attaining requisite computer science skills.

Lecturers had Masters' degrees in Computer Science, which is the minimum acceptable for one to teach such a course at a university. However, the fact that they did not have a professional qualification in teaching could have made their task more difficult. A significant number (64%) of the students confirmed that lecturers did not differentiate them according to their levels of computer knowledge to cater for individual differences, something that a professional teacher could probably do in the first instance. Such recognition would have assisted in teaching and treating students accordingly for maximum benefit without wasting time for those who knew more or everything on the course outline. More time, resources and simpler tasks, to begin with, would then be allocated to students who either did not have, or had little experience in computers.

Since class sizes were very large, participants made the following suggestions for improvement: *the university could procure, speakers, microphones for voice projection.*

With more computers, it would be better for students to work individually so that they gain experience. The university could go further and find a suitable students' laptop procurement scheme in liaison with reputable suppliers of such products.

There seems to be no way to confirm competencies acquired by individual students. The assessment procedure is therefore flawed if one considers the conflicting interests of students' knowledge and skills acquisition vis-a-vis learning to pass examinations. It also emerged that the assessment procedure was flawed since more marks (70%) were awarded for the theory examination in this practical oriented course. The practical aspect was assessed from group work not done under examination conditions, which tended to cover up for those who may not have mastered the relevant skills. The lecturer also noted the disparity and stated that, *their marks were mainly boosted by the practical assignment marks.*

One student pointed out that she:

> .. got no skills from this course. I got a 2.1. I think I passed it through the theory exam. When doing the practical, we would work in fours on one computer. The one who knew computers did everything and we would get a group mark which made up 10% of the final mark. We wrote 2 in-class tests (10%) and two assignments (10%). The exam made 70% of the final mark.

Therefore it is imperative that there be a final practical examination for individual students. This would encourage students to acquire and practice the basic computer skills both for certification and future application at the workplace.

Some students felt that lecturers' pitch was too

high because they assumed that all students were operating at the same level such that they did not differentiate the students. The focus group discussion revealed that lecturers, *mystified everything because the theory was too mathematical.* **Student 4** reiterated that, *They should remove mathematics because binary doesn't help us. We can't see it on letters on the key board. We want more practicals.* In agreement to that, one lecturer said, *we revised the course outline and removed most elements that had to do with mathematics because most of the students do not have a mathematical background.* This is the reason why Oman (1986) argued that mathematics proficiency was identified as the key student characteristic leading to successful completion of computer science courses. This enables better understanding of programmes like Excel and Statistical Package for Social Sciences (SPSS), which play a great role in a number of their academic courses and future jobs. Since the introductory course was compulsory, whether one had a good mathematical background and ability or not, those who were weak are more likely to have complained about the inclusion of the mathematical aspects.

The history of computers, their classification and the other two sections on how data is presented, as noted from the document analysis, could be removed from the institution's course outline since it will not affect the main aim and objectives of this course, which are; to use ICTs as communication and information, processing and storage tools in various organizations. Such a move could save time that can then be reallocated for practical sessions since it has already been observed that time as a resource in this course is inadequate. In a way, students were keen to learn the practical aspects of computers that would enable them to enhance their learning while at the university and did not see the reason why they were supposed to know the mathematical background of computers. They could have been right since the course was mainly designed to enhance learning through, for example, the ability to surf on the Internet and get relevant information for their studies as well as to know software packages relevant in their fields of study and how they are used. This is supported by earlier research findings that concepts must be connected to useful skills for them to be meaningful during the learning process. Motivation vanishes rapidly if the learning objectives are reduced to memorizing facts or through routine drills with application software (Faessler, Hinterberger, Dahinden and Wyss, 2006).

Quality and Quantity of Computer Skills Attained By Students Who Did the Introduction to Computers Course

The quality and quantity of computer skills to be attained by students as indicated in the course outline are adequate for an introductory course in computer skills if everything was done as stated. The lecturer acknowledged the negative impact of shortage of resources on the teaching and learning of the course and stated that:

> During theory lessons, I used slide lectures [power point presentations] in the Great Hall. The challenges I faced were related to audibility, so there is need for a public address (PA) system since most of the students attend lectures and the Great Hall was always full of students. Last year (2010), ES alone had a group of 60 students who would share 20 computers. I had to divide them into 3 groups such that I ended up having 3 instead of one session. I had to sacrifice some of my time as a lecturer in order to cover up.

The students also concurred with the lecturer's assessment of the unfavourable teaching and learning environment. According to **Student 7** *One had to come very early for lectures in order to sit in front near the lecturer so that you could hear what he/she says. Therefore there is need for projectors and microphones.* **Student 6** concurred and pointed out that, *The practical aspect was really poor but as for theory they tried and we were given a lot of notes. They should build a big computer room for common use. Or else they could fill Room C2 with public computers for students.*

Therefore, the shortage of lecturers, computer laboratories, computers and time, coupled with absence of student differentiation during instruction resulted in inconsistencies in the quality and quantity of skills acquired by students as illustrated by what they said during the focus group discussion:

Student 1 *I was taught generally how to use a computer.*

Student 2 *Fast learners can cope but others can't. I found it humiliating to go to the lecturer on my*

own to seek assistance and clarification.

Student 3 *How to find totals of pupils and ranking them.*

Student 5 *How to write a letter, print and animation.*

Student 6 *How to write assignments and store information.*

Student 7 *I learnt the importance of computers in learning, use of Internet for searching information and e-learning.*

The inconsistencies could also have resulted from the variations in lecture attendance by both students and lecturers. This is illustrated by individual students' focus group responses on lecture attendance: **Student 1** *I attended all lecturers* **Student 2** *10%*; **Student 3** *80%*; **Student 4** *100%*; **Student 5** *70%*; **Student 6** *60%* and **Student 7** *100%*

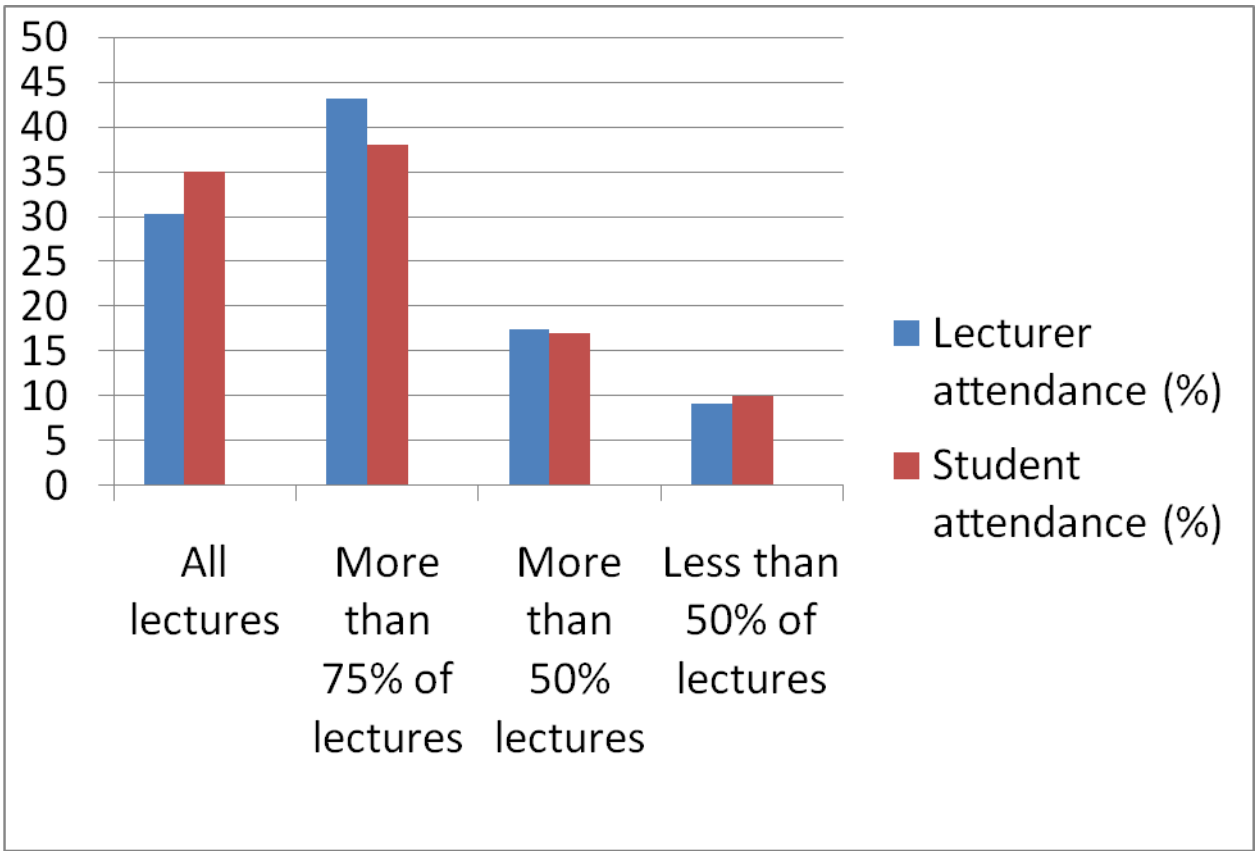


Fig 1: Lecture attendance by both students and lecturers.

Despite an outcry of inadequate time for the course, both students and lecturers lost 27% of the valuable time for teaching and learning through non-attendance of lectures. However, these variations could have resulted from frustrations on the student's part due to the nature of the learning process, that is, large classes and shortage of computers or the level of student competence in computers. **Student 1** pointed out that:

there was too much theory and the practical part was not very much considered so it was poorly done. We were asked to go to the ASTRA Campus where we shared computers at a ratio of 1 to 5. Only one person could gain experience instead of everybody. Lecturers taught as if everybody knew what they were talking about. Wasara wasara, they were too fast. They didn't show us for example how to google. **(Student 6)**

On the other hand those who knew almost everything on the course outline in theory and practice might have found no reason to attend all lectures. Meanwhile, those who did not know anything or very little about computers observed that lecturers were too fast for them to catch up and learn meaningfully. The content could also be too difficult for them to comprehend such that they probably ended up not attending or attending a few lectures, maybe those which had something to do with assessment. In view of the above, computer science lecturers needed to take cognisance of the students' computer skills and knowledge background so that their methodology could be

chosen accordingly for meaningful learning to take place.

Both lecturers' and students' negative perceptions were a barrier to meaningful learning. **Student 2** said that, *lecturers had misperceptions about groups of students who did certain degree programmes eg Peace and Governance* and **Student 7** said that, *the last group was asked to write 6 assignments and upload them. This was too much because the regular and usual we know are 2 assignments.* The lecturer could have increased the number of assignments as a mitigating measure to take care of students' shortcomings but they took it otherwise. **Student 1** reiterated that, *2.1 was a grade reserved for those who did computer science as a degree programme. The degree programme one was doing was used to consider whether a student was passing or was failing.* However, such allegations were not supported by facts since document analysis of the mark profiles indicated that even Development Studies, Biology, and some Computer Science students got distinctions as well.

One other observation was that students really acknowledged that lecturers uploaded notes on the Internet but they failed to access them because of numerous reasons they outlined during the focus group discussion. According to **Student 3,** *We were given notes as soft copies and we were supposed to open e-mails but due to differences in backgrounds, others failed. We had no computers and we would get high practical marks through unscrupulous means. It demotivates students.* 5 out of the 7 students who made up the focus group had no computers and they also reiterated that only a few students had personal laptops, which they were not really willing to share with fellow students for various reasons. Others would make them pay for using their laptops. **Student 5** said, *Soft copies of notes affected us because we had no access to computers* and **Student 3** said, *It took us time to print and we would pay money for someone to do it for you.*

To show that students were aware of what was necessary and what they could also do to effectively make use of the minimal opportunities, **Student 2** said, *Individual effort is the one that works when one is doing this course.* However, students disadvantaged themselves by paying other students to do work for them since they ended up not knowing anything. **Student 1** stated that, o*thers could not even form a folder upon completion of the course. I think because of numbers, they* (lecturers) *would just say each man for himself. If you can't do it, that was your own business. Nothing was solved….Others would make noise and it would affect everybody in the lecture.*

In some cases failure by students to execute certain computer functions was because**:**

> Others would do it for us. You would buy sadza (Zimbabwe's staple food made of maize meal mixed with boiling water into thick porridge) for a fellow student to upload for you so that you could pass. Today a student with a 2.1 cannot use a computer, 3 years after doing the course. You end up paying someone for your work to be done. **Student 2**

The focus group members said some of the computer skills they attained include the use of MS Word (typing, cutting or copying and pasting), Power point, Excel and use of the Internet to surf for relevant information and sending e-mails. Those with laptops went a step further to learn more than the basics, for example, Access and DBMS.

The relationship between the basic computer science curricula and ICT usage by university students for studies and future career

An evaluation of the *Introduction to Computer Science* (CS101) course outline revealed that it contained all what is critical to be learnt at that level. However, it was impossible to accomplish everything and do all the theory and practical aspects in 48 hours, which is the time allocated for each full course per semester at the institution. It is critical for the students to continue practising the various computer skills outside lecture time if resources are available so that they sharpen and widen their computer literacy skills acquisition horizon. Possibly, they could use free slots but one wonders how feasible it could be without their own laptops and the few ICT resources available in the institution, computers in particular.

It was established that there was a wide variation of what students learnt from lectures and individually and not adequate to prepare them for the world of work as indicated by the excerpts below:

> [I learnt] How to use the Microsoft word, mailing of letters, printing, using Power point, Microsoft Excel and Access, how to google information, how to send an e-mail and opening an e-mail address. How to copy and paste, opening folders in

> Power point, animation, transitions and changing font sizes, deleting information and retrieving it from the recycle bin, how to calculate and rank marks. I don't have a computer or laptop. (**Student 3**)

> I can type but not very well also I now have an idea on how to access information from google but I am not able to do some of the things like designing a programme. What I can do right now is typing. I did this through the knowledge from the lecturer. I don't have any computer or laptop personally. (**Student 5**)

> Now able to access information from the computer but face some difficulties on how to get the source. I am unable to download. I am able to write assignments through individual effort. I am able to use the Microsoft word and power point through the lecturer's effort. I am able to read e-mail and save the information through both individual and lecturers' effort. I don't have a personal computer. (**Student 7**)

> Typing, power point, theory-application of computers in education, printing letters, mail merging. All these became known through the lecturer's effort. I learnt how to access the Internet and searching for information through my own effort. I don't have a personal laptop or computer.(**Student 8**)

Even the lecturer acknowledged in an interview that in this course they do not focus on subject-specific computer skills as noted in the excerpt below:

> During lectures, students are taught the following; How to operate a computer, how to use a computer to do online research as well as to type, store and retrieve information. They are also taught to communicate using the Internet and to appreciate the concept of having data bases and networks. Normally 80% of the students will be able to do the above listed by the end of the semester. Students are taught about how to use an already existing system, software packages but they do not do programming. In geography and ES they use Geographical Information Systems (GIS) while those doing commerce also use accounting packages like Pastel.

The importance of attachment and library orientation on the use of e-resources cannot be overemphasized since 'an appropriate use of digital technologies in HE can have significant positive effects both on students' attitude and their achievement' (Ben-Youssef, and Dahmani, 2008: 48). Workplace attachment is necessary for practising and improving particular skills in the relevant context. Most students revealed that it was during attachment that they learnt more about computer skills and software packages relevant to the type of job that they were being trained to do. This serves to reinforce the fact that 'if HE institutions are to accomplish their mission of preparing students for success in today's world, then clearly they must address the growing demand for ICT literacy' (Sari, 2012:29). One student said, *I can now draw graphs and use Excel and I can now prepare power point presentations, which I could not do earlier on. I learnt all this while I was on attachment.*

Learners should have access to computers and should be computer literate before enrolling in tertiary institutions. This can only be accomplished if Computer Studies becomes one of the core subjects from primary school level to high school so that by the time they graduate from high school they should have gone beyond the ability to type. Tertiary institutions would then start on software packages for the different degree programmes rather than elementary skills. Focussing on different tiers of the education system can result in a more ICT savvy university product that can be released into the workforce in a state ready to productively contribute towards economic and intellectual development of the country. The product of such an environment is more likely to be internationally agile and productive through the medium of a computer and the internet. Effective workforce is crucial for the development of the country if they are effective users of technology to

drive economic productivity in their workplaces. When such people become managers and workers in companies they are likely to make maximal use of advanced network skills in conducting business. They are also likely to push for the greater use of technology to maximize productivity and business profitability on an international scale.

Conclusion

Whilst lecturers have the requisite qualifications to teach the course, the shortage of resources compromise the quality and quantity of skills attained by students. Differentiation of students according to prior knowledge is not being taken into account when planning teaching and learning approaches. There is inconsistency in lecture attendance by both students and lecturers which may be causing variations in the basic skills acquired by different students. Time allocation during lessons and the assessment procedure are strongly skewed towards the theoretical at the expense of the practical component for this practical oriented course.

Recommendations

Students could be differentiated according to prior knowledge and instructional approaches which should cater for their various levels of competency and exposure in ICT so that they find it worthwhile to attend lectures and benefit accordingly.

Time allocation during lessons and the assessment procedure should reflect that the course is practically oriented by allocating more time and marks to the practical component.

The institution could make moves to make the basic computer course double or to have it done in 2 stages of Basic Computer Science (CS101) I and II so that more time can be allocated to this important course.

Students need to be taught using the actual and contemporary ICT technologies in industry, for example upgrading computer software from Turbo Cash to Pastel in Commerce.

Private or university owned and subsidised Internet Cafes could be set up at various points in the campus to enable students who do not have computers to continue practising and accessing information from and to lecturers as part of e-learning. The establishment of a large e-learning centre through sourcing for donations in cash and kind from the corporate world and the alumni could be done.

Procurement of more generators to deal with incessant power cuts could be done for students' computer laboratories.

Revision of course outline could be done in line with the findings and arguments such that it equips students with specific practical skills that make it possible for them to make a positive impact in the workplace. A case in point is where a university focuses on producing students who will be predominantly teachers and lecturers, then it should equip them with specific skill such as providing assignments to students through the Internet. Imparting them with online teaching skills like Blackboard and Moodle make it possible to implement these in the colleges and schools they go to teach. Nevertheless, lecturers and students should have frequent and reasonable access to and use of ICT in order to achieve the revised course objectives.

Responsible Education ministries should aggressively lobby for the enforcement of policy changes which make it mandatory for school children to have certain ICT skills before they complete the following education levels; primary, secondary and university. This is achievable because computers are becoming more affordable and since most parents have built many schools through school levies. Making ICT a pre-requisite for entry into university though, a harsh approach might speed up the process. An advance warning of between 3-5 years could be given before such a policy is enforced. This will force schools, teachers and parents to find more innovative means of increasing ICT resources for example through school levies, to enhance computer skills acquisition as students go through the education hierarchy.

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