

**Information and Communication Technology (ICT) Skills for Bachelor of Education Degree Students at the University of Zimbabwe: Implications for University Policy on a Computer Course for Undergraduate Student Teachers.**

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**ABSTRACT**

*The development of appropriate computer literacy skills within all school teachers for non-computing subjects has recently become a strong international challenge. This is in view of the increasing use of computers in enhancing learning in all educational institutions, including colleges and universities. Employing a survey methodology, this study sought to provide answers to questions that included; what computer skills do undergraduate student teachers bring with them to the University of Zimbabwe; what computer equipment was available at the teachers' schools and homes; and what factors influenced the teachers' computer skills development. The findings indicated the students teachers were generally from rural areas and had no, or very little, experience with computers, with most of them using a computer for the first time. The study recommends strengthening the course through strategies such as increasing the computer equipment available for training and offering a separate certificate for the course as an incentive.*

## **1.0 Background to the Study**

Zimbabwe has an Information and Communication Technology (ICT) Policy requiring all school and college students be exposed to computer skills (Government of Zimbabwe, 2004). This is in view of the importance ICT literacy skills have assumed in today's world, especially for teachers who have the responsibility for preparing the nation's children for a future dominated by ICT technology. This means that computer literacy skills for all teachers are critical in Zimbabwe's efforts to introduce effective ICT programmes in its educational institutions. Of particular concern are ICT skills for non-computing teachers who tend to use computers mainly for word processing as a tool for administrative chores rather than for assisting students to learn (Ministry of Higher & Tertiary Education, 1995; Williams et al, 1998). This study explores the views of undergraduate student teachers exposed to introductory ICT skills at the University of Zimbabwe with the aim of assessing these views and their implications for policy.

Chetsanga (2002) notes that skilled Zimbabweans have been emigrating to other countries in large numbers, the greatest loss occurring in the education and health sectors. Chetsanga observes that this has resulted in a serious shortage of teachers with computer literacy skills within Zimbabwean schools. This means that ICT training at university for student teachers who will then train other students becomes crucial. The issues to be addressed with regards to ICT training for Zimbabwean school teachers include:

- 2.0.1 The effective utilisation of the large number of computers recently procured by, or donated to, Zimbabwean educational institutions, with over 7300 computers having been donated through the President's Computer Programme between 2004 and 2006 and one university having received more than 400 computers as donations in 2005 (The Herald, 2006; University of Zimbabwe, 2006);
- 2.0.2 The apparent inadequate ICT skills within Zimbabwean non-computing teachers;
- 2.0.3 The flight of Zimbabwean ICT teachers from schools to other employers within and outside the country;
- 2.0.4 The need to develop within all Zimbabweans relevant ICT skills for survival in the twenty-first century;
- 2.0.5 The potential for the Internet and other ICTs as alternative information sources in addressing curriculum related challenges, such as shortages of books, periodicals and other printed reference material, in Zimbabwe; and
- 2.0.6 The ICT skills required by teachers who teach subjects other than ICT for them to be effective in teaching those subjects.

In response to the above challenges, most state universities in Zimbabwe have introduced ICT skills training as a compulsory component of the curriculum for all their Bachelor of Education and Master of Education degrees, and the Graduate Diploma in Education programmes (University of Zimbabwe, 2004; Bindura University of Science Education, 2005).

## **2.0 Conceptual Framework**

The teaching of ICT skills to practicing teachers for non-computing subjects has recently received attention both locally and internationally because of globalisation. For example, Hawkrige and McMahon (1992) stress the importance of appropriate policy with respect to the use of computers by teachers for non-computing subjects in Third World Schools. They point out that all teachers need computer skills and recommend a collaborative effort between school heads, teachers, teacher educators and computer education specialists or consultants in coming up with an appropriate policy. Williams, Wilson, Richardson, Tuson and Coles (1998) recommended a shift in policy towards staff development for all non-computing teachers to the Government of Scotland in line with its programme to have all schools connected to the Internet by the year 2002.

The policy to introduce ICT training for teachers attending programmes at universities in Zimbabwe is an innovation whose implementation needs to be guided by research. Therefore, this study is justified for two reasons. Firstly, the study should provide information that may be useful in understanding the challenges faced by those that enrol as undergraduate student teachers for ICT courses in Zimbabwe. This information should help in ensuring the success of the ICT skills training of these teachers through addressing identified challenges. Secondly, the study should contribute towards the refinement of policy on the ICT skills training for undergraduate student teachers at the University of Zimbabwe. This is because the information generated here should be useful

to policy makers, implementers of the policy, and other stakeholders participating in making graduate teachers become computer literate.

### **3.0 The Research Questions**

In view of the above issues, the questions that guided this study were:

- 3.0.1 What ICT skills do undergraduate student teachers bring to the University of Zimbabwe?
- 3.0.2 What ICT equipment is available at the schools from which these teachers come?
- 3.0.3 How do the student teachers rate the level of ICT skills that they bring with them to the University of Zimbabwe?
- 3.0.4 What ICT equipment is available at these student teachers' homes?
- 3.0.5 What factors influenced the teachers' ICT skills development during training at the University of Zimbabwe? and
- 3.0.6 What were the students' views on the ICT training programme they had just completed at the University of Zimbabwe?

These questions guided the inquiry and formed the main sections of the questionnaire that was used for gathering data.

#### **4.0 Methods and Procedures**

The study utilised a survey methodology that sought to assess Bachelor of Education student teachers' views and opinions on an ICT skills development course they enrolled into during the August 2005 semester. The course was a compulsory component of the degree programme and had to be studied during one academic semester only (a period of fifteen weeks). It was also a core course, meaning one had to pass the course before proceeding to the next level. The course was attended using the full-time mode of study. Only the students who were on campus were used for gathering data.

#### **4.1 Research Design**

The study utilised a descriptive survey research design in which the main data-gathering instrument was a questionnaire administered during the last lecture of the semester. The questionnaire was used as an interview guide during face to face interviews with students who volunteered to be interviewed. Students' views and opinions on computer skills development and the course they had attended were sought and analysed. The data were analysed using descriptive statistics to give an assessment of the students skills at entry into the course and after training, the level of confidence with operating the computer packages and how useful the course was to them after leaving university.

## 4.2 The Sample

The target population comprised the 68 student teachers enrolled for full time study in the Bachelor of Education degree programme for the university's August to December academic semester for 2005. The student teachers were in the specialist programmes of Special Needs Education, Art and Design Education, Primary Education and Educational Management. The questionnaire was administered to the 59 students who attended the lecture during which data were gathered. Fifty-four (54) responses were received from the students. In addition, ten students who volunteered were interviewed using the questionnaire as an interview guide. The data from the interview were combined with that from the questionnaire during analysis.

The demographic details for the students were asked for in Questions 1.1 to 1.4 of the questionnaire. The composition of the students by gender was fifty-four percent (29) female and forty-six percent (25) male. Forty-one percent (12) of the female respondents were aged between 31 and 41 years compared to sixty percent (15) for males, while thirty-four percent (10) were aged between 20 and 30 years compared to twenty-eight percent (7) for males. This means that females were generally older than males but the majority (44) of both females and males were aged between 20 and 41 years. None of the students was aged over fifty years.

The majority (41) of the students taking the ICT course had up to ten years of teaching experience. When analysed by sex, the percentages of teachers with up to five years experience were almost the same for both males and females. However, females had more teaching experience when compared with males. The subject areas for the teachers were Educational Administration, Special Needs Education, Art and Design and Primary Education. Those taking Educational Administration are mainly school heads and special Needs Education is for teachers of the physically and mentally challenged children. Students for Art and Design teach that subject at secondary school level while those for the degree in Primary Education teach in primary schools. The biggest group for the undergraduate student was Primary Education followed by Special Needs then by Educational Administration and finally by Art and Design. This means that the biggest proportion of respondents were working in primary schools.

### **4.3 The Instrument**

A questionnaire was designed and piloted on four students who volunteered during a practise session when they were preparing for examinations. An experienced professor within the Faculty of Education was asked for his views on the draft questionnaire. The contributions from the students in the pilot study and from the Professor resulted in adjustments that included rewording some questions and discarding others completely. The final version of the questionnaire had six sections comprising demographic details, the students' places of work, the students' ICT skills before August 2005, ICT equipment



at the students' homes, ICT skills acquired at the university and the students' views on the ICT course. The sections were based on the study questions.

#### **4.4 The Procedure**

Due to problems of securing stationery and duplicating facilities, the questionnaire was changed to a PowerPoint presentation. The researcher was the ICT course tutor and had taught the course from the beginning to the end of the semester, with the assistance of a Graduate Research Assistant (GRA). During the lecture in which the questionnaire was administered, the tutor first revised what had been covered for the entire course during the first ninety minutes of the two-hour lecture. The questionnaire was then administered during the remaining thirty minutes. Before the questionnaire was presented, the tutor explained to the students the objectives of the research and how responses to the questions on the slides were to be recorded.

All the 59 Bachelor of Education programme full-time student teachers who attended that last ICT lecture for the August 2005 semester were given a ruled A4 sheet of paper to write their responses on. The PowerPoint slides were on manual transition, with the students being allowed to ask questions where they needed clarification. Of the 59 A4 sheets that were distributed, 54 were returned with responses filled in, giving a 92% response rate. The responses to the questionnaire were then analysed as discussed below.

## **5.0 The Research Findings**

The students' responses produced the findings discussed below. The total number of responses was fifty four (N=54) and the actual number of responses is given in brackets.

### **5.1 The Students' Place of Work**

Questions 2.1 to 2.6 asked data about the institution at which the undergraduate student worked. Responses to Question 2.1 showed that sixty-two percent (32) of the teachers were teaching in primary schools, thirty-three percent (17) in secondary schools, none in tertiary institutions, four percent (2) in adult education agencies and two percent (1) in a Special School for the Disabled. The distribution was similar when the comparison was based on gender with sixty-three percent (15) of males compared to sixty-one percent (17) of females teaching in primary schools. Figure I shows the responsible authority for the institutions in which the teachers worked.

**Figure I: Responsible authority**

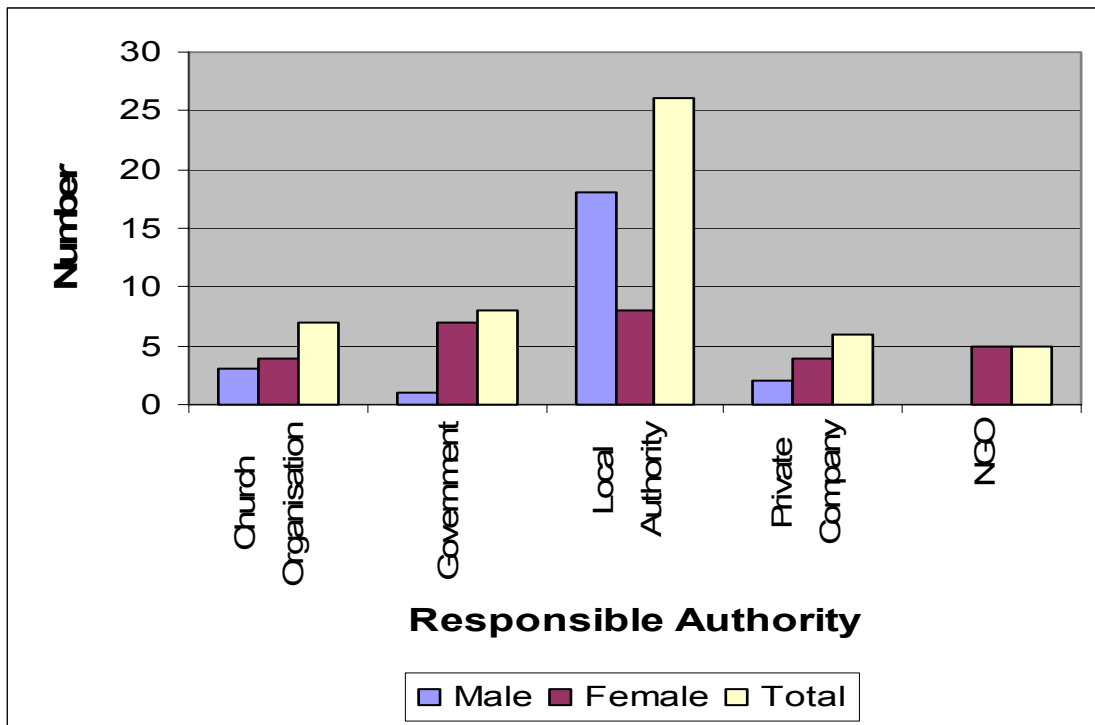


Figure I shows that the largest employer for the students were local authorities, followed by government and church missions, then by private companies and non-governmental organisations. When analysed according to gender, seventy-five percent of males (18) were under local authorities while only twenty-nine percent (8) of females were under the same employer. Females were evenly spread across all employers while males were concentrated in local authorities and church organisations. Question 2.3 asked about the location of these institutions and sixty five percent indicated that their institutions were in rural areas. A higher proportion of males (91%) was in rural areas compared to females (43%). Thus, a larger proportion of females were employed in urban areas while a larger proportion of males were employed in rural areas.

Questions 2.4 to 2.6 asked about availability of ICT equipment at the students' places of work and whether the students used the available equipment. The majority of the respondents (sixty-one percent, or 36) did not have ICT equipment at their places of work. Worst affected were male respondents of whom eighty-three percent (20) did not have ICT equipment at their places of work while fifty-five percent (16) of females were in a similar situation. This suggests that females generally had a potential for better access to ICT facilities than their male colleagues. Figure II shows the type of equipment that was available in some of the institutions.

**Figure II: Computer equipment available places of work**

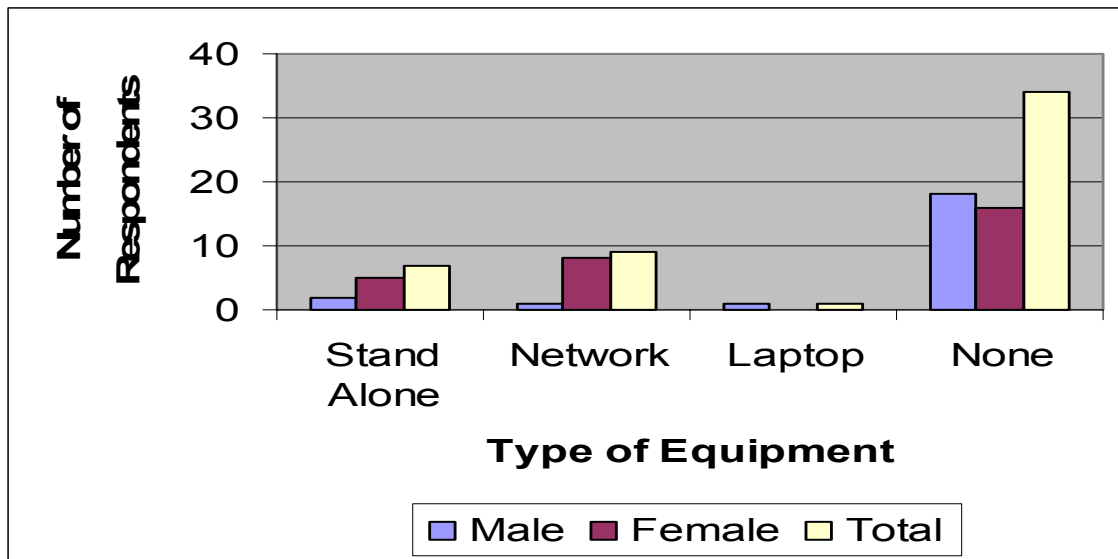


Figure II shows that the network was the most common type of equipment available in the places of work for the students. More females (16) indicated that ICT equipment was available at their places of work than males (7). This is understandable since most of the

male respondents indicated they work in rural areas where, generally, there is no electricity. Table I indicates how often the teachers use the ICT equipment at their institutions.

	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
Never	0.17*	0.21	0.20
Rarely	0.04	0.21	0.14
Sometime	0.00	0.25	0.14
Frequently	0.09	0.08	0.08
Not Applicable	0.70	0.25	0.44
TOTAL	1.00	1.00	1.00

\*Responses for each item are expressed as a ratio of the total.

**Table I: Frequency of use of ICT equipment at institution**

Table I shows that twenty percent (10) of those who say ICT equipment is available do not have access to. This is a rather high percentage bearing in mind the need to fully utilise the ICT equipment. The table also shows that females undergraduate student teachers have better access to their employers' ICT equipment than their male colleagues.

## **5.2 ICT skills before attending university course**

The majority of the respondents (66%, or 35) indicated that they had not used any computer equipment before attending the ICT course at the university. Table II shows the

students' familiarity with some software before the beginning of the semester in which they enrolled for the ICT course.

<b>Software</b>	<b>Never</b>	<b>Rarely</b>	<b>Sometimes</b>	<b>Frequently</b>
Word processor	0.69	0.17	0.17	0.24
Internet Browser	0.70	0.19	0.16	0.23
Spreadsheet	0.88	0.13	0.06	0.25
Database	0.98	0.10	0.02	0.00
Desk-top publishing	0.96	0.07	0.02	0.25
Presentation package	0.96	0.04	0.04	0.00

**Table II: Use of Microsoft Office packages**

Table II shows that most of the students had no experience with the selected packages before attending the course. The ICT course for the undergraduate students had included all the packages indicated in Table II and was an introduction to Microsoft Office packages. The database package (MS Access) was the least used package of them all, followed by the desk-top publishing (MS Publisher) package and the presentation package (MS PowerPoint). The packages that some students had used most before training were the word processor (MS Word) and the Internet browser (Internet Explorer). Table III shows how the students rated their ICT skills before the course.

	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
None	0.40	0.41	0.41
Poor	0.40	0.49	0.44
Do Not Know	0.20	0.10	0.15
Good	0.00	0.00	0.00
Very Good	0.00	0.00	0.00
TOTAL	1.00	1.00	1.00

**Table III: Rating of ICT skills as at August 2005**

Table III shows that the eighty five percent (46) of the students rated their skills before enrolling for the course as having been either ‘none’ or ‘poor’. Even if males were more unsure about how to rate their skills than females, none of the respondents rated their skills as ‘good’ or ‘very good’. This means that the bulk of the students had a very low opinion of their skills prior to training, were most likely learning these packages for the first time, and had very little or no experience with the packages.

### 5.3 ICT equipment at students’ homes

Question 4 asked for the ICT equipment available at the students’ homes. Eighty five percent (39) of those who responded to the question did not have any ICT equipment at their homes. More females than males had ICT equipment at home, with one female indicating she had access to a network at home and one male indicating he had access to a laptop at home. Table IV shows how often the students used the equipment at home.

	MALE	FEMALE	TOTAL
Never	0.18	0.19	0.19
Rarely	0.00	0.08	0.04
Sometimes	0.05	0.04	0.04
Frequently	0.05	0.04	0.04
Not Applicable	0.73	0.65	0.69
TOTAL	1.00	1.00	1.00

**Table IV: Use of equipment at home**

Table IV shows that about seventy percent of the respondents chose the “not applicable” option because they did not have ICT equipment at home. Nineteen percent (19%) of those that had ICT equipment at home were not using it. This figure is similar to those who had ICT equipment at school and were not using it (20%), meaning that a fifth of the students were not adequately utilising the ICT equipment available at home or at work.

#### **5.4 ICT skills acquired during training**

Questions 5.1 to 5.4 asked about the students’ own evaluation of the skills they acquired during the university ICT course. Question 5.1 asked the usefulness of the skills learnt to the student’s work. Table V gives the frequency of responses to this question.

	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
Do not Know	0.04	0.00	0.02
Not Useful	0.08	0.04	0.06
Useful	0.44	0.42	0.43
Very Useful	0.44	0.54	0.49
<b>TOTAL</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>

**Table V: Usefulness of ICT skills learnt**

Table V shows that ninety-two percent (49) of the students felt that the training they received was either useful or very useful. Forty-nine percent (26) of the respondents felt



the course was very useful. This shows that, in line with the course's objectives, the students perceived the programme as giving them the skills they would need when they got back to their workplaces.

Question 5.2 asked for what the students saw as the strongest reason for their view in Question 5.1. The reasons cited for negative reasons included: too little time for the course; the fast pace at which the course was delivered; lack of adequate practice in the computer laboratories during the course, hence one did not learn much; and the absence of ICT equipment at the place of work. The reasons given for the "Useful" or "Very Useful" options include the skills learnt were going to be used in management of student records, and for lesson preparation, delivery and evaluation. For example, typical comments were "The skills will enable me to create files for teaching and management of student records using these packages and research on the Internet", "We are living in a world of technological advancement, hence the need for computer literacy" and "There is a computer at my school which is not being put to good use and the knowledge I got here will enable me to use that computer to teach the packages to students".

Question 5.3 asked the students to rate their ICT skills after training at the university.

Table VI shows the responses to this question.

	<b>MALE</b>	<b>FEMALE</b>	<b>TOTAL</b>
None	0.00	0.00	0.00
Poor	0.28	0.08	0.17
Good	0.60	0.70	0.66
Very Good	0.12	0.22	0.17
<b>TOTAL</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>

**Table VI: ICT skills after course**

Table VI shows that the majority (83% or 44) of the respondents rated their skills as either “Good” or “Very Good”, a high positive self evaluation of the skills gained. Nevertheless, females gave themselves a higher positive evaluation (92%) than males (72%). This suggests that a larger proportion of females saw themselves as having benefited from the course than their male colleagues. The most likely cause for this rating is that the females seem to have used their social status to get better access to computer equipment as shown by response to Questions 2.6 and 4.3 in Tables I and IV respectively.

Question 5.4 asked for the students’ own evaluation of how confidently they could use the computer packages learnt during the course. Table VII analyses the responses.

SOFTWARE	DO NOT KNOW			NOT CONFIDENT			CONFIDENT			VERY CONFIDENT		
	M	F	T	M	F	T	M	F	T	M	F	T
Word processor	0.16	0.00	0.07	0.08	0.17	0.13	0.52	0.69	0.61	0.24	0.14	0.19
Internet Browser	0.16	0.00	0.07	0.24	0.17	0.20	0.44	0.66	0.56	0.16	0.17	0.17
Spreadsheet	0.16	0.03	0.09	0.24	0.17	0.20	0.44	0.52	0.48	0.16	0.28	0.22
Database	0.16	0.21	0.19	0.36	0.31	0.33	0.44	0.38	0.41	0.04	0.10	0.07
Desk-top publishing	0.24	0.14	0.19	0.28	0.29	0.28	0.32	0.43	0.38	0.16	0.14	0.15
Presentation package	0.08	0.11	0.09	0.28	0.11	0.19	0.48	0.46	0.47	0.16	0.32	0.25

**Table VII: Confidence with use of the Microsoft Office packages learnt**

Table VII shows that the highest confidence with use was for the Presentation package and the Spreadsheet while the lowest was for the Database and Desk-top publishing. This means the students felt they had mastered PowerPoint and Excel well while they doubted

their skills in Access and Publisher. Table II shows that ninety-eight percent had never used Access and ninety-six percent had never used PowerPoint before attending the course. This suggests that either PowerPoint is an easy package to learn, or there were other factors that made the package interesting to the students. One such factor could have been that the theory lectures for this course were presented using PowerPoint.

### **5.5 Evaluation of the ICT skills training course**

Questions 6.1 to 4 asked for the students' evaluation of the ICT course they had attended at the University of Zimbabwe. The most interesting aspects of the course were identified as laboratory practical activities (31) and own practice (18) while theory lectures were seen as the most boring aspect (40). Figure IV shows the aspects that hindered learning.

**Figure IV: Aspects that Hindered Learning**

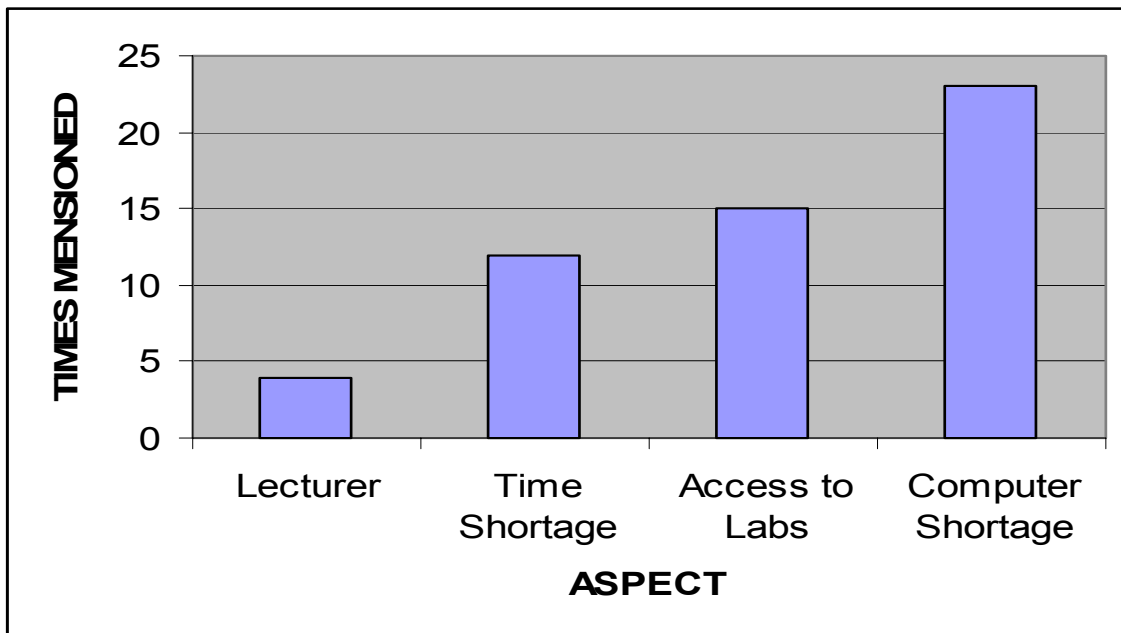


Figure IV shows that the shortage of computer equipment for practice and access to computer laboratories for individual practice were identified as the strongest factors that hindered learning during the course. This was mainly because the computer laboratories were occupied for normal lectures most of the time and the students did not have enough time to practise on their own. When the laboratories were free, the computer equipment in them was seen as not being adequate for meeting the demand from those that wanted to use them. In addition, the time for the course was seen as being inadequate by twenty-two percent (12) of the students. One student who mentioned the lecturer complained about the fast pace at which the lectures were delivered and two complained of verbal abuse from the GRA. Typical comments were “Lack of practice because computers were few and the labs were always occupied”, “Speed and attention – speed too fast and attention

focussed on fast learners” and “Time for the course was too little”. Question 6.6 was on aspects that assisted learning and Figure V analyses the responses.

**Figure V: Aspects that Assisted Learning**

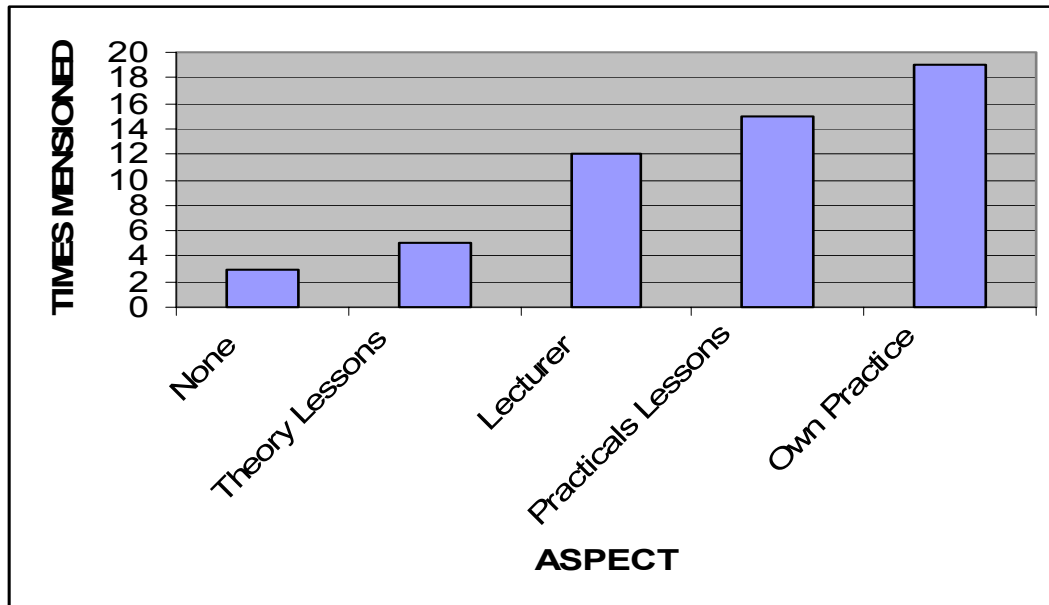


Figure V shows that practical lectures and own practice were seen as the strongest factors that assisted learning. In comparison to Figure IV, twenty-two percent (12) identified the lecturer as having assisted with learning. This shows the lecturer aspect was seen as more positive than negative.

Question 6.7 asked what one adjustment to the existing programme would greatly improve ICT skills training and Figure VI gives an analysis of the responses.

**Figure VI: Adjustments Needed to Existing Course**

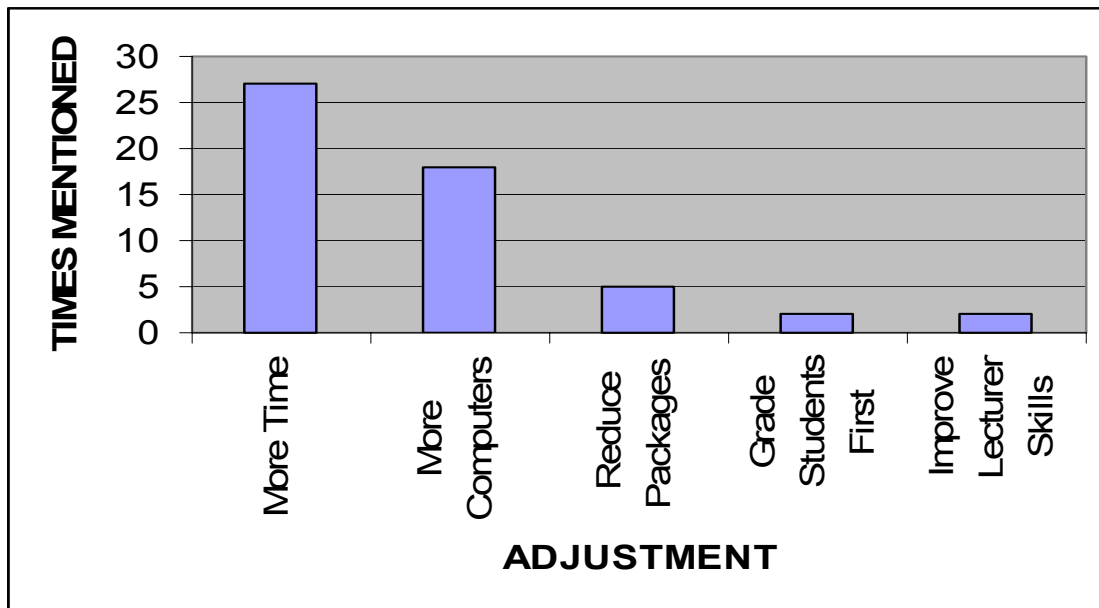
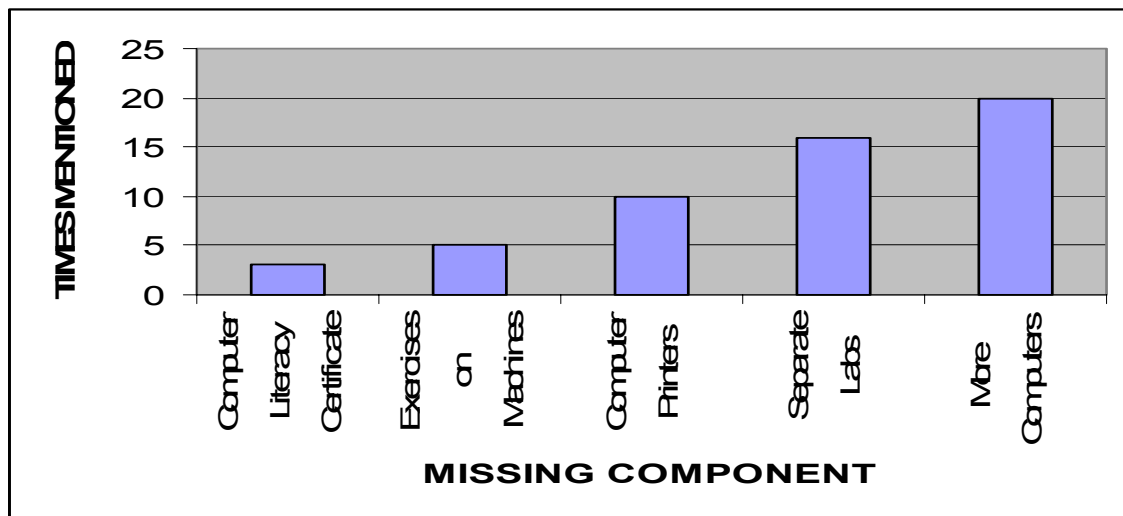


Figure VI shows that the majority (83% or 45) of the students felt that they needed more time and more computers for the course. The need to reduce the number of packages was mentioned by nine percent (5). Those that mentioned the need to grade students first felt that more attention would be given to those with little prior experience. The two that mentioned the need to improve the teaching skills of the lecturer mentioned the Graduate Research Assistant (GRA). The GRA does not deliver lectures but assists in monitoring laboratory practical activities. Students had expressed reservations about his attitude towards them during the course. Typical comments were “ICT course should stretch perhaps for at least two semesters before being examined so that students can have enough practice”, “More computers should be made available so that students can practice whenever they want to”, “Offer not more than four packages to effectively use

available time”, “Grade students to give more time to beginners” and “Assistant lecturer (GRA) should treat students as adults”. One student who is visually challenged commented during an interview that “There is too much to be covered within a short space of time and hence the lectures are taken fast such that it becomes difficult to cope.”

Figure IX gives a summary of the responses to Question 6.8.

**Figure IX: Missing Components to the Programme**



Question 6.8 asked what, in the student’s view, was one missing component that, if included, would greatly assist student learning of ICT skills at the university. Figure IX shows that the missing components to the programme were seen as related to equipment and facilities, and not to the syllabus. A large proportion of the respondents (86% or 46) believed that more computers, computer laboratories and computer printers were required. All the computer laboratories available for student use did not have printers and this was seen as a disadvantage. This means that students felt that the university had to make more computer equipment available for learning to be enhanced. Ten percent (5)

felt that they needed instructions and practical exercises on the computers to make their individual practical exercises more beneficial while six percent (3) felt that giving certificates of competency in the packages learnt was necessary.

The comments on the ICT training programme given in response to Question 6.8 included;

- Add printing facilities to enable students to download from the Internet and print;
- Students need a fully available technician in the computer laboratories;
- ICT is quite an enjoyable course. Wish it was done longer than one semester;
- The course was an eye opener and (the lecturer) tried his level best though his efforts were thwarted by lack of computers. Time again was not enough; and
- For most students, it was the first time to use a PC computer and this made the course difficult.

## **6.0 Summary of Findings**

The study sought and analysed the views of student undergraduate teachers who had enrolled for a bachelor of education degree programme at the University of Zimbabwe. A questionnaire administered to fifty-nine students who attended the last lecture for the course was the main data gathering instrument. The questions that guided this study and the findings are presented in Table VIII.



ITEM	DATA GATHERED	DATA INTERPRETATION
Biographical Data	Group composed of 54% female and 46% male. 81% aged 20 to 40 years. 40% teach in primary schools. 70% with 0 to 10 years teaching experience. Majority from local authority (50%) and government (15%) schools. More females had teaching experience above 10ys. 66% were from rural schools. More males than females were from rural schools.	Sample composed of rather young rural areas based primary school teachers with limited teaching experience. Males were concentrated in rural areas and mostly employed by local authorities while females were concentrated in urban areas and spread almost evenly across employers.
Q1: What ICT skills do undergraduate student teachers bring to the University of Zimbabwe?	66% had never used any computer before the course. Most students had no experience with the packages in the course. MS access was the least used and MS Explorer and Word the most used.	The students had a very limited experience with MS Office packages. The majority were learning the packages for the first time and needed special attention this was at university level.
Q2: What ICT equipment is available at the schools from which these teachers come?	Standalone most common type of computer available in schools. More females than males have computer equipment available at their schools. 53% of those with computers are on a network.	Most of the computer equipment available in the schools is on networks, making the practical lectures at the university's laboratories that are networked relevant.
Q3: How do the student teachers rate the level of ICT skills that they bring with them to the University of Zimbabwe?	None (0%) rated their pre-course skills as good or very good. 85% rated their skills before attending the course as none or poor.	The students had a very low opinion of their ICT skills before the course.
Q4: What ICT equipment is available at these student teachers' homes?	85% did not have ICT equipment at home. 19% had no access to ICT at home compared to 20% who had no access to ICT at school.	Most students had no ICT equipment at home, meaning they had to do most of their individual practice at the university.
Q5: What factors influenced the teachers' ICT skills development during training at the University of Zimbabwe?	Aspects that assisted learning most were seen as own practice, practical lessons and lectures. Aspects that hindered learning were identified as computer shortage, failure to access computer laboratories, and shortage of time .	Theory lessons may be important but practical lectures are best for ICT skills development. The university has to procure more computers for the course so that students get adequate hands-on practice during training.
Q6: What were the students' views on the ICT training programme they had just completed at the University of Zimbabwe?	92% said course was useful or very useful. More females (96%) gave a positive rating than males (88%). Course not useful because of too little time for the course, pace of delivery too fast, lack of adequate practice in labs and no computers at place of work. Useful (or very useful) because skills will be used in lesson preparation, delivery and evaluation, and in managing students records.	The students indicated that they benefited from the course, hence, course objectives were met. Shortage of computers had a negative effect of students' view about the course.
Suggestions for improvement of the ICT course for Bachelor of Education degree students.	More computers (37%). Separate laboratories (30%). Computer printers (19%). Put practical exercises on machines (9%). Reduce number of packages (9%). Give separate certificate for ICT (6%).	Suggestions for improvement mainly on more computer resources for the course. Increasing number of computers will allow students to have more practice.

**Table VIII: Summary of findings**

Table VII shows that the students benefited from the course and gave useful suggestions for the improvements that may be made to it. The most popular suggestions included increasing the quantity and range of equipment, creating separate laboratories for different training levels, reducing course duration and reducing the number of packages learnt from six to four. The recommendations below emanate from these views.

## **7.0 Recommendations**

In view of the findings from this study, the following recommendation to the University of Zimbabwe should be appropriate;

- a. do not compromise the quality of training by making the course simpler or easier through the reduction of the quality or quantity of material to be learnt;
- b. do not train in too many packages at once, that is, offer only relevant and necessary Microsoft Office packages (for example, there may be no need to learn Word and Publisher at the same time, to give five packages only);
- c. increase the number of computers available for student practice to one machine per two students enrolled for the ICT course;
- d. dedicate a laboratory per training level where possible, for example, a laboratory for undergraduate and another for post-graduate students only;
- e. provide printing facilities in all laboratories;

- f. open laboratories for longer periods by using main library opening times of 0800hours to 2200hours weekdays and up to 1600hours on other days;
- g. assess ICT skills at the beginning of the course and give more attention to those with no or little prior experience with the packages; and
- h. offer a separate certificate as an incentive for extra computer skills.

The quality of a university programme should not be compromised because of students demands for a reduced workload. Nevertheless, most of the teachers that enrol into the ICT course for undergraduates are using a computer for the first time. It is vital that the curriculum demands for the course do not leave students overstretched bearing in mind the students' own limitations and the limited amount of ICT equipment available for training. For beginners, desktop publishing in MS Word to exclude learning MS Publisher is adequate.

It is this researcher's view that the development skills for effective computer usage may be viewed in a manner similar to the development of skills for driving a car. In that respect, students require adequate hands-on practice on computer equipment during training in order to develop the intended skills to levels commensurate with adequate confidence levels for use after the course. The ideal situation during training would be to have a computer available for every student registered for the course. The recommendation for a machine per two registered students is a compromise that recognises the reality of the economic situation at the Universities of Zimbabwe.

The available equipment may be utilised more efficiently and effectively by appropriate timetabling well in advance of the beginning of the academic semester. Ideally, each training level (that is, diploma, undergraduate and postgraduate) should have its own computer laboratory into which is loaded appropriate training material for use during own practice. The time during the laboratories are opened for use by students may match those for the university's main library. This would make the laboratories available for use by the students for longer periods.

The students' ICT skills at the beginning of the course should be assessed so that more attention is given to those that are 'starting from scratch'. Priority for individual practice in laboratories would then be given to those that need it most, that is, those with no or little prior experience with the packages. This should lead to a situation where ICT skills development by the students is enhanced through improved access to laboratories.

Even if the results for the ICT skills development course appear on the transcript that the student is given upon completion of the whole Bachelor of Education programme, giving an independent certificate would provide an added incentive for extra work. Those that receive the certificate will have to pass a separate examination after doing more. During an interview, one of the students remarked "I am going to restart the computer classes that had been stopped after the teacher left for greener pastures". I am convinced that there is a critical shortage of ICT teachers in the schools and such certificates will be useful. I am also convinced these recommendations can lead to an improved ICT university course for undergraduate student teachers.

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