An analysis of the barriers experienced in the implementation of “Creating Learning Networks for African Teachers” pilot project in Zimbabwe.

Young Mudavanhu
Department of Education, Bindura University of Science Education, Zimbabwe
nyamayaonda@yahoo.co.in

Abstract
This paper reports a study conducted to investigate the barriers experienced in the implementation of “Creating Learning Networks for African Teachers” (CLNAT) project in Zimbabwe. A related goal was to consider the lessons that could be drawn from the experiences of the project. The target population was 350 lecturers in five Teachers’ Colleges (TCs). Fifty-three lecturers were selected as participants through preferred sampling and these were asked to complete questionnaires. Purposive sampling was used to select four lecturers who were in charge of the project and these were interviewed. The other person interviewed was the Project Manager at Head Office, Ministry of Higher Education and Technology. The data collected was analysed using frequency counts, tables and verbal description. The project implementation barriers were identified in four key areas: awareness, access, training, and misuse of CLNAT computers. The study recommended classifying CLNAT as a primary activity in TCs, conscientization workshops at each TC, purchasing at least 10 sets of equipment and producing policy guidelines on computers in education.

Introduction
Zimbabwe was chosen to implement “Creating Learning Networks for African Teachers” project (CLNAT) by United Nations Educational, Scientific and Cultural Organisation (UNESCO)-Learning Without Frontiers (LWF). The aim was to facilitate development of learning networks among teachers in Africa and to develop an extensive use of information and communication technology in teaching and learning. Information and Communication Technologies (ICTs) have given rise to new pressures on teacher educators like need for learning to live in an open and global society, and need for learning opportunities required in such environments. ICTs as catalyst to change have potential to break traditional isolation of TCs, to increase collaboration and partnerships (LWF Coordination Unit, 1996).

The implementation of CLNAT involved a number of activities and of particular interest were the selection of colleges and identification of lecturers-in-charge, the development of training materials and training of the rest of the lecturers in TCs. In the first phase three committees were set up namely the Steering Committee, the Technical Committee and the Educational Committee (Machawira, 1997). The Steering Committee was an administrative committee made up of Project Manager, Principals of the five participating TCs, and five representatives each from University of Zimbabwe, UNESCO, National University of Science and Technology, Post and Telecommunications Corporation of Zimbabwe, and Research Council of Zimbabwe. The committee was supposed to set up guidelines, to monitor and to advise in the implementation of CLNAT (Machawira, 1997).
The Technical Committee was made up of specialists in computers and programming. Their role was technical: to introduce participants to computers and to set up computer networks. The team was made up of people not directly involved in teaching and learning in TCs (Machawira, 1997).

The Education Committee was made up of ten lecturers from five TCs, two members from the Department of Teacher Education (DTE-UZ), one member from Centre of Educational Technology (CET) at University of Zimbabwe, and one member from Ministry of Education and Culture. The role of the committee was to initiate and implement educational applications of computers in TCs (Machawira, 1997). The composition of the committee was appropriate in that the participants were drawn from the client system of CLNAT pilot project.

The selection of TCs was similar to how participants had been selected in Malawi where UNESCO had implemented a similar project. According to Reinen (1997:9) "five schools in Malawi were selected based on such factors as geographical distribution, educational administrative divisions, gender, security, sustainability within an institution, and willingness of school management to participate". The government colleges chosen were Belvedere Technical Teachers' College, Gweru Teachers' College, Mutare Teachers’ College, Masvingo Teachers' College and United College of Education. Three were secondary school and the other two primary school teachers' colleges.

Principals of TCs were responsible for the identification of two lecturers from each college. They were guided in their selection by self-motivation, and the willingness of individuals to participate.

Phase two of CLNAT project was aimed at strengthening the capacity of individual institutions to use ICTs as teaching-learning tools; developing partnerships with schools, Ministry of Education and Culture, Curriculum Development Unit, Audio Visual Services and UZ; and linking up with the "World Links for Development" programme (Machawira, 1997). Three basic activities were suggested: firstly purchasing additional equipment so as to have two Internet sets at each college, secondly to liaise with two schools per TC for a start, and to train staff representatives and teachers (Machawira, 1997). Colleges, schools, and universities were expected to carry out research into the collaborative use of ICTs in schools. It was also envisaged that there would be expansion from five TCs to nine.

**Conceptual framework**

Barriers are conditional factors that affect the implementation of computer technology. Krysa (1998) used the term 'disablers' to describe factors that act as disincentive for teachers and which have a negative effect on the implementation of computers in education. The opposite of disabler is 'enabler'. An enabler is a factor that acts as an incentive for teachers and which has a positive effect in the implementation of computer technology in education (Krysa, 1998).

Literature has yielded a list of frequently recurring factors that influence the use of Information Technology (Roszell, 1995). Five factors were identified to have the greatest impact namely time factor (Pelgrum & Plomp, 1991), accessibility factor (Ginsberg & McCormack, 1998; and Middleton, Flores & Knaupp, 1997 all cited in Krysa, 1998; Heinich at al., 1993), software issues (Ginsberg & McCormack, 1998; Mann, 1997; and Newhouse, 1997 all cited in Krysa, 1998), attitudes of administrators (Krysa, 1998 citing Brand, 1998; Morton, 1997; Arzt, 1991), and personal familiarity with computers (Heinich et al., 1996; Krysa, 1998 citing Morton, 1996; Newhouse, 1995; Zammit, 1991; and Ely, 1991; Pelgrum & Plomp, 1991). Teacher educators often do not have adequate time for teaching and learning. An innovation that appears to have a "potential interruption" to teaching and learning time is likely to be avoided by teacher educators.
Researchers in Africa cited problems of lack of policy on computers in education, resistance to change, and lack of resources. Hungwe (1992) noted that the introduction of computers in primary and secondary schools occurred in an environment that lacked clear official guidelines. Could technophobe, lack of awareness and ill timing have been barriers to the successful implementation of CLNAT? This study examined some factors that affected implementation of CLNAT. The purpose of the study was to investigate the barriers in the implementation of CLNAT, and identify the lessons that could be drawn from those experiences.

The study was guided by two research questions:
• What barriers were experienced in the implementation of “Creating Learning Networks for African Teachers” project in Zimbabwe?
• What lessons could be drawn from the experiences in the implementation of “Creating Learning Networks for African Teachers” project in Zimbabwe?

Methodology

The study employed the descriptive survey and collected data using interview, questionnaire, documents and personal experiences the researcher had as a lecturer at one TC that was part of CLNAT. Researcher interviewed the Project Manager and four lecturers-in-charge of CLNAT. Fifty-three lecturers from a population of 350 were chosen, through preferred sampling, to complete questionnaire. Researcher posted twenty sets of questionnaire to each TC and asked the Principal to distribute the questionnaire to lecturers who were readily available. Rate of return was low. This is quite common with surveys, which make use of the questionnaire instrument. Fifty-three lecturers who completed and returned the questionnaire made up the sample. The sample was 15% of the population and considered adequate to proceed with the study. Weakness of such sampling technique is that lecturers who considered themselves not computer literate were likely to avoid completing and returning the questionnaire. The study may therefore have failed to seek information from lecturers who were non-users of CLNAT computers.

Data presentation, analysis and discussion

Data collected was presented under the following themes: biodata of lecturers, awareness of the aims and objectives of CLNAT by lecturers, barriers experienced in the implementation of CLNAT, alternatives that could have been used to implement CLNAT, and lessons that could be drawn from the experiences of CLNAT project. Frequency distribution counts, tables and percentages were used to analyse data. Data collected through personal experiences, documents, questionnaires and interviews was compared.

Biodata of lecturers

Altogether thirty-six (68%) males and seventeen females (32%) completed questionnaires. Interviews were conducted with four males and one female. The distribution of lecturers who took part in the survey showed that there were more male than female. This was representative of the general trend in the distribution of lecturing staff in TCs. Respondents were from all grades (Lecturers, Senior Lecturers and Principal Lecturers) and subject areas offered in Teacher Education.

None of the respondents learnt to use computers at school level. Those who had experience of computers prior to introduction of CLNAT had learnt about computers at university or their work
place. This may have had a negative effect on appreciation and acceptance of computers in education.

Thirty-four percent of respondents considered themselves as not being computer literate, 40% computer literate to some extent and 26% computer literate. It was deduced that the majority of the lecturers in TCs lacked adequate pre-requisite skills for use of CLNAT computers.

**Barriers experienced in the implementation of CLNAT**

The attitude of lecturers toward computers was positive. All the respondents were enthusiastic to use computers and said they liked to learn about using computers in teaching and learning. This contradicted the lecturers-in-charge of CLNAT who claimed that lecturers did not want to use computers in education. Despite lecturers’ positive attitudes towards computers there were several barriers encountered in the implementation of CLNAT in TCs.

**Lack of awareness of CLNAT pilot project by lecturers**

The term "Creating Learning Networks for African Teachers", was known by a minority of respondents (36%). The project was popularly known as "computers" or "Internet" or "e-mail". Almost all the respondents (96%) knew that their college was on Internet except 2 who were not sure. It was inferred that college representatives who were in the Education Committee of CLNAT had not used the actual title of the project when communicating and staff-developing colleagues despite the claim that they marketed the project.

Many lecturers (60%) knew that e-mail facilities were available at their colleges. Majority of lecturers (59%) knew that UNESCO funded CLNAT. Majority (55%) of the surveyed lecturers did not know that CLNAT was aimed at connecting TCs on the information highway. 53% of the lecturers did not know that CLNAT was aimed at encouraging collaboration in TCs. Majority of lecturers (66%) were either not sure or did not know that CLNAT was aimed at changing practices in TCs. The surveyed lecturers were equally divided on whether CLNAT was aimed at sharing resources in TCs or not. The lecturers-in-charge of CLNAT were familiar with the objectives of the project: to access materials on Internet, to network TCs and schools, to put TCs on the information highway, to improve collaboration and communication of lecturers in TCs, to improve the quality of teaching/learning in TCs, to use Internet as a teaching/learning tool, and to conscientize lecturers on the usefulness of Internet, e-mail and computers in education. This was consistent with the actual aims and objectives of CLNAT as stated by Machawira (1997). It was inferred that although the lecturers-in-charge of CLNAT knew the aims and objectives of the project they did not communicate this information to the rest of the lecturers in TCs.

Findings of the study are consistent with Krysa (1998). When people do not have a clear and coherent sense of the reasons for educational change, what it is and how to proceed they do not accept change. Lack of understanding the need for change leads to “faddism, superficiality, confusion, failure of a change programme, unwarranted and misdirected resistance and misunderstood reform” (Krysa, 1998). It may mean lecturers were given insufficient opportunities to make sense of the CLNAT goals and objectives.

**Lack of access to CLNAT computers**

The equipment was not adequate. The lecturers-in-charge also confirmed this. One lecturer-in-charge described the availability of one computer for approximately seventy-lecturers as an impossible situation to successfully implement CLNAT. The inadequacy of resources was a
demoralizing factor in the implementation of CLNAT project. Access was therefore a barrier to implementation of CLNAT. Expressions used to describe the situation were limited access, not accessible, not quite easy, impossible, extremely difficult, restricted, and ever busy. These responses suggest that those lecturers who intended to use the facilities were frustrated. Forty-eight (90%) surveyed lecturers held this view, and only 10% said that access was easy. It was concluded that from the lecturers’ point of view the CLNAT project facilities were not accessible. In contrast to what the lecturers said, the lecturers-in-charge of CLNAT said that the facilities were accessible.

Other respondents did not use the facilities because the trainer was too busy to induct them. On average there were seventy lecturers in each of the colleges. This was a large number when compared with two lecturers who had been trained at national level. The lecturer-to-trainer ratio was 35: 1. Another reason for not using the facilities was that the computer room was not open at convenient times. This also was compounded by that there was only one set of the equipment at each college, that is, 70 lecturers to 1 computer.

The lecturers-in-charge further identified barriers of connectivity and breakdown of hardware. Provision of telephones lines for the CLNAT project was difficult and delayed connection of TCs. Each of the computers bought has since been replaced. In one case repairs and maintenance services were not available in the local town.

Research elsewhere has established that the barrier of accessibility is threefold: lack of access to hardware, lack of access to appropriate software and lack of access to technical support (Krysa, 1998). All affect, negatively, the level and frequency of computer use in TCs. A more equitable access to newer and well-supported technology is required to change the way lecturers use technology in the classroom. Lecturers who may have wanted to use CLNAT computers failed to do so because of insufficient computers, insufficient time to review the ICT and plan lectures incorporating ICT use. Access to technology tends to override all other factors in determining ICT use (SOEID, 1998). It was the main barrier to implementation of CLNAT. Further lack of time reduces accessibility. Lecturers who are already overworked may fail to create time to learn computers.

*Lack of appropriate training*

Thirty-seven (70%) respondents said that they had not received any training. Some were not sure whether there was any training at all that had been done. Those who claimed to have received training were of the view that the training given was not adequate, and haphazard. Therefore, training of lecturers in TCs was neither properly nor successfully done. In view of the lack of adequate number of computers, limited number of trainers, lack of practice, and lack of exposure it was concluded that the conditions in TCs were not conducive to successful training of lecturers. The number of lecturers in TCs was too large for hands-on training. The college representatives were over loaded with responsibilities. They still had a normal working load besides CLNAT duties. It was therefore concluded that one barrier experienced in the implementation of CLNAT project was failure to effectively train the lecturers.

CLNAT staff development courses may have focused attention on technical aspects of computers, ignoring the pedagogical practices required and how to incorporate ICT in the curriculum (Krysa, 1998). Lecturers gained knowledge and skills to run software, but not to use it for teaching purposes.
The cascade approach used where two lecturers from each TC were selected for training at national level, and then expected to return to their TC and train the rest of the lecturers proved ineffective. Probably rest of the lecturers in TCs “set up antibodies to the new ideas the unfortunate two lecturers brought back to college” (Krysa, 1998).

**Misuse of CLNAT computers**

According to the lecturers, the computers were used mainly for basic productivity: producing teaching/learning materials (handouts, examinations, and profiles of marks), writing letters and as databases (storage of information). Another common use was entertainment or playing computer games. In view of the aims and objectives of CLNAT, these were not the main uses of the computers. The lectures were therefore not using computers as intended. There were no lecturers who claimed to have used computers for purposes of collaboration and sharing experiences with lecturers in other TCs yet this was the main focus of CLNAT. Majority of lecturers who claimed to have used e-mail did so to keep in touch with friends, and to communicate with the business sector for personal reasons not related to teaching and learning.

Lecturers-in-charge cited the following benefits: availability of ICT materials, acquisition of computer skills by some of the lecturers, connection of TCs in Zimbabwe as well as connection with other institutions outside Zimbabwe, access to information through Internet, improved communication due to use of e-mail, motivation of lecturers who used the facilities, and staff development opportunities. It would appear that the benefits cited were limited in scope and did not adequately address the key objectives, that is, collaboration and sharing experiences among the lecturers in TCs.

The participants stated that the current teaching and learning practices in TCs negatively affected the success of the implementation of CLNAT project. These practices were described as conservative, bookish, old, traditional and rigid. This would seem to imply that lecturers were reluctant to change and learn to use computers in education. The use of Internet as proposed through the project required a new approach to teaching and learning. The project emphasized collaboration and sharing of resources and expertise, yet the current practices did not encourage such partnership in TCs.

Findings of the study were consistent with Krysa (1998) who argued that teachers hardly question their professional practice. A considerable effort is necessary to create the possibilities of restructuring teaching and learning in the face of using ICT (Krysa, 1998). Impact of ICT is weakened if it is in conflict with teachers’ beliefs and practices. Lecturers who did not see the need to change or question their practices were likely not to accept CLNAT in their teaching. Research elsewhere has established that “constructivist approach to teaching allows one to avoid many barriers to using computers in instruction” (Krysa, 1998).

**Alternatives that could have been used to implement CLNAT**

Conscientizing of lecturers of the project was necessary for awareness. Respondents suggested that this could have been achieved by provision of more information about the project and services on offer through educational campaign, involvement of lecturers in planning, advertisements in the mass media, and newsletters. Respondents suggested bottom-up approach in needs analysis, planning and implementation of CLNAT.
A computer library, open throughout the day as the main library, was considered appropriate in overcoming the problem of accessibility. Colleges could employ a technician on either full-time or part-time basis who would maintain and repair the hardware.

It was also suggested that the Ministry of Higher Education and Technology could develop a policy on computers in education, Inter-schools cooperation, and management of educational resource centres.

Increased funding by the Ministry of Education and Technology would solve the problem of accessibility through purchasing at least ten sets of computers. By classifying CLNAT as a primary activity colleges would be able to appoint lecturer-in-charge on a full-time basis as opposed to part-time engagement. In order to conscientize lecturers in TCs of CLNAT respondents suggested training activities. Areas of interest suggested were word processing, Internet, e-mail, web publishing and computer aided instruction.

Mann (1996) identified three approaches to introduce technology namely: transformationalism, collaborationism and incrementalism. Transformationalism proposes a complete overhaul of the education system before introducing technology (Mann, 1996). This is not an appropriate approach to use in Zimbabwe because it calls for large sums of money to purchase new equipment and systems. Collaborationism advocates for collaborative interactions through computer networks (Mann, 1996). The approach assumes that collaboration promotes change as people teach and learn from one another. Collaboration was not effective in the CLNAT project. Incrementalism is like "slow never-ending improvement in all aspects of life" (Mann, 1996). It relies on investment in people (not equipment). In-service courses in educational computing should be provided to assist lecturers on how to implement computers in instructional processes (Mann, 1996). This study strongly recommends adoption of the incrementalism approach, particularly investing in training of lecturers.

Lessons learnt from the implementation of CLNAT

The assumption that there are interfaces available which render computers relatively easy for non-specialists to use holds where the client system possesses pre-requisite skills in using computers. The lesson that was drawn here was that lecturers required basic training in computers when computers are introduced in education. Training must focus on all participants, Hebenstreit (1984).

The second lesson was that understanding the need for change is very important when an innovation is introduced. There was need to effectively communicate the aims and objectives of CLNAT to the client system.

An adequate number of sets of equipment should be in place for successful introduction of computers in education. This number is supposed to be determined by the number of users. The equipment must be readily available so that when people have been trained, they immediately put their skills to practice.

The fourth lesson learnt was that lack of a policy on computers in education prevents successful introduction of computers in education. A policy on computers in education, which spells out guidelines on training and management, was a necessity.

Conclusion
The implementation of "Creating Learning Networks for African Teachers" project in Zimbabwe was largely unsuccessful because of lecturers’ lack of awareness of goals and objectives, lack of access to CLNAT computers, lack of appropriate training and misuse of CLNAT computers. Policy guidelines on computers in education could have assisted in achieving successful implementation. Future studies were recommended to examine critical factors that determine successful implementation of information technology in Teacher Education.

REFERENCES