International Journal on New Trends in Education and Their Implications
October, November, December 2010 Volume: 1 Issue: 3 Article: 8 ISSN 1309-6249

THE POTENTIAL AND CHALLENGES OF INTRODUCING NEW TECHNOLOGY IN DISTANCE TEACHING AND LEARNING

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ABSTRACT

One of the most significant recent technological developments at the Zimbabwe Open University has been the introduction of the CD-ROM digital text as the central medium of instruction. The ZOU has always used tutorials and the module as the main delivery mode. However, the advent of the global village, advancement in new technology and the socio-economic and political challenges Zimbabwe experienced in the past two years from 2008 to 2009 forced ZOU to adopt an alternative medium of instruction (CD-ROM digital text) in order to survive. However, the introduction of the CD-ROM text has become a topical issue that has raised heated debate in ZOU's departmental, faculty and senate meetings. Those supporting the use of CDs have argued that ZOU must adopt new technology in order to survive in today's computer age and in the global village. On the other hand, critics have seen the use of CD-ROM as one way of abandoning the distant and the socio-economically disadvantaged student!

This article reports the findings of a university-wide study the two authors conducted at the ZOU during the 2nd Semester (July-December 2009) in order to contribute meaningfully to the current debate on challenges ZOU and other ODL institutions are facing the introduction of new technology in their delivery mode. The present study focused on three key issues;

- students' preparedness in the use of CD –ROM in their studies,
- whether students found CDs convenient to use and
- what ZOU should do to improve effectiveness of CD-ROM in the teaching and learning process.

We collected data through a questionnaire from a stratified random sample of 100 undergraduate students 25 students from each of the following faculties; Arts and Education, Sciences, Commerce and Law and Social Sciences.

This study found that the majority of ZOU students were not ready and prepared to use the CD-ROM as only 34% of ZOU students were computer literate, 5% had personal computers, 12% had computers either at home or at their workplace. Fifty-eight percent of those students with access to computers reported inconveniences from other members of the family or workmates when using the computer for their studies. The majority of students (72%), experienced financial challenges in the use of CD-ROM due to high costs charged at inter-net cafes and for printing the module. The major implications of the present study are that:

1. Before introducing new technology, ODL institutions must conduct a survey to determine the extent to which students are ready and prepared to use the new technology effectively.
2. ODL institutions must know and understand who their students are, their characteristics and the domestic environment in which they operate.
3. ODL institutions must provide the resources (equipment and software) and training for students when introducing new technology.
4. ODL institutions must provide access and technical support to students to ensure the effective use of new technologies.

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Key words: New technology, distance teaching, distance learning.

INTRODUCTION

The two disciplines of distance education and educational technology have seen dramatic changes and growth recently. Although the two areas have been developing concurrently, they have been doing so rather independently. Distance education technologies are expanding at an extremely rapid rate. Computer networking is opening the way to virtual classrooms and unprecedented communication (Myrdal, 1994). The major purpose for adopting new technologies in ODL institutions is to provide accessible, affordable and quality distance education to all students regardless of factors such as physical disability, their educational background and their financial status. However, too often, instructional designers and curriculum developers have become enamored of the latest technologies without dealing with underlying issues of learner characteristics and needs, the influence of media upon the instructional process, equity of access to interactive delivery systems, and the new roles of teacher and the student in the distance learning process (Sherry, 1996). Adoption of new technology is likely to impact, positively or negatively, on the quality, flexibility, accessibility and affordability of distance education.

This article discusses the challenges distance education students at the Zimbabwe Open University experienced when a new technology (CD-ROM digital text) was introduced as the central medium of instruction.

BACKGROUND OF THE STUDY

University distance education, in Zimbabwe, has been in existence for approximately ten years. Since the establishment of the Zimbabwe Open University (ZOU) in 1999, distance education has acquired a dubious reputation, establishing a conflict with many traditional colleges and universities (Izuagie, 2001). Critics have based their attack on the issue of quality, arguing that by making university education affordable, flexible and accessible, distance education has managed to achieve quantitative expansion but has compromised effectiveness, efficiency and the quality of education provided. Issues of affordability, flexibility, accessibility and quality of distance education, have become topical issues and continue to attract the attention of educational researchers, distance education scholars and educators.

The Zimbabwe Open University (ZOU) is the largest state funded university, in Zimbabwe, established to cater for a substantial component of people who, by design or unintentionally, could not be accommodated in conventional universities, by offering them the opportunity to study in their homes and in their workplaces through distance education.

The (ZOU) evolved out of the University of Zimbabwe in 1993, initially as a Centre for Distance Education in the Department of Education. In 1996 the Centre for Distance Education became the University College for Distance Education.

Three years later, on 1st March 1999, through an Act of parliament (Chapter 25:20), the college became the Zimbabwe Open University. Over the past ten years, distance education has challenged historical perceptions and has started climbing the Ivory Tower. Since 1993, distance education at the ZOU has been grown in leaps and bounds. By 2004 ZOU had become a mega university with approximately 18700 students, 1795 academic staff and 395 non - academic staff. During the time of this study, in 2010, ZOU had four faculties;

- the faculty of Arts and Education,
- the faculty of Science,
- the faculty of Commerce and Law, and
- the faculty of Social Sciences.

The university was by then offering 30 undergraduate degree programmes, 3 diploma courses, 5 masters' degrees and 2 doctoral degrees. The phenomenal growth of distance education in Zimbabwe has been a success story (Benza, 2001). However, Prof. Izuagie (2002), Pro Vice Chancellor of the Zimbabwe Open University identified a number of challenges that were militating against effectiveness, efficiency and quality of education at the ZOU. Izuagie (2002) identified five major challenges confronting the university as;

- Poor internal communication,
- Shortage of funds,
- Inadequate staffing,
- Lack of suitable technology, and
- Organizational resistance to change.

These problems became more acute in 2008 due to the economic and political challenges the country was experiencing. The inflationary environment caused the cost of providing distance education to balloon. In order to keep the university afloat, a number of drastic measures were adopted to reduce operational costs. Tutorial hours were reduced from 10 hours to 4 hours. The printing of modules (new and old) was suspended. Thus some courses were presented without modules. The ZOU has always used tutorials and the module as the main media of instruction. In order not to completely abandon the student, ZOU introduced the use of the CD-ROM digital texts in those courses which had no modules. However, the introduction of the CD-ROM text has become a topical issue that has raised heated debate in departmental, faculty and senate meetings. Those supporting the use of CDs have argued that ZOU must adopt new technology in order to survive in today's computer age. On the other hand, critics have seen the use of CDs as one way of abandoning the distant student! Researchers in distance education have argued that the introduction of new technology in distance education brings with it both opportunities and challenges to the distance student. Are these challenges universal or unique? Zimbabwe is a developing country in Southern Africa with very low levels of technological development.

Thus, the introduction of new technology, the opportunities it brings and the challenges encountered, especially in distance education, have become issues of interest to distance educators, scholars and researchers.

The present study, therefore, sought to capture students' perceptions and experiences in the use of the CDs and to establish the impact of CD-ROM digital texts on the quality, effectiveness, affordability and accessibility of distance education at the ZOU?"

Research Questions

The present study sought to answer the following questions:

- Were ZOU students well prepared to use CD-ROM as the central medium of instruction? By preparedness, we meant students' access to computers, level of computer literacy and financial capacity?
- Did ZOU students find CD-ROM text convenient to use in terms of time, space and pace?
- What was the impact of CD – ROM on the quality of distance education at the ZOU?
- What should ZOU do to improve effectiveness of CD-ROM as a medium of instruction?

Importance of the Study

The present study has both theoretical and practical significance to ODL institutions. It presents a critical analysis of how new technology was introduced to enhance teaching and learning at the ZOU. It examines the underlying theory, model and assumptions that influenced the introduction of the CD-ROM as a delivery mode.

The study also assesses opportunities and challenges faced by the ZOU students in the use of CD-ROM digital texts. Findings of the present study have direct implications to ODL institutions that have adopted or are

planning to adopt new technologies in their delivery mode. The study will also benefit distance educators, scholars and researchers with an interest in the role of technology in distance education.

LITERATURE REVIEW

Distance Education Defined

Holmberg (1986:7) says the term Distance Education was formally recognized, internationally, in 1982, when the then International Council for Correspondence Education (ICCE) changed its name to the International Council for Distance Education (ICDE). Since then, distance education, as a field of study and mode of activity, appears to have taken significant strides and importance. The concept distance education is, therefore, relatively new and several writers and scholars have attempted to define and explain what they understand by the term 'distance education'.

In reviewing these definitions, we note the relationship between distance education and technology. In his explanation, Peters (1976), tends to use the term distance education somewhat interchangeably with the broader concept of correspondence education. Peters (1976) argues that distance education is characterized by the following features;

- Research and Development-Management
- The use of Printed Material, Radio and TV Programmes
- Counselor for specific problems concerning studies
- Advisors for general studies problem
- Supplementing study circles
- Computers.

According to Peters (1976) technology in distance education comprises of printed materials, radio and television programmes. Another scholar, Moore (1983:157), conceives distance education as synonymous with 'independent study'. He defines distance education as "…an education system in which the learner is autonomous and separated from his teacher by space and time, so that communication is by print, electronic, or other non-human medium". According to Moore (1983), Distance Education is a system consisting of three sub-systems; the learner, teacher and a method of communication. These methods of communication (print, electronic and non-human medium.) constitute technology. Professor Holmberg (1977) says the term "Distance education" includes all 'those teaching methods in which, because of the physical separateness of learners and teachers, the interactive, as well as the pre-active phase of teaching is conducted through technology (print, mechanical or electronic devices). Keegan (1986:49-50) definition includes two principal characteristics, which he regards as being essential for any comprehensive definition of distance education.

These characteristics are;

- The separation of teacher and learner, which distinguishes it from face-to-face lecturing; and
- The use of technical media, usually prints, to unite teacher and learner and carry the educational content.

Preferably, the definition that best meets the purposes of this study comes from the book *Distance Education*: *A Systems View (1996).* In this book, Michael G. Moore and Greg Kearsley write:

Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements. (P.2)

An analysis of all the above definitions reveals that in distance education, the teacher is separated from the learner by distance in the form of space and time. Cropley and Kahl (1983) identify 'distance' as the unique feature of distance education.

Technology then enables the teacher to teach at a distance and the student to learn at a distance. Cropley and Kahl (1983) also identify 'technology' as the second key feature of distance education. Scholars and writers in distance education have attempted to define what is meant by technology. Let us briefly look at these explanations.

Defining Technology

The term technology as explained by Simiyu (1999) has its origin in Latin. It encompasses two concepts, i.e. "technic" which means tools and materials, and "logic" which covers the different approaches in solving a problem. The term technology as applied to the processes of education includes the ways of organizing events and activities to achieve educational objectives as well as the materials and equipment involved in the process. Technology can be defined as a product and as a process.

Technology as a product

Technology, as a product, is the end result of the systematic application of scientific knowledge in finding practical solutions to specific problems. As a product, educational technology can include teaching procedures, practices and materials. Consequently, the inputs from technological developments, on the one hand, comprise non-physical products (programmed learning, individualized learning, teaching skills, the use of computers in learning, computer assisted education, comprehensive educational syllabi or curricula, multimedia, etc.). They also include physical products such as micro-computers, video cassette recorders, radio and television sets, videotape recorders, tape recorders, overhead projectors, photographic slides, electronic acetates, etc. Some authors add to this list of products language, writing case, pencil, paper, books, newspapers and films.

Technology as a process

Technology as a process includes functions connected with the management of organizations and human resources, research (the setting of theories, rational methods and practices related to the techniques of education and learning), logistics, the use and establishment of systems (Gagne, 1997).

For the purposes of the present study technology was taken to mean both the equipment (CD-ROM) used in the delivery mode and the processes involved in the use of CD-ROM for teaching and learning purposes.

Use of Technology in Distance Education

Garrison (2000) proposed three generations of distance education based on the technological changes that have occurred in the field. The first generation was based on the printed word and delivered by mail. The second generation was ushered in with the advancement of broadcast media, primarily in the form of television but also radio. The third generation of distance education occurred with the advent of computers and their use to deliver instruction material (Garrison 2000). As the third generation permeates the remote delivery of instruction, students are coming to expect institutions to deliver courses "on-line". Digital information will allow for a new generation of distance education that will lead to the virtual campus.

It is believed that technology makes distance education flexible, accessible and affordable and also enhances interactivity. However, the use of the CD ROM at the ZOU, according to 72% of the students, restricts them to study at a particular time in a particular place. Hence ODL becomes inflexible. Models of distance education implemented in developing countries, like Zimbabwe, suffer from lack of appropriate technology because the level of technological development is still very low. The use of technology in distance education, in Zimbabwe, is best discussed under three phases which Matshazi (1991) has referred to as generations. These generations show how distance education has developed and the type of technology employed in each generation.

The First Generation Technology (1920-1980)

In Zimbabwe, distance education technology can be traced back to the early 1920s when distance education was still known as correspondence education. Correspondence education in Zimbabwe was offered by private colleges such as Rapid Results College (RRC) and Central Africa Correspondence College (CACC). Correspondence education was less structured from teaching and study material production to delivery. The media in the first generation included written or printed material in the form of study notes, study guides and tutorial letters. Learners kept in touch with their tutors by various means ranging from correspondence, telephone and individual consultation visits and had to attend to regular written assignments, which were dispatched to the individual tutors and returned by post. The instructional media were highly flexible. Students were able to study during their own time, anywhere (at home or at work) and at their own pace. The major weakness in correspondence education was that the media used had limited interactivity. Learner-teacher feedback processes were slow, sparse and mostly restricted to the periods where the learners submitted scheduled assignments.

The Second Generation Technology (1980-2000)

In Zimbabwe, the earliest form of distance education started in 1980 and was used in the training of primary school teachers through a programme called the Zimbabwe Integrated National Teacher Education Course (ZINTEC). The ZINTEC programme was a four-year teacher-training course. Students had to undergo an initial sixteen-week residential course during which they were introduced to the programme and taught professional foundation courses, wrote assignments and end of term examinations. After the sixteen weeks, student teachers were deployed in primary schools, for 160 weeks, and received the bulk of their training on the job through distance education.

The main medium of instruction was the printed module. During this time, students wrote assignments, posted them to the college and received the marked assignments through the post. At the end of the programme, student teachers attended another sixteen-week residential course and wrote the final examinations.

During the same period, in 1993, distance education degree programmes to train educational administrators and managers were started at the University of Zimbabwe. A multi-media approach that integrated the use of printed material with broadcasting media (radio and television), cassettes, audio-tapes, and, to some degree, computers was adopted (Matshazi, 1991).

The strengths and weaknesses of the second generation were the same as those of the first generation except that second generation media technology is much better in that they include telephone as well as some face-to-face tutorials. The major weakness of radio and television is that they have limited flexibility in terms of time, place and pace of study. Interactivity is also limited.

The second generation technology gives very low priority to the process of communication, by making communication one way or very restricted two ways resulting in a strong social bias which has expelled educationally or socially weaker learners. (Matshazi, 1991).

The Third Generation Technology (2000 to 2010)

The third generation technology in Zimbabwe is characterized by computer-mediated communications technology that includes the use of print material, e-mail, CD-ROM, the Internet, and face-to-face tutorials. All these instructional media, except for the print text, are highly flexible and interactive. Communication is asynchronous (two way) and effective. The major weakness in the use of these technologies is that the majority of students do not have access to computers because they are very expensive to acquire.

However, what seems to disturb about the introduction of high technology in African distance education is the fact that high technology is expensive, therefore, beyond the reach of many would be providers of and learners

in distance education programmes. As a central element, rather than a learning aid in distance education programme, computers mediated communication smacks of more problems than solutions. When high technology is elevated to the level where it becomes the mainstay of a distance education programme, it becomes very expensive. Matshazi (1991) says ODL should be cautious in the sense that despite the availability of and possibilities for using high technologies in their provision, the printed word remains central and resources need to continue to be mobilized to support or supplement the printed word.

Introducing New Technology: The Model

Models in distance education have a great influence on management decisions to adopt and implement a new technology. The type of technology to be adopted and the way it is implemented mainly depend on the model of distance education senior management ascribe to. Scholars of distance education have identified a number of models that outline how ODL institutions should introduce new technologies in their systems. In this article, we focus on a model developed by Clark et. al. in 1988. According to Clark et. al. (1988), the process of introducing new technology consists of five distinctive stages. These are:

- initiation,
- decision to adopt,
- system selection,
- implementation, and
- routine operation.

Initiation refers to the process by which managers identify and pursue an opportunity for the adoption of new technology.

The decision to adopt refers to the process leading up to the decision to invest resources in its purchase and introduction. System selection denotes the process of in-house design and development of a particular system or equipment or choice of system from an external supplier. The forth stage, implementation, embraces the process of introducing the technology in the workplace. This includes both technical and human aspects of installing, commissioning and debugging of the chosen technology and the mediating role of management and union strategies towards implementation. The final stage, routine operation, is where the system has been brought into service and a stable pattern of working of the technology has been established.

Previous Research Studies

A number of researchers have identified technological challenges faced by ODL institutions in Africa and their distance education students at present as the availability of computers, knowledge of computers, and knowledge of networking. Problems arise when a technology-led approach is adopted and the needs of individuals who might use the technology are an after thought (Vincent, 1995).

Introducing a new technology without preliminary research is often based on assumptions that the student has access to the technology and is able to use the technology in the learning process. Technology–led assumptions of this kind are not unusual in the distance education world of the 2000s.

A recognition of the diverse context within how much distance learning takes place is essential, not only for those directly involved in the development of distance education learning materials, but also for the policy makers responsible for the introduction of the new technology. A major concern is that such an approach, which is common, can undermine the potential of using information technology. Myrdal (1994) noted that in Iceland, for instance, when implementing online education, over 90% of faculty and students had never used the computer networking capabilities prior to the attempt reported. Another attempt to include e-mail transactions in a course for teachers in California encountered students who had no access to computers or little knowledge about computers (Fisher and Desberg, 1995). A project in Canada found that even when students had access to computers and knowledge about them generally, students still needed considerable

time to master the techniques involved in using e-mail for discussions and communications, and searching and retrieving information from remote sites (Barnes, 1995).

Distance educators involved in the development and dissemination of media-based materials for home study need to be aware at the very least of the extent to which technology could be used for studying. Research on the location and patterns of use of media technology is important. This research can provide information about the extent to which media technologies that could be used for studying are to be found in the homes of students or potential students.

In a distance education environment such as the home environment, the lack of immediate advice and support also places even greater demands on providing appropriate, accessible and effective technology. For this reason, the present study actively engaged students in order to identify challenges they are facing in the use of CD-ROM text and to identify important factors that need to be taken into account when introducing new information technology. Information communication technologies undoubtedly have a great potential for distance education but the domestic environment within which students work and student ability to use the technology often seem to be overlooked or its constraints underestimated by those advocating the wider use of such technologies. This literature review has argued the need for all institutions to undertake research on both the quantity and quality of students' access to media technologies and has provided some illustrations from the UK studies.

RESEARCH DESIGN

The present study adopted the descriptive survey research design. The survey design was preferred because it is the most appropriate design where perceptions of participants are sought. Leedy (1985), points out that a survey design is one of the most effective ways of conducting research. It is effective in gathering information that describes the nature and extent of specified data, providing a systematic attempt to collect information, describe it and explain perceptions, beliefs, values, views and behavior.

Methods and Procedures

The present study focused on three key issues; (1) students' preparedness in the use of CD –ROM in their studies, (2) whether students found CDs convenient to use and (3) what ZOU should do to improve effectiveness of CD-ROM in the teaching and learning process. A questionnaire (see Appendix 5 was used to collect data from a stratified random sample of 100 undergraduate students, 25 from each of the four faculties at the ZOU. The four faculties were (1) Arts and Education, (2) Commerce and Law, (3) Sciences and (4) Social Sciences.

DISCUSSION OF RESEARCH FINDINGS

Students' Preparedness to Use CD-ROM Digital Text.

Computer literacy

The present study revealed that 34% of the respondents were computer literate. All ZOU programmes had a computer course but the course is mainly theoretical thereby only testing theoretical understanding of computer concepts. The course does not give students hands-on practical skills in the use of computers. Studies have also found that students often face challenges of learning the practicalities of how to use the technology effectively. For example, learning how to use a computer can be extremely frustrating and time consuming, particularly when in the privacy of one's home. When the OU introduced its home computing policy from 1988 a large proportion of students were novices in the use of computers. (Jones et. al., 1992). A variety of supporting mechanisms were established to provide assistance, including specially prepared guidance notes and a Help Desk that students could telephone for advice on how to overcome problems they

encountered in their computing activities. However, despite the low levels of computer literacy amongst ZOU students, no initiative was undertaken to train students in the use of computer CD-ROM text.

Access to computers

Only 5% of ZOU students owned or had a computer at home due to the fact that computers are very expensive with a simple PC costing $600. 00. Five percent of the students had access to a computer at their workplace. However, these students reported that they still needed permission from their superiors to use the computer for their studies. In most cases this permission was not granted. And also stealing time at work to do private studies on the computer was, according to many students, unethical. The majority of students working in rural areas had no access to a computer. Most rural areas in Zimbabwe are not electrified. Results of the present study show that distance education students in Zimbabwe are experiencing the same technological challenges experienced by students at the OU, UK ten years ago. Taylor's 1991 survey of a random sample of undergraduate students at OU, UK revealed that only 24% had access to a computer at home with a further 17% having access both at home and at their workplace. Distance educators involved in the development and dissemination of media-based materials for home study need to be aware of the extent to which their students are likely to have access to suitable equipment at home that could be used for study. According to Clark et. al. (1988), preliminary research must be carried out before the adoption of a new technology. This research can provide information about the extent to which media technologies that could be used for studying can be found in the homes of potential students.

If there is no suitable domestic equipment already, it is also important to know if it is feasible to arrange for equipment to be hired (from the distance teaching institution or elsewhere). The present study found that ZOU did not undertake any preliminary survey of students' access to computers before the introduction of the CD-ROM text. As a result the introduction of CD-ROM as a medium of instruction has been met with serious challenges and stiff resistance.

Convenience in the use of CD-ROM digital text

The majority of students 58% of those who had access to computers reported that they experienced inconveniences in the use of CD-ROM texts. The inconveniences resulted from the fact that CD-ROM text can only be accessed in places where there is a computer and electricity, whereas the module can be carried and read anywhere anytime even when a student is travelling on any mode of transport. There is also a need to recognize the environment within which it is to be used. Research on location and patterns of use of media technologies at the OU UK (Taylor, 1992) show that, in most homes, the computer is located in the main living room, which is open for use by all members of the household.

Thus, home-based students cannot just use the computer whenever their study schedule suggests. They often have to negotiate the convenient time with other members of the household or wait until everyone is out or asleep. Thus, ODL institutions using technology to teach their students need to be aware of domestic patterns of their use. Successive OU surveys on the use of computers have found that a larger proportion of those students with home access to a computer has the machine located in a quite private area like a study or spare bedroom. However, a significant minority has to undertake computing activities using equipment set up in a public part of the household.

Another important feature of using a computer at home for study purposes is the inconvenience caused to other members of the household. In the present study, 20% of those who had access to computers said they were aware of inconveniences their use of the computer caused to others at home or at the workplace. Using the computer especially when printing, can cause noise that disturbs others. It is also possible for household members to cause noise or to inconvenience the student when he or she is trying to work. The general access survey undertaken by Taylor in 1992 at the OU UK indicate that about 30% of the students were aware of inconveniences caused to others when using the computer for their studies.

Women tend to be more likely than men to report the inconvenience to others. This is because female students are likely to consider the computer they use to be a family resource while male students use equipment that is theirs. Information communication technologies undoubtedly have a great potential for ZOU distance education but the domestic environment within which ZOU students' work seems to have been overlooked or its constraints underestimated by those advocating the wider use of the CD-ROM text.

Printing costs

Seventy-two percent of the students reported that the printing of the module was an intolerable financial burden. The students were required to pay fees and then meet the cost of printing the CDs.

IMPLICATIONS

Findings of the present study have direct implications to ODL institutions that have adopted or are planning to adopt new technologies in their delivery mode. The study will also benefit distance educators, scholars and researchers with an interest in the role of technology in distance education.

Knowing and understanding the student and his/her environment

Technology is meant to make distance education accessible to all students regardless of their place of residents, social, financial or political status. However, the CD made it quite impossible to access information due to the fact that only a few students, 12%, had access to computers. Therefore, isolating 88% who could have been accommodated in distance education through the use of the traditional module. ODL institutions, therefore, must know and understand who their students are, their characteristics and the domestic environment in which they operate. Before introducing new technology, ODL institutions must conduct surveys to determine the extent to which students are ready and prepared to use the new technology effectively. It is also very advisable to carry out a survey on the benefits of new technology or an innovation. There is a need to set up structures that support the use of the new technology; for example, capacity building in the form of staff that could be trained in the use of the new technology. Students should also be trained in the use of the new technology. The institution should provide equipment in labs and even for hire or loan the student. A help desk can also be set up to advice students in need of help. Training workshops should be held and guidelines provided to users of the new technology.

Institutional Support: Technical Support and Access

ODL Institutions must not use technology that abandons the distant student! There must be resources not only to provide the software and at times the hardware but also the training. Assumptions cannot be made that the distant student possesses the necessary skills required to survive in a virtual classroom. An institution never assumes that the traditional students do not require the basic presentation, communications and intellectual skills. Likewise, the distance education system should never make assumptions on the technical skills of their students.

Support must be provided and the most successful avenues have been: call-in help desks, structured and evaluated workbooks, and informed technical tutor support. To provide this support, an institution has to allocate resources and factor in the wide range of requests and training while keeping in mind the time elements that the requests may arrive and the need to keep the services up and running twenty-four hours a day. There is a direct relationship between support and instructional effectiveness (Moore, 1996).

Another critical aspect to be considered by institutions is the issue of access. To offer distance education and to believe that there is a "technocentric utopianism" is naïve. Institutions must factor into their distance education system the reality that not all students will have equal access to information technology. Is it the

responsibility of a college or university to provide this access? If the institution is committed to a distance program, then they have an intrinsic responsibility to address the issue of equality to access.

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