

**Access and Utilisation of ICTs: the Case of Distance
Education in Ethiopia**

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Abstract

Education and training are strategic tools that a society needs to continuously apply in order to sustain a global competitive advantage, create a better standard of living and / or development. To this effect, Distance Education (DE) has increasingly been used in most parts of the world as a viable alternative to the conventional education. The twin merits of DE over the conventional have reportedly been expanding educational opportunities (overcoming the barriers of time, space and pace of learning) and providing quality education (through its high quality learning resources). Since the success of any DE depends on the appropriate and effective application of ICTs in its system, the repeated reports about the high prevalence of problems in most developing countries with regard to the use of ICTs in DE deserve serious research attention.

On the other hand, the tremendous growth in information communication technologies over the past few years and the related powerful global economic forces have apparently put the education systems of any country around the world under a compelling pressure to introduce and develop a predominantly technology based education. That is why most world states have made the promotion of technology-based education as one of their top priority agenda in their education policies and national development schemes. Thus, in addition to the problems in the use of ICTs in DE, that is inherent in the nature & practice of DE system itself, the global imperative for a technology-based education in the twenty first century, the use & misuse of ICTS in DE has recently become the centerpiece of several research attempts in the area.

In a modest attempt to fill in the research gap observed regarding the above problem in Ethiopian context, this paper has aimed at forwarding some recommendations for the better use of ICTs in DE in Ethiopia. More specifically, the paper has tried to give answers to the following basic questions.

- **What is the current status in the use of ICTs in DE programs in Ethiopia?**
- **What could be the possible problem areas in the use of ICTs in DE?**
- **What recommendations could be made for the better use of ICTs in DE in Ethiopia?**

With regard to the methodology, documentary analysis was the predominant method of data collection used for the paper. The collected data were analyzed qualitatively vis-a- vis theoretical underpinnings and empirical findings that were reviewed from relevant literature.

I. THEORETICAL BACKGROUND

1.1 The Application of ICTs in DE

The increasing use of ICTs in DE in the last decade is a major contributor to the dramatic transformation of this form of education. Although the use of ICTs for DE is not new - radio and TV have been used effectively for more than forty years - satellites and the Internet are transforming the world into a borderless educational arena, benefiting both previously underserved citizens and education entrepreneurs. (Mason, 1998) Although many developing countries still have limited access to these new technologies, major new investments in telecommunications and information systems are going to dramatically improve their access. (Shery & Morse, 1995, Blanchard, 1989)

However, making sound investment decisions about the ICTs to be used for DE is a major challenge facing educational policy makers and planners. This is mainly because inappropriate decisions regarding whether to use the ICTs or what types of ICTs to use can be costly and can seriously impede the success of DE program. However several scholars (Bates, 1995; Romiszowski, 1988; Sparks, 1984) affirmed that the information needed to make appropriate decisions on the use of ICTs in DE are limited. What are the contents of this body of information? Before going into the discussion of the theoretical analyses that have been made about the use of ICTs in DE, a brief examination on the existing types of ICTs being used in DE is in order.

Currently several types of ICTs are being use in DE-Bates(1995:30) Summarized the ICTs that are currently in use in DE around the world in the following table.

Table 1. The relationship between media, technology and distance education application of technology.

**Media
Technologies
Distance Education
Applications**

Text
(including graphics)
Print
Course units;
Supplementary materials;
Correspondence tutoring

Computer
Data-bases; electronic publishing

Audio
Cassette; radio

Programs

Telephone

Telephone tutoring; audio conferences.

Television

Broadcasting; video cassettes; video discs; cable; satellite; fiber-optics; ITFS; microwave; videoconferencing Programs; lectures; videoconferences

Computing

Computers; telephone, satellite; fiber-optics; ISDN; CD-ROM; CD-I Computer-aided learning (CAI, CBT); e-mail; computer conferences; audio-graphics; databases; multimedia

Generally, there are two broad application areas of ICTs in DE. These are using ICTs **as primary and supportive learning resources** (also called one- way technology application in DE) and for the **two-way communications** (also called two- way technology application in DE). To illustrate this based on the list of ICTs applications in DE given in Table 1, one –way technology application include: course units, supplementary materials, cassette programs, broadcast programs, CAL, CAI, CBT, database and multimedia. On the other hand, the two-way technology applications in DE consist of; correspondence tutoring, telephone tutoring, audio conferencing, interactive television (TV out; telephone in), video conferencing, e-mail, interactive database and computer conferencing.

1.2 Major Factors that Determine the Use of ICTs in DE

A closer look into the existing research literature that deal with the problem in the use of ICT's in DE reveals that two different levels of emphasis appear to exist among researchers in addressing the issue. Some of the researchers (Bates,1996; Gagne 1989; Romiszowski ,1988) focus on the variables that need to be considered at the level of the distance teaching institutions for the appropriate use of ICT's in their systems. On the other hand, the other group of researchers (Mason,1998; Minoli,1996;Rumble,1989) seem to have given greater emphasis to the contextual and national factors that determine the use of ICT's in DE.

Since both the institutional and national variables are believed to be worth considering to get the comprehensive picture of the factors that determine the use of ICTs in DE in Ethiopia, the major research findings form the two levels of emphasis mentioned above will be reviewed in the sections below.

1.2.1 Factors that Determine the Use of ICTs at the Level of the DE Institutions.

There are numerous theoretical models that have been used for deciding on the appropriate use of ICTs in an educational institution. These models have been employed by researchers to identify the major factors that determine the use of ICTs in education. A good example of such models is the often quoted model of Romiszowski (1988) which was developed based on a systems approach

and used as a basis for deciding on the appropriate use of ICTs in education. Prior to the above model Reiser and Gagne (1983) carried out a useful analysis of 10 models on making selection and identified many common characteristics of such theoretical models. However, there are certain fundamental problems in applying these models as the basis for the use of ICTs in distance education. The most important of these problems is perhaps, the fact that the models were primarily designed for the conventional face-to-face education. Secondly, these models don't deal with non-instructional issues such as costs and organizational requirements. Thus, it doesn't seem to be reasonable to make strategic and practical decisions about the use of ICTs in DE based on these models.

On the other hand, when the decision on the use of ICT's that have been made by most distance education institutes around the world are looked into they appeared to be mostly determined intuitively (Holmberg, 1996; Schloser & Anderson, 1994)

Because of the problems that been discussed thus far, and due to the need to have a conceptual framework that takes into account the rapidly expanding number of technologies and the many new organizations entering the area of distance learning for the first time, a more comprehensive conceptual model was sought for that can serve the purpose of this paper. With this rationale in mind, what is called ACTIONS framework was adapted for this paper.

According to Bates (1995:35) ACTIONS model comprises seven variables that determine the use of technology in DE. These are: Access, Cost, Teaching and Learning, Interactivity and User friendliness, Organizational issues, Novelty and Speed. However, instead of using the above model as it is, the following minor adjustments were made:

1. Since "Organizational Issues" are the basic criteria not only to determine the use of ICTs in DE but also to define whether an organization is a DE organization or not, it was made to be the first criterion of the model
2. Since interactivity and user friendliness are entirely different dimensions of ICTs (when used in DE) they were made to be two independent factors in the model

Thus, the adapted model to be used in this paper to examine the major institutional level variables that determine the use of ICTs in DE includes the following.

Organizational Issues	Access	Cost	Teaching and Learning
Interactivity	User friendliness	Novelty	Speed

1.2.2. National Factors that Determine the Use of ICTs in DE

After making a comprehensive review of literature on the national factors that determine the use of ICTs in DE, the following three factors were identified.

1.2.2.1. The Status of the Communications Infrastructure in the Country

Researchers in DE (Keegan, 1990; Gagne, 1989, Garrison, 1987) have long contended that the

crucial national condition that determine the possible use of ICTs in DE is the status of the communications infrastructure that exist in the country. The writer of this article feel that though this appears to be undisputable fact, such a justification for not using ICTs in DE doesn't give a clue as to what the concerned bodies should do about the problem for it externalize the responsibility of finding solution from those concerned bodies to a national syndrome- the poor economic status of the country. Therefore, this national factor will not be included in the conceptual framework adapted for this paper.

1.2.2.2. The Place and Role of DE in the National Education System of the Country

The increasing need to use technology in any form of education (i.e. distance or conventional) seem to have got widespread acceptance around the world. However, studies (Willis, 1993; Moore, 1990) have affirmed that DE is, by far, found to have greater potential for the application of ICT's than the conventional education. What logically follows from the above line of argument is, therefore, in the country where the role & place of DE in the national education & training systems is insignificant, one of the most pervasive area for the application of ICT in education would be substantially hampered.

1.2.2.3. The Status of the Interactive Distance Learning Industry in the Country

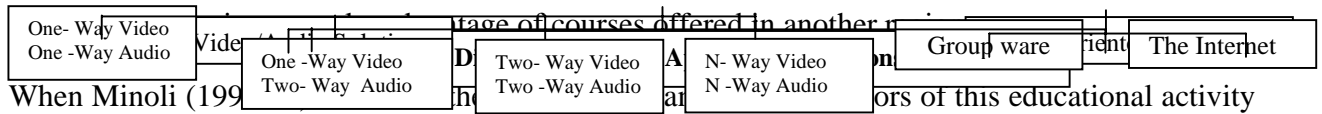
The contemporary DE practices around the world, as part of what is called the third generation DE, heavily rely on **interactive** communications technologies. Since these technologies require huge financial resources and extensive organizational commitments, both beyond the capacity of most educational institutions, DE institutions depend on establishments of communications technologies to get the services of the technologies.

On the other hand, even if the establishments of communications technologies control virtually all of the infrastructure required to provide interactive-communications- technology - based education their organizational vision, mission and goals don't seem to have allowed them to function as education and training institutions.

Therefore, in developed countries organizations that control the establishments of communications technologies are flooding the enterprise of education and training not as educational institutions, but as principal actors of a new form of industry referred to as **interactive distance learning industry**. Furthermore, since these IDL technologies have increasingly been used in the conventional face -to - face education systems, the presumed difference between DE and the conventional is becoming meaningless. Thus, the possible ways for the better use of IDL technologies both in distance education and the conventional seem to be determined by a common national factor i.e. the status of IDL industry in the country. The next section is entirely devoted to the discussion of IDL industry.

1.2.2.3.1 Interactive Distance Learning (IDL): An Emerging Industry

Interactive Distance Learning (IDL) simply means the interactive delivery of educational programming to remote sites. These remote sites can consist of a single individual or groups of individuals such as a classroom or a training center. With interactive distance learning students in a



When Minoli (1996) wrote: "The benefits of distance learning are driving the growth of a distance learning industry made up of providers of distance learning applications and networking solutions and buyers of distance learning networking solutions, including both distance learning providers and receivers." Perhaps, the central point in the above description is that interactive Distance Learning (IDL) is not an activity that is limited to distance education institutions or even the national education system of a particular country, but a global industry in education and training.

Although the issue of IDL industry needs extensive discussion to understand its basic features, for the consumption of this paper suffice it here to examine only the application of ICTs by the interactive distance learning industry. This embraces distance learning application solutions and distance learning networking solutions.

1.2.2.3.1.1. Distance Learning Application Solutions

Many distance learning communication solutions are on the market today to satisfy the needs of distance learning providers and receives. These application solutions can be divided on to two categories: video solutions and data solutions: The figure below portrays the taxonomy of the ICTs being used in distance learning i.e. distance learning application solutions.

Table 2 - Taxonomy of Distance Learning Technologies

(Source: Minoli: 1996:14)

2.3.1.2.Distance Learning Networking Solutions

Several network solutions exist to support the application solutions indicated in the preceding section. Since the discussion of the available network solutions is beyond the scope of this paper, an attempt will be made in this section only to indicate the level at which communication occur, topologically, in IDL networking solutions. This include:

- A local-or campus area network, that is, within a building or within a campus
- Public network access; that is between the user's building and the carrier's point of presence, for example, a local central office;
- A Metropolitan Area Network (MAN); that is, a the community level;
- A WAN that is regionally or nation wide;

- A global area network; that is internationally.

II. THE CURRENT STATUS IN THE USE OF ICTs IN DE PROGRAMS IN ETHIOPIA

To find out the current status in the use of ICTs in the DE programs in Ethiopia, it is essential to know all of the major DE programs that are currently active and functioning in the country. Therefore, the writer has made extensive inquiries and reviewed relevant documents of the Ministry of Education (MOE), Educational Media Agency (EMA) of MOE, Addis Ababa University (AAU); selected regional colleges, the Federal Civil Service Commission and the Ethiopian Civil Service College (ECSC). Finally, a comprehensive list was made consisting of the DE programs that are being offered to various target groups in Ethiopia. For the sake of convenience, these highly diversified DE programs and activities were grouped into five categories. Although the collected data were inadequate, the level of the DE programs being given, the ICTs being used in the existing DE programs and activities in Ethiopia were summarized and presented in Table 4 below.

2.1. ICT's Being Used as Primary and Supportive Learning Resources in the DE programs in Ethiopia.

Table –4 makes clear that the ICT almost invariably being used as a primary learning resource in all of the DE activities is print. With regard to the ICTs being used as supportive learning resources, with the exception of private Ethiopian Students who study in DE institutions abroad and EMA of MOE, all of the DE programs don't seem to have made use of ICTs as supportive learning resources. EMA of MOE found to use Radio and TV broadcast as a supportive learning resource not only for its DE Program but also for the conventional face-to-face school programs.

1.3 ICT's Being Used for the Two-Way Communications in the DE programs in Ethiopia.

As it is disclosed in Table-4, the two-way communications between the distance teaching institutions and their students were mostly mediated through the use of postal service. The only exceptions in this regard were the private Ethiopian students who learn at a distance in DE institutions outside Ethiopia and the videoconferencing programs of ECSC which were found to use telephone, Fax and E-mail for the two way communications.

2.3. ICT's Being Used for Establishing Network

Although it was not indicated on Table-4, none of the DE programs was found to have made use of networking solutions at any communication level, except for the IDL (videoconferencing) program of the ECSC which is part of the Global Distance Learning Network (GDLN).

Table 4. ICTs Being Used in the Major DE programs and Activities in Ethiopia

ICTs Being used for the two-way communication	Description of DE programs/Institutions	Targeted Education Level of the DE Programs ICTs being used as Learning Resources
<p>1</p> <p>Educational Media Agency</p> <p>Grades 9-12</p> <p>Print</p> <p>Radio Broadcast</p> <p>Postal correspondence</p>	<p>Supportive educational programs for school Grades in selected subjects</p> <p>Radio & TV broadcast</p>	<p>Primary</p> <p>Supportive</p>
<p>2</p> <p>Higher Learning Institutions</p> <p>Addis Ababa University</p> <p>MA in educational Management & curriculum Dev't</p> <p>Print</p> <p>Postal correspondence</p>		

Primary
Supportive

1
Educational Media Agency
Grades 9-12
Print
Radio Broadcast
Postal correspondence

Supportive educational programs for school Grades in selected subjects
Radio & TV broadcast

2
Higher Learning Institutions
Addis Ababa University
MA in educational Management & curriculum Dev't
Print
Postal correspondence

2.1

2.2

Regional teacher training colleges.

- For the unqualified second cycle primary school teachers in Ethiopia

Diploma Level training in those subject areas given at the second cycle primary school level

Print

Postal correspondence

2.3

Ethiopian Civil Service College

- For the unqualified civil servants in Ethiopia

Diploma in Accounting Management & Law

(to start soon)

Print

- IDL programs for the professionals in Ethiopia

Short term Idl training in several areas

Video, conferencing

- Postal correspondence
- Fax
- E-mail
- Telephone

3

3.1

DE programs through local centers of foreign DE Institutions

Ethiopian Management Dev't program (mainly by UKOU)

Certificate & diploma in Management

Print

3.2

Staff Dev't in DE for colleges & Universities in Ethiopia (Mainly by IGNOU)

Post graduate certificate & Diploma in DE

Print

4

Alpha Education & training PVT.Lt. Comp.

Diploma in various vocational and Technical fields

Print

Private students in Ethiopia who study in DE institutes out side Ethiopia
In diversified fields and at different training levels

Print

- Audio
- Video
- Internet
- Postal correspondence
- Fax
- E-mail
- Telephone

III. POSSIBLE PROBLEM AREAS IN THE USE OF ICTs IN DE

Consistent with the conceptual framework adapted for this paper, the possible problem areas in the use of ICTs in DE will be examined at two levels, i.e. at the level of the DE institutions and at national level.

3.1. Possible Problem Areas at the Level of the DE Institutions

As indicated in the previous sections there are eight major problem areas that must be looked into to identify the specific problems in the use of ICTs in DE institutions. These include: the organizational issues of the DE institutions; the accessibility of the ICTs to the students; cost-related problems; the appropriateness of the ICTs to the teaching and learning process; the interactive of the ICTs; the user friendliness of the ICT, the speed of the ICT's for up-dating the content it delivers; and novelty.. The above variables are further discussed in this section.

3.1.1. The Organizational Issues of the DE Institutions to Use the ICTs

Studies (Holmberg, 1996; Keegan, 1990; Moore; 1990) have shown that successful applications of technology in DE require the existence of appropriate institutional organization and adequate organizational preparation for managing changes that could result from the introduction of the new technology in the DE institutions. Bates (1995:57) put the basic question that must be answered in this regard as "what are the organizational requirements, and the barriers to be removed; before this technology can be used successfully." He further noted that a major implication of using technology is the need to reorganize and restructure the teaching and technology support services in order to exploit and use technology efficiently.

However, many empirical studies (Willis, 1993; Evans, 1990; Gagne; 1989) indicated that the task of undertaking the institutional restructuring is far from easy as it commonly sounds. According to these authors the main reason for this practical challenges is the fact that too often technology is merely added to an existing structure and way of doing things. Thus, for any thoughtful application of technology the DE institution must make adequate preparation to overcome the challenge that could result from the short-term disruptive and costly consequences of reorganization and restructuring for successful implementation of technology based-teaching.

3.1.2.The Accessibility of the ICT's to the Students

In any DE program it is essentially required to ensure whether the students actually receive the instruction mediated through the ICTs used in the program; that is, the accessibility of the ICTs to the distant students should be ensured. Different authors identified different points that need to be considered in order to give answer to the above question depending up on the type of technology used for the distance instruction.

For instance, those writers who studied radio or TV broadcast programs (Moore, 1990; Gagne, 1989) underscored the appropriateness of broadcasting time to the students and the availability of the equipment (i.e. radio & TV) to the students as major points that determine the accessibility of the technology. On the other hand, those authors who examined the accessibility of the communication technology that depend on the existing communication infrastructure found in areas where the students are located (Manjulinka & Redy, 1996; Willis, 1993) argued that one of the most important question concerning accessibility is "what is the appropriate location for the target distant students?"

3.1.3.Cost-Related Problems

Many scholars (Moore 1990; Spark, 1984) in DE agree that cost is the most crucial determinant for using any technology in a DE program. They further contend that since DE is widely recognized as more cost-effective than the conventional education, unless its cost-effectiveness is ensured DE can loose its one central merit. Therefore, all cost-related problems that are found to affect the use of ICT in DE must be examined in greater detail. Since such an in depth analysis of cost leads to the heart of the economics of DE, suffice here to state the basic question around which most cost-related problems in using ICTs in a given DE institution are organized. The basic question is stated by Bates (1995:37) as: "What is the average cost per student study hour for a particular technology for a given number of students over the expected life of courses to be delivered supported by the technology?"

3.1.4.The Appropriateness of the ICTs to the Teaching and Learning Process

It is essential that any ICT to be used in a given DE program has to be appropriate to the particular teaching & learning process it has primarily employed for. There are several studies that have dealt

with the match & mismatch between the instructional objectives and the technology used to attain the objectives in a DE programs (Gagne, 1989; Schramm, 1977). Perhaps, the most central question these studies have sought an answer for is; "what are the unique educational characteristics of each technology and how well do these match the learning and teaching requirement?"

3.1.5. The Interactivity of the ICT's

The term interactivity seems to have two different meanings when used in the two application areas of ICTs in DE i.e. as learning resources (instructional material) and the two-way communications. When used within the context of instructional materials interactivity denotes the interaction between the student and the material while the student is being engaged in the self-study of the material. Here the learning material must evoke successive responses from the student as the student progress through the contents of the material and it must also provide feedback for every response the student has to make to each learning item presented in the material. In this case, if the ICT being used to deliver the learning material lends itself for greater interactivity, as it was just indicated, it will result in effective learning. But most of the widely used technologies in DE such as print & audiocassettes have limited potential for interactivity. On the contrary, most of the recent, technologies being used in DE (which are commonly known as IDL technologies) are highly interactive.

On the other hand the term interactivity is also used in the context of the application of ICT for the two-way communication mostly between the teaching institute & its students. In this context, ICTs differ in being one-way versus two-way communication technologies; in their types i.e. print, telephone, computers etc; and in their speed. Although tremendous advancement was made in using two-way, high speed interactive distance learning communication technologies, in most DE institutions found in developing countries such communication still rely on postal service.

3.1.6. The User friendliness of the ICT's

User friendliness denotes the extent to which the ICT being employed is easy to be used by the learners. Most of the IDL technologies in spite of their enormous instructional advantages are not easy to use for many learners and require the skill of manipulating the technologies. However, with regard to the older but the more widely used communication technologies such as print and radio, the problem of user friendliness is relatively less significant.

3.1.7. Novelty

Recent research reports on the use of technology in DE (Holmberg, 1996; Manjulinka & Reddy, 1996; Bates, 1995) have disclosed that certain new interactive distance learning technologies are being used by DE institutions without adequate justification as to their relevance & appropriateness for the DE program they have been used. This is what the scholar identified as a novelty derived decision on the use of technology in DE. According to the above authors, the reason for this is the influence of funding organizations. When they elaborate this they further, noted that it is easier to get funding for new uses of technology. Whereas audiocassettes combined with print materials can

be a very low-cost but highly effective teaching medium, it may be easier to persuade funding agencies to invest in much more costly but spectacular technologies such as computer-controlled videodiscs or satellite voice & data networks.

3.1.8. Speed

In a society subject to rapid change, courses need to be put on quickly and easily updated. Technologies vary in their capacity for speed of implementation and flexibility in up dating.

3.2. Possible Problem Areas in the Use of ICTs in DE at National Level

3.2.1. The Place and Role of DE in the National Education system

Since one of the paper's hypothesis is the role & place of DE in the national system determines the use of ICTs in DE, it is important to see few pints that indicate the situation in Ethiopia. DE in Ethiopia is in its infancy, (Getachew and Tilson; 1998). Moreover, the role of DE in the Ethiopian national education & training system is that of most developing countries (EMA; 1997). More importantly there seem to be lack of government policies about the role of DE in the Ethiopian education & training system. The evidence for this could be the fact that neither the education & training policy (TGE, 1994_a) nor the education & training strategy (TGE, 1994_b) directly state the role & place of DE in the national education system. Thus, this poor state of DE in Ethiopia seem to have curtailed one extensive area for the use of ICTs in education.

3.2.2. The Status of the National Interactive Distance Learning Industry

Distance learning industry in a given country is determined by the level of technological & economic development of the country. Although IDL industry is progressing at alarming speed in the developed countries, its status in most developing countries is quite meager. (Rao,1992;Garrison 1987.) Even worse, the existing very few IDL activities are functioning not only in a fragmented & ad hoc fashion but also initiated by limited organizations distributed sporadically across a country. In other words, the current IDL practices in many developing countries is far from being systematized, strategically coordinated & doesn't seem be a part of the nationally conceived & organized IDL industry that is getting momentum in the so called developed world. (Manjulinka & Reddy, 1996)

As far as the IDL industry in Ethiopia is concerned, there is no data that indicates the situation in Ethiopia to be different from that of most developing countries describes above. Besides, although there are a number of encouraging beginnings in introducing IDL applications solutions and networking solutions mostly through the bilateral & multilateral cooperation these don't seem to be part of a national vision in IDL industry strategically coordinated to solve the major challenges of education & training in Ethiopia.

VI. RECOMMENDATIONS FOR THE BETTER USE OF ICTS IN DE IN ETHIOPIA

It seems difficult to give recommendations as a solution to any problem without conducting field research on the nature of the problem. Since the paper is about the use of ICTs. in DE in Ethiopia, an activity which is in its infancy, the value of the recommendations cautiously given based on the underlying conceptual framework and a detailed analyses of the central points in the problems involved, cannot be disregarded in guiding future actions. Accordingly, the following recommendations are forwarded for the better use of ICTs in DE in Ethiopia with the purpose of indicating major ideas that could possibly be used as practical solutions for each problem area analyzed in the preceding section.

4.1. Recommended Ideas as Possible Solutions for the Problems at the Level of the DE Institutions.

Any DE institution in Ethiopia might ensure the better use of the ICTs it employs for its programs if it gives due considerations to the following points:

4.1.1. For the better use of the ICTs in DE institutions the major organizational issues that need to be considered include:

- Having a clear DE institutional organization i.e. to have either of the three modes of DE institutional organizations namely; the autonomous the dual-mode or consortia. Since DE is primarily conceived, developed and practiced as a technology-based education system, organizing a DE institution in line with the major modes of DE institutional

organizations by it self creates a better organizational condition to use ICTs in that DE institute.

- Trying to solve the three staff-related barriers for the use of the ICTs. These are: technophobia' -the personnel's' fear of dealing with new technologies; the personnel's lack of the prerequisite skills to manipulate the new technology e.g. computer illiteracy; and the personnels' reluctance to switch from traditional methods of teaching to technology oriented approaches.
- 4.1.2. Depending upon the nature of the target group, it would be important to identify the most appropriate location for the students to get access to the ICTs being used. The possible answers for this might be at home; in a local center dedicated to distance learning; at a local public education institution, with shared facilities for campus-based and distance students; at work-which could be an individual work-station or in an organization's learning center. Besides, if broadcasting is used, it is crucial to adjust the broadcasting time to the time that is appropriate to most of the target students.
 - 4.1.3. It is essential to ensure the cost-effectiveness of each ICT being used. This requires, among others, providing adequate answers to the following basic questions vis-a-vis the total number of target students: what is the capital and operating costs required for the ICTs being used; what would be the fixed and variable costs needed to use the ICTs; what are the production costs and delivery costs.
 - 4.1.4. For each ICT being used it is necessary to ensure its appropriateness for the type of learning and instructional strategies it is meant to serve.
 - 4.1.5. Since with the current conception of DE the principle of interactivity is the basis for every instructional activity, depending upon the type of ICT used; it is essential to make the presentation of the course contents interactive. For instance, if print is used, it is important to prepare the instructional materials, using an interactive approach such as tutorial-in-print. If the ICT is radio, it is recommended to make use of the approach of Interactive Radio Instruction (IRI) in developing and delivering the instruction. Moreover, as much as possible, it is advantageous use to the ICTs that allow two-way communications between the students & the teaching institution and also among the students themselves. For instance, telephone might effectively be used for tutoring, counseling etc.
 - 4.1.6. Instruction to be delivered through any ICT is required to have user-friendly presentation. Depending upon the type of ICT used, it is necessary to include the major elements required to make the ICT easier for the students to use in the process of learning. For instance, when print is used it is suggested to make use of what are called 'access devices' while preparing the instructional material; and when computer is used for the distance instruction, it is essential ensure the students' prior skills in using the computer and address their problem due to technophobia'
 - 4.1.7. A novelty derived decision should not be made on the use of a new ICT (i.e. unless there are adequate evidences as to the relevance and appropriateness of the ICT for the DE program it is supposed to be used.)

4.2. Recommended Ideas as Possible Solutions to the Problems at National Level.

- 4.2.1. Enhancing the place and role of DE in the national education and training system of the country. This might involve:
 - 4.2.1.1. Incorporating in the education and training policy the idea of using DE as a viable alternative to the conventional education system and its special relevance for democratization & Universalization of education in the country. Further indicating in the policy document the application of ICTs as essential requirement in the design, development and delivery of the DE programs.
 - 4.2.1.2. The need to introduce certain strategic interventions directed towards strengthening DE in Ethiopia such as establishing Open University and this should be stated in the strategic plan of the Ethiopian education & training policy. In this regard, instead of establishing a new Open University considering to upgrade the existing institutions particularly EMA of MOE which has the communication infrastructure that fairly compare with that of most open Universities in developing countries, to the level of the National Open University of Ethiopia might have been one national step for the better use of ICTs in DE in Ethiopia.
- 4.2.2. Working towards establishing a strong Interactive Distance Learning Industry in Ethiopia. Based on the experiences of several countries the following could possibly be undertaken shortly in the Ethiopian condition.
 - 4.2.2.1. Identifying the stakeholders of the Interactive Distance Learning industry in Ethiopia, developing their awareness about the challenges and opportunities of the industry; design means of strengthening their capacity and encourage their activity. The stakeholders include:
 1. Potential Education Providers (Universities & College, training organizations, educational media agencies who are either implementing distance learning programs or are considering the implementation such programs.
 2. Potential Education Receivers, including high school students, university & College students, employees of government organizations, NGOs, the private sector who have a diverse range of educational needs and are seeking distance learning as an alternative to traditional face-to-face education.
 3. Potential Network service providers (e.g. Telecommunications Corporation). These service providers can become competitive and can race to create a national infrastructure in support of the needs of the distance learning industry as well as the needs of other stakeholders.
 4. Providers of Application Solutions, such as video conferencing, video broadcasting, and audiographics who are exploring new business opportunities
 5. Government agencies at the regions and federal levels that are attempting to speed up the creation of a better education system in the country.
 - 4.2.2.2. Given the current underdeveloped IDL activities in Ethiopia, it seems less practical to presume the stakeholders of the industry to have the required capacity and commitment to function properly as part of the national IDL industry. Thus, some IDL projects need to be initiated by the potential IDL applications and network solutions providers and the federal government.
 - 4.2.2.3. There should be a national policy of IDL that require, among others, education providers, the organizations or employers of education receivers, and providers of applications solutions to have a vision and strategy conceived at national level to introduce networking

solutions in support of their programs in education & training and thereby promote the IDL industry in Ethiopia.

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