

## **Prospects for Combining Residential and Distance Mode of University Education in Tanzania**

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### **Abstract**

Advancement in telecommunication technology has created opportunities for universities to expand residential education beyond the traditional institutional walls. As a result, universities world-wide have or are in a process of embracing distance education. The reforms are necessary to meet challenges of the changing demographics of the student population; broader demand for accessibility and equity in distribution of benefits and costs; and the general global trend in the progression of the role of University education in the broader contexts of economic and social development. The emphasis is on the use of teleinformatics technology and maximising capacity and quality of academic programmes.

Through the Institutional Transformation programme (UDSM 2000), the University of Dar es Salaam (UDSM) has initiated a study whose aim is to examine and propose a model of strategic planning that can be adopted by the University of Dar es Salaam in order to combine residential and distance modes of education delivery. The proposed model would be one, which can easily be translated for use by other Universities with particular needs in the delivery of distance education.

### **1. Introduction**

Some literature already shows that the imbalance between enrolments, funding and social demand for higher education has compelled many countries in the world to review their university education modes towards enhancing capacity (Evans and King, 1999; Saint, 1999; UDSM, 2000). The focus has been a shift from the traditional lecture in a classroom setting where students listen and write notes at prearranged times and locations (a typical residential based model), to a new and more flexible model with a distance teaching and learning orientation. Moreover, advances in information communication technology (ICT) imply that it is going to be increasingly impossible for a university to continue offering courses using the traditional system of delivery at the same time remain locally and globally competitive. Tanzania's Members of Parliament meeting in Dodoma

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between 15th-18th July 1998 seemed to be convinced that given the current number of academic staff, physical facilities and textual material available it was possible for the UDSM and the Sokoine University of Agriculture – the prime public universities in Tanzania—to start providing distance education. This paper tries to answer the following question: How can UDSM and other universities effectively combine the residential and distance mode of teaching and learning?

## **2. Theoretical Overview**

### **2.1 *The Concept: Distance Education (DE) and Residential Education (RE)***

There is likely no standard definition of distance education. The main reason is the rapid change in information and communications technology (ICT), and the explosion of new models and theories on the subject over time (Distance Learning Resource Network, 2000:1-2; Stenerson, 2000:2-3). A few definitions have managed to accommodate changes in existing philosophical paradigms and technologies which best describe the pedagogical arguments of Distance Education (DE) in the context of changing ICT. According to Moore and Kearslet (1996:2), Distant Education:

- is planned learning;
- normally occurs in a different place from teaching;
- requires special techniques of course design and instruction;
- requires special methods of communication, i.e., electronic and other technologies; and
- requires special organisational and administrative arrangements.

Residential education (RE) refers to an educational experience where the students board (live/sleep) on campus, as well as attend face-to-face classes. It is sometimes referred to as “traditional education” in the sense that it is classroom-based, and face-to-face. RE has been described as expensive, its success limited to a few students, rigid and not demand-oriented, and that it lacks a pragmatic relationship between the knowledge generated and work. It is for these reasons that some countries advocate the integration of residential with distance learning at university level where students take a mix of on-campus and distance course (see Evans and Nation 1989 for Australia). This approach minimises the weaknesses inherent in the traditional RE model while at the same time addressing the weaknesses and problems in the purely “open distance” model as we shall see later.

### **2.2 *Africa's Experience with DE Through ICT***

As pointed out before, the meaning and scope of distance education has been evolving over time due to the growth and emergence of ICT. One way of looking

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at these developments is to describe them as belonging to three different generations. The first generation is mainly related to the traditional correspondence study where the written and printed material was the medium of communication. The second generation continued to use the print as the dominant medium, but this was integrated with broadcast. During this generation, two-way communication between tutors and students was introduced through correspondence tuition, face-to-face sessions, and short residential schools. The third generation uses ICT as its basis. It offers two-way communication in various forms such as video-conferencing, audio-graphics, electronic mail, Internet and computer conferencing. In this section, the African experience with DE through ICT (third generation) is discussed. Particular attention is paid to the use of Internet as an example.

### *2.2.1 Internet Access in Africa*

According to the International Thompson Computer Press (1996), in 1995 there were about 600 million users of the Internet world-wide. Africa, with a population of 650 million had less than 1 percent of its population with access to the internet (and less than one percent of the world's computers). By the year 2000 Africa's internet connectivity indicators show a significant improvement.

Some indicators of the African situation in Africa in 2000 were:

- All countries and territories in Africa had public local dial-up internet accesses in capital cities. 19 had local ISPs or POP for dial-up access in secondary towns, with South Africa leading by having 100 such points. Others in ranking order included: Egypt (14), Namibia (11), Morocco (9), Ghana (7), Tunisia (7), and Kenya (6). Tanzania was among the last three with only 2 access points in Arusha and Dar es Salaam.
- Of the 54 countries, 25 had public drop-in internet access – tele-centres, internet cafes, and cyber-net cafes—with South Africa leading in the list by having more than 50 of such centres. Tanzania had registered such services in Arusha, Dar es Salaam (5), Mbeya and Morogoro and several other regions were in the marathon. There were more than 6 television stations and one radio station broadcasting on the internet.
- Tele-centre pilot projects continued in various countries such as South Africa, Morocco, Egypt, Guinea, Benin, Mali, Mozambique, Senegal, Tanzania and Uganda under UNESCO, IDRC, and WHO; including the Leland Initiative in 22 African countries aimed at improving internet access and use. Tele-centres are discussed in detail later when we look at

the potential for its use by Tanzanian universities to provide on-line distance education.

- Telephone infrastructure has also improved with 15 countries having GSM mobile phone international roaming.
- Efforts to interact in Swahili in the internet are being initiated to cater for East Africans not conversant with current ICT languages (English, French, Portuguese, Spanish and Arabic).

The internet connectivity, particularly with the population within and between the rural African countries is extremely poor: about 75% had no access to basic facilities of telephone or electricity, making it doubtful to depend entirely on internet as the medium of delivery. This point underscores the role of print as a medium of delivery of distance education, which has for long been in use. The Open University of Tanzania (OUT), established in 1992 has, for example, been using mainly print delivery mode. OUT is now carefully planning to move to computer-based generation of distance education strategies (Mahenge, 2000).

It can therefore be suggested that each country's experience with DE reflects its political ideology, economic structure, educational policies and the conflicting or matching interests between the stakeholders. These experiences vary between nations and across time and space (King, 1989a). However, lessons from comparative countries can be used to shed some light on how Tanzania could fair in DE.

African experience with pedagogies, methods, technologies, and techniques of DE are predicated on Western notions of learning and social life and depend on Western forms and levels of infrastructure (King and Terry, 1991). This does not premeditate neglecting African country's needs, infrastructure in the initial planning of DE as emphasised in Ghana (Ansu-Kyeremeh, 1991) Kenya, Zimbabwe, and Zambia (Guy, 1991; Mulenga, 1987; Coldevin, 1980); Guyana and West Indies (Lahor and Mawett, 1986; Brophy and Dindley, 1983). Distance education has assisted underprivileged groups of people, provided manageable solutions for democratisation and liberalisation of education (Gana, 1984; Omolewa, 1984), and has facilitated a wide educational reach and individualised forms of instruction (Dewal, 1988).

Chambo (2001) reinforces the potential of distance education by comparing the enrolment statistics of Tanzania's two universities. At the age of 36 years in

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1996, the University of Dar es Salaam had enrolled about 4000 students. At the age of 4 in the same year, the Open University of Tanzania (OUT) had enrolled 7000 students. About the same number of students (6738) were enrolled in 2000 (889F; 5849M) (see also Balalusesa 2001). Guy (1991) stresses the need to consider the political contexts of DE by reflecting to an example of Papua New Guinea. The little willingness by government to support DE was coupled by poor support from university academic staff hence poor staffing and resource limitations. Similar political influence and resources allocation to DE was experienced by Brazil, Iran, Columbia and Malawi (Mutambuka, 1987; Trillo, 1982; De Kadt, 1970; Rumble; 1983b).

Over 140 public and private institutions currently provide DE services in Sub-Saharan Africa, and the programmes rely mainly in print media, supplemented by written assignments and face-to-face tutoring. Some countries make use of natural radio broadcast, and audio cassettes. Out of 143 tertiary DE programmes in Africa, 52% are Anglophone programmes, and 7% are Francophone programmes targeting teachers and school administrators. 12% of the 143 programmes are aimed at university students. Satellite broadcasts is now being used on a pilot basis by countries participating in the African Virtual University project initiated in 1996 by the World Bank.

Active Internet markets are found in South Africa, Ghana, Senegal, Mozambique, Kenya, Uganda, Zimbabwe, and Cote d'Ivoire as shown earlier, and these have enhanced e-mail capacity through individual connections in some university departments. This situation will improve considerably in the few years following multinational and local companies' interest to invest in the ICT infrastructure in support of Africa's Internet connectivity (see Walker and Latchem, 2001).

Among the degrees offered by distance education include: Master's Degree in education for in-service teachers (Zimbabwe Open University); Bachelor of Commerce (Uganda); B. A. and B. Sc. Degrees in 14 subject areas (Nigeria Centre for Distance Learning, Abuja); degrees in Law and Social Sciences (Madagascar) and Masters' degree programmes in health and law (Senegal). The OUT offers a variety of Bachelor's degrees in Arts (B.A.); Arts with Education (B.A. Ed); Commerce with Education (B.Com. Ed); Law (LLB); Science (B.Sc.); and Science with Education (B.Sc. Ed).

DE in Africa is however, changing rapidly with the experimentation of various distance learning methods in a number of countries such as Namibia, Ghana, Botswana, Cameroon, and Zambia. Among these, Namibia and Ghana have declared dual-mode instruction to be their national policy. Generally, more countries are in the stage of developing tele-centres, i.e. public centres that offer

access for a fee to telephones, fax e-mail and full Internet services including Tanzania. South Africa is believed to be in advanced stage in this area.

Table 1 shows enrolment in DE in some countries in Africa and elsewhere. This provides a background from which to discuss in some detail the DE situation in Tanzania.

**Table 1. Tertiary Distance Education Enrolments in Selected Countries.**

Country	1 Tertiary Enrollments 1996	2 Distance Learning Enrollments 1996	3 % Enrollments In Distance Education 1996
South Africa	617,897	225,000	36
Madagascar	26,715	7,864	29
Tanzania	12,776	2,836	22
Swaziland	5,658	450	7
Zimbabwe	46,673	3,473	7
Zambia	10,489	621	6
France	2,091,688	233,000	11
Spain	1,591,863	104,429	7
United States	14,261,778	1,000,000	7
Mexico	1,532,846	103,913	7
United Kingdom	1,820,849	110,477	6
Netherlands	491,748	25,051	5
Germany	2,144,169	55,000	3
Thailand	1,220,481	456,313	37
Sri-Lanka	63,660	20,601	32
China	5,829,636	1,422,900	24
South Korea	2,541,659	482,915	19
Indonesia	2,303,469	414,061	18

*Source:* Saint (1999:10)

One gains the impression that countries with wide income disparities and a track record of recent efforts to address endemic socio-economic imbalances tended to have a higher percentage of enrolments in DE. These were countries such as South Africa (36%), Thailand (37%), Sri Lanka (32%), and Madagascar (29%). Most of the highly developed countries in Europe and North America such as Germany (3%), The Netherlands (5%), the UK (6%), and the USA (7%) tended to have low percentages of enrolments in DE. Among these, only a country like France had a significantly high rate of enrolments for DE at 11%.

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Countries in Asia which were having fast rates of economic growth like China (24%), South Korea (19%), and Indonesia (18%) indicated that there could be some link between higher rates of enrolments in DE and success at rapid socio-economic transformations in a given society. All of these are trends from which Tanzania has to draw some lessons. Expansion in enrolments of students taking higher education is increasingly seen as highly facilitating rapid socio-economic transformations which Tanzania badly needs.

### **3. Towards a Dual Mode Distance Education in Tanzania**

Distance higher education in Tanzania is gaining importance. As Bhalalusesa (1998) observed, this is due to the facts that for a long time Tanzania has been trying hard to ensure the growth and expansion of higher education. However, it has proved difficult to achieve this through the traditional residential education. Distance education has been seen as another alternative towards that end. Within this context, the Open University of Tanzania (OUT) was established as an autonomous university to offer degree programmes through distance education. All the same, the need for a greater number of students being enrolled into institutions of higher learning is still greatly felt.

Accordingly, the UDSM is now looking for possibilities of improving its enrolment capacity. In 1997/98 the University failed to enrol all applicants who qualified with only 26% of these being the ones who were enrolled against the target of about 80% to 90% set for June/July 2000 (UDSM, 2000:46. Hence, a study was commissioned in 2000 to:

- study and advise the UDSM on the method of introducing the combination of residential and distance education modes of education;
- prepare a UDSM policy regarding the application of ICT in teaching and learning, and in a particular time frame; and
- prepare a UDSM policy on the introduction of ICT-based content development in the curricular.

#### ***3.1 Design of the Investigation and Methodology***

The study was conducted using largely quantitative methods employing a survey of the stakeholders in distance education. Interview schedules for the population was developed and administered to the sample population in the form of a questionnaire on which they wrote their response at the same time gave oral responses to researchers who generated useful qualitative data. The different types of respondents and their size is represented in Table 2.

**Table 2: Number of respondents per different sets of questionnaire**

S/N	Questionnaire	Place							Total
		DSM	Zanzibar	Mbeya	Iringa	Arusha	Mwanza	Songea	
1	Teachers	35	19	10	5	2	21	4	96
2	ICT Providers	10	5	17	2	2	2		38
3	Providers of distance learning	3	2	15	3	2	2	5	32
4	Market Assessment	28	18	22	33	15	14	15	145
5	Graduates	1		1	2	2	2	2	30
6	Employers	15	11	1	6	3	6	2	44
7	Students in Distance Education	24	6	3	1	5	12	19	70
8	From VI students	29	146	51	49	36	27	65	406
9	Heads of school	24	3	2	4	8	13	4	58

There were 9 types of questionnaires administered on the various types of respondents. First, there was a questionnaire for teachers that dwelt more on the teacher’s experiences and knowledge on distance education. Information on the willingness to participate in distance education teaching was also sought through this set of questionnaire. Second, there was a ICT infrastructure provider questionnaire; the information sought by the questionnaire was on the type of infrastructure providers had, service coverage, and possibility of assisting the distance education programme. The third questionnaire was for providers of distance education; this was mainly concerned with exploring the available resources for the distance education programme. Fourthly, there was the market assessment questionnaire that provided information on training needs of different people and potential beneficiaries of distance education. Fifthly, opinion on how the programme was conducted and the benefit attained were sought through a questionnaire administered on graduates of distance education. Sixthly, there was a questionnaire for employer that investigated the type of support which can be obtained from employers regarding distance learning.

The seventh questionnaire was for distance education students. These were students of OUT, and it was concerned with knowledge and opinion on distance education and areas for future improvement of the program. The questionnaire sought the views of prospective students of distance education. These were Form VI students. Lastly, a questionnaire for the heads of schools was administered in order to get information regarding availability of space, infrastructure and support for conducting distance education in different institutions.

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### **3.2 The Sample**

For each of these sets of questionnaires, purposive or convenient samples of respondents were selected. The status of the respondents with respect to distance education was considered, and willingness of the respondents was also taken into account when drawing the samples. The sample covered different regions in Tanzania Mainland and Zanzibar as shown in the Table 2.

Note that Kilimanjaro, Dodoma and Morogoro regions were also surveyed but did not yield adequate data to be included in the above list. In Kilimanjaro, for example, only one Institution—Moshi Co-operative College—was visited due to time constraints. On the spot audit of ICT infrastructure was, however, done in all regions.

### **3.3 Data Collection Technique**

Using the nine sets of questionnaires face to face interviews were conducted in different places. In some cases questionnaires were left to respondents, filled in and posted to the interviewer or collected by the interviewer. The interviewer also took short notes covering the interview discussions—but only with some key informants who were heads of institution. To ensure good quality data, the team members checked all the filled-in questionnaires for any inconsistencies.

### **3.4 Data analysis**

When the exercise of data collection was completed, all the questionnaires were coded and entered into the computer using the SPSS/PC package. Frequencies of all the variables were produced, and this was the basis of the initial analysis. Categorical analysis of the findings was also performed for the different variables in order to establish if there was any association between the background characteristics and the study variables.

The qualitative data obtained from in-depth interviews and open-ended questions were analysed to establish important interest with respect to distance education in Tanzania.

### **3.5 Limitations**

During the interviews some respondents were not willing to be interviewed since they thought that the exercise was part of registration of voters for the general election in October 2000. The election campaigns also made it rather difficult to track down some of the target groups. In some cases, the respondents partially filled in the questionnaires. The non-responses to some items in the questionnaire were due to the fact that the interviewers did not like to influence the respondents.

#### **4. The Findings**

In this section I highlight on the major findings and a framework for guiding the UDSM and other universities in developing a new programme of combined residential and distance education often referred to as a “dual mode” of university education.

##### ***4.1 Dual Mode of University Education***

The survey for the feasibility of introducing a dual mode at UDSM covered five hundred and seventy one (320 males and 251 females) potential beneficiaries, and its objectives were to determine the:

- Spectrum of potential students.
- Preferred mode of learning.
- Reasons for choice of learning mode.
- Preferred courses of study.
- Knowledge about the programme and its advantages.
- Likely demand for the programme.
- Acceptability of the programme.
- Willingness to participate with university in offering the programme.

##### ***4.2 Spectrum of potential students***

Form IV and form VI students, diploma and certificate holders, professionals and degree holders, are among the respondents who indicated interest in the dual mode. The professionals included teachers, accountants, economists, agriculturalists, pharmacists, journalists and engineers. The majority of the professionals was married, employed, aged between 31 and 40 years; who considered their education to be inadequate. Attempts were made to ensure there was a gender balance across the spectrum.

##### ***4.3 Reasons for choice of learning mode***

Many respondents chose the distance learning mode because they believed that it:

- was simple and cheaper;
- enabled them to study and work at the same time;
- was less time-consuming and less disturbing;
- was reliable, and allowed access to higher education for people not able to get admission into full-time colleges.

Some also thought that studying by this method would enable them to get employment, and that it was good and interesting.

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### *4.4 Courses of study*

Most employed interviewees chose a particular course because it was relevant to their work. On the whole the following courses of study were identified: Education, Computes Science, MBA, Accountancy, B. Com, Languages, Finance, LLB, Materials Management, Electrical Engineering, Banking, B.A., B.Sc., and foundation courses. Levels of study included, A-Level, Diploma, Advanced Diploma, Bachelors degrees, Masters, Ph.Ds, and Postgraduate Diplomas.

### *4.5 Knowledge about the programme and its advantages*

Experience from the Open University of Tanzania have shown that most students of distance learning are employees of public institutions. Therefore in the survey, employers, heads of secondary schools and teachers of distance education were asked to give definitions and advantages of distance learning.

Seventy five percent of heads of schools indicated that they understood the concept of distance learning. Twenty six percent of employees were also aware of distance learning. The majority of teachers of distance learning provided clear definitions of distance learning terminology in terms of its advantages including those already mentioned above, such as:

- ability to accommodate more students;
- potential to upgrade their education system;
- smooth running if manuals and learning materials were provided;
- less time-consuming; and
- flexible for students with families.

### *4.6 Likely demand for the programme*

Many respondents believed that other people in their neighbourhood were likely to be interested in joining the programme if they were made aware of it. More than half the respondents believed this figure was between 1 and 10 people per town or region. Only 10% of respondents believed this figure could be higher (21 to 30 people per town or region). Sixty five percent of Form VI students wanted to study through the programme.

### *4.7 Acceptability of the proposed learning modes*

Seventy-three percent of graduates of the Open University of Tanzania (OUT) indicated that distance learning was useful in that it enabled them advance their careers. The majority of employers also were supportive of learning by the distance mode, citing the facts that it was cheep, interesting and that it improved communication and workers' expertise. Students of the OUT also expressed satisfaction with the distance learning mode, but asked for improvements here and there.

#### ***4.8 The Capacity to pay for Distance Learning in Tanzania***

Ninety-one percent of the students of the OUT surveyed were paying for the distance education using their own resources. The government or the family supported only seven percent. This implies that there is an adequate capacity within the working force to pay for DE provided that it is relevant for their professional advancement, and the fees are kept within a reasonable range. In some institutions employees attending distance education are given loans which they repay at a convenient rate and duration of time.

The OUT set an annual fee of Shs.120,000/=. Fifty-five percent of OUT students surveyed found this fee satisfactory and affordable. Thirty eight percent found it to be too high. Two percent considered it to be average. The graduates of OUT were split on this issue. There were just as many respondents who considered the fee to be affordable as those who considered it to be too high. The majority of employees and Form VI students surveyed gave the opinion that the fee should be between Tsh 50,000/= and 500,000/=. However, the range was as wide as Tsh 50,000/= to 5,000,000/=.

Although they did not feature very strongly in financing their employees attending DE programmes, employers did indicate willingness to provide financial support.

#### ***4.9 Benefits for Dual Mode University Education in Tanzania***

In the surveys conducted, the following were some of the views of the majority reflected in the qualitative data.

- It would improve the programme if distance learning were combined with periodic class instruction seminars.
- Lectures by post, internet, and video cassette tapes should be combined with residential sessions for audio visuals and practical sessions.
- It would promote opportunity for face to face instructions.

Some of the views concurred with some scholars (i.e., Saint, 1999) that dual mode of learning may offer the following benefits:

- availability of an already existing academic community and research capacity;
- use of learning materials and evaluation standards already in use for the full-time studies;
- possibility of introducing the combination mode gradually; and
- possibility of offering courses during vacation.

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### *4.10 Constraints for implementing dual modes of learning in Tanzania*

The main disadvantage of combining the two modes of learning is that initial efforts may encounter stiff resistance among the existing academic and administrative staff. A number of other factors may also contribute to making the target of combining the two modes difficult to achieve. Among those mentioned by the majority respondents include:

- poor communication infrastructure, especially to remote areas;
- poor financial capacity;
- problems of transportation;
- distraction of combination mode students by extended families;
- lack of adequate reading and other training materials;
- poor organisation;
- inadequate number of lecturers with appropriate training;
- greater distances to study centres;
- lack of encouragement from employers;
- limited accessibility to facilities for practical and field work in science subjects;
- low motivation of teaching staff;
- competition with other institutions offering similar programmes;
- low publicity of the programme; and
- high running costs, and therefore high fees.

### *4.11 Students' Perceptions of Distance Learning and Traditional Classroom Learning*

As concerns distance learning, the majority of students surveyed felt that distance learning was not well understood. However, they appreciated that it was good, cheap and continuous, and that it can increase accessibility to higher education. They also acknowledged that it is more flexible in terms of the variety of degrees it can offer and time limit.

However, they also noted that in the absence of careful planning distance learning could lead to lower quality of higher education. They expressed concern that there was also a greater danger of non-recognition of degrees and certificates obtained through distance learning. Some of the students were of the view that DE could be less efficient, more demanding, and that it requires students to be more self-reliant and self-disciplined. They also said that DE was ineffective in the evaluation of student performance.

In the case of traditional classroom learning, students were aware of the limited accessibility of this mode of learning. They noted also that the mode was more costly. However, most were of the view that this mode was more suited for science subjects, and that it provided better learning resources.

#### ***4.12 Teachers' and Heads' of Secondary Schools Perceptions of on the Proposed Programme.***

The survey sought to establish from heads of secondary schools and instructors of higher education in the regions the potential of utilising the infrastructure in the region. Of the 36 heads of secondary schools asked to indicate whether their schools could be used as study centres for the proposed programme, 75% responded positively. Also, out of the 73 instructors of higher education asked whether they could offer the DE programme, 82% responded positively.

The heads of schools felt that the DE programme could expand accessibility of low cost education opportunities to more people with the resultant improvement of working skills. Both the teachers and heads expected a fee for rendering or administering the programme ranging from Tsh 12,000/= per student per annum to 5,600,000/= per degree programme as institutional fees.

### **5. The Future of Internal and Inter-University ICT Networking**

There is substantial international, regional, and local information on the current status of ICT and feasibility of internal and inter-university networks including some key institutions. Maltha (2000) discusses the potential for improved education and research in African universities, while van Linde (2000) and Mabila (2000) offer lessons in the management of university ICT networks in the Dutch universities, and the Eduardo Mondlane University respectively.

Current studies on the status of ICT specific to Tanzania universities and some institutions have also been done (Gama, 2000; Masano, 2000; Mahenge, 2000; Mgombelo and Kissaka, 2000; Mdoe, 2000; Mutagahywa and Bakari, 2000; Tomeka, 2000; Yonazi, 2000). A commendable job has also been done by the UDSM ICT Advisory Committee, which worked hand-in-hand with other local and international agents.

A critical analysis of the above experiences and review of ICT contexts in distance education from relevant universities (Evans and King, 1991, Hanche, 2000) was coupled by field data on the type of ICT infrastructure in 10 selected regions in Tanzania.

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There is adequate corresponding infrastructure at each regional and district receiving ends (see Table 3) to facilitate the strategic moves which are, or could be taken by Tanzanian universities to connect to local area networks (LAN), connect to the internet, create websites, and establish individual satellites (VSAT). The survey indicates that 2 readily available ICT providers in the regions are Radio and TV. Negotiations can, therefore, be made with ICT providers for education rates and convenient time can be arranged to suite university needs in providing distance education.

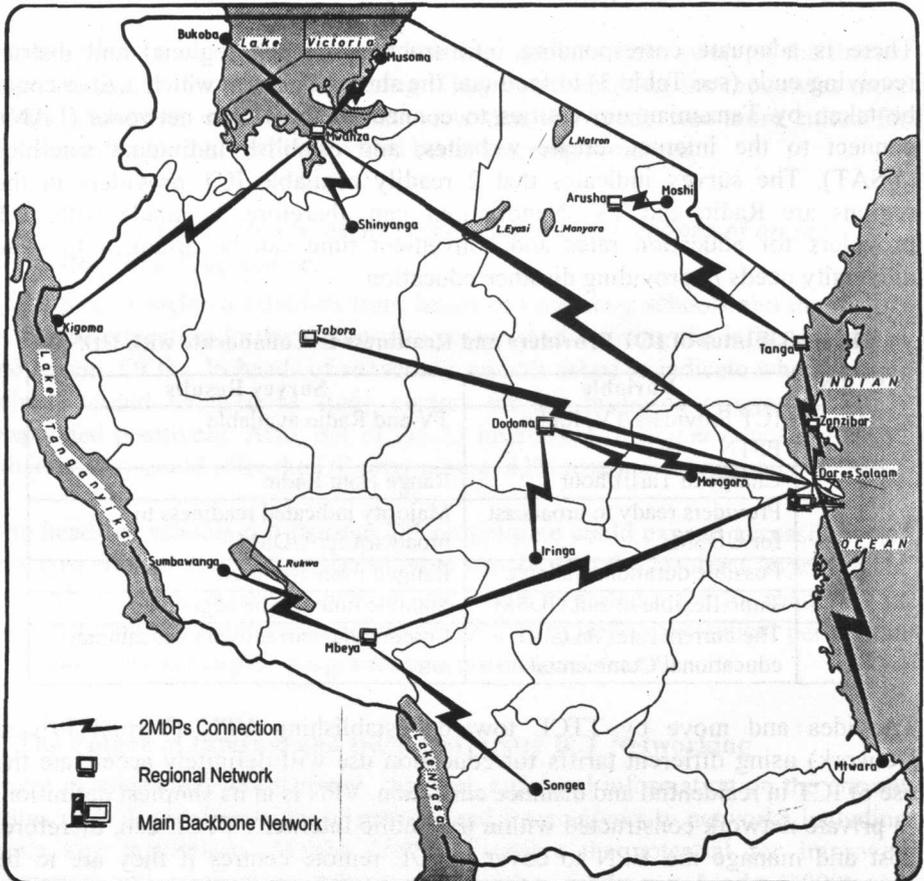
**Table 3. Status of ICT Providers and Readiness to Collaborate with UDSM**

S/N	Variable	Survey Results
1.	ICT Providers TV, Radio, PSTN	TV and Radio available
2.	Charge in Tariff/hour	Range from Radio
3.	Providers ready to broadcast for UDSM	Majority indicated readiness to broadcast for UDSM.
4.	Possible duration available	Ranged from 1-4 hours
5.	Time flexible to suit UDSM	Suitable time can be negotiated
6.	The current rates on tariff educational/Commercial	Commercial currently no educational rates

The idea and move by TTCL towards establishing VPN (Virtual Private Network) using different tariffs for education use will definitely accelerate the use of ICT in residential and distance education. VPN is in its simplest definition, "a private network constructed within the public Internet". TTCL can, therefore, host and manage the VPN to cover all DE remote centres if they are to be established. E1 streams in its PSTN backbone and distribute the service for education purpose as seen in Figure 1.

It can be seen from Figure 1 that there is a bright future in providing dial-up customers country-wide with reliable and low cost access to Internet Service Providers (ISPs), once TTCL implements the points of presence (PoPs) in the near future. For details of tariffs and scalling of bandwidth which customers can apply, see Yonah (2000: 8-9). According to Yohan, these tarrifs are, however, being revisited with a view to introducing competitive and negotiabe internet access tariffs to allow differentating customers based on their needs and nature of business activities (ibid: 9). Implied in the recommendations by Yonah is that:

- TTCL can host the Virtual Private Network (VPN) to cover all schools, colleges, and universities; and
- TTCL can manage the VPN—measuring and manaign network performance and optimising quality of service (ibid: 10).

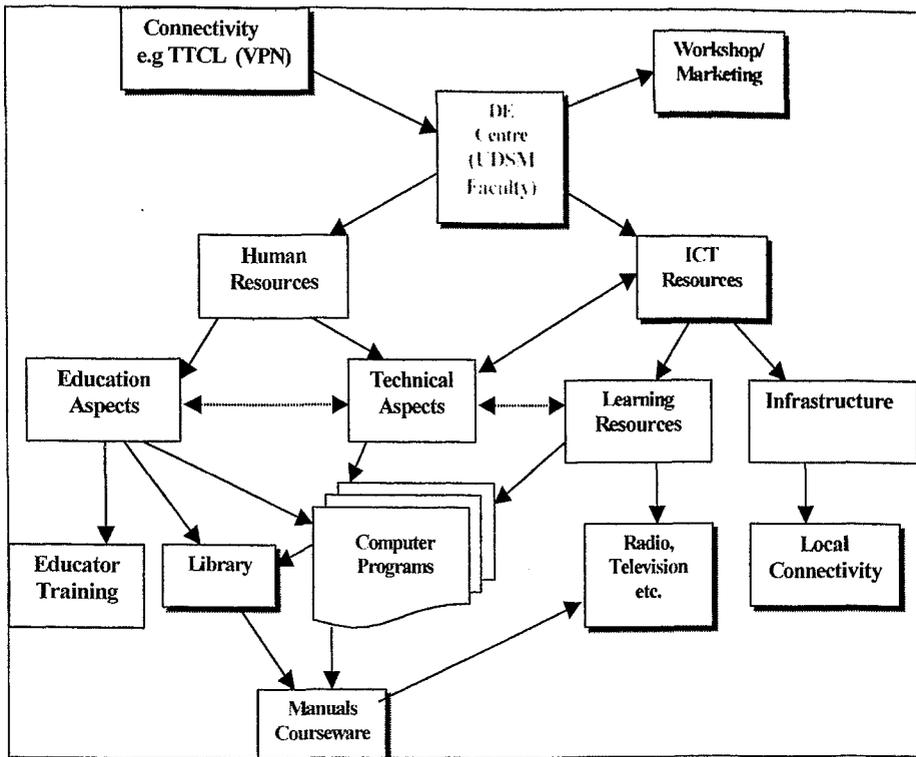


**Figure 1: TTCL National Internet Backbone showing Points of Presence (PoP)**

Source: Yonah (2000:7)

### 5.1 Proposed Delivery Modes for Distance Education at UDSM and Other Universities

In discussing how Tanzanian universities can combine dual modes of education, we will start by looking at the case of the UDSM in detail, a model that can be emulated by the other universities in the country. Figure 2 shows how UDSM can facilitate the establishment of a number of ICT centres throughout the prospective region and district clusters. From the model, the UDSM can have its own satellite dish to receive and send information using VPN to Tanzania Telecommunications Company Ltd (TTCL) or any other telephone company. Manual courseware developed within, leased or bought from outside the University may be adapted, converted into computer programmes and delivered using the ICT (the internet, TV, radio) infrastructure and print form within campus learning centres or distant centres. The next section gives a summary of the main features of the model.



**Figure 2:** *Conceptual model of a typical DE centre of the dual model with a network showing major function components*

### **5.2 Remote Centre Connectivity**

Depending on their physical location, the connectivity of the prospective centres can be done using leased telephone line, wireless, VSAT, fibre optic, or coaxial cable. In the proposed architecture by TTCL, all sites will be connected to the nearby Data Point of Presence (PoP) forming one Virtual Private Network (VPN). This facility will enhance the delivery of distance education. The strategic planning, development and implementation specifications of ICT requirements and facilitation of training of staff for such centres should be addressed well in advance by the UDSM. Educator training is required so that DE staff are able to make full use of ICT facilities. The training of DE centre staff need to include both technical aspects as well as educational aspects of how best they can use ICT for teaching and learning purposes. Boxes 1, 2 and 3 summarise some of the suggestions that have been offered regarding implementing the desired ICT use for DE.

**Box 1: Institutional Roadblocks to Tele-learning**

- Only allowing students access to minimal-level network tools and a restricted amount of time they can use a network
- Not allowing students to download and save files (presumably to prevent illegal copying of software)
- Not allowing students to have full Internet access, (out of the fear that they might abuse it, or because they are only given access to limited-capacity, old computers unable to handle graphic user interfaces or the spread and memory requirements of many tele-learning applications)
- Closing students' log-in privileges for a range of sins such as overdue library books or late payment of fees
- Making it a tedious or confusing task to find the person who assigns log-in IDs in order to arrange to have one's account active or reactivated, or to get help with network problems.
- Limiting students to computers with a non-graphic work environment (ancient DOS instead of Windows, for example).
- No allowing students access to computers "after hours" or via modem.
- Not accommodating file transfer in the main system available to the students.

*Source:* International Thompson Computer Press 1996:423

**Box 2: Next Step Decisions for Campus Support for Tele-learning**

- Expect faculties and courses to maintain WWW pages with accurate and up-to-date information for access from within and outside the institution (or more student calling in for information about a course...)
- Work toward a "one port per pillow" standard by wiring residence halls, eventually with at least three jacks by each pillow; a cable TV line for video of lectures and demonstration on demand, a 10 megabit Ethernet connection to the data network and a phone line.
- Subsidize low-cost personal computers for students with easy connectivity to the Ethernet network.
- Wire lecture halls for network access and projection and have computer system available and set up to take advantage of that access.
- Channel all administrative contact with students through the network, including registration.
- Digitize library resources, and support access of multi media library resources.
- Provide convenient tools for students and faculty to conference has real-time communication and makes multi-media links to other contact points for guest lectures and collaborative work.

*Source:* International Thompson Computer Press (1996: 424)

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### **Box 3: Examples of innovation on university campuses to support tele-learning**

- Stanford University is testing methods to digitally store video, audio, text, an graphics, and deliver these materials via high-speed networks, the Internet, an standard telephone lines to students both on- and off-campus.
- The Helsinki University of Technology is experimenting with supplying lecture on demand via ATM technology so students can call up a lecturer from a vide server and watch it at their convenience. In addition, students' compute laboratories are networked both for the Internet and for ISDN desktop multi-medi conferencing.
- The Institute of System Sciences at the National University of Singapore i working on projects that integrate multimedia with artificial intelligence multimedia applications in real time, and software for distributed collaborativ work for students.
- The college of Gjovik in Norway makes extensive use of ISDN networking t connect lecture halls, student workstations, and instructors' workstations fo multimedia applications and both real-time and asynchronous communications.

*Source:* International Thompson Computer Press (1996:40)

The move to adopt ICT in education creates an orderly and proactive paradigm that allows universities to change in accord with local and global changes. However, caution shall be taken especially in two major issues: first, should the ICT responsibility for university education be given to the techo-technicians? Secondly, should it unquestioningly adopt the corporate model (Hanche, *ibid*: 14)? The example of AVU programmes being managed and controlled from outside is an arrangement, which will put universities in an awkward position regarding planning and implementation of the programmes.

### **5.3 Institutional Partnership/Networking**

Networking is particularly a good way of building local capacity in distance education, and well-suited to the use of institutional linkages and collaborative networks. Given the time and expense required to develop good course materials, it would appear an obvious solution for Tanzania universities to work together in producing these materials, perhaps in association with experienced institutions located within and outside the region.

The most common areas for collaboration are the sharing of instructional materials, the development of new courses, training of teachers and managers, the use of programme evaluation technology, sharing experience on common policy issues, and mutual recognition of credit. By working together, institutions

can pool together limited resources and attain the desired economies of scale. Other advantages of networking would be to enable students to access various library materials from the networked institutions. The various organisational frameworks which would facilitate the operationalization of institutional partnerships and networking are summarized in Table 4.

**Table 4: Organizational framework for decisions about course design and tele-learning**

<b>Organizational context for the course design</b>	<b>Main implications relating to tele-learning for the educational technologist as course designer</b>
1. Traditional face-to-face institution, offering face-to-face courses.	Courses are typically designed by the teachers or instructors themselves, as such a professional educational technologist is not involved.
2. Traditional face-to-face teaching institution, having made a decision to expand its delivery range by offering courses at a distance.	The institution will probably have decided on the basic delivery strategy, such as compressed video, interactive broadcasting, or computer networking; the educational technologist must work within that decision and seek to maximize its possibilities.
3. Traditional face-to-face teaching institution, wondering if it should commit itself to some form of tele-learning.	The course designer must focus on the cost-effectiveness of tele-learning versions of an existing course compared to traditional delivery or compared to each other. Initial versions of courses may be used to collect such comparative data.
4. Institution already organized around non-face-to-face instruction competing for new clients.	The course designer considers tele-learning in terms of increasing the competitive attractiveness of the course as a product to be sold, and thus must balance cost and innovation in terms of changes in course design.
5. Course provider is part of a consortium for a special project, testing the feasibility of some form of tele-learning (usually that supplied by the vendors who are also a partner in the special project).	The course designer must harmonize the special-project course with traditional courses within his or her institution in order to convince sceptics that the possibly disruptive special project involving tele-learning is legitimate and meaningful to the institution (beyond the benefits of being in a project).
6. The course to be designed involves some aspect of tele-learning as a funded research project.	The educational technologist works with the researcher who allows funding for some sort of research, such as "concept mapping as a cognitive tool in distributed learning groups"; the course to be designed must reflect the experimental needs of the researcher.

*Source:* International Thompson Computer Press (1996:437)

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### *5.4 Teaching Materials*

Numerous studies have shown that the medium of instruction does not make any important difference in student achievement, attitude or retention (Willis, 1994:42; Ramble, 1992; Moore and Kearsley, 1996:99; Turoff, 1997a). In fact how the media are used has proven to be more important than which medium is selected. Furthermore, multiple media appear to be more effective than a single medium, with interactivity between students and tutors contributing a major boost to learning.

On the basis of the above, the print media are likely to remain the best choice for most of Africa. They are inexpensive, reliable and accepted. At the same time, care is needed to avoid commitment to inflexible technologies chosen without reference to educational need and context, unexpectedly high operating costs, and under-estimation of the needs for good pedagogical practice and strong student support systems (SAIDE, 1999). For this reason, educational planning should be emphasised over technical planning in the early stages of program design (Saint, 1999). World experience indicates that both governments and tertiary institutions tend to under-fund distance education, thereby compromising its effectiveness. Under-funding is most common in the provision of critical student support services and in staff training and professional development. One deterrent is that distance education normally requires considerable up-front investment to train staff, design curriculum, prepare materials, and acquire the reflected technology.

Purchase of existing course materials from other distance education institutions can be a good strategy for beginning a distance education programme since the materials are proven, readily available, and likely to facilitate local accreditation. However, caution must be exercised in transporting an effective distance education course from one cultural context to another. Usually some re-tooling and adjusting is required for the course to fit in the new (local) culture. In the longer run, local production of course materials is frequently the best approach. Further, it is a good way to promote local staff ownership of the program.

The generally accepted practice is to produce learning materials through the use of design teams in which each member contributes a specific skill. Design teams vary in composition, but often include a content expert, an instructional designer, a communications or media specialist, an editor, and a peer reviewer (Rumble, 1997). Nonetheless, caution should be taken against the limitations of this approach: it is usually time-consuming. Contrarily, the approach provides greater

room for checks and balances in the programme development process, hence high probability of generating high quality courseware.

### ***5.5 Human Resources and Leadership Qualities***

Today's education world information and communication is intensive, and IT professionals need to be empowered with the knowledge, skills, and abilities that technology offers. Its leadership requires many of the characteristic common to all leaders, but also requires special abilities and insights into technology's impact (Debra et. al., 1999).

The IT leader must be a self-achiever and should be motivated to become a proactive leader and a role-model. Changes in technology often produce a "chaos situation" where change management in the use of instructional technology in teaching and learning become increasingly important (Fitzgerald, 1998). The IT leader must be ready to embrace all these changes. The field of IT leadership will be of extreme importance in the new millennium as technology (equipment software, hardware and infrastructure) continues to advance rapidly, and change becomes imperative.

### ***5.6 ICT Development Constraints at UDSM***

Absence of systematised skills for integrating technology into teaching and learning. Inability of the university to ensure the retention of skilled technical staff due to poor remuneration. Inadequate external and internal training programs for critical skills to manage and support ICT functions.

### ***5.7 Financial Implications***

There are inadequate financial resources to run and develop ICT facilities at the University of Dar es Salaam and its colleges. It is important to point out that the donor community has been very supportive in meeting budgetary requirement of the University of Dar es Salaam. The support has enhanced provision (to a limited extent) of training of staff, computers and telecommunications facilities, and physical structures.

### ***5.8 Financial Implication on the Proposed ICT Mode of Delivery***

If the University of Dar es Salaam and others in Tanzania are going to adopt the proposed ICT mode of delivery, a considerable amount of financial resources will be required. Such expenses include procurement of ICT infrastructure to cater for the remote centres, acquisition of more ICT infrastructure at the universities, recruitment of key staff at remote centres, and training for the

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exiting staff. Other expenses will be required by the provider for setting up the VPN to internet-work the centres. There are, however, other alternative resources and tele-centres which can be exploited.

### *5.9 The Potential of Tele-centers in the Provision of University On-line Distance Education*

Tanzania universities, through public-private partnership and a franchise of local community, regional and international institutions, business enterprises and educational institutions can highly use a model of multi-purpose tele-centers for educational delivery. By 1998, for example, there were more than 9000 such centers in Africa alone. The majority of the centers are a product of Africa Online and Internet service providers' projects in South Africa, Morocco, Senegal, Mozambique, Uganda, Egypt, Ghana, Mali, Benin and Tanzania among other 21 such centers. One case in point in Tanzania is Simbanet, which in partnership with agents, provides internet services to ten regions in Tanzania.

The potential to bank on such centers by universities lies in the fact that a center can be designed using several alternative feasible models. The first is demand-oriented model where the design starts by a small Tele-center with relatively small investment. The center is then allowed to expand only when demand and affordability grows. The second is a commercial model, planned and run on a commercial basis; and managed by local private and highly spirited entrepreneurs (it can incorporate a franchise element involving national telecommunication firms and internet players).

The third is the "tele-center partnership" model. Tele-centers are established using micro-loans for local franchises, educational institutions, entrepreneurs or other viable agents. This third model can extend the partnership to include multi-sector support. International development agents, NGOs or agencies aligning themselves with national Tele-center operation could sponsor services and applications that are self-supporting. In the same model, a different approach could be contracting Tele-center facilities for educational outreach programme to agencies using a public-private partnership.

The tele-centers could operate on a regional basis for enhanced and flexible delivery of services within a specified regional population. To cut down the costs of educational service provision, the centers could broaden its services to offer e-commerce, e-community, e-health and life-long learning services (short or long),

and on demand basis. The centers, once supported and networked to broader ICT infrastructures could be used as *Open-learning Centers* with a purpose to expand the scope and range of educational opportunities available to regional, rural, and remote locations.

Internet network facilitates the provision of formal accredited programmes from universities, colleges and other educational and training providers to a wider population. Various platforms for collaboration strategies could then be exploited to achieve quality on-line distance education provision. Among the strategies are university-university partnership, public-private partnership, or government contracted services through a wider alliance with a wide range of local government, industrial, business and community organizations. It is important that the partnership gains strong support in establishing, maintaining, and managing the facilities and services within the local communities.

To be sustainable, tele-centers must create financial output activities such as charge network pay on an annual membership fee basis, and mount a range of revenue-generating projects. tele-centers network for example could provide a variety of on-line programmes related services to its members and external clients including training of teachers and trainers to develop and deliver programmes using communication information technologies.

The centers should also engage in a range of research and evaluation projects on commercial, consultancy and educational/academic purpose. The challenge is for each universities to identify champions for lobbying different information, commercial, educational, voluntary and religious institutions on the multi-faceted opportunities that each could get from such centers from training, business services, marketing, social events and networking opportunities. Best practices can be drawn from the Gaseleka Tele-center, Northern Province, South Africa; Nakaseke multipurpose community tele-center in Uganda; the Daimler-Chrysler Distance Learning Support Center in Maseru, Lesotho; Ghana's community learning centers, and the Namaacha and Manhica tele-centers (pilot) project in Mozambique (Walker and Latchem 2001).

Strategies for success in most of the best examples—be it in African or other nations—has been affiliation and alliances with groups such as internet service providers, computer warehouses software developers, public and private educational institutions, libraries, museums, NGOs, community-based and non-

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profit organisations, chambers of commerce, local businesses, and media organisations. Universities need not to leave anyone out, but approach partnership development with the philosophy of exciting everyone. Secondary schools and/or Teacher Training Colleges which have made a mileage in this area should not be left out. The tips for success may include:

- Seeking technical support for the initial conception and development of the concept from a multitude of sources—international and local.
- Conducting pre-survey using background platforms from documented policies such the 1996 African Information Society Initiative (AISII) proposed by the Economic Commission for Africa, the Technology Enhanced Learning Initiative of South Africa (TELISA), etc.
- Allowing local communities to participate from the conception stage to implementation, and also access information and communication resources.
- Aiming at serving a wide perspective of population such as NGOs, research organisations, universities, primary schools, secondary schools, teacher colleges especially those which have no ICT resources or resource centers. Opening partnership to broad but appropriate multitude of local, regional and international champions willing to collaborate on a win-win basis. The best practice is the case for TELISA where there are 14 different collaborating institutions, where 5 are universities (Lesotho, Namibia, South Africa, Botswana, and Swaziland); and the World Bank is the main donor.

### **6. Concluding Remarks and Recommendations**

It is clear that Tanzania needs increased access to higher education. A lot of work must still be done to educate potential students of the proposed programme on the range of opportunities and modalities for taking them up. In addition, to this a lot of publicity and marketing of the programmes is also needed. However, for the time being it would appear that the combination of distance education with some face-to-face teaching—or "dual" (flexible learning or open learning) mode—is more preferable to the single distance learning mode. The dual mode maximises capacity utilisation of available resources: human and physical for both the residential and distance learning modes. There is, however, scepticism about quality standard of the distance part of the dual mode of educational delivery, a limitation that might call for close attention.

The ICT survey indicates that radio and television is much more widespread in the country. At regional towns there are limited e-mail and internet services. Absence of systematised skills for integrating technology into teaching and learning is also a serious constraint, exacerbated by inability of the university to ensure the retention of skilled technical staff due to poor remuneration. Inadequate external and internal training programs for critical skills to manage and support ICT functions need to be redressed to sustain a mix of delivery systems of print media and well-planned ICT mode in the dual mode. The proposed networking/partnership between universities in Tanzania is vital to attain the desired economies of scale. Careful planning on the delivery mode is a prerequisite before embarking on using ICT due the high financial and technological cost at the initial stages. UDSM has got limited ICT capacity in terms of human and financial resources, which will need redressing in order to cope with the proposed ICT needs in DE. The training of ICT staff, and the development of retention package at UDSM is vital for future sustainable delivery of both residential and distance education. UDSM should liaise with TTCL in establishing VPN for educational purposes, and seek a tax waiver from the government in the endeavour.

### ***6.1 General Recommendations***

The detailed report of the study on the feasibility of dual-mode university education has elaborated strategic implementation models and guideline, policy analysis framework (PAF), implementation time frame and expected outcome. This section gives only a summary of the recommendations specific to UDSM.

- Marketing: to educate and inform all potential beneficiaries about the proposed programme.
- Implementation: to start with a trial phase of as short duration as possible, and involving as few courses as possible.
- The trial phase should be followed by an evaluation, the result of which should form the basis for inputs and directives to faculties to identify and prepare lists of distance/residential learning mode courses.
- A careful analysis of the unit costs of the programme be made.
- Seek government commitment or subsidy on the actual cost so as to make the programme affordable to most students.
- All possible programme implementation constraints have been identified.

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On ICT, the UDSM can initially use print materials currently in place, and later develop its own. It should also use a mix of delivery system of print media and ICT package. This means that it will need to establish core regional centres with key manpower and basic ICT infrastructure. It should continue with the proposal of networking with all national universities through the Virtual Private Network (VPN). Here, a thorough planning followed by some financial assessment must be made on the scale of investment needed in involving ICT in distance education. Needless to say UDSM will need to invest in Human Resources Development and Retention on ICT personnel.

### *6.3 The Package for Dual Mode of Teaching Learning at the UDSM*

It is recommended that the University of Dar es Salaam adopts the dual mode (a combination of traditional classroom and distance learning) of education. In doing this, it should choose between three options in organising the programme.

The first option is that of creating a core group of specialist teachers drawing upon the expertise from the University's departments to design courses, produce materials, and oversee their distribution and use. The second option involves forming a co-ordinating unit with the function of liaising between students and the University's departments, but with the departments being directly responsible for producing and offering distance education courses. If this option is chosen, it is recommended that departments be given more decision-making powers within the University. The third option is for the UDSM to offer distance courses with a foreign university. If this option is chosen it is recommended that it should last only for some years during which UDSM trains its own staff in a field where it has no expertise.

The same teachers who run the face-to-face courses of UDSM should run distance education courses. To begin with, distance education courses should offer the same subjects which are offered by UDSM in the current residential courses. New subjects may be introduced as distance education takes root and as the teachers gain experience. To build the right attitudes and skills in distance education into the existing UDSM teachers, it is recommended that UDSM teaching staff be exposed to short courses on distance education programmes in countries with well-established distance education programmes like South Africa, Israel, and Britain. In order to motivate and to remove negative attitudes towards the introduction of new programmes, it is recommended that a compensation system for distance education be designed for UDSM staff. For example, UDSM may decide to use half of the fees collected from distance education to pay allowances to teachers of a particular programme.

Pre-qualification courses for form four leavers, unqualified form six leavers and potential students with certificates and diplomas should be introduced to upgrade applicants who do not meet the current admission criteria. This strategy is necessary otherwise there would be a double standard entry qualification. For the uniform strengthening of capacities within faculties, it is recommended that the UDSM management advocate inter-faculty co-operation and support for distance education. It is therefore recommended that strategic planning for distance education be introduced for smooth take-off of distance education at UDSM.

### ***6.3 Policy Framework***

It is recommended that curriculum development and course approval in distance education be done at university level. Current admission standards and procedures should be maintained even for distance education but with a view to more decentralisation. Course evaluation should be undertaken on a regular basis, and accreditation of courses should remain at university level. Course integrity and transferability in distance education should be subjected to the same university policy, as it is the case for residential education. The University should also consider decentralising approval of examination results, recruitment, deployment, development and disciplining of staff as well as payment of salaries to college, faculty or even departmental level be given.

### ***6.4 The Need for a University Vision and Mission***

Academics as well as the public often have different fixed values and beliefs about distance education. Such differences tend to lead into heated debates, which is likely to make the initial work in the strategic planning of the “dual-mode” of education delivery stressful. It is important that each university provides a forum for dialogue to clarify the final vision and mission and achieve a consensus regarding the values and beliefs about the new dual mode of education delivery. The mission statement must take into account:

- University’s past and achievements;
- The clients it has to serve as well as the stakeholders;
- Sensitivity to the changing contexts in which concerned university is evolving in order to meet needs of its clients;
- Availability of feasible, motivating and realistic contexts; and
- Correspondence between the implementations strategies vis-à-vis the available resources without which the mission becomes impossible.

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Each university must, therefore, concentrate its efforts on what it can do best, its own particular strengths and weaknesses, its internal and external relations, etc., before taking up the challenge to mount the new programme.

### ***6.5 University Partnership in the Provision of Residential and Distance Modes of Education in Tanzania***

We have, in previous sections, recommended a dual mode of university education delivery for universities in Tanzania. The use of ICT in teaching and learning was considered necessary to promote interactive teaching and learning independent of time and space within and outside universities using local and international networks. Let us now look into the possible models of alternating between the on-campus and off-campus among the students in the dual model.

#### ***6.5.1 Flexible Autonomous Entry and Exit Model***

This model assumes that universities run semester courses to allow students to flexibly enter and exit the campus at different and appropriate times. The time and duration students would spend in each teaching will solely determine learning environments, but the minimum should be one semester and no one would be allowed to enrol and leave in between. A number of factors may however come into play, especially the speed at which students feel competent to learn independently, their financial position, employment conditions and the number of credits one requires in a particular programme. To enable effective planning and utilization of resources, particularly synchronising students' movement and transfer of credits from institution to another, it is necessary to have a university or inter-university policy to guide students' decisions. It is important to note that each of the proposed models will have serious implications on the spread and spreading of financial, human, and material resources.

#### ***6.5.2 Flexible But Institutional Programmed Model***

This model forms parallels to short courses, which lead into certification. Some institutions like East and Southern African Management Institute (ESAMI) has an annual programme calendar showing the time and duration of different courses. Universities could as well have such arrangements to cover wide levels of awards such as certificates, diplomas, and degrees. This model, however, appears to be more suitable to the lower awards than the traditional degree classification. Universities may be required to revisit the classification of their degrees and combination of subjects. On the other hand, the model is suitable for the semester education system.

### *6.5.3 Rotation Model*

One of the objectives of establishing dual model university education was to enhance the relationship between the academic and the world of work. It is assumed in this model that universities will have different regional and district tele-centres or/and learning centres. Some of such centres could be established in work-places where employers could take part in the education of their immediate or future employees. This approach is intended to allow the quick translation of academic knowledge and skills into tangible work piece or service that has both the academic and business value. It offers employers a chance to attempt to develop the abilities they think they require in the workforce. A course programme could be arranged in such a way that students are rotated from one learning centre to another and in fixed times. The exchange between university and work-place could attract the interest and partnership of private industry into higher education.

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