

# ONE YEAR OF VIRTUAL UNIVERSITY EXPERIENCE AT MAKERERE UNIVERSITY IN UGANDA

## A CASE STUDY

By  
Jessica N. Aguti (Miss)  
Lecturer,  
Department of Distance Education,  
Institute of Adult and Continuing Education,  
Makerere University  
P.O. Box 7062 Kampala, Uganda  
Tel: 256-41-543188  
Tel/fax: 256-41-554083  
e-mail: [avumuk@imul.com](mailto:avumuk@imul.com)

## A PAPER TO BE PRESENTED AT THE PAN COMMONWEALTH FORUM

1<sup>ST</sup> –5<sup>TH</sup> MARCH 1999  
BRUNEI - DARUSSALAM

SECTOR: UNIVERSITY

PRIME FOCUS: INFORMATION TECHNOLOGY

1.0 BACKGROUND

### 1.1 Description Of The African Virtual University Project

The African Virtual University is a distance education project currently being funded by the World Bank. It involves a number of countries in Sub-Saharan Africa. As of now, the participating countries in the English speaking Sub-Saharan Africa include Ethiopia, Ghana, Kenya, Namibia, Tanzania, Uganda, and Zimbabwe. Some Universities in South Africa are also considering joining up.

The following are the specific institutions in each of the participating English speaking countries:

COUNTRY	SITE
Ethiopia	Addis Ababa University
Ghana	University of Science and Technology, Kumasi
	University of Cape Coast, Cape Coast
	University of Ghana, Accra
Kenya	Kenyatta University
	Egerton University

<b>Namibia</b>	University of Namibia
<b>Tanzania</b>	Open University of Tanzania, Dar-es-Salaam
	University of Dar-es-Salaam
<b>Uganda</b>	Makerere University, Kampala
	Uganda Polytechnic Kyambogo, Kampala
	Uganda Martyrs University, Nkozi
<b>Zimbabwe</b>	University of Zimbabwe, Harare
	National University of Science & Technology, Bulawayo

**Table I: Participating Universities in Anglo-Phone Africa**

In the Franco-phone African countries, installation of receive sites is taking place in four countries. The equipment is already installed in Senegal and is being installed in Niger, Mauritania and Benin.

Virtual Universities are increasingly becoming popular because of their emphasis on flexibility and on independent learning. They are also growing because the use of technology opens up avenues for sharing up-to-date material. This is particularly useful in Africa, where access to current literature is sometimes difficult.

The AVU project is being implemented in phases. The first phase is the prototype phase in which the AVU is being piloted to establish whether the project is viable or not. This phase started on the 1<sup>st</sup> October 1997 when transmissions started in most of the sites; although transmissions for Kenyatta University had started in July 1997.

### 1.2 Concept

The AVU is a satellite-based distance education project whose objective is to deliver to countries of Sub-Saharan Africa (SSA) university education in the disciplines of engineering, science, non-credit/continuing education programmes and remedial instruction.

It is based on the idea that you can have a university 'without walls'. Students and faculty of a virtual university can be located anywhere. They need not be confined to the walls of any University. Through the virtual universities, people living physically apart can share knowledge, skills, and resources.

### 1.3 Mission

The mission of AVU is to use the power of modern information technologies to increase access to educational resources throughout Sub-Saharan Africa. Technology is available and, in spite of problems and challenges it poses, it has the potential of being used to increase access and to improve both the teaching and learning. The AVU is therefore committed to this.

### 1.4 Objectives

The AVU was set up with the following objectives in mind:

- Significantly increase the enrolment levels of scientists, technicians, engineers, and business managers;
- Improve quality and relevance of science, business and engineering instruction in SSA;
- Provide an academic environment in which African educational institutions, faculty and students can participate effectively in the world-wide community of learning, research, and dissemination of knowledge.

### 1.5 Rationale of AVU

- There is increased demand for education which is not being met by the existing universities;
- This is particularly significant in the scientific and technological disciplines;

- Use of technology through AVU, enables institutions to supplement existing programmes and use existing facilities to expand enrolments.
- AVU taps the potential offered by technology to overcome existing barriers of declining budgets, too few faculty, outdated equipment, limited space, and facilities that prevent increased access to higher education for a significant majority of students in SSA.

## **1.6 Implementation of the AVU**

AVU is being developed in three phases:

### *The Pilot Phase*

In this phase the model, technology and the entire package will be tested to establish its feasibility, problems that are likely to be faced, and possible strategies of better running it. It is also a marketing phase.

### *The Second Phase*

This is the operational phase during which complete curricula for fully-fledged undergraduate degree programmes will be offered. The tentative plan is to have this phase begin by October 1999. Various faculty from Universities in Africa and in the USA are currently involved the development of the curricula.

### *The Third Phase*

A transition to Africa phase when programmes will be originated from African universities.

## **2.0 AFRICAN VIRTUAL UNIVERSITY ACTIVITIES IN MAKERERE UNIVERSITY**

After Senate approved the integration of the AVU programmes into Makerere programmes, Makerere was able to participate in the pilot phase.

### **2.1 Installation of Equipment**

All the equipment required to help Makerere start receiving the transmissions was installed in June 1997. The following equipment was installed:

- satellite dish,
- digital video receiver (IRD),
- computers,
- TV screens,
- laser printer,
- UPS, and
- Fax machine.

The total cost of this equipment including shipping and installation was US\$ 53,424.

Since then, the University has also received a total of 60 computers which have been installed at the AVU computer laboratory and at the University Main Library.

## 2.2 Course Selection

Since transmissions started, Makerere has participated in 12 different courses [See table III]. Selection of courses to participate in was based on:

- Relevance of course content to Makerere syllabi
- Whether there was a category of students that could take this course as a credit course [in the case of the credit courses] or
- Whether it was a course that could be taken by any interested students

To select courses that Makerere participated in, the relevant departments were contacted. Once a course outline was received, the relevant department vetted the course to determine its relevance to Makerere and to determine level of the course. Decisions were taken depending on this feedback. Selection of students was then carried out as described in section 2.3

The following table indicates how far the AVU courses covered the MUK syllabuses.

Course	% of the MUK course covered by the AVU course
<b>First Semester</b>	
Calculus I	100
Calculus II	70-80
Electrical Circuits	90
Introduction to Statistics	80
Physics I	60
Using the Internet	N/A
<b>Second Semester</b>	
Differential Equations	~100
Calculus III	~100
Introduction to Computing	N/A
Internet	N/A
Introduction to C++	N/A
Introduction to Computer Science	N/A

**Table II Showing the AVU Courses and the Percentage Coverage of Makerere Syllabi**

## 2.3 Student Selection

For purposes of the pilot phase, the students who participated in the AVU courses were mainly University students registered on full time programmes. Selection of these students was of two types:

- Selection by the Departments. Under this system, departments fielded specific groups of students.
- Voluntary Registration. This should initially have been the approach but this was not possible in the first semester. However, in the second semester and where the classes were very large, students were encouraged to volunteer taking into account both the University and the AVU timetables

The following table gives the courses taken, where they originated and student registration for the three semesters. A total of 324 students benefited from the credit and non –credit courses

<b>COURSE</b>	<b>ORIGINATING INSTITUTION</b>	<b>STUDENT NUMBERS</b>
<b>1<sup>ST</sup> Semester 1st October – 19<sup>th</sup> December 1997</b>		
Calculus I	New Jersey Institute of Technology (NJIT), Newark, New Jersey USA	57
Calculus II	-do-	17
Electric Circuits	University of Massachusetts, Amherst, Massachusetts, USA	57
Physics I	Dublin Institute of Technology, Ireland	34
Introduction to Statistics	-do-	30
Using the Internet	-do-	nil
<b>Sub Total</b>		<b>195</b>
<b>2<sup>ND</sup> Semester 26<sup>th</sup> January – 15<sup>th</sup> May</b>		
Electric Circuits II	University of Massachusetts, Amherst, Massachusetts, USA	nil
Introduction to the Internet	-do-	20
Introduction to Computing	-do-	12
Calculus and Analytic Geometry III	New Jersey Institute of Technology (NJIT), Newark, New Jersey USA	30
Differential Equations	-do-	30
Computer Organization	Colorado State University, (CSU) USA	nil
Introduction to Engineering	Georgia Institute of Technology (GTECH) USA	nil
Physics II	Carleton University, Canada	nil
Introduction to C++ Programming	Mount Saint Vincent University (MSVU) Canada	08
Organic Chemistry	Laurentian University, Canada	nil
<b>Sub Total</b>		<b>100</b>
<b>The Recess Semester</b>		
Introduction Computer Science		12
Calculus II	University of Massachusetts, Amherst, Massachusetts, USA	17
<b>Sub Total</b>		<b>29</b>
<b>GRAND TOTAL</b>		<b>324</b>

**Table III: Course Originating Institutions & Student Numbers**

## 2.4 Instructional Package

The instructional design consisted of the following:

- Videotaped and live lectures supplemented by course notes, textbooks and assignments. These were transmitted from COMSAT RSI up-linking facilities in Clarksburg, Maryland. Live question-and-answer sessions are one-way video, but two-way audio.
- Tutorials and assignments that are run and marked by the local moderator in Africa. The local moderator also provides supplementary local instruction where courses from originating institutions do not exactly match traditional courses.
- Examinations that are set and marked locally.

The following diagram illustrates the relationship between the transmitting institution and the receive sites

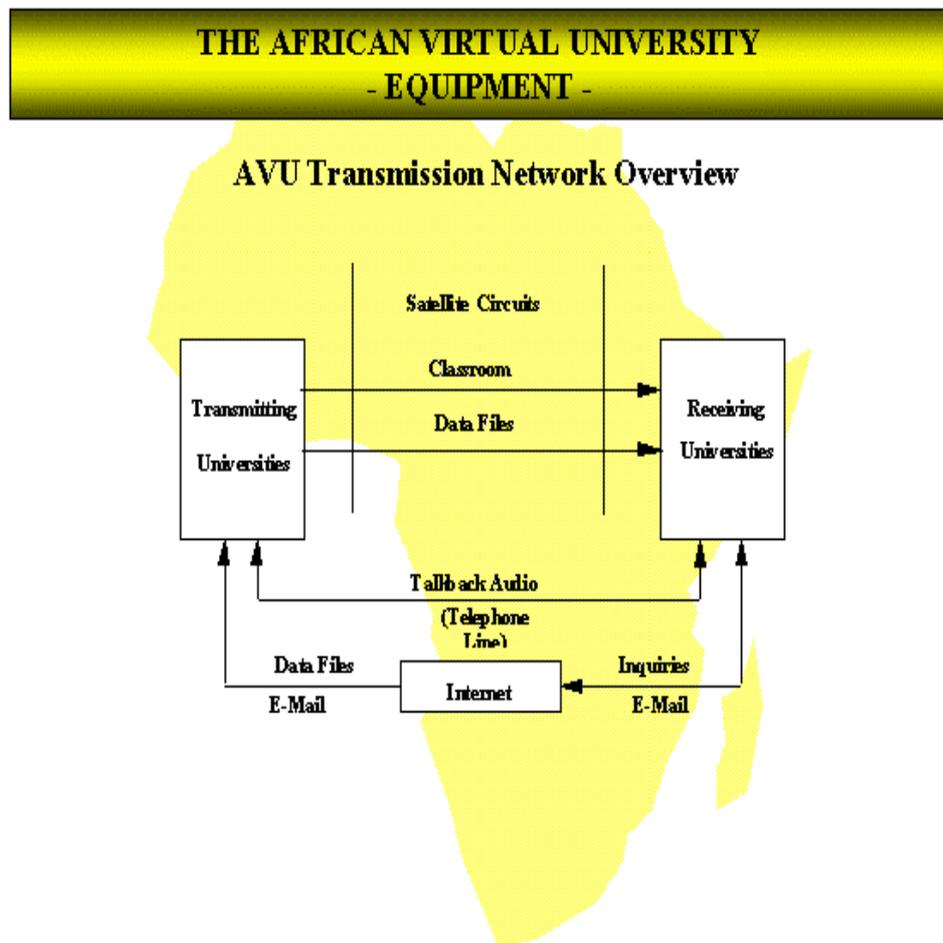


Figure 1: Showing the Transmitting Network

[Source: AVU Web page [www.avu.org](http://www.avu.org)]

## 2.5 Role of the Local Academic

According to the instructional design, the role of the local academic was to:

- Offer tutorials
- Set and mark students' course work
- Cover up any gaps in the Makerere syllabus not covered by the AVU
- Set and mark University examinations
- Evaluate the course, its delivery, and appropriateness to the MUK syllabus
- Evaluate the students' performance

## 2.6 Assessment and Examinations

Assessment and examinations serve three major functions: teaching, learning, and assessment. To fulfill these, students were given assignments, practice exercises and examinations. The examinations done in all the credit courses were Makerere examinations.

The general observation was that students of AVU performed very well. It was not possible to have, in all cases control groups against which to compare the performances. However, in all the subjects, there was no

significant difference in performance between students of the AVU and students who had done the same courses in the previous year.

### 2.6.1 Performance Statistics

#### Physics I

Range of Marks	Percentage of Students	
	96/97	97/98 [AVU]
80-100	0	3
70-79	8	21
60-69	48	26
50-59	32	32
45-49	8	12
0-44	4	6
<b>Total %</b>	<b>100</b>	<b>100</b>
<b>Number of students in the class</b>	<b>25</b>	<b>34</b>

Table V Showing Performance of Students in Physics I 96/97 & 97/98

#### Mathematics

There were a total of four mathematics courses run in the first two semesters. Table VI gives the performance in Calculus II. According to these results, there was no significant difference in performance.

Range of Marks	Percentage of Students	
	1996/97	1997/98
90-99	0	0
80-89	0	17.7
70-79	36.4	11.8
60-69	27.3	23.5
50-59	9.1	11.8
40-49	18.2	17.7
30-39	9.1	5.9
20-29	0	5.9
10-19	0	5.9
<b>Total %</b>	<b>100</b>	<b>100</b>
<b>Number of students in the class</b>	<b>11</b>	<b>17</b>

Table VI Showing Performance of Students in Calculus II 96/97 & 97/98

#### Electric Circuits

Range of Marks	Percentage of Students	
	1996/97	1997/98
80-100	4.3	15.0
75-79.9	4.3	5.7
70-74.9	10.6	20.8
65-69.9	10.6	13.1
60-64.9	14.9	11.3
55-59.9	17.0	17.0
50-54.9	25.5	3.8
45-49.9	4.3	3.8
40-44.9	0	3.8
35-39.9	0	0
Below 35	8.5	5.7
<b>Number of students 47</b>	<b>100</b>	<b>100</b>

## **Table VI: Showing Performance of Students in Electric Circuits 96/97 & 97/98**

According to this table, the overall performance of the students following the AVU programme was better than for those who in the previous year had followed the traditional mode.

### **2.6.2 Semester II Courses**

Results are not yet available for the credit courses done in the second semester.

## **2.7 Other AVU Activities**

Apart from the credit courses which were transmitted, there have been a number of other activities that have taken place. Most notably, the AVU has attempted to make maximum use of the facilities to run customized courses. Most of these are short computing courses. A total of 75 participants have benefited from these courses.

### **2.7.1 Digital Library**

One of the most exciting benefits of the AVU to Makerere is access to the digital library. The AVU has negotiated for access to a wide selection of full text journals. This has been of great interest and benefit to students and researchers at the University. Because of inadequate funding, Makerere can not effectively stock its libraries with the most up-to-date literature. Therefore access to the Internet becomes a crucial gateway to this literature. The AVU through its digital library has opened up this access.

It is however true that many members of the university community are not skilled in accessing the Internet. The University Library and the AVU are therefore mounting training seminars to facilitate this access.

### **2.7.2 Seminars and Addresses**

A number of seminars have been run and many more will be run in this coming semester. These seminars have been varied covering many areas including Teacher Training, Year 2000 Problem, and Business Management. Clients for these courses have been teachers, business executives, managers and government officials.

## **3.0 STUDENTS RESPONSE**

Through discussions with students and using the evaluation forms that students filled, it was noted that the students' response to the whole project was mixed. The initial response was cautious but gradually became more clearly defined. Some students were excited by the whole idea of studying through the AVU and some of the reasons put forward were:

- The novelty of studying using the television. Television in Uganda is being used largely for entertainment and for general information. It is not used for serious study purposes. Some of the students therefore found this intriguing.
- The promise of access to computers. The earlier expectation was that the computers would be available for access to the digital library. This generated a lot of excitement and expectation.
- The quality of teaching and relevance to the Makerere curriculum. Where the teaching was rated as either very good or excellent, the students were enthusiastic. This was closely related to the extent to which the AVU curriculum answered the demands of Makerere curriculum. In cases where the AVU curriculum was almost 100% the Makerere curriculum, the students were more interested and more enthusiastic.
- In Mathematics particularly, students also reported that they found the AVU courses exciting because of the approach to problem solving. According to them the examples used in both Calculus and Differential Equations were very practical making it easy for them to understand concepts.

In spite of this excitement, there are some problems highlighted by the students. These include:

- Having to watch the TV for long periods was discomforting to some students. This was particularly so at the beginning. Later this was no longer seen as a threat.
- Live sessions were conducted after about two weeks, some students felt there should have been more live sessions to ensure increased contact with the lecturers teaching the courses.
- Too much load for little coverage. This was particularly true where students felt that most of what was being covered was elementary. In their view, the amount of time being invested was too much yet they were gaining very little. This was particularly the case where the AVU coverage was far below 100% as in Physics I and in Introduction to Statistics.

#### **4.0 IMPACT**

The African Virtual University Project has been operational for only one year. This may be too short a time to judge its impact on Makerere. However, there have been some achievements.

- Increased awareness of the benefits and potential of virtual universities.
- Capacity building for Makerere staff through interaction with academicians from other Universities, and through access to the Internet.
- Five Makerere lecturers are currently involved in the curriculum development process.
- Access to communication equipment and to Internet.
- Computer skills for many academics and students.
- Publicity for Makerere.
- Makerere has also been opened up to the wider public through the seminars and workshops run.
- Interest and expectation of additional courses that are likely to be offered through the AVU.
- The Institute of Adult and Continuing Education which is hosting the AVU site at Makerere is now generating income using the AVU facilities.

#### **5.0 CHALLENGES**

Although it is true that the AVU has successfully started, there are a number of challenges it still faces. Some of these challenges will certainly impinge on AVU's next phase.

##### **5.1 Compatibility of Courses**

One of the major reasons for the Departments'/Institutes' initial hesitation to embrace the AVU was because of differences in the course content. The originating institutions were following different syllabi and this created problems of coverage for Makerere. Admittedly since there are many institutions participating in the AVU it is difficult to come up with a course that satisfies the needs of all the institutions. Promoting interrelations and interdependence between these different groups was a real challenge to the lecturers. This was made more difficult by the fact that most of the courses with the exception of those from Ireland were screened for different classes many years before the AVU came to being. The AVU is now developing its own curriculum so as to deal with this problem.

##### **5.2 Sustainability**

For the AVU to have impact in Makerere and in Uganda as a whole, it has to be sustainable. The AVU will not continue receiving financial support from the World Bank indefinitely so it has the challenge of trying to identify alternative sources of funding to keep it running. This has to be done with care so as to avoid making enormous expenditures on technology and maintaining the technology at the expense of other crucial factors.

Some of the high cost areas are: initial capital investment, repairs and maintenance, telephone bills, satellite time, staffing and books.

Makerere is running a number of paying programmes so the AVU can explore the possibility of using this approach to raise some funds.

### **5.3 Timetabling**

Scheduling or timetabling was one of the major challenges in these two semesters. The AVU has sites in many different countries. These institutions have their own schedules and in some cases belong to different time zones. This problem is compounded by time differences of the participating institutions. If programmes will still be run as it has been in these three semesters, we will continue to face this challenge. The implication of this is that the AVU ought to move ahead and have its own courses developed and therefore have its own schedules.

### **5.4 Power back-up**

Reliable power supply is mandatory if this technology is to function at all. Unfortunately power supply is still a big issue in Uganda. Although Makerere does not suffer a lot of power black outs, there are occasional power cuts. These interrupt the transmissions and pose a serious risk to the equipment. It is therefore extremely important to have reliable power back-ups. The AVU, Makerere now has a generator but this is a short-term measure. There is therefore need to explore alternative power supply if the AVU is to reach out to other parts of the country.

### **5.5 Maintenance and Servicing of Equipment**

The equipment which has been installed needs to be well maintained and serviced. So the AVU needs to build up a group of technicians that are capable of day-to-day management and maintenance of equipment.

### **5.6 Training**

All the participants on the AVU ought to be trained to carry out their different functions. All the local academics participating in the AVU had little or no experience at all with instruction by information technology. Although workshops were run to identify and discuss roles, this was not sufficient. A lot more needs to be done.

Training will also be crucial for academics in the development of courses in preparation for the third phase [Africa Phase].

### **5.7 Monitors**

The monitors given are 25" monitors. These are too small. There is therefore need to either buy more monitors, a bigger one for each viewing room or computer video screens.

The other related problem is that for some of the courses, quality of the pictures was not very good. For example in Differential Equations, although the lecturer was very good, it was difficult to read the writings on the screen. It is vital that courses are previewed before they are purchased.

## **6.0 CONCLUSION**

AVU is a project with a bright future. It has the potential of contributing to increased access to education and contributing towards the inclusion of information technology in the provision of education in Africa in general and Uganda in particular. This is an area where Africa needs to catch up with the world trends and the AVU is one way of doing this.

In Makerere in particular, the AVU has come a long way. One year may be too short a time to judge the impact of the AVU on Makerere but a lot has been achieved in this short time. There is certainly room for improvement. This needs to be closely examined.

As Makerere prepares for the next millenium and as it faces the challenge of providing education to masses at affordable rates yet preparing them to face up to the challenges of the changing world, the AVU can be seen as one way in which Makerere can do this. The potential is there. True, there are number of challenges some may be yet unseen but '*diamonds must be polished for them to glitter*'. Tackling the challenges can be seen as polishing the AVU to measure up to what it can achieve and to what we want it to achieve.

All in all, Africa needs to make good use of the technology which is now available to increase access to education and to improve the teaching and learning functions. However, this must be done with caution and taking into full consideration the challenges and problems which exist.

## **REFERENCES:**

The African Virtual University Web page

Jessica N. Aguti (1998) 'A Report of The African Virtual University Project First Semester', Makerere University

Jessica N. Aguti (March 1998) 'The African Virtual University Project (AVU)' A Paper Presented At The Conference On Challenges And Perspectives Of Universities In Africa Held In Kampala. 1<sup>ST</sup>-5<sup>TH</sup> MARCH 1998

Etienne Baranshamaje: The African Virtual University, Concept Paper.  
Washington D.C.

Magdallen Juma (Oct. 1997) 'The African Virtual University Project (AVU) The Case of Kenyatta University Kenya East Africa' A Paper presented at the AAU/WGHE Meeting in St Louis Senegal

Murray Turoff (1996) 'Costs for the Development of A Virtual University' In JALN Volume I, Issue I March 1997