Association of African Universities
Association des Universités Africaines
اتحاد الجامعات الافريقيه

INTERNATIONALISATION OF HIGHER EDUCATION IN AFRICA

2ND-5TH JUNE 2015 • KIGALI, RWANDA,

Selected Papers

COREViP2015
Conférence Des Recteurs, Vice-chanceliers et Présidents Des Universités Africaines
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Preface

The Association of African Universities (AAU), organized its 18th Conference of Rectors, Vice Chancellors and Presidents (COREVIP) of African Universities in Kigali, Rwanda on June 2 – 5, under the theme "Internationalisation of Higher Education in Africa".

COREVIP is one of the permanent organs of the AAU responsible for debating and taking concerted actions to reinforce inter-university co-operation. It is held every two years in a selected member university country to create the platform for discussing a chosen theme and subthemes on critical issues of continental and global importance to AAU member institutions. The 2015 COREVIP was successfully co-hosted by the AAU and the Government of Rwanda.

The AAU's convening power as the voice of higher education in Africa was re-affirmed when the event attracted over 250 participants from 30 African countries and 14 other countries across the world. In all, 99 African Vice Chancellors, Presidents and Rectors joined a diverse cross-section of participants which included development partners, policy makers, heads of quality assurance agencies in Africa, students and various stakeholders of higher education in Africa. High profile participants at the conference included the honourable Minister of Education of Rwanda, Professor Silas Lwakabamba, President of the AAU and Vice-Chancellor, Federal University of Agriculture, Abeokuta, Professor Olusola Oyewole, the Vice Chancellor of the University of Rwanda, Professor James McWha, the Chargé d' Affaires who represented the European Union Ambassador to Rwanda, Mr. Daniel Schaer, and the Commissioner for Human Resources, Science and Technology of the African Union Commission, Dr. Martial De-Paul Ikounga.

The rich conference program was made up of plenary sessions; parallel sessions; special sessions and working group discussions, whilst its highly engaging five sub-themes included Harmonization & Quality; Mobility & Transferability of Credits; New Modes of Teaching; Curriculum Relevance & Employability; and Centres of Excellence. Discussions on the joint Africa/EU Strategy and the review of the AAU core programmes were also carried out during this event.

The conference theme – Internationalisation of Higher Education in Africa – inspired valuable debates and discussions that led to useful recommendations targeted at the AAU, African Universities, African Governments and the African Union Commission.

Internationalisation is now an integral part of higher education in all parts of the world and in many instances, a major driving force for change in universities. The global higher education environment has assumed a new dimension, with internationalisation and globalisation playing a determining role in universities in the north. Internationalisation is, however, not new to African higher education. Indeed, it was through internationalisation that most African universities were created and developed prior to and after independence, the majority of them being patterned on universities in countries of which they were former colonies. After decades of neglect and under-funding, African universities are now going through a major process of revitalisation.

But African universities have so far been grossly disadvantaged by the internationalisation of higher education in the north. Academic mobility is grossly skewed with very few foreign students coming to Africa, while outward student mobility from Africa is among the highest in the world. There has also been significant brain drain of academic staff to the north. And Africa has to cope with an invasion of cross-border higher education providers, in many cases of dubious quality.

African universities, therefore, should adopt new internationalisation strategies. We need to contextualise and prioritise our activities by giving preference to, among others, regional activities, regionalisation being very much a sub-set of internationalisation. We also need to collaborate with institutions in other developing regions, such as Asia and Latin America, which have similar development concerns. COREVIP thus availed the platform for key players of African higher education to discuss the various facets of internationalisation under five main subthemes.

There were recommendations emanating from the 20 papers presented under the five main subthemes of the conference. These papers, as has been done over the years, were peer reviewed and six identified as publishable to serve as the

Conference Proceedings. These are contained in this publication, with each paper being preceded by its abstract both in English and French.

The AAU is grateful for the financial and material support provided by the European Union, Sida, World Bank, African Development Bank, Carnegie Corporation, West African Economic and Monetary Union (UEMOA), Government of Rwanda and the University of Rwanda toward this important COREVIP.

Finally, a special thank you is extended to the authors, reviewers of the selected papers and all participants of the 18th Conference of Rectors, Vice Chancellors and Presidents (COREVIP) of African Universities.

Professor Etienne E. Ehile
Secretary General
Association of African Universities

PAPER

Emerging Centres of Excellence in Africa:

PROMOTING REGIONAL & CONTINENTAL COLLABORATION

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Emerging Centres of Excellence in Africa

Abstract

There is general recognition that Africa direly needs scientists and technologists to address its development challenges. At the same time, it is also recognised that the quality of higher education is poor in Africa and there is hardly any innovation. However, a major handicap of higher education institutions in addressing these issues is the serious lack of resources – human, financial and physical – in individual institutions and countries. The concept of creating Centres of Excellence (CoEs) through collaboration among existing institutions has been a response to overcoming these challenges. They help to overcome the tendency of African scientists and institutions to work in isolation and to enable them to share scarce human and infrastructural resources. The creation of CoEs is thus strongly motivated by regional or continental collaboration. Most of the CoEs also place emphasis on international collaboration.

The creation of the CoEs takes its origin from the 2005 Africa's Science and Technology Consolidated Plan of Action (CPA) which mentions developing an African system of research and technological innovation by establishing

networks of centres of excellence dedicated to specific R&D and capacity building programmes. Mention of CoEs is also made in the African Union Plan of Action for the Decade of Education for Africa (2006-2015).

The paper will briefly outline several of the main initiatives taken since 2005 to create CoEs, explaining their objectives, what led to their creation, the disciplines covered and also highlighting the differences between them. In each case the regional, continental and international collaboration aspects will be emphasised. The paper will end by considering some of the challenges to be expected in institutions in Africa collaborating with each other – the foundation for the success of the CoEs. These challenges include governance arrangements and sustainability, since almost all of them are externally funded. A case will be made for the creation of a database of all the CoEs to encourage collaboration among them and avoid duplication of efforts. This will require the CoEs to make available their relevant data – programmes, student enrolment, research projects, funding and their sources, etc. – on their respective website

Resumé

Il est généralement reconnu que l'Afrique a un besoin urgent de scientifiques et technologues pour régler ses problèmes de développement. En même temps, il est également reconnu que la qualité de l'enseignement supérieur est pauvre en Afrique et il n'y a guère de l'innovation. Cependant, un handicap majeur des établissements d'enseignement supérieur de s'attaquer à ces questions est le grave manque de ressources - humaines, financières et matérielles – dans les établissements et les pays. Le concept de la création des Centres d'Excellence (CdEs), grâce à la collaboration entre les institutions existantes, a été une solution à surmonter ces défis. Ces centres aident à surmonter la tendance de scientifiques africains et les institutions de travailler dans l'isolement et leur permettent de partager les ressources humaines et les infrastructures. La création des CdEs est donc fortement motivée par la collaboration régionale ou continentale. La plupart des CdEs mettent aussi l'accent sur la collaboration internationale.

La création des CdEs prend son origine du Plan d'action consolidé de l'Afrique sur la science et la technologie (PAC) de 2005 qui parle de développement d'un système africain de recherche et d'innovation technologique par la création de réseaux de centres d'excellence dédiés à la recherche et le développement et les programmes de renforcement des capacités. La mention de centres d'excellence est

également faite dans le Plan d'action de l'Union Africaine pour la décennie de l'éducation pour l'Afrique (2006-2015).

Cette communication décrira brièvement plusieurs des principales initiatives prises depuis 2005 pour créer des CdEs, expliquant leurs objectifs, ce qui a conduit à leur création, les disciplines couvertes et mettant également en lumière les différences entre eux. Dans chaque cas, les aspects de la collaboration régionale, continentale et internationale seront soulignés. La communication terminera en prenant compte de certains défis à prévoir quand les institutions en Afrique collaborent les uns avec les autres - la base pour le succès des CdEs. Ces défis comprennent les ententes de gouvernance et de durabilité, car la plupart d'entre eux sont financés de l'extérieur. Un cas sera fait pour la création d'une base de données de tous les CdEs afin d'encourager la collaboration entre eux et d'éviter le dédoublement des efforts. Cela exigera des centres la mise à disposition de leurs données pertinentes - programmes, inscription des étudiants, projets de recherche, financement et leurs sources, etc. - sur leur site Web respectif.

Introduction

In Europe and the US, there are many institutions and centres that excel in teaching and/or research and which can be designated as centres of excellence. They have taken decades, even centuries, and been supported by significant funding, to achieve their level of excellence and world-wide fame.

Because of Africa's colonial history, and the political and economic turmoil that African countries went through since independence, very few such centres of excellence have so far emerged. One such centre, however, is the International Institute of Insect Physiology and Ecology (ICIPE, 2015), created in 1970 and based in Kenya. It undertakes research and postgraduate trainingin collaboration with universities in Africa and other parts of the world and is an internationally recognised centre of excellence in its field.

This paper, however, will cover essentially the emerging Centres of Excellence (CoEs) in Africa that have been or are being created since 2005 to deal with specific issues of direct relevance to Africa's socio-economic development, and that build on sharing capacity and resources in existing institutions through networking and through regional andcontinental collaboration.
This paper, however, will cover essentially the emerging Centres of Excellence (CoEs) in Africa that have been or are being created since 2005 to deal with

specific issues of direct relevance to Africa's socio-economic development, and that build on sharing capacity and resources in existing institutions through networking and through regional and continental collaboration. The methodology used was mainly desktop research.

Background to Africa's CoEs

The more recent concept of creating networks of CoEsin Africa takes its origin from the 2005 Africa's Science and Technology Consolidated Plan of Action (CPA) which, following earlier decisions taken by the African Ministerial Conference on Science and Technology (AMCOST), effectively consolidated the science and technology programmes of the African Union Commission and the New Partnership for Africa's Development (NEPAD), the technical arm of the African Union. The CPA places emphasis on “developing an African system of research and technological innovation by establishing networks of centres of excellence dedicated to specific R&D and capacity building programmes.” (CPA, 2005).

Two main reasons guided the proposal to createnetworks of CoEs. First, to overcome the tendency of African scientists, engineers, technicians and institutions to work in isolation and enable them to efficiently share scarce human and infrastructural resources so as to increase productivity and innovation. Second, to enable Africa to exploit the diversity of institutions and programmes available across the continent. (African Union, 2006). The creation of CoEsis thus strongly motivated by regional or continental collaboration.

The CPA outlines twelve specific flagship R&D programmes to be implemented over the five-year period 2006-2010. The programmes are grouped into four Clusters based on their relationships and potential of establishing institutional networks (CPA, 2005):

Cluster 1: Biodiversity, Biotechnology and Indigenous Knowledge
Cluster 2: Energy, Water and Desertification
Cluster 3: Materials Science, Manufacturing, Laser and Post-Harvest Technologies
Cluster 4: ICT and Space Science &Technologies

In each Cluster, under each programme, objectives are outlined and indicative projects and initiatives mentioned. The CPA also outlines the institutional arrangements, funding and governance structure in implementing the Plan.

Finally, the criteria for accrediting the projects are annexed. The CPA is, indeed, a very comprehensive document.

Following the adoption of the CPA by AMCOST, another document was produced by NEPADproviding criteria and guidelines for establishing African networks of CoEs (African Union, 2006). The document outlines the key characteristics of an institution to be designated as a CoE and then lists a series of performance indicators of such an institution. The latter include scientific outputs, R&D services provided, capacity building efforts, management and overall performance of the institute.

The creation of networks of CoEs alsoappears in the African Union Plan of Action for the Second Decade of Education for Africa (2006-2015). Tertiary Education islisted as one of the seven areas of focus and one of the approaches specifically mentioned is: "Identification and strengthening of networks of Centres of Excellence to enhance the capacity of Africa to contribute to the global pool of knowledge and innovation". Another approach stated is: "The building of partnerships and networks among African institutions and organisations, and with those in the South and North..." (African Union, Undated). Again, there is a clear intention of continental collaboration, but not excluding international collaboration.

NEPAD Networks of CoEs in Science &Technology

Following the adoption of the CPA, NEPAD started creating its networks of CoEs. TwoNetworks in Water Sciences were established by NEPAD in 2009: the Southern African Network of Water Centres of Excellence (SANWATCE), comprising ten institutions in seven countries, coordinated by Stellenbosch University in South Africa; and the Western African Network of Water Centres of Excellence (WANWATCE) consisting of five institutions in four countries, coordinated by University Cheikh Anta Diop in Senegal. Financial support was received from the European Commission. Judging from its website (NEPAD Water CoE, 2015), both Networks appear to be doing well, with several research publications and training outputs, although the Southern African one seems more dynamic and productive, perhaps because of the support it receives from South Africa and the regional community, SADC.

The NEPAD Africa Biosciences Initiative (ABI, 2015) covers the three programmes under Cluster 1 of the CPA. Biosciences are seen as major engines of growth in fields such as human health, industrial processes, environment

and agriculture, and yet Africa is lagging behind in them.The ABI Biosciences Network consists of a secretariat, hub and several nodes distributed throughout the region.Four regional Networks have been established, namely: Biosciences eastern and central Africa (BecANET); Southern African Network for Biosciences (SANBio); West African Biosciences Network (WABNet); and North African Biosciences Network (NABNet). Several research projects have been undertaken, postgraduate students trained and infrastructure capacity strengthened, all though regional collaboration.

In order to increase human and institutional capacity for regulating medical products and technologies, vital for Africa to access medicines of key priority high burden diseases, in 2012 NEPAD launched the Regional Centres of Regulatory Excellence (RCOREs) Programme(NEPAD, 2014). In 2014, ten RCOREs, one in each of ten African countries, were selected, each RCORE designated to deal with a particular regulatory aspect, e.g. training, Quality Assurance, medicine registration, clinical trials oversight, etc., thus promoting collaboration and knowledge sharing among African countries.

The African Laser Centre (ALC), set up in 2003 at the South African Council of Scientific and Industrial Research, aims at encouraging laser sciences and optics-related research collaboration between African researchers. ALC is a virtual CoE with nodes at research institutes in some 14 African countries (CSIR, 2015).Although it existed before the CPA, it has now been officially acknowledged as a flagship programme of NEPAD. In terms of structure and activities, it is a much smaller initiative than the other CoEs.

African Union's PanAfrican University

In line with its proposal in the Plan of Action for the Second Decade of Education in Africa, in 2008 the African Union Commission (AUC) proposed the creation of a Pan African University (PAU), comprising five Institutes, one in each of Africa's five regions, each Institute being assigned a thematic area of importance to Africa's development (African Union, 2015). Initially, each Institute is hosted by an existing university. The AUC and each region then selected the country and existing university to host the Institute. The five Institutes are:

- Basic Sciences, Technology and Innovation Institute, hosted by Jomo Kenyatta University of Agriculture and Technology, Kenya.

- Life and Earth Sciences Institute, hosted by University of Ibadan, Nigeria.
- Governance, Humanities and Social Sciences Institute, hosted by University of Yaounde II, Cameroon.
- Water and Energy Sciences Institute, hosted by University of Tlemcen, Algeria.
- Space Sciences Institute, hosted by a university (yet to be identified) in South Africa.

The plan is that each Institute will become a CoE in its assigned area, by serving as a hub networked with 10 other African institutions in the same area, thus promoting continental collaboration. Each Institute is supported by a lead thematic partner - a foreign government -for providing financial support and for linking the Institute with institutions in the partner's home country. The thematic partners are China (for Kenya), India and Japan (for Nigeria), Sweden (for Cameroon) and Germany (for Algeria). The partner for the South African Institute has yet to be identified.

The PAU has a complex governance structure with a Rectorate to be located in Cameroon, a governing Council and a Senate, and each Institute presumably has its own academic/administrative set up. The Institutes primarily concentrate on Master's and PhD training. The first batch of 193 students were enrolled at the three Institutes in Kenya, Nigeria and Cameroon in 2012 and the Master's students graduated in 2014 with a joint degree from PAU and the host university. There was a call for applications for the 2015/16 academic year for the Master's and PhD programmes at the four established Institutes.

Although regional collaboration was to take place through each Institute networking with other institutions, this has not happened so far. However, each Institute admits candidates from other African countries and academics with relevant academic expertise from other countries are encouraged to teach at any Institute on a part-time basis. With regard to international collaboration, hardly any information is available on which partner country institutions are collaborating with the different Institutes.

RUFORUM

The Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), established in 2004, is a consortium of 46 universities in 22 African countries, the majority being in Eastern and Southern Africa

(RUFORUM, 2015). Its strategic objectives include training a critical mass of Master's and PhD graduates in Agriculture responsive to stakeholder needs and national and regional development goals, develop collaborative research and training facilities that achieve economies of scope and scale, and improve the capacities of universities to produce high quality and innovative training, research and outreach activities that contribute to policy and development practice.

RUFORUM's Master's and PhD programmes, launched in 2008, are its flagship activities. It identifies one (or more in some areas) of its member universities as a Centre of Excellence to host a particular programme based on its competitive advantages. Staff from the region and internationally are then recruited to teach on the programmes. Students are recruited from across Africa. It has so far launched seven coursework-based PhD and five Master's programmes. As examples, the MSc in Plant Breeding and Seed Systems is jointly hosted by Makerere University, Uganda, and University of Zambia, and the PhD in Dryland Resource Management is hosted by the University of Nairobi, Kenya. Scholarships, sourced from donors, are awarded to the best qualified selected students, but the fact that RUFORUM cannot financially support all applications for scholarships does limit the intake to its programmes. RUFORUM also mobilises financial resources to award research grants to faculty members of its member universities.

RISE Networks

The Regional Initiative in Science and Education (RISE) is a project established in 2008 by the Institute of Advanced Study, Princeton, USA with the objective of building capacity in science, technology and innovation for the economic development of Sub-Saharan Africa (RISE, 2015). With grants totalling US$ 15.4 million from the Carnegie Corporation, RISE has established five research and teaching Networks, each Network linking several African universities in a particular research area, thus enabling African scientists to undertake postgraduate studies and research using the resources of the institutions in the respective Network. The five Networks are in the areas of Materials Science and Engineering (AMSEN), Natural Products (RISE-AFNNET), Biochemistry and Bioinformatics (SABINA), Water Resources (SSAWRN) and Coastal and Marine Science (WIO-RISE).

Although not labelled as such, the universities in the RISE Networks operate effectively as CoEs and rely heavily not only on continental collaboration but

also international cooperation, as many of RISE students have an opportunity to spend time in universities outside Africa. To date, 85 students have graduated with a Master's or PhD degree and 101 are currently enrolled.
The Carnegie grant is coming to an end in 2016 and the Institute of Advanced Study is in discussion with the African Development Bank with a view toobtaining funding to continue its support to the Networks.

DAAD Centres of African Excellence

Over the period 2008-2011, following a call for applications, the German Academic Exchange Service (DAAD) financed the setting up of five Centres of African Excellence. The main objectives were to provide quality undergraduate and postgraduate training in selected African universities in relevant areas, to train future leaders in Africa, to limit brain drain, to build capacity at the institutions and to promote African-German academic collaboration. An important condition in selecting each Centre was the existence of well-established cooperation between an African and a German university in the chosen discipline. The disciplines were restricted to Social Sciences, Economics, Law and Public Health (Horiget. al., 2012). None of these is a S&T discipline as identified in the CPA, but they are nevertheless important for Africa's development.

The location of the five Centres (and the chosen discipline) are: University of Dar-es-Salaam, Tanzania (Law); University of the Western Cape, South Africa (Developmental Research & Criminal Justice); Polytechnic of Namibia (Logistics); University of Ghana (Development Studies and Health Research); and Protestant University in Congo (Microfinance). Each Centre has at least one German university as partner. The Centres engage in undergraduate and postgraduate training and research.Each Centre has been provided with about € 0.5 million per year for a period of ten years. In 2011, there were over 400 Bachelor's, Master's and PhD students who had been enrolled and who had graduated.

The DAAD Centres are probably the only ones where international cooperation primes over continental collaboration.

World Bank's Africa Centres of Excellence

In 2014 the World Bank launched its Africa Centres of Excellence (ACE) project. The main objectives of the project are to promote regional specialisation, to strengthen the capacity of existing universities for delivering quality teaching and research, specially postgraduate training, and to meet the demand for skills required for Africa's development in specific fields such as extractive industries (World Bank, 2014). Unlike the other CoEs, the ACE project does not directly promote networking and regional collaboration among the selected institutions, although the proposed governance structure will provide opportunities for the institutions to share experiences and to benefit from external expertise.

The project is being rolled out in two phases. In the first phase, 19 competitively-selected ACEs have been approved in seven countries in West and Central Africa: 10 in Nigeria, 3 in Ghana, 2 in Senegal and one each in Benin, Burkina Faso, Cameroon and Togo. Eight of the ACEs are in the general area of Science, Technology, Engineering & Mathematics (STEM); six are in Health;and five are in Agriculture. Specialised fields have been identified in each general area. Each ACE is being provided with a loan of about US$ 8 million and the project is being facilitated by the Association of African Universities. An important characteristic of the ACE project is that it encourages African governments to contribute to higher education development in their respective country and not to depend entirely on external donor funding.

The World Bank is now in the process of moving into the second phase of the project with ACEs being identified in Eastern and Southern African countries. A similar competitive bidding process as in the first phase is being used.

Observations and Conclusions

Strategy. A remarkable array of Networks of CoEs have emerged in Africa in recent years, diverse in many ways but with the common objective of boosting the capacity of Africa in terms of highly-skilled personnel and research output, crucial for its development, essentially through regional collaboration. The list of networks of CoEs covered in this paper is not by any means exhaustive. The strategy of providing training in Africa through regional networking and sharing of resources is the right one as experience has shown that training

outside Africa, even using the so-called 'sandwich formula', invariably leads to brain drain. All the CoEs are equally conscious of the importance of institutional capacity building and ensuring quality.

Nomenclature. Excellence is usually a recognition of a status already achieved. Most of the CoEs have yet to achieve a high level of quality, they still need to build capacity in terms of human and physical resources, and their postgraduate training and research outputs have yet to be significantly increased. One could then well question the labelling of the universities within the emerging Networks as Centres of 'Excellence'. In the context of Africa, however, a CoE is being regarded as a Centre having the potential of achieving excellence. Excellence is therefore considered as the goal, not necessarily eminence already achieved. It might perhaps have been more appropriate to consider the Centres of Excellence as Centres of Specialisation, with Quality as an essential element. Later, once a Centre satisfies some specified criteria, it could then be considered as a Centre of Excellence.

Collaboration. Almost all the emerging CoEs rely heavily on regional or continental collaboration; those which do not at present will invariably do so in the future. It is well-known that most African universities have well-established collaborations with universities in the North which, in many cases, have evolved over the years through personal contacts, often from the time when an African academic staff undertook his/her PhD in the university in the North. Also, in most cases of international collaboration, it is usually the university in the North that undertakes most of administrative work, including managing the funds. Collaboration between African universities, especially between those that have had little previous collaboration, can pose challenges. Experience has shown that personal contacts and trust are key elements in a successful collaboration, and these take time to get established.

Although the emphasis is on regional and continental collaboration, international collaboration is equally important for all the CoEs. Higher education is now highly globalised and African universities must keep abreast of developments in other parts of the world. Continental collaboration must not therefore displace any successfullyestablished international collaboration; the two must complement and support each other.

Governance. The governance mechanism of networking and collaboration of theCoEs within a network must be carefully and consultatively worked out. On the one hand it is important for all partners to have, in writing, clearly defined roles and responsibilities. On the other hand the administration of the network

must not be too rigid and must allow for some flexibility in cases of unexpected circumstances. Above all, the management of the network must not take precedence over the academic activities of the constituting CoEs.

Also, any network must take into account the 'political' will at both institutional and country levels. Many successful networks have faltered when changes in leadership in participating institutions or countries have occurred. And a network is dependent not only on effective management at the central coordinating unit, but equally at the level of the various nodes, which is not always easy to achieve.

Sustainability.Almost all the networks are financed by donors or funding agencies. It is therefore vital to consider the long-term sustainability of a network beyond the period of the donor support. In fact, one of the challenges identified in the review at the end of five years of the networks established under the CPA was over-reliance on external funding, which often targets short-term activities (African Union, 2014). It is imperative for all networks of CoEs to develop plans for resource mobilisation and alternative funding sources at an early stage of their operations.

Information. The Networks of CoEs are at too early a stage of their development to enable firm conclusions on their performance to be drawn and, in any case, there is little information publicly available on their achievements so far. Indeed, although almost all of them have their website, the latter does not always have all the relevant information. The CoEscomprising each Network should make available their relevant data – programmes, student enrolment, research projects, funding and their sources, publications, etc. – on their respective website,not only to create awareness of their activities, but also to encourage linkages with other initiatives, to share resources and to avoid duplication of efforts. This should then lead to the creation of a central database of all the relevant Networks of CoEs, a task that could perhaps be undertaken by the Association of African Universities.

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PAPER

A Need of Embracing Ethos of Education 3.0 for Effective Learning Outcomes in Africa[1]

By Prof. Faustin Kamuzora and Aurelia Kamuzora
Mzumbe University, Tanzania

Abstract

A number of scholars are doubting the utility of today's education system that was originally conceived during the intellectual culture of the Enlightenment and in the economic circumstances of the Industrial Revolution. Thus, continuing managing the education system based on the industrial revolution paradigm has been likened to trying to make squares out of circles.

Considering the importance of knowing one's customers, the paper presents generalised characteristics of the current generation of students in the universities. Similarly, the paper discusses some salient features of the world economy which the graduates of today are likely to confront. Some of the features include shortage of new jobs because the changes in the structure of the economy, the activities creating much of the world wealth are not good job creators. Another feature is the rise of "knowledge-intensive" trade which is nearly half the total value of trade in goods, services and finance. This implies that due to the effects of globalisation, reduction in prices of the machinery and improvement in artificial intelligence, industrialisation which used to be a model of economic development and job creation may be inappropriate now in some developing countries.

This conceptual paper, based on literature analysis, finally explores and

[1] Original version of the paper was presented at the Conference of Rectors, Vice Chancellors and Presidents of African Universities (COREVIP), Kigali, Rwanda, June 2-5, 2015

discusses the efficacy of new teaching methods which employ Freire's vision of empowering the learner as encapsulated by Education 3.0 which describes a level of transformative capabilities and practices for education in the 21st century. Some of these methods include blended learning which is an approach that combines online and in-person learning, allowing a higher degree of personalisation and learner autonomy. Specific methods which implement andragogy, which is learner–centred, facilitated and validated by the teacher, and heutagogy, which emphasises on 'learning how to learn,' self-determined and self-regulated learning – the teacher teaches the student 'how to learn', are briefly analysed and how the universities can employ these methods to effective teaching and learning.

Resumé

Divers chercheurs et penseurs ont eu pendant des siècles des divergences sur les rôles appropriés des universités dans la société. Toutefois, le rôle commun sur lequel ils se sont tous mis d'accord est la fonction d'enseignement qui attribue à l'université sa raison d'être. Selon Castell (2009) par exemple, « les universités sont créées pour quatre raisons principales à savoir la production des valeurs et la légitimation sociale ; la sélection des élites dominantes ; la formation de la main-d'œuvre ; et la production des connaissances scientifiques et l'appui à son application dans la société ». Selon Nabudere (2003), les universités africaines doivent jouer un rôle d'émancipation et de libération humaine comme l'un des résultats de l'enseignement. De même, dans les pays en développement, le rôle des universités doit être ancré dans l'aspiration au développement durable (AUA, 2009).

Un autre point commun sur lequel ils se sont mis d'accord est le doute sur la pertinence de certains programmes universitaires actuels dans le monde d'aujourd'hui. Cela se justifie par le fait que les universités fonctionnent et offrent des programmes d'enseignement en se basant sur la révolution industrielle malgré les deux autres révolutions récentes causées par les progrès technologiques, à savoir, les informations et les connaissances. L'un de ces penseurs est Robinson dont la vidéo, Changing Paradigms in Education postée sur You Tube a été visionnée par près de 13 millions d'internautes et son Ted Talk, l'école tue-t-elle la créativité? est suivi par presque 8 millions de téléspectateurs. Robinson affirme que le système éducatif d'aujourd'hui a été conçu au cours de la culture intellectuelle du siècle des lumières et dans les circonstances économiques de la révolution industrielle.

Continuer à gérer le système d'éducation basé sur le paradigme de la révolution industrielle a été comparé à essayer de dessiner des carrés à partir des cercles. De même, Ferrera (2015) postule que la conception actuelle des universités traditionnelles ressemble à une usine du XIXe siècle dont toute la production se fait sur le site.

En dehors de la conception, les méthodes d'enseignement traditionnelles, basées sur la pédagogie centrée sur l'enseignant, contrôlées et dirigées par l'enseignant, ont été critiquées par de nombreux spécialistes de l'éducation. Par exemple, les remontrances faites par Freire sur les méthodes traditionnelles d'apprentissage sont bien connues en Afrique et dans de nombreux autres pays en développement. Au regard des changements technologiques qui ont eu lieu dans le monde, le mode traditionnel d'enseignement et la conception des programmes d'études sont dépassés parce que le type d'apprenants et la compréhension de l'efficacité de l'apprentissage ont également changé. Les universités sont maintenant peuplées d'étudiants qui sont nés après l'apparition de l'internet, l'année 1991, qui sont appelés génération Z ou des natifs du numérique. Ces étudiants incarnent différentes caractéristiques comme le fait remarquer Tapscott, D. (2008). Il est donc crucial, comme dans toute entreprise, de connaître vos clients et autres parties prenantes.

Comme brièvement mentionné ci-dessus, l'évolution rapide des technologies, notamment l'Internet, qui est une force perturbatrice dans l'éducation, tout comme dans d'autres secteurs, a pontifié l'apprenant de l'esprit de l'éducation 3.0. L'éducation 3.0 décrit un niveau de capacités et des pratiques transformatrices de l'éducation au 21e siècle. Lengel (2013) fait la distinction entre ce nouveau niveau de l'éducation et le niveau 2.0 qui représente l'ère de l'industrialisation, et le niveau de l'éducation 1.0 qui représente l'ère de l'agriculture. L'éducation 3.0 est caractérisée par un monde où l'enseignement n'est plus basé sur la rareté de l'information.

La communication explore donc et analyse l'efficacité des nouvelles méthodes d'enseignement qui se basent sur la vision de Freire sur l'autonomisation de l'apprenant. Certaines de ces méthodes comprennent l'enseignement mixte qui est une approche qui combine l'apprentissage en ligne et en classe, ce qui permet un plus haut degré de personnalisation et d'autonomie de l'apprenant. Des méthodes spécifiques qui mettent en œuvre l'andragogie, méthodes qui sont centrées sur l'apprenant et qui sont facilitées et validées par l'enseignant, et l'heutagogie, qui

met l'accent sur «apprendre comment apprendre», l'apprentissage auto-déterminé et auto-régulé - l'enseignant enseigne à l'étudiant «comment apprendre », seront analysées de même que l'ampleur de leur utilisation dans les universités africaines et comment les universités peuvent employer ces méthodes pour qu'elles aient un impact sur l'enseignement et l'apprentissage.

Introduction

Various scholars and thinkers (see for example, Newman, 1907; Nyerere, 1968 and Nabudere, 2003) have over centuries debated on what are proper roles of universities in the society. However, the common role which they all agree on is the teaching function thus making it universities' raison d'être. For example, Castells (2009) avers, among other things, that universities are created for producing values and social legitimation; selecting the dominant elites; training the labour force; and producing scientific knowledge and supporting its application in society. Specifically, according to Nabudere (ibid) the African universities must play a role of human emancipation and liberation as one of the teaching outcomes. Equally, in developing countries the roles of universities must be rooted in aspiration of sustainable development (AAU, 2009) which can be attained by being a learning society. This is because according to Duncan (2014) learning is the cornerstone of all development. Without the underpinning of quality education, other systems upon which development depends – governance, health, economic growth, the judiciary, commerce – can never reach maturity.

Another common thread of agreement among scholars and higher education thinkers is the doubt as to whether some of the elements of the curriculum in most universities are germane in today's world. This is because the universities are said to operate and offer curricula based on industrial revolution despite other two recent revolutions which have been caused by exponential changes in technology, namely, information and knowledge. One of these thinkers is Robinson, whose video -Changing Paradigms in Education on YouTube has been watched by close to 13 million viewers and his TedTalk, Do schools kill creativity? by 32,942,641 at time of writing, claims that today's education system was originally conceived during the intellectual culture of the Enlightenment and in the economic circumstances of the Industrial Revolution. Continuing managing the education system based on the industrial revolution paradigm has been likened to trying to make squares out of circles. Similarly, Ferrera (2015) posits that the present design of traditional universities resembles a 19th-century factory that builds everything on site.

Apart from the design, the traditional teaching methods, based on the teacher-centred pedagogy which is controlled and directed by the teacher, have been criticised by numerous educationists, past and present. For example, Freire's (2005) admonition of the unsuitability of the traditional, the banking concept, teaching methods is well known so much in Africa as is supposed to be in many other developing countries as well.

Given the technological changes which have taken place in the world it is imperative that relying on traditional mode of teaching and design of curricula are outdated because the type of learners and the understanding how effective learning takes place have also changed. The universities are now populated by students who were born after the onset of public internet, the year 1991, who are referred to as Generation Z (also as digital natives, Generation M for multitasking, Generation C for Connected Generation, the Net Generation or the iGeneration) in Western world but due to the influence of globalisation and information technology even the African youth can easily be characterised as such. These students embody different characteristics as observed by Tapscott, D. (2009:34-36). It is therefore crucial, as in any business, to know one's customers and other key stakeholders. According to Tapscott the following are some of the characteristics of the Z Generation:

- They want freedom to choose where and when they work. They use technology to escape traditional office constraints and integrate their work lives with their home and social lives.
- They love to customize and personalise.
- They strive for transparency and know that their market power allows them to demand more of companies, which goes for employers as well.
- They look for corporate integrity and openness when deciding what to buy and where to work.
- They want entertainment and playing their work, education, and social life.
- They like collaboration. For example, they collaborate on Facebook, some play multiuser video games; text each other incessantly; and share ? les for school, work, or just for fun.
- They are in need of speed as they have made rapid communication the new norm.
- They are the innovators. They want gadgets not because the old one is no longer cool, but because the new one does so much more. They seek innovative companies as employers and are constantly looking for innovative ways to collaborate, entertain themselves, learn, and work.

As briefly referred to above, the rapid change in technologies, particularly the Internet which is disruptive force in education, as it is in other sectors, has empowered the learner as encapsulated by the spirit of Education 3.0. The Education 3.0 describes a level of transformative capabilities and practices for education in the 21st century. Lengel (2012) distinguishes this new level from education 2.0, for the industrial age, and education 1.0, for the agricultural age. Education 3.0 entails a world where the organization of education is no longer based on scarcity of information and it is quite interactive.

The paper therefore explores and discusses the efficacy of new teaching methods which employ Freire's (ibid) vision of empowering the learner. Some of these methods include blended learning which is an approach that combines online and in-person learning, allowing a higher degree of personalisation and learner autonomy. Specific methods which implement andragogy, which is learner–centred, facilitated and validated by the teacher, and heutagogy, which emphasises on 'learning how to learn,' self-determined and self-regulated learning – the teacher teaches the student 'how to learn', are briefly analysed and how the universities can employ these methods to effect teaching and learning.

Ecosystem of the world of today where the university students are situated

All societies have been preparing their youth to face the realities of the world they find themselves in. In the African traditional society, the role of education was meant to foster understanding and adaptation to the prevailing environment. Among other things, the indigenous knowledge the ability to use community knowledge produced from local history form important literacy skills critical to survival in an African context. Therefore, as observed above, a true African education that embodied lessons of "…mutual respect for the opinions of others, lessons of deference to elders, lessons about the importance of dialogue, lessons about conflict negotiation, the spirit of tolerance and forgiveness, and the spirit to face the future with an open mind (Opata 1998: 117).

The question to ask now is what is the prevailing environment which African university graduates are expected to face upon their graduation. While the list is not exhaustive, the following is part of the list of the issues which are reflecting the world of today:

Unemployment as Structural Economic Reality

The circular stagnation as evidenced by the growth of economy but not enough employment creation or rise in labour productivity looks to be reality the world must contend with for some time (Summers, 2014). This aspect has been well articulated by The Economist (2014a) in its October 4, Special Report entitled Wealth Without Workers and Workers Without Jobs. Because the economic activities creating much of the world wealth are not good job creators and as noted by Picketty (2014), in his award winning best seller – Capital in the 21st Century, even those with work their incomes are not guaranteed to raise to keep pace with inflation as well the return on capital. Specific examples include very wealthy IT companies with just few workers.

Generally in Africa, much of the growth in the economy is not coming from industries manufacturing consumer and intermediate goods but from other sectors which are not necessarily creating a lot of new jobs. These sectors would include extractive industries of non-renewable natural resources, tourism, and information technology (IT) related sectors such mobile telephony. Unfortunately, a number of these sectors have very little backward and forward linkages with other sectors where the majority of the citizens in Africa are involved in, say agricultural sector.

Rising of Inequality

The world of rising inequality is well articulated by the French Economist, Thomas Piketty (ibid). Given that the returns on capital far outweigh the returns on labour, the graduates from low income families without the capital or wealth which includes residential property and financial assets are likely to face a heavier task to break through the social ladders. This is because in many societies in Africa and elsewhere the facilitators of social mobility are being curtailed by neo-liberalism policies, among other things.

Rise of Knowledge Intensive Trade

As noted earlier, one of the revolutions the world has recently witnessed is the knowledge economy. This is evidenced by the rise "knowledge-intensive" trade (flows of goods or services in which research and development or skilled labour contribute a large share of value) to be nearly half the total value of trade in goods, services and finance (Mckinsey, 2014). This means the physical assembly accounts for a declining share of the value of finished goods. They accounted for 80% of world exports in 2008 (the most recent figure available),

down only slightly from 83% in 1980. Measured in value-added terms, however, the importance of goods trade tumbled, from 71% of world exports in 1980 to just 57% in 2008, because of the increasing weight of services in the production of traded goods. Much of the value of an iPhone, for example, derives from the original design and engineering of the product rather than from its components and assembly (The Economist, 2014b).

The Internet of Things

Universities have to prepare for the world of Internet of things (IoT) which has already ushered in its own opportunities and challenges. It is estimated that by 2020 about 26 billion devices (not including PCs, tablets and smartphones) will be connected to the Internet (Gartner, Dec. 2013). Today university students are already highly connected and the universities can take advantage of this fact in updating their teaching methods as will be shortly discussed.

Heutogogical Environment as sine qua non of Embracing Ethos of Education 3.0

Whereas much of the discussion on curriculum development has been mainly on pedagogy and andragogy in many universities, a few have moved on higher level by striving to create the enabling heutagogical environment. As quoted by Msila (2014: pg 214), Turner (2012) points out that the educator in a heutagogical environment facilitates the learning process through guidance and by providing resources. Among the learning outcomes that the universities are striving at include to produce future citizens who will be critical beings in society. Other skills include: ability to take charge of their own learning; ability to function meaningfully with others; use technology to better their lives, others as well as improving their surroundings; and competency and being able to use creativity to sustain themselves. The learners are empowered to determine their path and set their own learning goals. Other features according to Gerstein (2015) include acquisition of the ability for collaboration across networks and leading by influence; agility and adaptability; initiative and entrepreneurialism, effective oral and written communication; accessing and analysing information; empathy and global stewardship curiosity and imagination; and above all the ability to learn new things since the world is changing very fast. What one learns in the university might be obsolete a few years later.

Some new forms of teaching, learning and assessment for an interactive world of Education 3.0

Various universities in Africa and elsewhere have already incorporated in their teaching and learning strategies the new innovative teaching methods. The following is the summary of these methods based on the work compiled by Sharples, et al (2014: pg 3-5) to guide teachers and policy makers in productive innovation.

1. Massive open social learning: This brings the bene? ts of social networks to the people taking massive open online courses (MOOCs). The aim is to engage thousands of people in productive discussions and the creation of shared projects, so together they share experience and build on their previous knowledge. A challenge to this approach is that these learners typically only meet online and for short periods of time. Possible solutions include linking conversations with learning content, creating short-duration discussion groups made up of learners who are currently online, and enabling learners to review each other's assignments.
2 Learning design informed by analytics: Data from tracking and management of learning activities can inform learning design by providing evidence to support the choice of media and sequence of activities. When analysis of learning data is also used to evaluate and improve
3 Flipped classroom: Flipped learning reverses the traditional classroom approach to teaching and learning. It moves direct instruction into the learner's own space. It also offers opportunities for the classroom to become a more ? exible environment, where the physical layout can be shifted to enable group work, where students can make use of their own devices, and where new approaches to learning and assessment are put into practice.
4 Bring your own devices (BYOD): When students bring their own smartphones and tablet computers into the classroom, this action changes their relationship with the school and with their teachers. This means that teachers become managers of technology-enabled networked learners, rather than providers of resources and knowledge. This shift opens opportunities for connecting learning inside and outside the classroom. The universities must also avoid disadvantaging learners who cannot afford suitable devices, and develop ways for individuals to keep their social and learner identities apart if they prefer to do so. With more recent development, the BYOD is being complemented with Wear Your Own Device (WYOD) as wearable devices increase.

5 Learning to learn: We are always learning. Self-determined learning involves learning how to be an effective learner, and having the con? dence to manage our own learning processes. This helps individuals to become self-determined learners with the ability to seek out sources of knowledge and make use of online networks for advice and support. Web tools and activities such as re? ective journals and concept mapping have been designed to support learning to learn, but these are rarely well integrated into a learner's social world.

6 Dynamic assessment: Dynamic assessment focuses on the progress of the student. The assessor interacts with students during the testing phase of the process, identifying ways to overcome each person's current learning dif? culties. In the dynamic assessment process, assessment and intervention are inseparable. Although labour intensive, it has the potential to be used as part of a range of assessment tools.

7 Event-based learning: Event-based learning runs over a few hours or days and creates a memorable sense of occasion. Examples are the 'maker fairs' that gather together enthusiasts who are keen on do-it-yourself science, engineering and crafts projects. Having such an event as a focus gives learners something concrete to work towards and to re? ect upon afterwards, together with a sense of personal engagement and excitement.

8 Learning through storytelling: Learning requires a structure that helps learners to embed and revisit their understanding. Stories provide one way of creating this structure. Developing a narrative is part of a process of meaning making in which the narrator structures a series of events from a particular point of view in order to create a meaningful whole. In a narrative approach to learning, the creation of stories is emphasised, allowing learners to navigate resources and to add coherence to different experiences. Narrative encourages the combination of historical overview and modern practice. It can provide emotional engagement and relevance for learners, together with personal involvement and immersion.

9 Threshold concepts: A threshold concept is something that, when learnt, opens up a new way of thinking about a problem, a subject or the world. An example is the physics concept of 'heat transfer' that can inform everyday activities such as cooking or home energy use. One approach is to develop standard sets of threshold concepts for different subject areas; another is to embed them in teaching and learning processes and practices.

10 Bricolage: Bricolage is a practical process of learning through tinkering with materials. It involves continual transformation, with earlier products or materials that are ready to hand becoming resources for new constructions. It is a fundamental process of learner's learning through

play. It also forms a basis for creative innovation, allowing inventors to combine and adapt tools and theories to generate new insights, while also engaging with relevant communities to ensure that the innovation works in practice and in context.

Whereas not all of the above methods are the panacea of teaching and learning in many of the African universities with very large classes, a strategic combination of these methods can enhance learning because the Generation Z students are already using some of them. For example, with BYOD some of the students are already practicing the flipped classroom whereby they record lectures for their later use or sending to their colleagues, by audio and video sharing applications, who may have missed attending the class.

As evidenced by a plethora of conferences on e-learning emphasising on the blended learning the online education and open and distance learning (ODL) have significant places globally due to being practical to some learners in terms of costs and time. To the learners who cannot manage to afford the financial and time costs for residential university education the ODL can supplement the traditional universities.

Technology has somehow weakened the role of the individual academic staff as 'gatekeeper' of knowledge (since the 'best' content authorized by disciplinary associations and/or authored by renowned scholars is increasingly available directly on the Web unmediated by local academic staff), and institutions anywhere in the world can offer courses taught by highly regarded faculty members with whom they have contracted.

However, this has to be looked at in its historical context because even though so much content is now on the web and to a certain degree the role of the academic in producing content has been vastly reduced, one needs to be careful about the definition of content. This is because despite the fact that libraries have been filled with books for hundreds of years, nobody suggested that academics were no longer necessary in the dissemination of knowledge and in particular in the design and moderation of the learning experience. Academics have always been the navigators through the wealth of resources. And navigators of course need to be properly trained and equipped for such a role. The term navigator is an old one in education circles but it now has new purchase. The quality of the selected content, the quality of the learning experience and its outcome, are consequences of the intervention, not the withdrawal, of the guiding hand of the teacher.

Conclusion

From the points presented in this paper, it can be concluded that there is a consensus that education is not a one-size-fits-all process and there are many ways to learn one subject or concept. When the learners are empowered to actively participate in the learning process there are better prospects of attaining the intended learning outcomes. Some of these outcomes is to produce graduates with ability of critical thinking and problem-solving; collaboration across networks and leading by influence; agility and adaptability; initiative and entrepreneurialism, effective oral and written communication; accessing and analysing information; empathy and global stewardship curiosity and imagination; and above all the ability to learn new things since the world is changing very fast what one learns in the university might be obsolete a few years later.

Hence the heutagogical approaches, despite some difficulties of effectively implementing them, are the practical way of fostering a revolution in the education sector which will ensure that the graduate from the African universities are fully prepared to confront successfully the real world they are going to encounter immediately as they complete their studies. The real world awaiting them is the world of diminished prospects of getting traditional jobs due to changes in structure of global economy where there could be economic growth without much job creation. This is mainly from the effect of globalisation and continuing reduction of prices of capital equipment which are becoming more "intelligent" thanks to the growth in the artificial intelligence.

From the characteristics of the Generation Z, it can be concluded that an effective curriculum and its delivery methods must take cognizance of the facts that learning takes place anywhere hence education should not be limited to the classroom or to school-time and the students do not all learn at the same pace. Given that the young generation prefer combining work and play, inclusion of the appropriate games in curriculum may be a good strategy because for them education should not be a dull, repetitive, and tedious.

There is a need of the realisation that effective teaching is not just a talent, it is also a learned skill. The universities must invest various resources to ensure that their academic staff are equipped with the necessary skills to teaching effectively for the 21st century learning outcomes of their students. Also there is a need of ensuring that teaching which is really the raison d'être of the universities is given its due weight in the career progression of the academic

staff. Finally, despite the growth of MOOCs, the evidence out there is that the residential universities are still needed in the society globally because of the importance of the credentials they provide. However, in the quest of the ethos of the Education 3.0 which is highly interactive with the learners, there is a need of devising other practical ways of evaluation the learning effectives since traditional tests do not necessarily reflect proficiency and there is more to education than grades.

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PAPER

Internationalisation of higher education:

TOWARDS AN AFRICAN CREDIT AND TRANSFER SYSTEM IN HIGHER EDUCATION

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Sub-Theme: African credit and transfer system (student mobility)

Abstract

This research interrogated ways in which African universities can move towards an African credit and transfer system that facilitates students and staff mobility within the continent. This research employed the qualitative methodology to gather data from 12 African universities spread across six geo-political areas of Africa. The results of this study showed that African universities need to have clear receiving and sending policies, put procedures in place to recognise qualifications, programmes and institutions, make information on accredited diplomas and degrees readily available, put in place health insurance facilities, devise mechanisms for linguistic tutoring, have access to mobility scholarships, enforce mandatory university partnerships, devise mechanisms for licensure and registration, improve foreign language proficiency and develop transversal skills among other issues. The research concluded that employability and competences of both students and staff greatly benefit from mobility thus, an African credit and transfer system is possible. The research recommends an African credit and transfer system in Higher Education and a related policy for HE enacted, adopted and enforced at AU level.

Resumé

Contexte
L'évolution rapide et continue de la situation globale de l'enseignement supérieur présente plus que jamais des enjeux nouveaux, d'immenses défis et de nombreuses opportunités pour les établissements, les décideurs, les universitaires et les étudiants (Streitwieser, 2014). L'internationalisation de l'enseignement supérieur (ES) parfois dénommée l'enseignement supérieur transfrontalier ou la mobilité internationale dans l'enseignement supérieur, s'applique aux étudiants et au personnel universitaire et, plus récemment, aux institutions et aux programmes d'études. Selon l'OCDE (2015), la mobilité internationale sert à plusieurs fins. Certaines d'entre elles consistent à :

- *Participer aux flux internationaux de connaissan-ces, s'exposer à de nouvelles idées ou de nouvelles technologies, y compris les connaissances tacites associées à leur utilisation.*
- *améliorer l'enseignement et les processus administratifs des établissements d'enseignement supérieur en leur donnant des références internationales (par exemple le feedback des étudiants internationaux).*
- *attirer et conserver, même temporairement, certains talents pour l'économie et le système de recherche du pays hôte.*
- *générer des revenus pour l'économie et le secteur de l'enseignement supérieur.*
- *Aider les pays en développement et les pays émergents à renforcer leurs capacités (OCDE, 2015, p.3).*

L'avènement de la technologie fait du monde un simple village planétaire. Cela signifie que les établissements d'enseignement supérieur en Afrique doivent rapidement embrasser la technologie et rattraper le reste du monde. Afin de réaliser la vision de l'Union Africaine « d'une Afrique intégrée, prospère et pacifique, dirigée par ses propres citoyens et qui représente une force dynamique sur la scène mondiale », des efforts considérables doivent être faits sur plusieurs fronts. A cette fin, l'importance de comprendre l'impact de la mobilité des étudiants dans le monde entier et de l'internationalisation de l'enseignement supérieur sur les systèmes sociaux et économiques aux niveaux local, national, régional et mondial ne peut plus être soulignée. Afin de réaliser cette vision, l'Afrique doit faire les choses autrement afin de profiter de la dynamique créée en rendant l'enseignement supérieur attractif dans toute l'Afrique.

Le maillon manquant en Afrique est la marche vers un système de crédit et de transfert de crédit dans le système de l'enseignement supérieur africain qui rend

l'enseignement et l'apprentissage plus transparent et facilite la reconnaissance de toutes les études. Le système africain de crédit et de transfert de crédit dans l'enseignement supérieur pourra contribuer à l'amélioration de la conception des programmes d'études et de l'assurance qualité et faciliter le transfert d'expériences entre les différents établissements d'enseignement supérieur. Il permet également une plus grande mobilité des étudiants et permet aux étudiants africains de terminer rapidement leurs études et obtenir leurs diplômes avec succès.

Question

Comment les universités africaines peuvent-elles évoluer vers un système de crédit et de transfert de crédit?

Objectif de la recherche

Cette recherche examine les moyens par lesquels les universités africaines peuvent évoluer vers un système de crédit et de transfert de crédit pour faciliter la mobilité des étudiants et du personnel sur le continent.

Méthodologie

Cette recherche a utilisé la méthodologie qualitative pour recueillir les données de 10 universités africaines issues de cinq zones géo-politiques en Afrique pour y dénicher les universités qui peuvent évoluer vers un système africain de crédit et de transfert de crédit. Le but de cette recherche qualitative a été de recueillir des informations sur la manière dont les universités africaines peuvent évoluer vers un système africain de crédit et de transfert de crédit et rechercher les raisons qui régissent ces pratiques. Cette méthode qualitative étudie le pourquoi et le comment de la prise de décisions, et non quoi, où, quand. Il s'agit d'une des raisons pour laquelle l'échantillonnage raisonné et ciblé riche en informations requises a été utilisé.

Résultats

Les résultats de cette étude démontrent que les pays africains doivent se doter de politiques et des procédures bien définies pour reconnaître les diplômes, les programmes et les institutions. Les informations liées à la reconnaissance des diplômes doivent être facilement disponibles ; les systèmes d'assurance santé doivent être mis en place. Il faudrait également concevoir des mécanismes pour le perfectionnement linguistique, faciliter l'accéder aux bourses de mobilité, renforcer les partenariats universitaires et les mécanismes d'accréditation, améliorer la maîtrise de la langue étrangère et développer des compétences transversales etc.

Conclusions

La recherche a conclu que l'employabilité et les compétences des étudiants et du personnel bénéficieront énormément de la mobilité, d'où la possibilité de la mise en œuvre d'un système africain de crédit et de transfert de crédit.

Recommandation

La recherche recommande un système africain de crédits et de transfert de crédits dans la politique de l'enseignement supérieur qui doit être adoptée et appliquée au niveau de l'UA.

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Background

Continuous and rapid developments in global higher education arena today more than ever before present new insights, questions, greater challenges and vast new opportunities for institutions, policy makers, scholars and students alike (Streitwieser, 2014). Internationalisation of HE which is sometimes called cross-border higher education and in some places international mobility in higher education, applies to students and staff and, more recently, to educational programmes and institutions. According to OECD (2015), international mobility serves several purposes. Some of these are to:

- participate in international knowledge flows, be exposed to new ideas or technologies, including the tacit knowledge associated to their use.
- improve teaching and administrative practices of higher education institutions by giving them international benchmarks (e.g. the feedback of international students).
- attract and keep, even temporarily, some talents for the economy and research system of the host country.
- generate revenue for the economy and the higher education sector.
- help developing and emerging countries build capacity (OECD, 2015, p.3).

Internationalisation of HE is made easier by the advent of technology which makes the world a mere global village. It means Higher Education institutions in Africa should move fast to embrace this new phenomenon and catch up with the rest of the world. In order to achieve the IPP Africa (Integrated, Peaceful and Prosperous Africa) premised around the African Union's vision of "An Integrated, prosperous and peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena", significantly more action is still required on a number of fronts. Towards this end, the importance of understanding the impact of worldwide student mobility and internationalisation of higher education on social and economic systems at local, national, regional and global levels cannot be over emphasised. In marching towards this vision, Africa must do things very differently to take advantage of the current momentum towards 2063 by making higher education comparable across Africa.

On the surface, the continent appears to be on track. However, going deeper, one glaring missing link in Africa is clearly vivid and this missing link is the march towards an African credit and transfer system in Higher Education. Credit Transfer System not only makes teaching and learning more transparent but also facilitates the recognition of all studies. The African credit and transfer system in Higher Education has the potential to aid curriculum design and quality assurance and allows for the transfer of learning experiences between different institutions. It also allows greater student mobility and more flexible routes to gain degrees in Africa.

Credit Transfer System

As a starting point, we need to be clear on what a credit is. We take the definition of the Civic Education Project (2015) who are of the opinion that there is growing consensus among HEIs that the basis for credit allocation is "the student workload required to achieve the objectives of the programme". To make it easier for HEIs, these objectives should preferably be specified in terms of learning outcomes. In that context, the credit can have a numerical value. Junor and Usher, (2008) who appear to agree with these sentiments, further point out that postsecondary credit is awarded to students who have demonstrated successful completion of a module or unit. This credit represents a portion of an academic qualification. They further add that in order for this to occur, a student must meet a minimum standard, commonly known as a "pass," in the assessment process. To Junor and Usher (2008), these credits often allow individuals to continue further academic pursuits and form the building blocks

of a post-secondary credential. SEAMEO (2015) who also appear to share similar views, says Credit Transfer System is a mechanism through which higher education institutions share students' workload and accomplishments with other institutions that will enable them to facilitate their horizontal mobility and vertical progression. They point out that the CTS systems seek to avoid duplication of studies. On the other hand the systems save time and money for students who decide to embark on an exchange programme. What is important for Africa is that an appropriate system of credit transfer is a key facilitator of student mobility and cooperation among higher education institutions.

The definitions by Civic Education Project (2015) and Junor and Usher (2008) point to the fact that credit systems are processes that build on numerical values allocated to study programme units. They appear to agree that these credits may be allocated on the basis of factors such as student workload, the number of contact hours, or learning outcomes. Systems differ from one country to the other. What appears good for Africa is harmonisation. This is because certain national systems promote approaches that rely either on contact hours or learning outcomes only. Amongst the Bologna countries, however, there is growing consensus among HEIs that the basis for credit allocation is "the student workload required to achieve the objectives of the programme. These objectives are preferably specified in terms of learning outcomes" (Zürich Conclusions and Recommendations, p.2; cited in Civic Education Project, 2015).

According to Civic Education Project (2015), the Credit Transfer System (CTS) is a common framework for valuing, measuring, describing and comparing educational achievement in higher education. They gave a very good example of the European Credit and Transfer System (ECTS) which to them plays a key role in the creation of the European Higher Education Area (EHEA) through the Bologna process. Junor and Usher (2008) point out that a proper protocol (or mechanism) designed to recognise previous academic performance is essential in ensuring a full range of student mobility options. They argue that it is for this reason that credit transfer and student mobility are linked. To them, credit transfer systems provide the lubricant to ensure seamless academic mobility (Junor and Usher, 2008). Africa need to take a leaf from such good practices from other countries considering that Civic Education Project (2015) is of the opinion that the ECTS process has had a major impact on all actors in higher education in the European Union and beyond. They even pointed out that ECTS has been especially influential on higher education institutions (HEIs) because it postulates increased convergence and compliance. This

increased convergence and compliance does not in any way compromise the Universities' independence and autonomy in the implementation of their core mandates.

Technology as an enabling environment

It is through the wide use of technology that has enabled HIEs to interact with each other. This interaction also facilitates students and staff mobility. This argument is supported by Junor and Usher (2008) who are of the view that technological advances in communication and transportation have increased educational opportunities for post-secondary education students around the globe. The two point out that owing to advances in communication and transportation, individuals and information now more than ever before, travel quicker and considerably cheaper between countries, regions and continents. This is an opportunity for HEIs because they no longer have a local, jurisdictional or even domestic focus. It means HEIs in Africa need to move with the times. In that case, their visions have to change. Globalisation entails visions that become global in nature. Junor and Usher (2008) agree with this kind of reasoning and even go on to add that governments and employers should recognise that the workforce of the future must include well-trained, globally aware professionals with international work experience who can solve economic and social challenges for sustainable development. They went on to point out that at the same time, students and faculty are becoming increasingly interested in spending time in different academic environments, often in foreign surroundings (Junor and Usher, 2008). This length of stay in foreign environments is now made easier and quicker by technology and communication advancement and it is imperative that HEIs capitalise on this development in their noble quest for internationalisation and globalisation of their practices.

Quality Assurance in Credit Accumulation and Transfer Systems (CATS)

Quality Assurance in Credit Accumulation and Transfer Systems (CATS) is critical considering that its major aim is to facilitate the recognition, validation and accumulation of learning outcomes of individuals who are aiming to acquire a qualification (EQAVET, 2015). This is important for African higher education whose major objective is renewed commitment by African

governments to re-vitalize Higher Education in the continent to support Africa's development agenda. This will improve the general understanding of learning outcomes, increases transparency, increase cross-border citizens-mobility between and within Member countries, and at the same time fostering learners' and labour mobility and portability of qualifications in a borderless area of lifelong learning (EQAVET, 2015).

In some countries like those under European Union, quality assurance is given priority. In fact, EQAVET (2015) contents that by 2012 countries are expected to have created the necessary conditions and taken measures for gradual implementation of quality practices to vocational qualifications at all levels of the European Qualifications Framework. Africa need to take a cue from such practices in order to support flexibility of programmes and availability of pathways to achieve qualifications. This on its own will enhance the opportunities for lifelong learning. This will then make it easier to recognise the learning achieved by learners in other contexts.

The RUFORUM handbook (2011) appears to be a shining example for Africa. This handbook builds on the renewed commitment by African governments to re-vitalize Higher Education in the continent to support Africa's development agenda especially under the frameworks for the Second Decade of Higher Education in Africa (2006-2015) and the Comprehensive African Agricultural Development Programme (CAADP) (RUFORUM, 2011). The handbook uses the two frameworks to provide guidelines for reinvigorating higher education in the continent to respond better to the critical need for quality and skilled human resource and for universities to engage more pro-actively and effectively in the continent's development process (RUFORUM, 2011).

Some useful examples

A well known and documented Credit Transfer and Accumulation System is the European Credit Transfer and Accumulation System (ECTS). This Credit Transfer and Accumulation System is said by European Commission (2015), to be a tool that helps to design, describe, and deliver study programmes and award higher education qualifications. In Europe, they use the ECTSs, in conjunction with outcomes-based qualifications frameworks, making study programmes and qualifications more transparent. In the process they facilitate the recognition of qualifications in many countries. Another good example for Africa is the Asian situation. According to SEAMEO (2015), the Asian Development Bank (ADB) is implementing a project called: “Harmonization and Networking in Higher Education, Building a Common Credit Transfer

System for Greater Mekong Subregion (GMS) and beyond" This project aims at providing GMS (+ ASEAN + Japan + Korea) means for harmonising existing credit transfer arrangements in higher education. This very good project is structured in four stages: Explore, Experiment, Experience and Expand seeking to create a regional and all inclusive academic credit transfer framework. It is also done in support of the ASEAN Leaders' vision to build an ASEAN Community from 2015 consisting of three pillars: the ASEAN Economic Community (AEC), the ASEAN Socio-Cultural Community (ASCC), and the ASEAN Political-Security Community (APSC). The primary goal of ASCC is contributing to realizing an ASEAN Community that is people-centred and socially responsible.

Problem statement

Universities and higher education institutions in Africa are using different credit transfer systems which are either too general and all too inclusive or too narrow and applicable to only limited number of universities. This stifles students' mobility and as a result the number of students actually moving within the continent remains relatively small. Yet, Africa is failing to learn from other parts of the world where higher education has grown in size, fluidity and complexity. Future development depends on how the continent response to the globalisation and internationalisation agenda. The problem therefore is that there is no African mechanism through which higher education institutions share students' workload and accomplishments with other institutions. This mechanism, premised around Credit Accumulation and Transfer System (CATS) will facilitate students' horizontal mobility and vertical progression.

Research question

How can African universities move towards an African credit and transfer system in Higher Education that will facilitate student and staff mobility in the continent?

Objective of research

This research looked at ways in which African universities embark on to move towards an African credit and transfer system in Higher Education that will aid student and staff mobility in the continent.

Methodology

This research employed the qualitative methodology to gather data from 12 African universities spread accross six geo-political areas of Africa to unearth ways in which universities can move towards an African credit and transfer system in HE. According to Yin (2011), in qualitative research, one has an opportunity to study a real-world setting. This will then enable the researcher to discover how people cope and thrive in universities. How they can move towards an African credit and transfer system in HE setting. This was the case in this study because it captured the contextual richness of people's everyday lives. Studying the meaning of people's lives, under real-world conditions enabled me to unearth ways in which universities can move towards an African credit and transfer system in HE. Thus, this qualitative research in many ways than one represents the views and perspectives of the people affected by the absence of an African credit and transfer system in HE. Qualitative research enabled me to gain insight into the goings on in universities from the people who are experiencing hardships due to the absence of the Credit Accumulation and Transfer System. The allure of qualitative research is that it enables one to conduct in-depth studies about a broad array of topics (Yin, 2011). This was the case in this study. Moreover, qualitative research offers greater latitude in selecting topics of interest, as was the case in this study. The main aim of this qualitative research was to gather an in-depth understanding of how African universities can move towards an African credit and transfer system in Higher Education and uncover the reasons that govern such practices. This qualitative method investigated the why and how of decision making, not just what, where, when. This is one reason why it used a smaller but focused purposive sample that was rich in the information required.

Results

The results of this study appear to agree with the assertions of Juror and Usher (2008: 9) who argued that:

> *Given the fluidity of the post-secondary education system, credit transfer systems are a vital element in supporting students along educational pathways and allowing for movement between programs and institutions. Credit transfer systems can help further lifelong learning, improve and widen post-secondary participation rates, eliminate unnecessary student tuition and educational costs (mitigating borrowing for some students) and reduce post-secondary non-completion rates (Juror and Usher (2008: 9)*

This means for an African credit and transfer system in Higher Education to succeed, this research has established that African countries need to have clear receiving and sending policies, put procedures in place to recognise qualifications, programmes and institutions, make information on accredited diplomas and degrees readily available, put in place health insurance facilities, devise mechanisms for linguistic tutoring, have access to mobility scholarships, institute mandatory university partnerships, establish mechanisms for licensure and registration, improve foreign language proficiency and develop transversal skills among other issues. Some of these are discussed fully in sub-sections that follow.

Knowledge base

This research found out that it is prudent for HEIs to have knowledge of African students pursing credits or credentials abroad. This means there must be put in place accessible databases tracking students pursing credits or credentials abroad and other related developments. The credit data that reside with each African institution that has established agreements with international institutions should be accessed by other institutions. A good example for Africa is the Association of Universities and Colleges of Canada which collects information from its members and has constructed the Canadian University International Exchange Agreements Database (CUE). Lessons for Africa are that the continent need to do the same and move fast to establish such an important database as a starting point, if the content needs to benefit from internationalisation of Higher Education. Right now, this research established that data on credentials are best accessed through either the Institute for International Education (IIE) or UNESCO – but neither one is considered infallible. This data is not readily available to African institutions and in many cases the data are no longer available due to security concerns. As a result, it is largely unclear how Africa compares with other educational world leaders in the global arena in terms of student mobility as information on this important aspect of HE development appears missing in the six universities in this study.

Clear receiving and sending policies

As a starting point, African Universities need to have clear receiving and sending policies that are accepted in the various countries of Africa. What that means is that CTS can be used as a tool. Civic Education Project (2015) appear

to concur with this view, arguing that as the name implies, CTS is a tool for transfer and recognition of credits for studies abroad. In addition to being a tool for transfer and recognition of credits, it is also a useful mechanism for students to receive credit for the work done at another HEI. Such practices make students highly mobile. This mobility of students and staff has benefits to HEIs. Through CTS, credits will then be used to ensure the recognition of studies at a host institution, indicating the workload students had to invest for the successful completion of a study programme. According to Civic Education Project (2015), the advantage of CTS as a transfer system is that it provides a simple and broadly defined tool for the measurement of workload and for the recognition of studies abroad. On the other hand, it provides HEIs with a device they can use with considerable freedom to translate their programmes into an understandable, transparent equation for students and other institutions. This can only be possible in Africa if HEIs put in place clear receiving and sending policies that will enable African HEIs to fall back on when faced with such opportunities.

Putting procedures in place to recognise qualifications, programmes and institutions

Recognising qualifications, programmes and institutions was mentioned as a key enabler of internationalisation of HE in Africa. In this case, the participants in the research called for procedures to be put in place as a matter of urgency. A participant said:

> *How do I know I am eligible for a programme of study if there are no procedures in place to recognise qualifications, programmes and institutions? How do I know an institution is a bonafide institution before I register? There is need for a central authority in Africa that assesses or grants recognition for degrees obtained from another African university.*

The finding on putting procedures in place to recognise qualifications, programmes and institutions means that universities in Africa and employers worldwide will value and recognise African university qualifications. These will be seen as evidence of academic ability if the continent puts in place procedures that are to be followed to recognise qualifications, programmes and institutions. Many students and prospective students will get assurance since they will view procedures that are in place to recognise qualifications,

programmes and institutions as a passport to success. Some of the procedures that have to been in place include among other things that participating institutions publish their course catalogues on the web, they put detailed descriptions of study programmes, modules, university regulations and student services. On the other hand course descriptions containing 'learning outcomes' (i.e. what students are expected to know, understand and be able to do) and workload (i.e. the time students typically need to achieve these outcomes) should be readily available. What is important is that each learning outcome is expressed in terms of credits, with a student workload ranging from 1 500 to 1 800 hours for an academic year, and one credit generally corresponding to 25-30 hours of work.

Make information on accredited diplomas and degrees readily available

Once procedures are in place, participants in this research pointed out that information on accredited diplomas and degrees should be readily available for aspiring students. One of the participants pointed out that:

> *Prospective students want to know if professional degrees such as those in engineering, medicine, law, and accountancy are recognised by the respective professional bodies. This information should be readily available. If I have an engineering degree from an African university and I intend to seek registration as a professional engineer in any country that employer should easily check whether the institution that awards the qualification is recognised by the Professional Engineers Board.*

Making information for accredited degrees and diplomas available is in this case important step towards harmonisation of higher education in Africa. More important again is that professional degrees such as those in engineering, medicine, law, and accountancy should be those that are recognised by the respective professional bodies.

Putting in place health insurance facilities

The participants in this research were of the opinion that health insurance is critical to the success of a credit accumulation system. This insurance to them will facilitate student mobility. One of the participants in this research pointed out that:

It does not make sense to have an African credit and transfer system in higher education when there are no mechanisms in place to support student mobility. Higher education institutions need to put in place health insurance facilities because these facilities will facilitate student mobility.

Health and wellness of students is a very important topic in higher education. It makes sense that as Africa thinks of measures that could be taken to put in place a credit accumulation and transfer system, the continent is not blind to other enabling factors that include students' health insurance facilities. Health and wellness of students should be prioritised when the continent takes efforts to put in place a credit accumulation and transfer system.

Devise mechanisms for linguistic tutoring

Language has always been a barrier to student mobility. A credit accumulation and transfer system alone has been described by participants in this study as 'hollow'. They pointed out that:

> *A credit accumulation and transfer system should be supported by mechanisms for linguistic tutoring. On its own, it is hollow. Even tutors should have some knowledge of different cultures and linguistic perspectives to prepare themselves for working with international students.*

As Africa marches towards an African credit and transfer system in Higher Education it is important therefore to recognise that students from each national group share a set of writing difficulties. These difficulties are closely related to their linguistic and cultural background. To mitigate against this, there must be put in place mechanisms for linguistic tutoring that enhances the knowledge of the foreign students who find it difficult to operate using a foreign language. Linguistic tutoring is also important for faculty since it will help equip them with information to better service international students. These international students face challenges when operating in a different cultural and educational system. This is the reason why participants in this study were of the opinion that a credit accumulation and transfer system on its own is “hollow”. As Africa marches towards an African credit accumulation and transfer system in Higher Education it must be pointed out that foreign students' writing is affected by the rhetorical styles of their first languages. This entails linguistic tutoring for such students.

Access to mobility scholarships

Funding has always been an Achilles heel for many African students. In that regard, participants in this research thought it wise that as Africa marches towards an African credit and transfer system in Higher Education it must do so with a mobility scholarship in place to help disadvantaged students who may also want to benefit from that African credit and transfer system in Higher Education. One of the participants put it this way:

> *Access to mobility scholarship is important for African HE. The purpose of the mobility scholarship is to encourage students to study abroad as part of their study program by defraying part of the cost of this experience.*

Many African students have been handicapped by lack of funds. It appears that even if an African credit accumulation and transfer system is put in place a sizable number of African students will not benefit due to financial constraints. This therefore implies that a scholarship to that effect is important.

Mandatory university partnerships

An interesting finding from this study was the issue that mandatory university partnerships are necessary for effective harmonisation and internationalisation of higher education. Abeles (2015) appear to articulate this issue well by pointing out that:

> *One of the major weaknesses in education in Africa currently – and similar problems exist globally – is that individuals graduate with the requisite credits based on courses taken for a set period of time, yet are unable to effectively articulate that knowledge in a productive manner*

Articulating that knowledge in a productive manner means that universities need to collaborate so that they come out with comparable standards. According to Abeles (2015), collaboration, globally and across institutions, is key whether it involves researching new knowledge or making knowledge accessible for education.

Mechanisms for licensure and registration

To the participants in this study, it is not enough just to have a credit accumulation and transfer system in place. It must be followed by mechanisms for licensure and registration for the higher education institutions that are participating in the credit accumulation and transfer system. This was put this way by one of the participants in this study:

> *In order to have a robust African credit and accumulation system, accreditation is also helpful in that regard. This is because accreditation is a status that provides assurance to current and prospective students, their families and the general public that an institution or a programme meets minimum requirements and that there are reasonable grounds to believe the institution will continue to meet those standards in the future*.

It follows that accreditation is seen by the participants in this study as an assurance that an institution or programme meets the quality standards established by the profession. It will also help prospective students and their parents in making choices about a quality programme that meets their needs. On the other hand accreditation enables employers to recruit graduates they know are well-prepared.

Developing transversal skills

An important finding of this study is the transversal skills that should be imparted to the students. The ET 2020 Working Group of the European Commission (2015) see transversal skills as skills such as the ability to think critically, take initiative, problem solving and work collaboratively. These are skills which are relevant for individuals as citizens and in employment in today's varied and unpredictable career paths. What then this means for the African credit accumulation and transfer system is that HE institutions in Africa need to modernise education and training systems. When they do this, they are in a position to deliver the right skills needed by the labour market, to address the question of partnerships and funding and contribute to the drive for growth and jobs (European Commission, 2015). It is important for African HE institutions to adopt the constructionist learning model. This model is a sure way of imparting transversal competencies such as 21st century skills because these will ensure students' all-round development.

Conclusions

The research concluded that by making higher education comparable across Africa, the credit transfer system makes teaching and learning more transparent and facilitates the recognition of all studies. Credit transfer system aids curriculum design, nourishes quality assurance, allows for the transfer of learning experiences between different institutions, promotes greater student mobility, nurtures global consciousness and facilitates more flexible routes to gain degrees. Credit transfer system provides HEIs with a device they can use with considerable freedom to translate their programmes into an understandable, transparent equation for students and other institutions. In addition, employability and competences of both students and staff greatly benefit from mobility as this is a sure way of imparting transversal competencies such as 21st century skills. The research then argues that an African credit and transfer system is possible because it has immense benefits to HEIs in the continent. A robust credit transfer and accumulation system on the African continent facilitates the implementation of five fundamental concepts in higher education that include comparability, transparency, mobility, quality and coherence in study programmes. It also greatly enhances the value of a student's education. Studying outside one's city, province or country of residence has the opportunity to gain all kinds of important insights into cultural or global issues, acquire new skills and abilities, and perhaps learn a second or third language. It is the skills acquired while studying abroad that will subsequently benefit both the individual and society at large.

Harmonization of higher education in Africa and increasing transnational student mobility in the continent require a functional credit transfer system. Given the increasing fluidity and interconnectivity of the continent and the vision for rapid integration, a continental framework for credit transfers is envisioned as a key mechanism to create and consolidate an “education common space” for Africa. Inability to transfer academic credit is an academic barrier to mobility which Africa will ill afford to nurture and would certainly like to halt.

Recommendations

The research recommends:

- A more standardised and simpler ways to address the increasing demands from students regarding “easy and speedy ways” to facilitate mobility

horizontally (higher education institutions and countries) and vertically (lifelong learning).

- An African credit and transfer system in Higher Education policy for HE enacted, adopted and enforced at AU level.
- African institutions publish their course catalogues on their website so that it includes detailed descriptions of study programmes, modules, university regulations and student services
- In order for CTS to function effectively as a transfer and accumulation system in Africa, it must be built on a solid foundation of mutual trust and confidence in the academic judgements made by staff at other institutions.
- A credit African credit transfer and accumulation system should be built on numerical values allocated to study programme units on the basis of factors such as student workload, the number of contact hours, or learning outcomes
- The attitude, behaviour and mind-set in HE in Africa must change in order to embrace internationalisation agenda

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PAPER

The Effects of Virtual-Mediated Process Writing on University Students' Academic Achievement in Nigeria

(A CASE STUDY OF LONDON UNIVERSITY OUTREACH, YABA, NIGERIA)

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Abstract

This study involved a pre-test – post-test experimental and control group design and examined the effects of virtual-mediated process writing on students' academic achievement using a private University, in Lagos, Nigeria. With randomized sampling technique, an intact class of 145 students was selected from the medium ability groups out of which 40 students were drawn from each gender group to make up 80 students as sample and further classified into experimental and control groups. Essay Tasks for Undergraduates (ETU) and Semi-Structured Interview (SSI) were administered to the students. Analysis of data involved Arithmetic Mean, Standard Deviation and students' T-test. At the end, students in the experimental group exposed to the virtual-mediated process writing improved significantly in their academic achievement than those in the control group. In addition, the study provided an arena in which cohesive relationships were formed among the diverse learners' multilingual backgrounds in Nigeria. Recommendations involved amongst others, guiding students to achieve specific writing goals at every stage of their academic learning process.

Resumé

Le rôle de l'ordinateur dans l'enseignement de l'anglais dans les salles de classe en tant que deuxième langue (ESL) prend de plus en plus une nouvelle ampleur d'autant plus que les étudiants marquent le pas avec l'expansion phénoménale de la nouvelle technologie dans la société nigériane. Par conséquent, cette étude de pré-test et post-test quasi expérimental a examiné les effets du processus de rédaction virtuelle sur la performance des étudiants de l'Université de l'Etat de Lagos, Lagos, Nigeria. Grâce à une technique d'échantillonnage aléatoire stratifié, des classes entières de cent cinquante étudiants du premier cycle ont été sélectionnées en se basant sur les différentes spécialisations. Les étudiants de l'échantillon ont été repartis en en deux groupes, le groupe de traitement et le groupe témoin. L'outil statistique ANOVA a été utilisé pendant le pré-test et post-test à un seuil de signification de 0,05. A la fin de l'intervention, les résultats ont indiqué que le processus de rédaction virtuelle avait un effet significatif sur la performance des étudiants. Les résultats ont également montré que le processus rédaction visuelle apporte plus d'excitation aux activités de classe, requiert la contribution des étudiants moins doués dans la résolution de problèmes et dans la prise de décisions et est caractérisé par des relations interactives. En outre, l'étude a fourni une arène dans laquelle les relations cohésives ont été nouées entre les divers apprenants issus de milieux multilingues, avec des valeurs et des cultures différentes. Ce faisant, l'apprentissage visuel par médiation a servi de pont entre le monde de l'apprentissage et la paix. Les recommandations visent à aider les étudiants à atteindre les objectifs de rédaction spécifiques à chaque étape de leur processus d'apprentissage.

Introduction

The rapid growth of the internet, which links computers all over the world into a single electronic communication system, is making widespread virtual-based mode of instruction in higher education a reality. With the increasing popularity of the internet, virtual learning has taken a new meaning and dimension in the educational sector. The role of computer in English as a Second language (ESL) classroom, is increasingly taking a new stature, as students are advancing in phenomenal spread and expansion in the technologically emerging Nigerian society. The opportunities for using the internet in the language classroom have grown as well, and this has led to new interests in academic and virtual learning as a means of engaging students in collaborative learning in the target language. Virtual-based instruction takes

advantage of technology to provide a wide range of opportunities and numerous potential benefits at all levels. If students do not acquire the language skills, they are disadvantaged and may perhaps suffer exclusion from global literacy communities. As Leu (2000) points out, "individuals unable to keep up with the communication strategies generated by the new information technologies will quickly be left behind".

Traditionally, the use of computers in language learning has been associated with programmed applications like drills, animations, tests and so on. However, the innovative use of computers as a means of virtual-mediated language teaching represents a different kind of literacy where human-to-human communication is the focus (Perraton, 2000). The important elements of virtual-learning are the notions of interaction, flexibility, innovativeness, multimedia-based learning, resourcefulness, synchronous and asynchronous communication, motivation, problem-solving, facilitating work on meaningful projects and the internet. According to Palloff and Pratt (1999), when students learn in virtual environment, it:

- involves a community area where group members can interact on a personal level, apart from course materials;
- offers a better opportunity for the establishment of close monitoring relationships, because it allows for one on one interaction;
- offers a richly motivating context for content-area learning, while enhancing language development;
- allows students to explore content in collaborative learning;
- permeates each student learning progression through each module according to his or her level of ability and motivation- learning can occur throughout the programme; and
- encourages placement tests and other evaluative tests to be administered online.

The Nature and Purpose of Process Writing

Understanding the nature of writing is crucial in the development of this investigation. Writing is a very important and complex means of communication which is needed to cope with the globalizing trends of the twenty-first century. Learning to write is not just a natural extension of learning to speak a language. Writing is a technical skill that involves extremely complex cognitive processes, of which the writer is expected to demonstrate control of a number of variables simultaneously. To write well requires a whole range of abilities such as: listening, speaking, reading, vocabulary, grammar and so on.

Some researchers such as Pallof and Pratt (1999) consider writing as simple printed signs for language recording. Troyka (2000) defines writing as 'a system of written symbols which represents sound, syllables or words of a language'. However, many other linguists such as Egbe (1996); Engstrom (2005) and Christenson (2002) have not accepted this simplistic view of writing. Engstrom (2005) for instance, argues that writing is 'an extremely complex activity;' that requires the simultaneous work of the cognitive skill in order to produce a piece of writing. The thinking process is thus another way of defining writing, as observed by Graves (1994), Seow (2002) and Raimes (2002), who hold that thoughts need to be properly communicated to derive a purpose. This communicative view implies that writing is a process as well as a product task. Seely (2005) supports this idea by explaining that writing can be referred to as 'an act-process and as a noun-product'. Similarly, Owhotu (2006) agrees that writing is 'a creative act in which the process is as important as the product'.

Consequently, writing, when conceptualized holistically is both a process and a product which requires content, expression, organization and coherence for the development of cognitive skill, knowledge, experience, feeling and purpose in order to communicate effectively. Writing in a second language, can be an enjoyable and meaningful activity for learners, as it sets out to meet concrete needs than some more ephemeral activities. At a higher level, good writing skill not only provides useful language practice, but also stimulates learners to express themselves in creative and personal manners, which help them to cope with academic purposes.

Theoretical Underpinning

Researchers such as Graves (1994), Murray (1996), and Calkins (1994) have made advances and extensively conceptualized the process writing. In this perspective, the conceptual model of writing, the so-called 'product' model is being replaced by the 'process' writing which is seen as a means to an end in ESL classroom. The field of writing has experienced a shift from traditional writing instruction, to encouraging students to master the sub-skills before attempting whole pieces of writing (Leu, 2000). It is now increasingly accepted that the most important outcomes of writing and training are about developing the process of composing and not just marking what students write. The notion behind it is not really to dissociate writing entirely from the written product and to merely lead students through various stages of the writing process, but 'to construct a process-oriented writing instruction that will affect performance' (Freedman, S. W., et al., 1987; Christenson, 2002). To have an

effective performance-oriented programme, would mean that we need to systematically teach students problem-solving skills, which are connected with the writing process that will enable them to realize specific goals at each stage of the composing process.

Zamel (1983) further supports this idea, stating that writers use their own ways to compose, so that it is a 'non-linear, exploratory and generative process'. Kroll (1990) argues in support of this perspective, claiming that students develop their own writing strategies with ample time according to the type of tasks, situation, discourse community and socio -cultural setting in which they are involved. Thus, students' writings are processes which are developed considering the communicative functions of the pieces of writing. Raimes (1983a) also adds the critical dimension of gender to the process writing. He argues that in process writing, gender role refers to the expectations and behaviours associated with sex category within a context. This means that gender is also what differentiates the way male and female use language in creativity which he argues is socially constructed and depends on the situation where discourse takes place. Similarly, Venkatesh & Morris (2000) found that compared to females, men's technology usage decisions were more strongly influenced by their perceptions of usefulness while females are more strongly influenced by perceptions of ease of use and subjective norm. Finally, Williams (1998) points out that, 'the process model proposes that a finished writing is the result of the complex interaction of activities that include several stages of development such as: prewriting, drafting, re-writing, revising, editing, proof reading and publishing' as seen in Figure1:

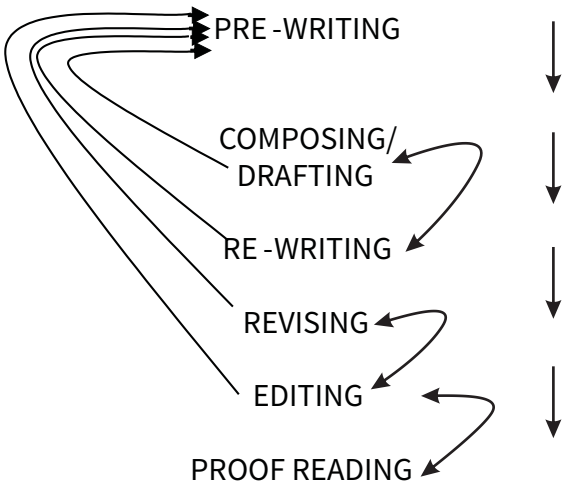

Fig 1: Adapted from: Raimes' Writing Process Model (1985, p.36)

As the figure shows, this model has the possibility of moving forward and backward in the process. Indeed, the researcher believes that writing does not follow a sequence of planning, organizing, writing, and then revising. It is, rather, a recursive process carried out in many necessary stages depending on the writer's needs reflected in accuracy of grammar.

Statement of the Problem

Researchers such as Reinking and Hart (1991, p. 84) and Raimes (2002), have argued that learning to write fluently and expressively, is the most difficult of the macro- skills for all language users, regardless of whether the language in question is the first, second or foreign language. In Nigeria, there are evidences of lack of creativity, clumsy expression, inadequate control and organization of content, poor spellings, general lack of cohesion and coherent devices in University students' works, as observed by Okoye (1994) and Adesanyo (1990). These challenges in the area of academic writing encountered by students are among the main factors contributing to the students' difficulties in producing academically sound assignments and dissertations. However, recent studies have found that, virtual-mediated learning will indeed, affect writing performance positively. This study is an attempt to bridge this gap. More so, there are only limited researches in Nigeria to date, that have explored the impact that virtual-learning may have on academic writing among students in tertiary institutions.

Purpose(s) of the Study

The purposes of this study are:

1. To assess the impact of using virtual-mediated process writing on year one undergraduate students' academic achievement in a Nigerian University.
2. To determine if the performance of male and female students will differ in written assignments in pre-test and post-test scores.

Research Hypotheses

1. There is no significant difference in mean post-test achievement scores of students exposed to virtual-mediated process writing and those not so exposed in a Nigerian University.

2. Gender is not a significant factor in writing skill achievement as measured by the students' post-test mean scores on virtual-mediated process writing.

Methodology

Research Design

The design of this study is the pre-test - post-test experimental design involving experimental and control groups in an intact class. The study sets out to assess the impact of virtual mediated process writing on year one undergraduate students writing performances.

Population of the study

The population of the study consisted of all year one undergraduates in Nigerian Universities for the 2013/14 academic session, in a private university affiliated with the University of London. The purpose for using the year one undergraduate students is because; it is the only level in which all students offer the compulsory Use of English language course. In view of the preliminary nature of the study, cost, time constraints and other logistics, the study targeted only one Nigerian University. The selection of this university was predicated on the fact that, the researcher was a part-time tutor in this University. Also, the geographical proximity to the researcher served as time-saving device.

Sample and Sampling Technique

A Pre-Expository Writing Achievement Test (PREWAT) was given to a total of all 250 students drawn from all course specializations, which included: Political Science, Economics, Business Administration, Law, Philosophy, International Relations, English, Industrial Relation and Sociology. The students were grouped into high, medium and low ability groups, based on scores obtained from the pre-test (viz: 60% and above = high, 45-59% = medium, below 45% = low). The 145 students who fell into the medium ability were made up of 75 females and 70 males. 40 students were drawn from each gender group at random to make up to 80 students as the sample of the study. Then the female and male samples were further classified into control and experimental groups using a random sampling technique. Consequently, we

had the control group made up of 20 females and 20 males, while there was also the same number of students in the experimental group. The ages of the participants ranged from 18-28 years and they were all from diverse multilingual backgrounds. All the students had moderate exposures to the computers.

Instruments for Data Collection

The data for this study were collected using two instruments, namely:

1. **Essay Tasks for Undergraduates (ETU)**
2. **Semi-Structured Interview (SSI)**

The Essay Task for Undergraduates (ETU)

The Essay Tasks were selected from Humanities GST 107 essay topics listed below:

1. The problems of democracy in Nigeria.
2. Petrol scarcity in Nigeria.
3. My favourite athlete.
4. Participating in sports helps to develop good character.
5. A dangerous experience.
6. Road accidents in Nigeria.
7. Cultism in Nigerian schools.
8. Should computer be taught in schools?
9. A surprise birthday party.
10. The effects of social networking sites.

These topics selected by the researcher covered four types of essays: persuasive, narrative, argumentative and descriptive essays, which are topical issues that will captivate students' interests.

A Semi-Structured Interview (SSI)

The undergraduate students for this study were further interviewed as a follow-up to their perceptions about virtual process essay writing. All the interviews were audio-recorded with Samsung Mobile phone and transcribed.

Transcribed statements were returned to participants for corrections. During the interview, the random sampled students interacted with the researcher for about 3-5 minutes. The interviews carried out by the researcher took place during the normal lecture periods. The following questions were used only as a guide:

a) Briefly describe how virtual-mediated process writing had motivated your writing skill in your course of study.
b) What did you enjoy most concerning the virtual-mediated process writing and why?
c) How had the virtual-mediated process writing challenged your interest in reading and writing?
d) What was your impression about the co-operation and collaboration that you experienced throughout the teaching period?
e) What was your most important experience throughout the period of teaching?

Validity and Reliability

The content and face validity of the written tasks and interview questions were ascertained by submitting the two instruments to two experts in English language. Several sessions of discussions were held with these experts to determine the suitability of the topics in terms of clarity, age level of the class, the diverse students' cultural backgrounds, academic levels, interests, current issues and time factor. Their comments and suggestions resulted in the reduction of the number of topics from 15 to 10. The interview questions were also subjected to content analysis to ensure that they capture the feelings, thoughts and experiences of the students.

Procedures

The procedures were in the five (5) phases by Raimes (1985) and it lasted for 12 weeks. Training of research assistants was for two weeks, administration of pre-test spanned one week, treatment was for ten weeks, while administration of post–test spanned one week. Two research assistants were trained. The research assistants were exposed to components of effective writing and organizing process writing strategies using the computer. After selecting the respondents, the first step taken to clear the way for the conduct of the research

and administration of the instruments was to give students an orientation about what virtual-learning is all about. During this period, the researcher tried to establish a rapport with the students and get them mentally set to receive the exercise. Various discussions were held relating to the use of computer, the Internet, e-learning and the use of English generally. The essence was to pass across to the students very clearly the objective of the intervention. The students were thus psychologically prepared for the subsequent weeks' work. A date was fixed for starting the intervention. The Head of Department and Coordinator of the Use of English programme were also intimated about the need for the research. After very useful discussions were held, the researcher was given the actual date the research should start.

The Pre-Test

A Pre-Expository Writing Achievement Test (PREWAT) was given to both the control and experimental groups. The essay titled: 'The Problems of Democracy in Nigeria' was aimed to establish the fact that students were initially at the same level of knowledge before the treatment was given. While the control group continued with the conventional mode of writing the assignments, the experimental group was exposed to the treatment package. This group of subjects closely resembles the treatment group in many demographic variables but not receiving active treatment under study and therefore served as a comparison group when treatment results are evaluated.

Treatment Package

The treatment was broken down into the five stages of the writing process adapted from Christopherson (2002, p. 41): 1) Pre-writing 2) Drafting 3) Re-writing, Revision, Editing 4) Proof-reading and 5) Publishing. The students were told what the exercise was all about and what was expected of them. While the experimental group did literature search online, the control group was taught with traditional method of lectures and they also did literature search from the library.

Stage I: Pre-writing

The pre-writing stage involved the stimulation of students' creativities, to get them thinking how to approach a writing topic. In this stage, the most important thing is the flow of ideas not necessarily producing actual written work. The learners were divided into small cooperative groups of five each and they were involved in planning and activities before writing took place. At this

point, the students were encouraged to do surfing and searching the web for information, rapid free reading, and random transfer of information from internet to word document, teleconferencing with members of their group and the use of email to send drafts of their ideas to the researchers for correction and feedback. Such activities include: group brainstorming, comparing, associating discussions, arguing, questioning, and exchanging views, before the actual writing. The researcher's promptings helped them to develop great ideas concerning the topic: "The Problems of Democracy in Nigeria" and they were told to scribble them quickly on the word document without arranging or worrying about correct language or punctuation.

Next, students were taught how to outline, organize and order their ideas. The students were also encouraged to cluster the listed ideas into groups that represent similar ideas called "looping" and this helped to focus and organize their points. All the ideas generated are imputed in each computer and saved without arranging them in any other. With the assistance of the researchers, students were asked to loop all related ideas together, while the irrelevant ones were struck out. These looped and joined points were to form the basic paragraphs. Every student, both active and passive ones, excitedly participated in the looping, and the collaboration was especially powerful as it involved other skills (speaking, in particular).

Stage II: Drafting

During this stage, students wrote down their ideas on the document without much attention to the accuracy of their works or organizations. The researchers explained to the students that the most important feature is meaning hence, they should concentrate on the content of the writing. They were told that the draft does not mean that what is written is final; hence, it was expected to be sloppy and full of errors.

Stage III: Re-writing, Revision and Editing

During this stage, students were told to focus more on form and on producing a good piece of work that is readable. They were encouraged to print their essays, exchange with one another and critic their writings. They were guided at this critical stage to be patient in editing their works in the system, by self-checking for errors such as technical correctness of their writings. The researchers assisted the students with organizational pieces of advice, paying special attention to surface features of writing such as: spelling, punctuation, commas, capitalization, full stops, sentences and word choice. The students were also

guided to cut paragraphs and paste in another page, delete some words or substitute them. Students were observed to be very involved at this stage through sharing, collaborating, reflecting and discussing. Writing at this stage was viewed as a process workshop. This stage took a lot of students' concentration and time as a good writer must learn how to evaluate their own language. This way, students will become better writers.

Stage IV: Proofreading

In this stage, students were asked to take a second look at their essays and re-read them with a fresh insight. They were instructed to engage in careful line-by-line readings on the system, concentrating on the most important paragraphs before the final draft. To help students focus attention at this stage, the researcher repeated the revision checklist once again, as the texts are interchanged and the evaluation is done by other students.

Stage V: Publishing

After the proof-reading stage, students were invited to print and share their writings with one another and celebrate their works. This involved reading aloud sessions, display of finished pieces on their notice boards, creation of a book, or class-produced newspapers and magazines. The researcher provided a supportive environment for the students by being very patient and providing positive comments that helped to build students' confidence and create good feeling for the next writing class.

Post-test

All through the 12 weeks, the treatment group and the control group wrote 10 essays – one for pre-test, eight during treatment and equivalent one for the post-test. At the end of twelve weeks, the researcher with the assistants administered a Post-Expository Writing Achievement Test (POSWAT) to both experimental and control groups. Students in the experimental group were expected to answer all the questions, based on the knowledge gained during the intervention. The evaluation of the test items were based on the following criteria: Content Organization, Expression and Mechanical Accuracy. Although the course was not required for any credit or degree, learners were fully committed to all their activities. They were fully committed to it and they never missed a session.

As one learner put it, "for me, mastering writing skill is a matter of life and death. I am planning to work as a speech writer".

Analysis of Data

Analysis of data was carried out using Arithmetic Mean, Standard Deviation and students' T-test. Pre-test and Post-test scores obtained by students in both the control and experimental groups were analyzed and presented in tables. The two null hypotheses formulated for this study were tested using t-test statistic at 5% level of significance.

Results

Table 1: T-test of Differences in the Pre-test and Post-test Mean Scores of Control and Experimental Groups

Group	TEST	N	MEAN	S.D	t-cal	Remark
CONTROL	Pre-test	40	48.33	4.593	0.027	ns
	Post-test	40	50.4	5.913		
EXPERIMENTAL	Pre-test	40	49.83	4.101	4.26	S
	Post-test	40	66.8	5.336		

Table 1 shows that there is no significance difference between the pre-test and post-test scores of the control group at 5% level of significance, because t-calculated = 0.027 is less than critical t-value - 1.98. this is further shown by mean gain of 2.07 between the pre-test and post-test mean scores of the control group. Table 1 also shows that pre-test and post-test mean scores of the experimental group are respectively 49.83 and 66.8 depicting a mean gain of 16.97. Experimental group calculated t -value is 4.26 while the critical t-cal is 1.98 is approximately at df = 78 at 5%level of significance. It therefore, implies that a significance difference exists between pre-test and post-test mean scores since tcal>ttab. The students in the experimental group performed better in written assignments after exposure to Virtual-Mediated Process course.

Table 2: T-Test of Difference in the Post-test Mean Scores of Control and Experimental Groups.

Group	N	MEA N	S.D	T	Remark
Control	40	50.4	5.913	7.48	Significant
Experimental	40	66.8	5.336		

The results in Table 2 were used to test hypothesis 1.

Table 2, showed tcal = 7.48 > ttab = 1.98 at 5% level of significance, where df = 78. Hence, we reject null hypothesis 1. It implies that significant difference exists in the performance of students exposed to Virtual-Mediated Process Course in written assignments. The control group recorded a mean score of 50.4, while the experimental group had a mean score of 66.8, indicating a difference of 16.4 which increases by the experimental group over the control group that was taught with the conventional method.

Table 3: Comparison by Gender of the Performances of Students exposed to Virtual-Mediated Process Course

		PRE -TEST		POST -TEST			
Gender	N	MEAN	S.D	MEAN	S.D	T	Remark
Female	20	50.41	3.53	69.9	4.962	0.00	not significant
Male	20	49.25	4.621	63.7	3.686		

The results in Table 3 were used to test hypothesis 2. T-test was used on the mean scores of the post-test of the experimental group that were exposed to the Virtual-Mediated Process Course.

Table 3 shows that tcal = 0.00 is less than critical value of 2.02 at 5%level of significance, where df = 38. Hence, we accept null hypothesis 2, which implies that there is no significant difference in the performance of female and male students in virtual-mediated process course in written assignments. Pre-test and post-test mean scores of the female students exposed to virtual-mediated process course in written assignments were 50.41 and 69.9 respectively. This gives a mean gain of 19.49 for the females in the experimental group. For the male students, in the experimental group, pre-test and post-test mean scores were 49.25 and 63.7 respectively. In the mean gain of both sexes, we observed

that the female students in the experimental group were fairly better than their counterparts in written assignments though the gap was not high for it to be significant. The standard deviation scores of both sexes in the pre-test and post-test are within the range 3.5 and 4.96, which showed that the performance of the students are not far from each other within each group, which must have resulted from the fact that the students belong to same ability group. It can, therefore, be concluded that the virtual-mediated process course has similar positive impact on the performance of both female and male students in written assignments. Interview Responses

Trends of some interview responses are presented below:

a. *Virtual-mediated process writing helped me in organizing and patterning my writing much better.*
b. *Process writing gave me a scholarly base which helps one to capture the aim of what he or she wants to write before developing it.*
c. *Process writing gave sequencing and coherence to one's writing. It is therefore much better than traditional writing that focuses on the end product only.*

Discussion

Analyses of the study have shown that, virtual-mediated process writing could be used to increase written communication, level of motivation, creativeness and collaboration towards learning. This finding is in line with Olaofe's (1992) assertion that the new virtual-mediated strategy can improve the low students' academic achievements. Also, the virtual-mediated process writing added a spark of excitement to classroom activities and high academic achievement, as shown on Tables I and II. Furthermore, the virtual writing gave opportunities to individual differences and slow learners to engage in listening, speaking, reading, writing and thinking as well as making decisions and solving problems. The results further corroborated the studies by Warschauer (1996) and UNESCO (2003) that the potentials of technology in enhancing curriculum delivery education can only be realized when they have been well domesticated in institutions.

Additionally, the study revealed that questioning techniques personally, involved students to respond in a way that reflected their cultural diversity, as students 'traded places' with fellow students from different cohorts and diverse linguistic backgrounds. The co-operative learning groups were found to have strong and consistent positive effects on social relationships as group

discussions stimulated thinking, imagination, use of initiative and flexibility in learning. Group members became more accepting of classmates who are Yoruba, Igbo, Hausa, Niger-Delta, Ijaw, Igala, Tiv, Edo, amongst others. The balanced approach encouraged students to think strategically and learn how to solve problems they encountered while writing. It would, hopefully, provide the arena in which cohesive relationships will be formed among strangers from diverse Nigerian multi-linguistic backgrounds, cultures, values and beliefs.

In addition, findings show that, peer interactions pre-dominated the learning process. The socio-psychological dimension of sharing, exchanging and helping one another became critical for the success with technology. The prevalence of small group work in this technology-infused classroom corroborates Vygotsky's (1978) emphasis on the importance of social interaction for learning in higher education. Finding revealed that through virtual learning, interaction was encouraged at every level in the classroom, local, state, national and international fora. Furthermore, while virtual-mediated process writing seemed to motivate and engage both gender, the results show that the female students in the experimental group did fairly better than their counterparts in written assignments, though the gaps was not so high for it to be significant (see table III). This finding seemingly refutes Raimes' (1983) conclusion that the use of language is socially constructed and depends on the situation where discourse takes place.

Interestingly though, the findings depicted some of the usual disciplinary and control issues among students; consequently, a request was made to some of them to stop bothering the others. The researcher also had to be particularly alert to the pairs and groups of students who were forming clicks or not functioning well together. By implication, the researcher became the model, coach, facilitator and yet, faded away sometimes in order to promote students' independent works. If there was ever a need for good writing skill in English, it has become more imperative and pressing with the increasing global communication. It is important to teach students how to write in second language, but it is equally more important to consider virtual-process writing as a significant tool for academic improvement.

Conclusion

In conclusion, the introduction of virtual-mediated process writing strategy in Nigeria ESL classroom is feasible and worthy. The findings of the study have confirmed that virtual-mediated learning is indeed, an appropriate, powerful and strategic tool for improving university students' achievement in good

writing. The process necessary for good writing can start with pre-writing and be maintained through technological parts to a polished end. There is need for embracing flexibility, openness to change, innovativeness and the influences from e-learning technologies – mediated as an inescapable reality.

Finally, Busari (2006) reminds us that:
An average University student whose access to computer is very limited would surely be limited in intensity, scope and innovation. Educational technology centers must create the awareness of their roles and offer opportunities to students. The archaic gadgets, filling and slides must be modernized creatively to meet the current needs of University programmes (p.123).

In other words, the usage of technology still needs the consideration of other related factors such as financial support, the hardware and software supply, overpopulated classrooms, space, materials and equipment reserves, erratic electricity supply, time essence, technical assistance for teachers and the basic skills in using computers by students. Anyone who wants to use virtual - mediated instruction for higher education, should consider carefully all the above factors.

Recommendations

To incorporate the potential contributions of virtual-mediated process writing towards the Internalization of Higher Education in Africa therefore, the following are recommended:

1 Higher Education institutions in Africa should adopt the virtual-mediated process writing across borders and language groups as a means of addressing quality assurance in teaching and learning in Africa. More importantly, the virtual writing will afford individual learners the opportunity to redress the challenges of communicability and fluency in writing tasks throughout higher institutions in Africa.

2 The process mediated writing strategy, if adopted fully in Higher Education institutions in Africa, will help promote learners' initiatives and afford exciting opportunities for effective collaboration and co-operation in writing projects across geographic locations..

3 Many word-processing programmes are user-friendly enough for students to handle. The lecturer can, therefore, teach responding or editing skills

via the computer hooked on an overhead projector. Any work done can be saved on the computer for revision later.

4 University administrators need to concentrate on acquiring equipment and technical assistance for their lecturers. Identifying resources, whether through networking, grant opportunities or budgetary requests, collaboration and inter-linkages with other African universities should always be on the administrators' minds.

5 University administrators need to offer professional development opportunities that include coursework, hand-on presentations, tutoring, mentoring and coaching. Professional development needs of lecturers should be systematic and continuous, so that teachers would have experiences with practical and innovative applications of virtual reality in other African countries.

6 Lecturers in Higher Education in Africa need time to work with technology. Maybe, they would need compulsory designated time slots (at least one hour a week) to be called "techno hour" allotted for working individually or with students to prepare tools and materials with technology in all disciplines.

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PAPER

The West Africa Centre for Crop Improvement (WACCI), University of Ghana:

AN EMERGING CENTRE OF EXCELLENCE FOR TRAINING PLANT BREEDERS IN AFRICA

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Abstract

Africa needs skilled human resources to utilize advanced technologies in the development of superior varieties of staple crops for increased productivity per unit area. The West Africa Centre for Crop Improvement (WACCI) was established in 2007 at the University of Ghana (UG) to train plant breeders who will develop superior varieties of food security crops to spark a green revolution in sub-Saharan Africa (SSA). The concept of training plant breeders in Africa for Africa at WACCI was conceived out of a partnership between the UG and Cornell University, USA with initial funding from the Alliance for a Green Revolution in Africa (AGRA). WACCI runs an innovative 4-year PhD

programme focused on training plant breeders working on African crops in their local environments. To effectively and efficiently offer quality training, WACCI established collaborative links with the National Agricultural Research Institutions (NARIs) in the sub-region, the Consultative Group on International Agricultural Research (CGIAR) Centres and Universities locally and internationally as well as donor agencies. At WACCI, students undertake one year of coursework at the UG. WACCI students have electronic access to Albert R. Mann Library at Cornell University. Students from French speaking countries undertake a pre-enrollment eight-week intensive English language proficiency course, run by the Language Centre of UG, which continues throughout the first year. The students proceed to their home institutions where they carry out their thesis research under the supervision of in-country supervisors and UG academics over three years. Since inception, WACCI has enrolled 82 PhD students from 12 West, East and Central African countries and has graduated 18 highly qualified and competent plant breeders. As a result of the outcome of students' PhD research projects, national crop improvement programmes have been revived in the sub-region. WACCI graduates have demonstrated the value of quality plant breeding education in the region and made the WACCI programme a model for SSA and beyond. A classical example is Dr. Mamadou Mory Coulibaly, at the 'Institut d'Economie Rurale' (IER), Mali, a WACCI graduate who has developed three yellow maize varieties due for release in 2015. There are other numerous success stories demonstrating that graduates from the WACCI programme have contributed to and will continue to contribute towards enhanced regional food security through the delivery of superior crop varieties and hybrids that meet the needs of farmers and other stakeholders in each crop's value chain. The financial investments in WACCI have been enormous but the benefits have far outweighed the investments. Universities in SSA are encouraged to create environments conducive for the establishment of Centres of Excellence and governments are advised to increase investments for quality higher education especially, in the area of science for accelerated development.

Resumé

La résolution des problèmes alimentaires et nutritionnels en Afrique subsaharienne (ASS) où environ 214.1 millions de personnes souffrent de la faim et de la malnutrition chronique demeure un défi majeur à cause du financement inadéquat de l'agriculture par les gouvernements africains. L'agriculture, qui devrait être le moteur de la croissance économique et du développement en ASS, est essentiellement caractérisée par de petits exploitants pratiquant une agriculture de

subsistance et utilisant des variétés de cultures vivrières à faible rendement et peu d'apports externes. Ceci entraîne une faible productivité agricole. La menace de l'insécurité alimentaire est aggravée par les taux élevés de croissance de la population, la détérioration des sols, le manque d'eau et le changement climatique qui exercent des pressions sans précédentes sur les systèmes d'approvisionnement alimentaire. Les données montrent que l'insécurité alimentaire est un problème chronique qui s'aggravera durant les prochaines décennies. Les investissements dans la recherche agricole durant les dernières décennies ont entraîné l'émergence de technologies et de techniques innovantes dont l'adoption par l'Afrique pourra révolutionner le secteur agricole, contribuer à l'augmentation de la productivité, la réduction de la pauvreté, la sécurité alimentaire et produire des retombées sur d'autres secteurs des économies africaines.

L'une des principales approches à adopter d'urgence pour résoudre le problème de sous-productivité du secteur agricole est le renforcement des établissements d'enseignement supérieur et la formation d'une nouvelle génération de scientifiques et de technologistes nécessaires pour provoquer une révolution verte en Afrique. En ce qui concerne la production agricole durable, il est nécessaire de développer la capacité de sélection des plantes et de mettre en place des stratégies globales de sélection végétale qui incluront les méthodes traditionnelles de sélection végétale et les principaux nouveaux outils génomiques permettant d'accélérer le développement de meilleures variétés de cultures vivrières ayant de meilleurs rendements, des valeurs nutritionnelles plus élevées et plus résistantes aux stress abiotiques et biotiques. Ainsi, la région a besoin de phytogénéticiens, de scientifiques des semences et de technologistes locaux compétents qui ont été formés dans leurs environnements de travail par les programmes nationaux d'amélioration des plantes de leur pays d'origine. C'est pour répondre à ce manque apparent de phytogénéticiens en Afrique de l'Ouest et du Centre que le Centre Ouest Africain pour l'Amélioration des Cultures (WACCI) a été créé en 2007 à l'Université du Ghana grâce au financement de l'Alliance pour une révolution verte en Afrique (AGRA).

Le centre WACCI offre un programme de Doctorat de quatre ans axé sur la formation des phytogénéticiens opérant sur les cultures africaines dans leurs environnements locaux. Le centre WACCI a noué des liens de collaboration avec les universités et les Instituts nationaux de recherche agricoles (NARI) de la sous-région et avec le Groupe consultatif pour la recherche agricole internationale (GCRAI) afin d'assurer la rétention et la création d'un réseau de phytogénéticiens formés pour renforcer les programmes nationaux de sélection des plantes dans toute la sous-région. Dans le cadre du programme de WACCI, les étudiants suivent

un cours complet d'un an à l'Université du Ghana avant de retourner dans leurs institutions nationales (les différentes NARI et autres centres de recherche) où des superviseurs nationaux les encadrent pour leur recherche de thèse de trois ans. Le centre WACCI poursuit sa supervision grâce à des visites régulières et aux communications en ligne. Durant le dernier trimestre de la quatrième année, les étudiants retournent à l'Université du Ghana pour la rédaction et la soumission de leur thèse de Doctorat. Afin d'assurer un apprentissage effectif, les étudiants ont accès à tous les documents à lire dans une bibliothèque de référence du centre. Ils ont également accès à la bibliothèque virtuelle Albert R. Mann de l'Université de Cornell qui est un partenaire collaborateur depuis le lancement du projet. Les publications et autres matériels de lecture qui ne sont pas disponibles en ligne peuvent être obtenus grâce à un système de prêt inter-bibliothécaire avec l'Université Cornell. Les étudiants ont également accès à la Bibliothèque agronomique fondamentale virtuelle (TEEAL) et à la bibliothèque du système de recherche mondiale en ligne sur l'agriculture (AGORA). Les cours sont donnés en Anglais. Les étudiants francophones sont préalablement inscrits à des cours intensifs d'Anglais au Centre des Langues de l'Université du Ghana. Durant la première année de formation à WACCI, ils suivent des cours intensifs d'Anglais visant à leur permettre d'acquérir les connaissances et les compétences requises pour les communications scientifiques. WACCI possède une ferme modèle qui lui sert de plateforme pour la formation pratique en sélection des plantes. Des programmes de sélection du maïs, du niébé et du sorgho servent de centres de pratique pour donner une formation pratique de qualité aux étudiants.

Depuis son lancement, WACCI a accueilli 82 doctorants en provenance de onze (11) pays d'Afrique de l'Ouest, de l'Est et du Centre, et a produit dix-huit docteurs hautement qualifiés, compétents et très motivés. Les résultats des projets de recherche des doctorants ont permis de ressusciter les programmes de sélection des cultures dans leurs pays respectifs. Ces résultats sont la preuve de la valeur de la formation sur la sélection des plantes dans la région et ont fait de WACCI un modèle dans la sous-région et au-delà. Par exemple, au Niger, Ahmadu Issaka, un diplômé du centre et chercheur scientifique à l'Institut National de la Recherche Agronomique du Niger (INRAN), a créé une souche de millet perlé à stérilité cytoplasmique mâle, qui a permis de développer des variétés hybrides à rendement élevé et résistantes aux maladies. AGRA lui a octroyé une subvention de 184.984 dollars américains pour développer des variétés hybrides pour les agriculteurs. Toujours au Niger, Aissata Mamadou, une diplômée de WACCI, a été nommée Responsable du Programme d'Amélioration du Sorgho à INRAN et a reçu une subvention de 130.000 dollars américains pour créer des variétés hybrides stables et à rendement élevé pour les agriculteurs à faibles ressources. Mamadou

Coulibaly, un diplômé malien du centre à l'Institut d'Economie Rurale (IER) a développé des variétés hybrides de maïs ayant une maturité précoce, à rendement élevé, résistantes à la sécheresse et adaptées aux conditions de culture au Mali. Ces variétés hybrides sont les toutes premières à être développées exclusivement au Mali. Il a obtenu récemment une subvention de 191.800 dollars américains pour poursuivre ses travaux. Au Nigeria, un autre diplômé du centre WACCI, Moses Adebayo, enseignant à l'Université de Lakode Akintola a obtenu une subvention de 178.450 dollars américains pour créer des variétés hybrides de maïs résistantes à la sécheresse et à rendement élevé pour les zones où sévit la sécheresse au Nigeria. Plusieurs diplômés de WACCI sont en train d'exceller dans différents programmes nationaux de recherche dans toute la sous-région et plusieurs publications de bonne qualité ont été faites sur la base de leurs travaux de thèse. Sur la base des tendances et prévisions actuelles, le centre WACCI devrait produire environs 132 docteurs sélectionneurs d'ici 2020. Le programme du centre WACCI est une solution au syndrome de la fuite des cerveaux associée à la formation des scientifiques africains à l'étranger et il veille à ce que les diplômés formés dans leur pays reçoivent l'encouragement dont ils ont besoin de la part de leurs institutions en poursuivant leur recherche immédiatement après leur remise de diplôme. Ces diplômés devraient promouvoir le développement de variétés améliorées requises urgemment sur le terrain afin de lancer la Révolution verte en Afrique.

Le succès de WACCI est dû en partie à son réseau d'enseignants et de personnel engagé ainsi qu'aux partenariats établis avec des institutions de renoms qui permettent au Centre de tirer profit de l'expertise des scientifiques de niveau international tout en se donnant la visibilité dont il a besoin. La visibilité et l'excellence acquises par le centre WACCI durant toutes ces années ont encouragé un certain nombre de bailleurs à financer le projet qui n'est plus un centre financé par un seul bailleur mais un programme financé par plusieurs donateurs. En plus des 11 millions de dollars américains initiaux octroyés par AGRA, WACCI a reçu environ 3 millions de dollars de plusieurs autres bailleurs. L'Association des Universités Africaines a récemment choisi WACCI comme l'un des 19 Centres d'Excellence Africains à recevoir 8 millions de dollars octroyés par la Banque Mondiale dans le cadre d'une subvention pour soutenir des projets visant à transformer WACCI en un Centre d'excellence durable offrant une formation excellente aux phytogénéticiens et scientifiques des semences.

Il faut saluer l'audace d'AGRA qui a lancé ce programme de Doctorat innovant qui a acquis une renommée internationale. Il faut espérer que les gouvernements africains auront la volonté politique pour investir dans les initiatives agricoles de l'enseignement supérieur afin d'accélérer le développement des économies

africaines. Si l'agriculture échoue, tout échouera. "C'est notre objectif le plus noble car elle contribuera à la production d'une vraie richesse, une bonne morale et au bonheur", Thomas Jefferson.

Context

Food security is a major challenge, which is worsening due to several complicating factors including deteriorating soils, water scarcity, the use of low yielding varieties and low input farming. The food insecurity menace is further aggravated by high population growth rates and climate change that are putting pressures on food supply systems on a scale previously un-encountered. It has been documented that the yields of food crops of the sub-Saharan Africa (SSA) are the lowest in the world. This is because resource poor farmers who account for 80% of food production rely on cultivated varieties most of which are low yielding (FARA, 2006). The International Fund for Agricultural Development (IFAD) has argued that if smallholder farmers were empowered through the delivery of improved varieties with inbuilt resilience to abiotic and biotic stresses, food security will be enhanced in SSA (Nwanze, 2011).

In the globalized world of today, the key to sustained economic growth increasingly depends on how efficiently a nation can effectively use its human resources to gain and utilize the available knowledge to build comparative advantage for development in selected sectors of the economy. Throughout history, sustained increases in agricultural productivity have largely stemmed from the introduction of seeds of improved, locally adapted varieties. One example is how Brazil transformed its agriculture following the development and use of improved varieties accompanied by the use of modern methods of farming. These achievements were made possible through sustained human capital development; the training of over 1000 agricultural scientists in the 1960s and 500 PhDs by the Brazilian Agricultural Research Enterprise (EMBRAPA) in the 1970s) (World Bank, 2007). Aggressive human capital developments for the Agricultural sector have paid long-term dividends in Brazil, India, Thailand, Argentina and Malaysia among other countries.

In SSA, it has long been established that the human resource pool needed for the development of new improved varieties to address food and nutritional insecurity in the sub-region is severely depleted, yet only lip service has been paid by governments to quality tertiary education. SSA has diverse agro-

ecologies with significant variations in altitude, day-length, rainfall, temperature and soil conditions, each requiring radically different crop varieties and/or crops. Also, the diversity of cultures in Africa demands breeding for different traits for each staple crop. A way of assessing the current needs of plant breeders in West Africa is to estimate that there should be at least a trained breeder for each of the 4 agro-ecological zones in each country for each of the 11 major food security crops: maize, sorghum, millet, rice, cassava, sweet potato, cowpea, groundnuts, soya bean, tomatoes and pepper. Based on the Food and Agricultural Organization (FAO) survey data from Africa, the number of plant breeders has increased in some countries since 1985, but the current numbers in many countries are still below the critical level (Guimarães et al., 2006). If we consider the 13 World Bank partner countries in the West Africa sub-region namely Benin, Burkina Faso, Cote d'Ivoire, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, The Gambia and Togo, about 572 breeders are needed (13 countries x 4 agro-ecological zones x 11 crops = 572). There are fewer that 100 plant breeders in these countries according to an AGRA field survey (personal comm. Joe DeVries). The evidence to date indicates that the majority of the available plant breeders are near retirement or do not have the requisite knowledge and skills in modern methods of plant breeding to facilitate efficient and effective development of climate-smart and nutritious varieties of staple crops needed for food security in West Africa. This calls for the training of a new generation of plant breeders.

The majority of plant breeders in the sub-region were trained in universities in North America, Europe, Oceania and Asia, most of whom did not return home after completion of their programmes. The few who returned took some time to understand the biology and genetics of the crops they worked on. The majority of the returnees worked on crops exotic to African environments. Africa therefore needs its own Centres of Excellence to train the next generation of plant breeders. It is these breeders who will develop innovative technologies to revolutionise the agricultural sector. Accelerating economic growth in the SSA will require huge investments in higher education and training of a new generation of scientists.

Establishment of the West Africa Centre for Crop Improvement (WACCI)

The WACCI concept was conceived in 2005 out of discussions that Professor Eric Yirenkyi Danquah [(then Dean of International Programmes, University of

Ghana (UG)] and Professor Kwame Offei (then Dean of College of Agriculture and Consumer Sciences, UG) held at Cornell University with Professor Ronnie Coffman (Director of International Programs, College of Agriculture and Life Sciences, Cornell University) to establish a Centre at the University of Ghana modeled after the African Centre for Crop Improvement (ACCI) at the University of KwaZulu-Natal, South Africa. In parallel, the Rockefeller Foundation commissioned Dr. Eugene Terry, the founding Director of the West Africa Rice Development Association (now AfricaRice) to conduct a scoping study on a suitable location for a Centre for graduate plant breeding education similar to the ACCI in West Africa. Dr. Terry assessed five universities in West Africa in 2006 and concluded that the University of Ghana was the most suitable to host such a Centre. The Programme for a Green Revolution in Africa (ProGRA), now called the Alliance for a Green Revolution in Africa (AGRA) then commissioned a team to develop a proposal for the establishment of the WACCI at the UG. In February 2007, the University of Ghana team led by Professor Eric Yirenkyi Danquah as the Principal Investigator submitted a proposal to ProGRA for the training of 40 plant breeders for the West African sub-region over a 10-year period. The UG and Cornell University received project support grants from ProGRA in June 2007 to establish WACCI and enroll five cohorts of eight students each year over the first five years of the programme. Administratively, the Council of the UG approved WACCI as a semi-autonomous Centre with financial autonomy in the School of Agriculture in October 2009. Under the new collegiate system, which commenced in August 2014, WACCI is now one of the constituent units of the College of Basic and Applied Sciences (CBAS) and has constituted its Management Committee.

The Emergence of WACCI as a Centre of Excellence in Training Plant Breeders

At the end of the first five years of training plant breeders at WACCI, AGRA extended support for the enrollment of 13 additional students (eight in January 2013 and five in January 2014) into the PhD programme. An additional 29 students were enrolled through country/collaborative projects between 2013-2015. Currently, WACCI has enrolled 82 students from 12 African countries (Figure 1) and has graduated 18 from two successive cohorts in 2013 and 2014. A third cohort of 10 students is expected to graduate in July 2015. WACCI has grown from a single donor supported project into a multi-donor funded programme (Table 1). The Centre has attracted about USD 4.1 million from multiple donors in addition to the initial grant of USD 11 million from AGRA. Recently, following an open, competitive and merit based process, WACCI was selected as one of 19 African Centres of Excellence (ACE) by the Association of African Universities (AAU) to receive USD 8 million from the World Bank as a project support grant from 2015 - 2018.

The WACCI PhD Training Programme

The WACCI PhD programme is a 4-year innovative curriculum focused on training plant breeders addressing African farmers' crop production problems on African priority crops in their local environments. In the first year, students are taught and evaluated through continuous assessment and examinations on foundation courses and advanced modules on special topics in plant breeding, genetics, biometry, biotechnology, bioinformatics and related subjects at the WACCI. UG faculty and external guest lecturers teach these foundation courses. In addition, experts from the NARS, CGIAR Centres and other advanced institutions worldwide deliver advanced modules on special topics. WACCI also operates a model farm on campus, which serves as a platform for practical plant breeding training. Maize, cowpea and sorghum breeding programmes currently serve as practical hubs for delivering quality practical training to students and the development and release of improved varieties.

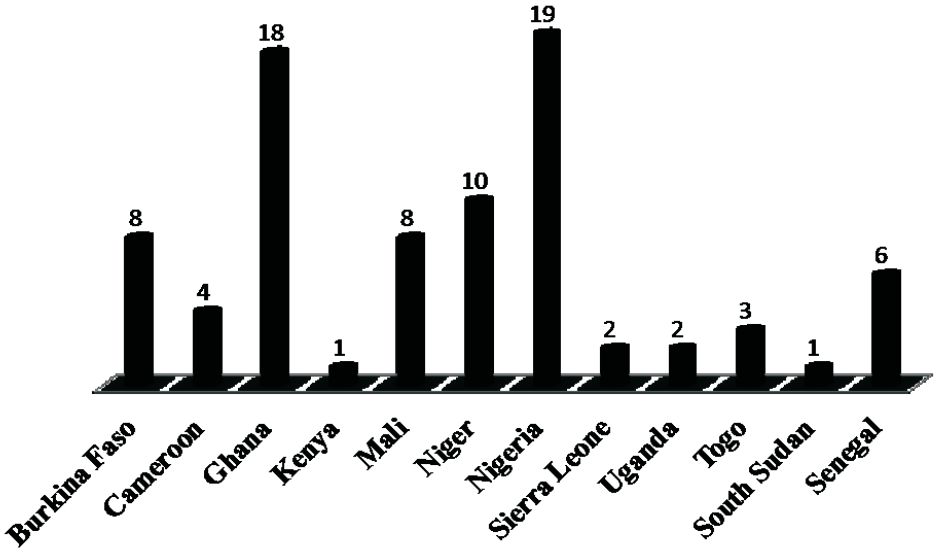

Figure 3: Expected number of WACCI trained Plant Breeders per country by 2018

Table 1: Committed funds (USD) to the WACCI project, 2007 to 2015

DONOR	COMMITTED (USD $)	RECEIVED (USD $)
AGRA	11,175,854	9,767,482
GCP	667,054	667,054
VW Foundation	90,960	90,960
Kirkhouse Trust	151,481	72,840
WAAPP	1,625,270	520,661
Purdue University	95,040	73,637
Purdue SMIL	277,992	68,908
Cornell NextGen	502,961	111,115
EU I NTRA ACP Mobility	196,630	59,225.06
ICRISAT DC	150,000	50,000
University of Jos	133,686	9,042
SFSA	133,686	29,183
AGRA SSTP	75,000	18,917
DAAD	311,360	98,310
World Bank ACE	8,000,000	-
USAID	735,000	-
UQ Demand-Led Variety Design	195,000	-
Total	**24,516,975**	**11,637,334**

At WACCI, students have access to all reading lists in a reference library at UG, TEEAL and AGORA for effective learning and also have electronic access to the Albert R. Mann Library at Cornell University. The curriculum is delivered in English; therefore, Francophone students undertake a pre-enrollment eight-week intensive English language proficiency course, run by the Language Centre of UG, which continues throughout the first year. After the first year, the students proceed to their home institutions (the various NARIs and other research centers) where they conduct their PhD research to address specific national priority crop production problems (e.g. poor yields, nutrient use inefficiencies, droughts, pests & diseases and nutritional & food quality improvement) (Figure 2) in partnership with farmers using conventional and new approaches in plant breeding. The students' research projects are closely supervised by in-country supervisors and UG faculty for 3 years. UG faculty continue supervision through regular visits and online communication. The students return to UG in the last quarter of the fourth year to write and submit their PhD theses for examination.

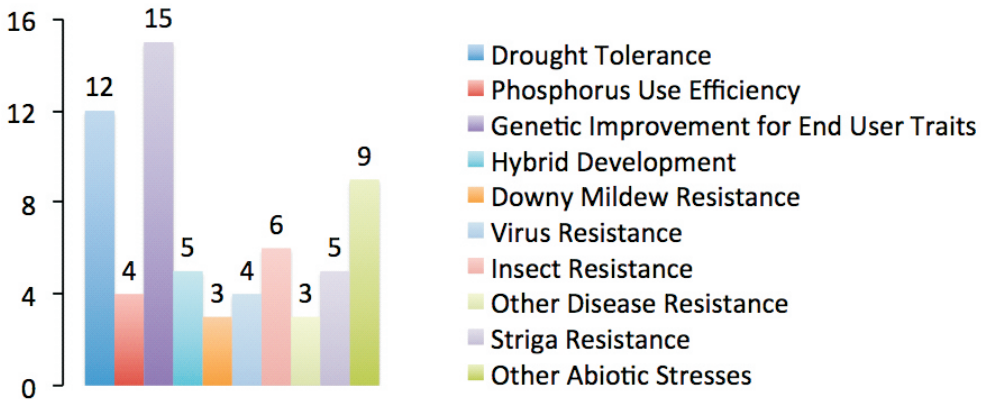

Figure 2: Thesis research area of students enrolled at WACCI

Strategic Partnerships and Collaborations

Partnerships and collaborations are key instruments through which WACCI was established and hence the life of the Centre is sustained by these activities. The Centre maintains partnerships with donors/international projects for funds (over 24 million dollars raised from multiple donors, Table 1); national, regional and international research institutes for students research work, leading experts for advanced module delivery and the development of collaborative projects; and seed companies for commercialization of improved varieties. For instance through WACCI's partnerships faculty from Cornell University and other major universities participate in the development and delivery of advanced modules. Also, an experienced plant breeder from Cornell University spends about 100 days in a year at WACCI teaching and mentoring students. WACCI has also partnered with Cornell University under the "NextGen Cassava Breeding Project", in which three PhD students from Nigeria and Uganda are being trained in plant breeding at WACCI. Through a special agreement, the Generation Challenge Programme (GCP) of the Consultative Group of International Agriculture Research (CGIAR) awarded full-cost PhD scholarships to four students to train at WACCI and also assisted three cohorts of WACCI students to use molecular markers to genotype their varieties under selection using the genotyping platform of LGC Genomics, UK and ICRISAT, India. WACCI has also signed memoranda of understanding (MoU) with over 20 National Agricultural Research Institutes (NARIs), the Biosciences of eastern and central Africa (BecA), International Institute of Tropical Agriculture (IITA) and the International Crops Research Institute for the Semi-

Arid Tropics (ICRISAT) of the Consultative Group on International Agricultural Research (CGIAR). Under the agreements, WACCI students undertake their theses research under in-country supervision in their home institution or International Centres. In August 2013, WACCI and Purdue University secured a grant support of USD 1 million from the Bill and Melinda Gates Foundation (BMGF) to develop a functional gene discovery platform for sorghum improvement. As part of the project, two joint workshops have been organized under the leadership of WACCI to equip students with knowledge and skills in genomics and bioinformatics for crop improvement. Other donors (e.g. Kirkhouse Foundation, UK and the VW Foundation, Germany) have contributed to the running of workshops in the area of biotechnology. These workshops have been coordinated by WACCI and a number of world-class scientists have participated as instructors.

Outputs and outcomes of the PhD training programme

The outcomes of students' PhD research projects that are primarily focused on key food security crops across the sub-region (Figure 3) are testament to the value of excellent plant breeding education in the sub-region and made WACCI a model for SSA and beyond. The Excellence of WACCI has been acknowledged by the Chicago Council on Global Affairs in two reports “Renewing American Leadership in the fight against global hunger and poverty”, and “Advancing Global Food Security: The power of Science, Trade and Business” published in 2009 and 2013 respectively, as a model which must be replicated in Africa and South East Asia. WACCI and AGRA are together changing plant breeding paradigms at national levels within the SSA, which will pay dividends for generations to come. Crop improvement programmes have been revived in many of the students' home countries, following their PhD research at WACCI. Key outcomes and outputs of WACCI graduates are summarized in Table 2. A classical example is Dr. Mamadou Mory Coulibaly, who works at the 'Institut d'Economie Rurale' (IER) has developed a maize hybrid called Tieba entirely in Mali that is early maturing (100-105 days), high yielding (7-8 t/ha), drought tolerant and adapted to growing conditions in Mali. The variety has been adopted by 40% of farmers in the breadbasket area of Sikasso. In addition he has developed three yellow maize varieties due for release in 2015. He was awarded a grant of USD 191,800 recently by AGRA to support his work in the SAHEL region. Other WACCI graduates are excelling in their various national research programmes across the sub- region and over 30 peer-reviewed publications have come out of their theses research.

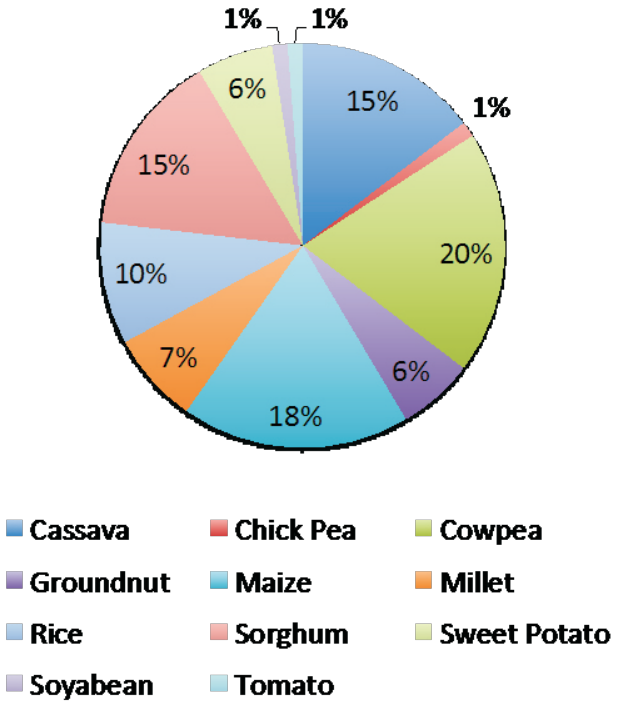

Figure 2: Pie chart showing students research focus crops

Table 2: WACCI Graduates, current positions **and breeding initiatives**

WACCI graduates	Current positions, outcomes/outputs and grants secured for breeding initiatives
Dramane Sako	Groundnut Breeder, Kayes Research Center, Mali • Genetic improvement of groundnut for drought and aflatoxin tolerance
Oumarou Goita	Head of SARD Irrigated Rice and Wheat Project Mali, Institut d'Economie Rurale (IER), Mali • USD 105,000 (funded by African Development Bank (AFDB) to support agriculture research development in strategic crops such as Wheat in Mali 2014/2015) • USD 50,000 (funded by WAAPP for Wheat production improvement in different agro-climatic zones of Mali) • USD 60,000 financed by Development Germany Cooperation (GIZ) to use in producing improved and certified Rice seed for Northern farmers (2014/2015)
Adama Mamadou Coulibaly	Head Groundnut Breeding Program, Institut National de la Recherche Agronomique Du Niger (INRAN) • USD 10,5582.44 funded by WAAPP for the transfer and dissemination of improved varieties of Groundnut tolerant/resistant to rosette virus. • USD 7117.15 (Competitive State funds for breeding of groundnuts tolerant to drought and rosette with high oil content) • USD 3,086.96 (Competitive State funds for the introduction of chickpea into Niger) • USD 11,467.01 (Competitive State funds for groundnut seed multiplication)
Allen Oppong	Research Scientist, CSIR-Crops Research Institute (CRI), Ghana
	• 1 Publications in peer-reviewed journals • USD 14,000.00 per year for 3 years funded by WAAPP to clean elite Sweetpotato clones from viruses and also optimize laboratory protocols for detection in Ghana • USD 278,000.00 [(funded by Bill and Melinda Gates Foundation (BMGF)] for the management of root and tuber viruses in Ghana
Vivian Oduro	Research Scientist, GAEC-Biotechnology & Nuclear Agriculture Research Institute (BNARI), Ghana • 2 Publications in peer-review journals
Ruth N. A. Thompson	Research Scientist, CSIR-CRI, Ghana • USD 72,000 (WAAPP, Characterization and in vitro conservation of local, exotic and elite cassava clones)
Valentin Stanislas Edgar Traore	Rice Breeder & Research Scientist, Institut de l'Environnment et de Recherches Agricoles (INERA), Burkina Faso • 2 Publications in peer-reviewed journals • USD 65,000 (funded by World Bank/FIDA for inventory and integrated management of major irrigated crops (rice, vegetable) diseases in the Southern-West region, Burkina Faso • West African Virus Epidemiology (WAVE) sub-regional project on tuber crops (Cassava, Sweetpotato and Yam, [USD 260,000 funded by BMGF], 2015 – 2017
Abdalla Dao	Program Coordinator of Maize & Wheat breeding unit, INERA, Burkina Faso • 2 Publications in peer-reviewed journals
Usman Alhassan	Researcher/Lecturer, Institute for Agricultural Research (IAR), Ahmadu Bello University, Nigeria, ABU
Beatrice Elohor Ifie	Maize Breeder, WACCI, University of Ghana • 1 Publication in peer-reviewed journals • USD 75,000 [AGRA Scaling Seeds & Technologies Partnership (SSTP) Grant to promote high yielding maize hybrids for adoption and commercialization in Ghana]
Ndubuisi Damian Njoku	Head of plant genetic resources unit, National Root Crops Research Institute (NRCRI), Nigeria • 5 Publications in peer-reviewed journals • USD 446,000 PEARL (Program for Emerging Agricultural Research Leaders) grant on "Elucidating the genetic basis and relationship of root post-harvest physiological deterioration tolerance and carotenoid levels in West African cassava germplasm".)
Some Koussao	Leader of Root and Tuber Crop Breeding, INERA, Burkina Faso • 2 Publications in peer-reviewed journals • 3 Varieties to be released this year • USD 177,500.00 (funded by AGRA (August 2014 - July 2017) for research on farmer focused participatory breeding of Orange-fleshed sweet potato adapted to Savannah and Sahelian environment of Burkina Faso)

	• Grant of USD 185,000.00 (funded by BMGF for "Jumpstarting Orange-fleshed Sweet potato in West Africa through Diversified Markets") • Other funds, Helen Keller Foundation
Mamadou Coulibaly	Lead Maize breeder IER Mali • Promoted maize hybrid, "Tieba" (7-8 t/ha) • 3 Yellow maize varieties to be released this year (2015) • USD 191,800.00 (AGRA-funded project for the development of intermediate and early maturity maize hybrids tolerant to drought and striga) • USD 11,800.00 (Drought Tolerant Maize for Africa and Seed Production Projects)
Moses Adebayo Adeolu	Lecturer and Researcher at Ladoke Akintola University of Technology, Nigeria • 3 Publications in peer-reviewed journals • USD 178,000.00 (LAUTECH-AGRA Maize Breeding Project 2013 PASS 026)
Maxwell Darko Asante	Leader of Rice Breeding Programme, CSIR-CRI, Ghana • 4 Publications in peer-reviewed journals • 4 Varieties to be released in 2016 (2 upland & 2 lowland rice) • USD 184,700.00 (Development and dissemination of high yielding, disease resistant and consumer-preferred rice varieties for the lowland and upland ecologies of Ghana" funded by AGRA-PASS) • USD 480,826.85 (funded by USAID, AATF, CORAF/WECARD for Improvement of Rice Value Chain Competitiveness (IRiVaCC) f or Food Security in West Africa")
Solomon Gyan Ansah	1. Acting Head of the Seed Unit (Directorate of Crop Services, Ministry of Food and Agriculture) 2. Ghana National Seed Specialist, [West Africa Seed Program (WASP)] • Part of USD 1 million project for safe use of pesticides as well as production of quality seeds in Ghana with for a five year period (2013-2017) funded by USAID-West Africa
Mamadou Ibrahim Aissata	Head of Department of Rainfed Crops, INRAN • USD 180,400.00 (AGRA to support her for the commercial production of Sorghum hybrid seeds in Niger)
Ahmadou Issaka	Senior Researcher, INRAN • 1 hybrid variety to be released in 2015 • USD 184,194.00 (funded by AGRA for the Development of top cross pearl millet hybrids in Niger)

Projected Impacts of the WACCI PhD Training Programme

WACCI has graduated 18 PhD exceptional students in Plant Breeding as of 2014 and will graduate 82 Plant Breeders by 2018, distributed across the sub-region (Figure 1). The 18 WACCI graduates are in the process of releasing new improved varieties of maize, rice, millet, cassava and sweet potatoes for their various agro-ecologies, have published in several peer-reviewed scientific journals and have obtained grants for the support of crop improvement programmes across the sub-region (Table 2). It is projected that WACCI will, by 2023, graduate about 200 plant breeders, who would release significant numbers of new crop varieties within 5 years of graduation. The human capacity developed over the phase of this project will be key in addressing the food insecurity challenges of SSA.

WACCI students work with about 200-300 farmers each in developing new varieties and they consider major production constraints and farmer preferences, together with important traits such as improved nutritional

content and/or tolerance to biotic and abiotic stresses. These superior varieties, which should be readily adopted by resource-poor farmers will have far reaching benefits in all West and Central Africa with potential spillover to the rest of SSA.

Sustainability of the Centre

WACCI has gained visibility in the world and is today, the largest institution for PhD education in plant breeding in Africa by current enrollment. The Centre has developed a Resource Mobilization Strategy to serve as an active policy document for gathering institutional, technical, financial and human resources as well as strengthening existing collaborations whilst forging new alliances for sustainability. A 10-year strategic plan aimed at transforming WACCI into a sustainable World Class Centre for training plant breeders is being developed and will be implemented from January 2018. An External Review Panel recently commissioned to evaluate the initial 10-year phase of the AGRA-funded project has concluded that given WACCI's evolution, strategic plans for further expansion, as well as its record of success to date, WACCI is an institution poised to have a tremendous impact on food security for Africa in the decade ahead and beyond.

Conclusions

WACCI has, in eight years demonstrated that we can train world-class plant breeders in Africa. The successes are attributed to its strategic vision, dedicated network of faculty and staff and strategic partnerships. This is evidence that the role of Centres of Excellence in Universities in SSA cannot be overemphasized. African universities need to create environments conducive for the establishment of Centres of Excellence for high quality training and innovation needed for the development of the continent. This calls for academic freedom and space for creativity, for the empires of the future will remain the empires of the mind. Governments are advised to meet the NEPAD call for emphasis on science for development by increasing investments for quality higher education especially in the area of science for development. The financial investments in WACCI have been enormous but the benefits have far outweighed the investments.

Acknowledgement

WACCI is grateful for the beneficial work of all its donors (particularly AGRA for the initial funds), partner institutions and collaborators across the world.

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TITRE

Les bibliothèques universitaires africaines à l'heure de la réforme LMD : l'exemple de l'UEMOA

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Sous-thème : Nouvelles méthodes d'enseignement et d'apprentissage

Abstract

Following the example of Europe, most African Universities are in the process of adopting or have adopted the LMD reform.

With this reform, we are witnessing a new philosophy, a new pedagogical method which puts the student at the centre of the learning and teaching process.

More than a simple consumer of knowledge, the student becomes a "consom-player", responsible for crafting his/her own educational background, a key actor in his/her training, or simply put, a "trainee"

This new paradigm brings forth new concepts such as: "teaching differently", "learning differently", "evaluating differently" and highlights the vital role expected of the student in educational activities.

However, for the student to better play this role, necessary tools including adequate documentary and information resources should be provided as well as well-equipped library by all standards. This, among other things, would facilitate the student's participation in class as well as in other learning and teaching activities, and enhance his/her information literacy in the choice of

[1] Ecole de Bibliothécaires, Archivistes et Documentalistes : http://www.ebad.ucad.sn/

programs etc...
Whereas, the findings of a study on the current state of African universities libraries carried out in the framework of PADTICE[2], show that the African universities libraries are far from being supportive tools. Their level of development, how they are organized and the poor state of their human and documentary resources are a matter of great concerns.

In this paper, we shall outline a set of proposals and recommendations for the enhancement of African universities libraries; to equip them with the necessary tools to allow them to support the LMD reform, so as to contribute to the emergence of a performing higher educational system in Africa.

Key words: LMD reform, university libraries, higher education, Africa.

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Resumé

A la suite de l'Europe, la plupart des Universités africaines sont en train ou ont fini d'adopter la réforme LMD.

Avec cette réforme, nous assistons à une nouvelle philosophie, une nouvelle démarche pédagogique qui met l'étudiant au centre du dispositif d'enseignement-apprentissage.

Plus qu'un simple consommateur de connaissance, l'étudiant devient un « consom-acteur », responsable de son parcours, acteur de sa formation, ou plus simplement, un « apprenant ».

Ce paradigme nouveau, matérialisé par des concepts nouveaux tels que: « enseigner autrement », « apprendre autrement », « évaluer autrement » met en exergue la place prépondérante et le rôle central de l'étudiant dans l'activité pédagogique.

Toutefois, pour mieux lui faire jouer ce rôle, il faut un dispositif d'accompagnement conséquent constitué de ressources documentaires et informationnelles suffisantes, de bibliothèques répondant aux normes bibliothéconomiques, qui facilitent à la fois l'intervention de l'étudiant par les TPE et autres activités d'apprentissage, et améliorent ses compétences informationnelles pour les choix de filières etc.

Or, l'état des lieux réalisé dans le cadre d'une enquête récente pour le compte du projet PADTICE[2], montre que les bibliothèques universitaires africaines sont loin de remplir leur mission d'accompagnement, tellement leur niveau de développement, d'organisation, et la faiblesse de leurs ressources humaines et documentaires sont préoccupants.

Dans cette communication, après l'analyse du contexte, nous tenterons de dresser un ensemble de propositions et de recommandations pour des bibliothèques universitaires capables de soutenir et d'accompagner la réforme LMD dont la réussite contribuera à l'émergence d'un système d'enseignement supérieur performant en Afrique.

Mots clés : Réforme LMD, bibliothèque universitaire, enseignement supérieur, Afrique.

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Diarra, Mamadou. - Le LMD et les écoles (africaines) en Science de l'Information : l'expérience de l'EBAD. Communication au Congrès de l'IFLA, Milan, août 2009
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Ndoye, Abdou Karim. - Le LMD en 60 questions. Document inédit, UCAD, 2004

Introduction

Les bibliothèques universitaires (BU) ont toujours été ou doivent demeurer le socle dur sur lequel repose tout système d'enseignement supérieur performant. Dans les pays développés, en général basés sur une tradition écrite et une culture scientifique fortes, on ne peut imaginer la création d'une université sans système de bibliothèques universitaires bien structuré, disposant de ressources humaines, matérielles, informationnelles et financières conséquentes pour soutenir, accompagner les universités dans leurs missions

de formation et de recherche. La bibliothèque est un facteur clé dans l'évaluation et le classement des universités.

Son rôle devient plus important avec le LMD, qui laisse une place de choix à l'apprenant qui devient un acteur de sa formation.

Or, l'état des lieux réalisé dans le cadre d'une enquête récente pour le compte du projet PADTICE, montre que les bibliothèques universitaires (africaines) sont loin de pouvoir remplir leur mission d'accompagnement, tellement leur niveau de développement, d'organisation, et la faiblesse de leurs ressources humaines, matérielles, documentaires…sont préoccupants.

« L'intégration de la bibliothèque dans la politique pédagogique ne (…) paraît pas entrée dans les pratiques ».

Cette communication cherche à restituer le bilan de l'état des lieux qui servira en même temps de plaidoyer en faveur de bibliothèques capables de soutenir et d'accompagner la réforme LMD dont la réussite contribuera à l'émergence d'un système d'enseignement supérieur performant en Afrique.

Le LMD et les nouveaux défis des BU

A la suite de l'Europe, la plupart des Universités africaines sont en train ou ont fini d'adopter la réforme LMD.

Avec celle-ci, nous assistons à une nouvelle philosophie, une nouvelle démarche pédagogique qui met l'étudiant au centre du dispositif d'enseignement-apprentissage.

Plus qu'un simple consommateur de connaissance, l'étudiant devient un « consom-acteur », responsable de son parcours, acteur de sa formation, ou plus simplement, un « apprenant ».

« Quand les enseignants cesseront d'enseigner, les étudiants commenceront enfin à apprendre », rappelait en substance un collègue pour rendre compte de ce fait nouveau.

Voir à ce sujet : Dépliant PADTICE : disponible à l'adresse : http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Dakar/pdf/depliant-padtice.pdf (consulté le 11 févr. 15)

Lachenaud, Jean-Philippe. Les bibliothèques universitaires à la croisée des chemins. Bulletin des bibliothèques de France [en ligne], n° 6, 1999 [consulté le 04 mai 2015]. Disponible sur le Web : <http://bbf.enssib.fr/consulter/bbf-1999-06-0050-006>. ISSN 1292-8399.

Ce paradigme nouveau, appelle de nouveaux défis et de nouvelles fonctions pour les bibliothèques universitaires.

En règle générale, avec le LMD, toutes les activités liées à l'IST (Information Scientifique et Technique) occupent une place de plus en plus importante. C'est ainsi que dans tous les nouveaux curricula, une attention particulière est accordée à la formation à la recherche documentaire, pour octroyer de nouvelles compétences informationnelles à l'apprenant.

En effet, pour mieux jouer sa partition dans ce nouveau système, l'apprenant a besoin d'un dispositif d'accompagnement conséquent, de ressources documentaires suffisantes, de bibliothèques répondant aux normes bibliothéconomiques.

L'état des lieux des BU africaines

Pour réaliser l'état des lieux des bibliothèques (universitaires), nous avons recueilli les données à partir des contextes suivants : le macro-environnement, le micro et l'environnement concurrentiel. Nous nous attarderons surtout sur l'analyse de l'environnement interne des bibliothèques.

Le macro-environnement

Il est constitué de l'environnement politique, économique, socio-démographique et technologique, plus connu sous la formule du PEST : Politique, Economique, Social, Technologique.

L'obstacle majeur au développement du livre, de la lecture et de l'édition en Afrique de l'Ouest francophone est la non-intégration, ou la non-prise en compte de ce secteur dans les plans de développement des États. La bibliothèque, n'étant pas un secteur d'activité directement rentable, est souvent reléguée au second plan par le pouvoir politique.

Les secteurs culturels sont souvent sacrifiés car réputés non productifs. La lecture n'étant pas un besoin irrépressible, les populations ne consacrent que des sommes résiduelles ou marginales au livre.

L'environnement social est maqué par l'oralité, la vie communautaire qui serait un frein à la lecture qui est un acte plutôt solitaire.

L'environnement technologique est plutôt favorable à l'Internet, qui, compte tenu de ses caractéristiques et de son mode d'utilisation communautaire, devient un véritable concurrent de la lecture et de la bibliothèque.

Pourtant, du point de vue pédagogique, la lecture sur Internet est à beaucoup d'égards, critiquable, à cause notamment de l'hypertexte et de l'hypermédia qui caractérisent le net; cette lecture est qualifiée de « butinage », de « surf » ou de « navigation », de « pseudo-lecture » par opposition à une lecture attentive et profonde, que l'on pratique sur un livre imprimé.

Les bibliothèques ne souffrent pas de la seule concurrence de l'Internet ; des concurrents « invisibles » l'envahissent .

Le micro-environnement

Il est de coutume d'examiner l'environnement interne des BU autour des points suivants :

- Ressources : humaines, matérielles, informationnelles, financières ;
- Activités.

Présentation de l'enquête

08 bibliothèques universitaires réparties dans 7 pays de l'UEMOA ont répondu. A l'exception du Bénin représenté par 02 bibliothèques (BU de l'Université Abomey Calavi : UAC et la Bibliothèque de la Faculté de médecine), une bibliothèque universitaire par pays a participé à l'enquête. La Guinée Bissau n'a pas répondu à l'enquête qui, pour rappel date de 2013.

Méthodologie de l'enquête

Pour la réalisation de l'état des lieux dans les huit bibliothèques universitaires, tenant compte de la dimension régionale du projet, l'enquête par questionnaire a été utilisée. Le questionnaire a été construit sur la base des rubriques suivantes :

- Le profil des responsables et leur niveau d'études ;
- Les ressources humaines (Bibliothécaires,Conservateurs, Informaticiens) ;

- Les ressources documentaires ;
- Les pratiques professionnelles d'organisation et de gestion de l'information documentaire ;
- Le SIGB (Système Intégré et de Gestion de Bibliothèque) utilisé ;
- Les possibilités d'accès en ligne aux ressources de la bibliothèque ;
- Les partenariats existants.

L'administration du questionnaire aux responsables des huit bibliothèques universitaires des pays concernés (Sénégal, Mali, Bénin, Burkina, Togo, Niger, Cote D'ivoire, Guinée Bissau), a été facilitée par le Bureau de l'UNESCO à Dakar.

L'analyse statistique des résultats a été réalisée avec le tableur MS Excel et le module « analyse » du logiciel Mediata Survey.

Analyse des résultats de l'enquête

L'analyse des résultats de l'enquête donne ce qui suit :

Les utilisateurs des bibliothèques

Les données du tableau1 confirment les résultats déjà admis dans le contexte des cultures orales, à savoir un faible pourcentage d'utilisation des bibliothèques. Seules les BU du Togo et du Mali atteignent les 50% de lecteurs réels.

Tableau1 : les utilisateurs des BU

Pays	Nom de la Bibliothèque	Utilisateurs réels	Utilisateurs potentiels	% utilisateurs **réels/potentiels**
Bénin	Bibliothèque Centrale de l'UAC	13000	95000	14%
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou (Bénin)	400	1572	25%
Burkina Faso	Bibliothèque Universitaire Centrale	13000	50000	26%
Cote d'ivoire	BU Houphouët Boigny	12000	60000	20%
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto (Bamako)	5000	6000	83%
Niger	Bibliothèque Universitaire Centrale	524	18078	3%
Sénégal	Bibliothèque Centrale UCAD	22321	77065	29%
Togo	Bibliothèque Centrale de l'Université de Lomé	21594	43590	50%

[8] Diarra, M. Ibid.

Ressources humaines :

Les responsables des BU ont tous un niveau au moins égal au master (tableau2) ; seulement, l'observation des activités de ces responsables démontre que souvent, plutôt que de s'occuper de tâches de conception, ils se confinent dans les tâches d'exécution. Cette situation peut être due à un manque de personnel (d'exécution), mais, plus grave, à un défaut d'initiative.

Tableau2 : Profil des responsables des BU

Pays	Nom de la structure documentaire	Bibliothéconomie	Documentation
Bénin	Bibliothèque Centrale de l'UAC	Doctorat	
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou (Bénin)		Licence
Burkina Faso	Bibliothèque Universitaire Centrale	Master	
Cote d'ivoire	BU Houphouët Boigny	Master	Master
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto	Master	
Niger	Bibliothèque universitaire centrale	Master	
Sénégal	Bibliothèque Centrale UCAD	Master	
Togo	Bibliothèque Centrale de l'Université de Lomé	Master	

Composition et qualification du personnel

L'analyse du tableau3 montre un taux d'encadrement faible, à la limite dérisoire rapporté aux utilisateurs potentiels : à l'exception du Niger, toutes les bibliothèques ont un taux d'encadrement inférieur à 1%, c'est-à-dire 1 professionnel pour 100 utilisateurs ! Cet indicateur ne permet pas à la bibliothèque de remplir convenablement sa mission de soutien à la formation et à la recherche. Une autre caractéristique du personnel des BU est que la plupart d'entre eux sont venus dans la profession non pas par vocation mais pour assurer des vacations.

« La bibliothèque d'aujourd'hui, c'est l'association d'une bibliothèque réelle et d'une bibliothèque virtuelle ». En complément du personnel, il devrait donc y avoir un personnel composé d'informaticiens, ce qui n'est pas le cas pour les BU du Niger, du Burkina, de la Côte-d'Ivoire, et du Mali.

Tableau3 : Composition et qualificationdu personnel

Pays	Nom de la structure documentaire	Bibliothécaires	Conservateurs	Informaticiens	Taux d'encadrement
Bénin	Bibliothèque Centrale de l'UAC	1	3	1	0,030
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou (Bénin)	3		1	0,75%
Burkina Faso	Bibliothèque Universitaire Centrale	6	2	0	0,60%
Cote d'ivoire	BU Houphouët Boigny	4	3	0	0,57%
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto	5	3	0	0,16%
Niger	Bibliothèque universitaire centrale	5	1	0	1,145%
Sénégal	Bibliothèque Centrale UCAD	20	10	4	0,13%
Togo	Bibliothèque Centrale de l'Université de Lomé	0	5	1	0,023%

Ressources documentaires

L'analyse du tableau4 montre que les BU privilégient les documents imprimés, au sein desquels, les périodiques qui contiennent l'information dynamique et actuelle, sont peu représentés. L'abonnement aux revues en ligne reste une activité marginale ; or on sait qu'avec l'internet, la tendance est plutôt de permettre l'accès aux documents et non leur acquisition.

Le rapport Miquel, qui a été à l'origine d'un profond mouvement de modernisation des bibliothèques universitaires françaises, fixait les objectifs suivants : 1,5m2/étudiant pour les locaux ; 60 heures d'ouverture hebdomadaire ; 6 agents pour 1000 étudiants. Le même rapport situait l'objectif des collections entre 35 à 100 volumes par étudiant.

L'examen partiel des collections d'ouvrages des différentes BU donne les chiffres suivants (nbre de vol/étudiant) : 2,15 pour le Benin ; 6,15 pour le Burkina Faso; 6,66 pour la Côte d'Ivoire ; 2,4 pour le Mali; 106,87 pour le Niger ; 19,91 pour le Sénégal et 3,47 ouvrages par étudiant pour le Togo. En dehors

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Le Nezet, Romain. Le rapport Miquel sur les bibliothèques universitaires. Bulletin des bibliothèques de France [en ligne], n° 3, 2009 [consulté le 04 mai 2015]. Disponible sur le Web : <http://bbf.enssib.fr/consulter/bbf-2009-03-0038-008>. ISSN 1292-8399.

Le Nezet, Romain. Le rapport Miquel sur les bibliothèques universitaires. Bulletin des bibliothèques de France [en ligne], n° 3, 2009 [consulté le 07 mai 2015]. Disponible sur le Web : <http://bbf.enssib.fr/consulter/bbf-2009-03-0038-008>. ISSN 1292-8399

du Niger, qui est un cas extrême, toutes les bibliothèques sont très éloignées de l'objectif défini par le rapport.

Tableau 4 : Ressources documentaires

Pays	Nom de la Bibliothèque	Ouvrages	Titres de Périodiques	Ressources numériques en Go.	Ressources audiovisuelles
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou (Bénin)	9 000	0	48	0
Bénin	Bibliothèque Centrale de l'UAC	28 000	0	0	0
Burkina Faso	Bibliothèque Universitaire Centrale	80 000	150	8	500
Cote d'ivoire	BU Houphouët Boigny	20 000		0	0
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto (Bamako)	12 000	50	5000	0
Niger	Bibliothèque universitaie centrale	56 000	50	0	500
Sénégal	Bibliothèque Centrale UCAD	444 593	52	50	0
Togo	Bibliothèque Centrale de l'Université de Lomé	75 000	94	197	0

Quant aux revues électroniques, seules 25% des BU affirment être abonnées à ces ressources.

Accès aux ressources en ligne

A l'exception de la BU Houphouët Boigny, qui se remet à peine des crises, toutes les BU ont une connexion Internet (tableau5).

Pour l'accès en ligne des ressources, les BU de Dakar, de Cotonou et de Lomé offrent un accès à leur OPAC (Online Public Access Catalog) avec une interface utilisateur permettant de faire des recherches en ligne ; ces OPAC ont actuellement pour rôle principal, le signalement des références.

On le voit, les BU africaines ont bien intégré les activités liées aux TIC ; seulement, avec les coupures intempestives d'électricité, leur fonctionnement se trouve souvent perturbé. Il y a donc lieu de penser à leur équipement en groupe électrogène.

Tableau5 : Accès aux ressources en ligne

Pays	Nom/structure documentaire	Connexion Internet	URL OPAC	Obs.
Bénin	Bibliothèque Centrale de l'UAC	Oui	www.koha.uac.bj	Actif
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou	Oui		Inactif
Burkina F aso	Bibliothèque Universitaire Centrale	Oui		
Cote d'ivoire	BU Houphouët Boigny	Non		
Mali	Bibliothèque de la Faculté de Médecine	Oui	http://www.keneya.net/fmpos	Inactif
Niger	Bibliothèque universitaire centrale	Oui		
Sénégal	Bibliothèque Centrale UCAD	Oui	http://www.bu.ucad.sn	Actif
Togo	Bibliothèque Centrale de l'Université de Lomé	Oui	http://www.bu.univ-lome.tg	Actif

Dépôt institutionnel

Un dépôt institutionnel est une collection numérique du produit intellectuel d'une organisation. Le dépôt institutionnel centralise, conserve et rend accessible le savoir produit par les établissements universitaires.

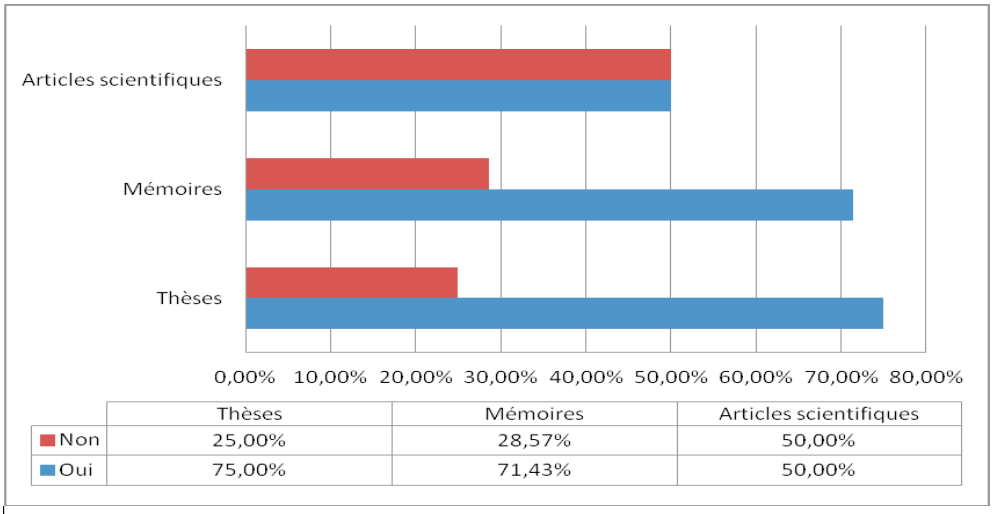
L'examen du tableau6 prouve que le dépôt institutionnel est devenu une réalité dans presque toutes les bibliothèques universitaires, à l'exception des BU de Dakar et d'Abidjan ; ce fait surprenant, compte tenu du poids de ces deux institutions dans l'espace UEMOA, doit être analysé avec prudence ; en effet, le dépôt institutionnel ne peut être réduit à une simple opération de mise à disposition de documents académiques à la BU, ce qui est le cas pour la plupart des bibliothèques interrogées. La BU étant d'abord par définition un centre de dépôt de documents (mémoires et thèses), un véritable dépôt institutionnel suppose en plus, l'existence d'une charte, d'une plateforme technique pour la visibilité des travaux qui peuvent être en accès libre, réservé, etc.

Tableau6 : Dépôt institutionnel

Pays	Nom de la structure documentaire	Thèses	Mémoires	Articles scientifiques
Bénin	Bibliothèque Centrale de l'UAC	Oui	-	-
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou	Oui	Oui	-
Burkina Faso	Bibliothèque Universitaire Centrale (Ouaga)	Oui	Oui	Oui
Cote d'ivoire	BU Houphouët Boigny	Non	Non	Non
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto	Oui	Oui	Non
Niger	Bibliothèque universitaire centrale	Oui	Oui	Oui
Sénégal	Bibliothèque Centrale UCAD	Non	Non	Non
Togo	Bibliothèque Centrale de l'Université de Lomé	Oui	Oui	Oui

Si le dépôt institutionnel est effectif dans plus de la moitié des bibliothèques universitaires, il concerne généralement plus les travaux de thèses et de mémoires que les articles scientifiques.

Graphique1 : Application du dépôt institutionnel



Voir : http://www.carl-abrc.ca/fr/communication-savante/programme-de-depots-institutionnels-de-l-abrc.html (consulté le 24 avril 2015)

Logiciels documentaires utilisés

L'informatisation des bibliothèques (tableau7), est de plus en plus une réalité dans l'espace universitaire de l'UEMOA. Le recours à Winisis, un outil basique de gestion de base de données, est presque systématique. Une nouvelle génération de SIGB (Système Intégré de Gestion de Bibliothèque), open source, conçue pour les bibliothèques et qui prend en charge tout le circuit du document (de l'acquisition à la diffusion avec la gestion des utilisateurs) incite certaines BU à investir sérieusement dans l'informatique documentaire. Il s'agit de Koha, au Bénin et de PMB à Ouagadougou. L'adoption des solutions open source est assez courante dans l'environnement des bibliothèques de l'enseignement supérieur en Afrique de l'Ouest. Au Sénégal, par exemple, la BU malgré un premier investissement dans une solution propriétaire, Advance Infor, a pris l'option d'une cohabitation avec PMB notamment dans certains de ces services. Elle rejoint ainsi la majorité des bibliothèques, membres du COBESS, le réseau le plus dynamique d'utilisateurs de PMB au Sénégal.

Au Bénin, la Bibliothèque Universitaire de l'UAC, entame sa migration de Koha vers Invenio, une autre solution open source.

Tableau7 : L ogiciels documentaires utilisés

Pays	Nom de la structure documentaire	Logiciel	Nbre de références	Nbre d'ouvrages	% documents catalogués
Bénin	Bibliothèque Centrale de l'UAC	Koha	51000	280000	18%
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou	Koha	5549	9000	62%
Burkina Faso	Bibliothèque Universitaire Centrale	PMB	36000	80000	45%
Cote d'ivoire	BU Houphouët Boigny	Winisis	0	20000	0%
Mali	Bibliothèque de la Faculté de Médecine	Winisis	5000	12000	42%
Niger	Bibliothèque universitaire centrale	Winisis	4526	56000	8%
Sénégal	Bibliothèque Centrale UCAD	Advance	122144	444593	27%
Togo	Bibliothèque Centrale de l'Université de Lomé	Winisis	34000	75000	45%

Consortium des Bibliothèques de l'Enseignement Supérieur du Sénégal

Ressources financières

À la lecture du tableau8, il apparait nettement que les bibliothèques universitaires ne bénéficient pas d'un financement suffisant pour s'acquitter convenablement de leur mission. Aucune ne respecte la recommandation de l'Unesco, à savoir disposer d'un budget compris entre 5 à 10% au moins du budget de leur Institution mère, proportion qui doit être plus élevée dans des institutions de création récente.

Toutes les difficultés que rencontrent les BU ont comme source principale cette faiblesse de ressource financière, à laquelle, s'ajoute souvent, l'inadéquation des procédures de passation des marchés pour l'acquisition des documents.

Ce déficit budgétaire aurait pu être comblé par un partenariat fructueux, mais qui pour l'essentiel se résume au prêt de documents entre bibliothèques.

Tableau8 : Ressources financières

Pays	Nom de la structure documentaire	Budget (Millions)	Budget Univ. (Milliards)	%/budget Univ.
Bénin	Bibliothèque Centrale de l'UAC	75	12,3	0,61%
Bénin	Bibliothèque de la Faculté des Sciences de la Santé de Cotonou (Bénin)	5	20	0,03%
Burkina Faso	Bibliothèque Universitaire Centrale	23	4,5	0,52%
Cote d'ivoire	BU Houphouët Boigny	18	Non fourni	-
Mali	Bibliothèque de la Faculté de Médecine et d'Odonto		Non fourni	-
Niger	Bibliothèque universitaire centrale	92	9,7	0,95%
Sénégal	Bibliothèque Centrale UCAD	244	27,7	0,88%
Togo	Bibliothèque Centrale de l'Université de Lomé	163	10	1,58%

Les activités des professionnels des BU

L'observation des activités des professionnels de l'infodoc démontre à suffisance, la prédominance des savoir-faire, des pratiques, des normes, des recettes etc. Les bibliothèques ont pour faiblesse notoire de consacrer trop de

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Abid, Abdelaziz. Techniques d'évaluation des ressources documentaires des bibliothèques universitaires. Bull. Bibli. France, Paris, t.28, n°1, 1983

La BU de Dakar arrive à peine depuis plusieurs années à consommer la part de son budget d'acquisition des ouvrages

temps et de moyens aux opérations techniques, avec comme point de concentration le traitement des documents alors qu'elles auraient pu se contenter par exemple, d'importer les notices bibliographiques établies par des organismes spécialisés, en les adaptant au besoin à leur contexte.

Si l'on considère deux espaces de la bibliothèque, le back-office et le front office, on a l'impression que les bibliothécaires perdent leur souffle au niveau du premier où ne s'effectuent que les tâches de traitement au détriment du second qui pourtant, constitue la zone de contact avec les usagers, l'espace-service aux utilisateurs.

Les BU ont tout intérêt à diversifier leurs activités et à s'orienter vers d'autres missions. Les nouvelles missions des bibliothèques appelées parfois services « non documentaires » sont des missions essentiellement sociales, orientées vers tous les publics, notamment les publics particuliers, dénommés les non utilisateurs, parmi lesquels : les consommateurs d'espace-bibliothèque, les jeunes des banlieues, les handicapés…; la bibliothèque est le seul lien social pour certaines catégories de personnes.

La bibliothèque doit être au centre de l'Université et de ses activités : activités culturelles, d'animation scientifique, tables rondes, cérémonies de dédicaces d'ouvrages, expositions etc. pour fortifier son image auprès du public, auprès des autorités universitaires, politiques...

Les professionnels de l'infodoc doivent faire en sorte que les BU deviennent un instrument de travail, de loisir, un patrimoine intellectuel de l'humanité. C'est ainsi qu'elles pourront conquérir l'estime et la considération des autorités et par conséquent, leur soutien.

Conclusion

Les BU ont rarement fait l'objet de la part de leurs tutelles, d'une attention particulière ou en tout cas à la mesure du rôle qu'elles doivent jouer.

Avec le LMD, leur sort semble rester le même. Pourtant, avec cette réforme, les activités liées à la gestion de l'information en général, à l'IST en particulier se trouvent au centre du dispositif : la réforme requiert en effet un adossement administratif conséquent, un service de scolarité fort pour la gestion des parcours, des mobilités, des transits, des passages…

Basée sur la philosophie du socioconstructivisme, la réussite de la réforme dépend d'un dispositif d'IST capable d'accompagner les activités d'apprentissage, les initiatives des apprenants. Les raisons à ce manquement sont certes nombreuses, mais les BU ne peuvent si elles veulent accompagner la réforme, continuer à vivre de déclarations d'intention.

Des efforts sont certes en train d'être menés dans le cadre du REESAO (Réseau pour l'Excellence de l'Enseignement Supérieur en Afrique de l'Ouest), qui a mis en place lors de son colloque de Dakar (2013) un comité technique3 relatif à la bibliothèque et à l'IST ; l'UEMOA par le biais du projet PADTICE (Projet d'Appui au Développement des Technologies de l'Information et de la Communication pour le renforcement des capacités de mise en œuvre de la réforme LMD par les institutions d'enseignement supérieur et de recherche de l'espace UEMOA) œuvre à la réalisation d'une Bibliothèque virtuelle dans son espace.

Mais ces efforts risquent de rester vains si à la base, c'est-à-dire si les bénéficiaires que sont les BU ne sont pas renforcées pas leurs tutelles.

C'est sans doute ce qu'a compris le Ministère de l'Enseignement Supérieur et de la Recherche du Sénégal, en signant pour une durée de trois ans un contrat avec la société Elsevier, donnant ainsi la possibilité aux scientifiques sénégalais de consulter des bases de données comme SciencesDirect , Scopus et les revues d'Elsevier Masson qui détiennent plus de 26% de la l'information scientifique à travers le monde.

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