

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/324679216>

Selected Papers on the State of University Education in Kenya

Book · April 2018

CITATIONS

0

READS

1,053

3 authors, including:



Eusebius Mukhwana

Kenya National Qualifications Authority (KNQA)

43 PUBLICATIONS 155 CITATIONS

SEE PROFILE



Alice Kande

Commission for University Education

7 PUBLICATIONS 8 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Training and Capacity Building in Higher Education in Kenya [View project](#)



Conservation of the Biodiversity of Arid Rangelands in kenya [View project](#)



Quality: The Agenda

COMMISSION FOR UNIVERSITY EDUCATION

**THE STATE OF UNIVERSITY EDUCATION IN KENYA: SELECTED
PAPERS FROM THE 1ST BIENNIAL CONFERENCE, 2016**

JANUARY, 2018



Quality: The Agenda

COMMISSION FOR UNIVERSITY EDUCATION

**THE STATE OF UNIVERSITY EDUCATION IN KENYA: SELECTED
PAPERS FROM THE 1ST BIENNIAL CONFERENCE, 2016**

VOLUME 1

ISBN 978-9966-009-24-1

This publication is copyrighted by the Commission for University Education. It is licensed for use under the Creative Commons Attribution-Non Commercial- Share Alike 4.0 International License. Unless otherwise noted, you are free to copy, duplicate, reproduce and distribute, or transmit any part of this publication or portion thereof, without permission and to make translations and adaptations. The work must be attributed to the authors but not in any way suggest endorsements by the Commission for University Education. This work may not be used for commercial purposes. If this work is altered, transformed, or built upon, the resulting work must be distributed only under the same license. Any of the above conditions can be waived if permission is obtained from the copyright holder. Nothing in this license impairs or restricts the authors' moral rights. Fair dealing and other rights are in no way affected by the above. The parts used must not misrepresent the meaning of the publication.

ISBN 978-9966-009-24-1

@ 2018

Commission for University Education

EDITORIAL BOARD

1. Ms. Eliza Mbatia - Commission for University Education
2. Ms. Lynette Kisaka - Commission for University Education
3. Mr. John Mutethia - Commission for University Education
4. Ms. Evelyn Okewo - Commission for University Education
5. Mr. Clifford Gicheru - Commission for University Education
6. Ms. Stella Chebiwot - Commission for University Education

FOREWORD

The Commission for University Education is established by the *Universities Act No. 42 of 2012* to regulate and assure quality in University Education in Kenya, by setting standards and guidelines on teaching, research and outreach; and monitoring compliance to achieve global competitiveness. The mandate of the Commission for University Education includes among others; promoting the objectives of university education in Kenya, promoting quality research and innovation, collecting, disseminating and maintaining data on university education as well as advising the Cabinet Secretary on Policy relating to university education. Research and innovation has been earmarked as one of the enablers of the Kenya Vision 2030. The Commission's role in the Second Medium Term Plan (2013-2017) is to develop quality and adequate human resource capacity through expanding access, relevance, equity and quality of university education as well as promotion of research, Science, Technology and Innovation.

The Commission with other stakeholders organized the first Biennial Conference on the state of higher education in Kenya from 22nd to 25th August 2016 to reflect on effective practices in the university sector, with a view of building a world class and globally competitive university education system. Key issues discussed included: sustainable financing of University education and strategies of boosting research outputs among university academic staff; enhancing the management and quality of a rapidly expanding university education; strengthening training in the science, technology and medical fields; enhancing completion rates especially for postgraduate students, and aligning university education with market needs among others.

This publication contains papers which have been subjected to a rigorous peer review process. We hope that it will be a key resource material for the academics, students and other stakeholders in the Higher Education Sub-Sector and lay a foundation for policy framework in the Ministry of Education.



PROF. CHACHA NYAIGOTTI-CHACHA
CHAIRMAN, COMMISSION FOR UNIVERSITY EDUCATION

ACKNOWLEDGMENT

The 1st Biennial Conference on State of University Education would not have been successful without the contribution of several people. We would like to express our appreciation to our sponsors who gave generously towards the funding of the conference and Kenyatta University who hosted the conference from 22nd to 25th August 2016. We are greatly indebted to you.

We applaud the members of the Local Organizing Committee chaired by Prof. David K. Some, who worked tirelessly to organize the conference. We especially thank all the local, regional and international participants and the entire Commission for University Education fraternity who played various roles during the conference week and made it a great success.

Our gratitude also goes to Dr. Fred Matiang'i, the Cabinet Secretary and Prof. Collette A. Suda, Principal Secretary, State Department of University Education - Ministry of Education; other Government officials and University representatives for their support during the planning, and for gracing the opening ceremony. In a special way, we appreciate Prof. Calestous Juma, Professor of Practice of International Development at Harvard Kennedy School, USA for honouring the conference with his keynote address via skype; and Prof. John Wood, the Secretary General of the Association of Commonwealth Universities, for setting the conference agenda rolling. In the same breadth, we acknowledge the immense contribution of all paper presenters, panellists and discussants, chair of sessions and rapporteurs without which this publication would not be realized.

I also thank the team that spearheaded the review of the papers presented during the conference and ensured that they met the required threshold; Prof. Rose Ruto of Moi University, Prof. Francis Wambalaba of USIU-Africa and Prof. Madara Ogot of University of Nairobi. I thank the authors for working with us and submitting their final papers which are compiled in this publication.

I would like to express my deepest appreciation to the team in the Division of Planning, Research and Development for their commitment and resilience in ensuring successful compilation of the papers. These include: Dr. Eusebius Mukhwana, immediate former Deputy Commission Secretary, Planning Research and Development, Prof. Jackson Too - Ag. Deputy Commission Secretary, Ms. Hyrine Matheka – Head of Department, Planning and Resource Mobilization, Ms. Alice Kande – Senior Research Officer, Mr. Pius Walela - Senior Research Officer, Ms. Claris Adoyo - Research Officer, Mr. Reynold Nyaga – Planning Officer, Ms. Stella Kiptoo - Assistant Commission Secretary, Mr. Muriithi Njeru - Data Analyst, Ms. Lucia Muia-Secretary and Ms. Jayne Mwangi - Secretary. Prof. Marcella Mwaka, Head of Programmes/Accreditation Department is appreciated for reviewing the draft publication. The Editorial team led by the Chief Editor; Ms. Eliza Mbatia and members; Mr. John Mutethia, Ms. Evelyne Okewo, Mrs. Lynette Kisaka and Mr. Clifford Gicheru are acknowledged for their guidance to ensure the document conformed to CUE publications quality standards.

I recognize and appreciate all those who made some contribution but have not been mentioned by name, I sincerely thank you all.



PROF. MWENDA NTARANGWI
COMMISSION SECRETARY

ABBREVIATIONS AND ACRONYMS

AAU	Association of African Universities
AGT	Academy of Graphic Technologies
APHRC	African Population and Health Research Center
ATPS	African Technology Policy Studies
AWARD	African Women in Agricultural Research and Development
BOG	Board of Governors
CNHR	Consortium for National Health Research
CUCK	Cooperative University College of Kenya
CUE	Commission for University Education
EFA	Education for All
ESAMI	Eastern and Southern Africa Management Institute
GDP	Gross Domestic Product
GIS	Geographic Information System
HELB	Higher Education Loans Board
HSBS	Helping Students and Businesses Succeed
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IITA	International Institute of Tropical Agriculture
ILO	International Labour Organization
IUCEA	Inter University Council of East Africa
JICA	Japan International Cooperation Agency
JKUAT	Jomo Kenyatta University of Science and Technology
JOUST	Jaramogi Oginga Odinga University of Science and Technology
KAM	Kenya Association of Manufacturers
KEFRI	Kenya Forestry Research Institute
KENET	Kenya Education Network

KCSE	Kenya Certificate for Secondary Education
KTTC	Kenya Technical Training College
KU	Kenyatta University
KUCCPS	Kenya University Colleges Placement Service
MMUST	Masinde Muliro University of Science and Technology
MoE	Ministry of Education
NACOSTI	National Commission for Science, Technology and Innovation
NCPWD	National Council for Persons with Disabilities
NEMA	National Environment Management Authority
NRI	National Research Institute
PAUSTI	Pan African University Institute for Basic Sciences, Technology and Innovation
PGDE	Post Graduate Diploma in Education
PR	Public Relations
PTA	Parent-Teacher Association
PUEA	Presbyterian University of East Africa
SASA	Society for Advancement of Science
SDGs	Sustainable Development Goals
SEKU	South Eastern Kenya University
SSA	Sub Sharan Africa
ST&I	Science, Technology and Innovation
STISA	Science, Technology and. Innovation Strategy for Africa
TTUC	Taita Taveta University College
TUK	Technical University of Kenya
TVET	Technical and Vocational Education Training
UASU	University Academic Staff Union
UNEP	United Nations Environment Programme
UON	University of Nairobi
USIU	United States International University- Africa

Contents

FOREWORD	iv
ACKNOWLEDGMENT	v
ABBREVIATIONS AND ACRONYMS	vii
OVERVIEW	1
Keynote Address: Creating Innovation Universities in Africa	3
<i>Prof. Calestous Juma</i>	3
Adequacy of Post Graduate Research Methodology Training: A Case of the School of Education, Kenyatta University	13
<i>Dr. Mukirae Njihia and Dr. Hellen Kiende</i>	13
Postgraduate Research Training in Sub-Saharan Africa: Shall Petals Blossom in Kenya	31
<i>Prof. Judith S. K. Achoka</i>	31
Assessment of State of Research Utilization among University Academic Staff in Kenya:	44
A Case of Education, Arts and Social Sciences	44
<i>Dr. Wambua Benjamin Kyalo and Prof. Marcella Mwaka</i>	44
Assessment of Lecturers Perceptions on Students-Lecturers Evaluations in Universities in Kenya: A Case Study of Kibabii University	71
<i>Prof. Julius K. Maiyo</i>	71
Aligning Higher Education Curricula with the Green Concept: A Case Study of Kenyan Universities	93
<i>Prof. George M. Ndegwa</i>	93
Towards Evidence Based Approach in Education Policy-Making for Social and Economic Development in Kenya	114
<i>Merecia, Anne Sirera and Christine Wasanga</i>	114
Potential Benefits of Using Teaching Kits In Inquiry-Based Learning in Geosciences	129
<i>Dr. Anthony Macharia</i>	129
Curriculum Change: The Fluidity of Knowledge and Technology. A Case of University Education in Kenya	137
<i>Prof. Edward K. Tanui</i>	137
Scaling Up Training in Forestry and Environmental Courses in Kenya: Reflection on Challenges and Opportunities in Newly Established Universities	152
<i>Dr. Joseph Hitimana, et. al</i>	152
Knowledge and Attitude of Secondary School Students and Other Stake-Holders about TVET	172
<i>Dr. Arun Datta</i>	172

Equity in Students’ Enrolment in Public Universities in Kenya: An Analysis of Undergraduates with Disabilities	192
<i>Dr. Beatrice Bunyasi Awori and Judith Chepkorir.....</i>	<i>192</i>
An Analysis of Gender Dynamics and Staffing in the University Sector in Kenya	207
<i>Jackson Too, Alice Kande and Silas Oure</i>	<i>207</i>
An Audit of ICT Funding Towards Effective Integration of ICT in Selected TVET Institutions in Kenya	220
<i>Mr. Tirus Muya Maina</i>	<i>220</i>
Assessment of Perceived Ease of Use and Instructional Use of ICT by Lecturers in Technical Training Institutions in Kenya.....	237
<i>Peace B. Agufana, PhD, Jackson K. Too, PhD & Chris W. Mukwa, PhD.....</i>	<i>237</i>
Interrogating the Harmonized Promotion Criteria Towards Quality Assurance in Kenya’s University System	249
<i>Fuchaka Waswa, Daniel Akunga and Mark Obonyo</i>	<i>249</i>
Building the University Sector of the Future: Experiences from Kenya	266
<i>Eusebius Mukhwana, Jackson Too & Alice Kande.....</i>	<i>266</i>
Towards Becoming an Industrialized Middle-Income Country: Recasting the Focus	285
<i>Jackson Too, Muriithi Njeru and Claris Adoyo</i>	<i>285</i>
Uncertainty in Universities in Kenya: The Role of Public Relations Function	303
<i>Catherine Nandain.....</i>	<i>303</i>
Reviewers	310
Conference Sponsors.....	311
List of Delegates	313

OVERVIEW

The 1st Biennial Conference on the State of Higher Education in Kenya was successfully held from 22nd to 25th August 2016 at Kenyatta University. The conference which was organized jointly by the Commission for University Education, Universities, Government agencies and ministries, industry players as well as regional and international partners and other key players in the higher education sector, brought together over 600 local and international delegates as well as renowned scholars, researchers, industrialists, technocrats and professionals to reflect and rethink on effective practices in the university sector, with a view of building a world class and globally competitive university education system.

The conference had two broad themes;

The first theme, titled Status of Higher Education in Kenya had several subthemes such as Evolution and Status of University Education in Kenya; Quality of Postgraduate Research Training in Africa; The Role of Research in Policy Formulation and National Development; Sustainable Funding of Education and Research in Africa; Regulating Higher Education in Africa; and Building and Sustaining Globally Competitive Higher Education Institutions.

The second theme on “Advancing Africa’s development through Science, Technology and Innovation” had sub-themes covering the following areas: Engaging International Science & Technology collaborations, Linkages and Partnerships; Promoting Science & Technology Research in Africa; Translating Academic Research into Innovation; Addressing Human Capital priorities for a technologically driven nation; Accelerating Research Infrastructure and Human development; Transforming the Academic Curriculum for Advancing Science, Technology and Innovation; Managing expectations of post-graduation employment; and Harmonizing Country to Country variations in Science Policy and Government Funding of Research.

This publication comprises of a keynote speech and eighteen (18) papers which are a culmination of a process of rigorous internal and external peer review of the papers presented during the Conference. The authors who are researchers in the Universities and stakeholders in the Education sector have articulated issues that characterise the present state of Higher Education in

Kenya. This publication also includes a list of Institutions who sponsored the conference and a list of the delegates who participated and played different roles in the Conference.

It is hoped that the publication will provide a valuable reference resource on the status of Higher Education sub-sector to stakeholders including policy makers, educationists, researchers, the student fraternity and the public.

Keynote Address

Creating Innovation Universities in Africa

Prof. Calestous Juma

Abstract

Africa is a youthful continent: nearly 41% of its population is under the age of 18. To address the unique challenges of this demographic structure, the African Union (AU) has adopted a 50-year Agenda 2063 to help guide the socioeconomic transformation of the continent with particular reference to the youth. One of the objectives of Agenda 2063 is to reposition the continent as a strategic player in the global economy through improved education and application of science and technology in development. The AU's Science, Technology and Innovation Strategy for Africa, 2024 (STISA-2024) provides an initial 10-year framework for pursuing this goal. Achieving the objectives of STISA-2024 will require aligning education, research and innovation with long-term socioeconomic objectives. This paper argues that the AU's Specialized Technical Committee on Education, Science and Technology (STC-EST) is well-positioned to play a strategic role in guiding and fostering the reforms needed to improve the integration of education, research, and innovation. The paper proposes the creation of "Innovation Universities" that combine research, teaching, community service and commercialization in their missions and operations. They would depart from the common practice where teaching is carried out in universities that do little research, and where research is done in national research institutes that do not undertake teaching. Under this model, there is little connection with productive sectors. The idea therefore is not just to create linkages between those activities but to pursue them in a coordinated way under the same university structure. Innovation universities can be created in diverse fields such as agriculture, health, industry, services, and environment to advance sustainable development and inclusive growth.

Introduction

Africa's most significant challenge is to invest in capacity building through enhanced education in science, technology, engineering, and mathematics. Such investments will enable the continent to leverage the world's available scientific and technical knowledge and use it to diversify the economy away from a historical dependence on natural resources. Very few African universities have updated curricula or use teaching methods that promote innovation. In fact, the mission of most African universities is still to teach and confer degrees, whereas much of the world is experimenting with new university models that focus on transforming the economies of the regions in which they are located (Trencher et al., 2014).

One way to promote innovation is to connect the functions of universities with research institutes, which are typically kept separate. The current approach is dysfunctional because universities use established teaching methods without incorporating new research, resulting in graduates with outdated worldviews and skill sets that are not suited to contemporary needs. Research Institutes lack the means to disseminate findings to the public through practical business or community outreach without students. These functions need to be pursued in an integrated way under one institutional structure. In fact, most African nations already possess pockets of such capabilities in their institutions of higher learning and research. They just need to capitalize on these by reforming their National Systems of Innovation (Metcalf & Ramlogan, 2008). In doing so, they will need to stress the role of universities as drivers of economic transformation (Mok, 2012). To achieve this, they must focus on innovation.

Innovation Universities can be created in diverse fields such as agriculture, health, industry, services, and environment to advance sustainable development and inclusive growth. There are two strategies for pursuing innovation universities. The first is to strengthen research, community service, and commercialization in existing teaching universities. The second; which this paper proposes; is to set up new Innovation Universities in Line Ministries, Public Corporations, Private Enterprises, and Development Agencies.

Creating Innovation Universities will require high-level coordination because of the increase in number of Governmental and nongovernmental actors. High-level coordination of these activities must be strengthened within the Offices of Presidents and Prime Ministers. To support Heads of State and Government in coordination, it is strongly recommended that an Office of Science and Innovation Advice be created in every country.

The first entry point is to strengthen research in existing universities. An additional approach is to upgrade carefully selected National Research Institutes (NRIs), technical colleges, and research institutes located in line ministries into innovation universities. Other opportunities for creating innovation universities lie in public corporations and large infrastructure projects.

Creating Innovation Universities from NRI's

Africa's NRIs provide a strong foundation upon which to create new colleges and graduate schools combining research, teaching, community service, and commercialization. Creative approaches are needed to add graduate teaching functions to the institutes. Many African agricultural NRIs work on the cutting edge of life sciences, especially in agriculture and health. They could be upgraded to push into frontier fields such as synthetic biology for health, industry, agriculture, and environmental conservation. For example, the Kawanda Agricultural Research Institute in Uganda has sufficient in-house expertise to form the basis for Africa's first biotechnology innovation university.

Policymakers should strengthen the educational, commercialization, and extension or commercialization functions of the NRIs. Clustering these functions would result in dedicated research universities whose curriculum would be modeled along full value chains of specific commodities. For example, innovation universities located in proximity to coffee or textile production sites should study the entire value chain of these industries. Such dedicated universities would help to connect higher education to the productive sector through continuous interaction with businesses, Government, and civil society organizations.

Creating Innovation Universities from Line Ministries and Public Corporations

The ministries or agencies responsible for higher education will need to be creative and flexible enough to foster the creation of such universities while granting the autonomy necessary for them to advance their specialized innovation objectives. Universities from line ministries will focus on advisory functions and leave operational activities to line Ministries. Most African line ministries and public corporations have their own research and training institutes that could be upgraded to serve as graduate schools focusing on the missions of each ministry. Countries such as China have extensively used this model to create new technical universities.

Creating Innovation Universities from Private and Public Enterprises

Third, private and public enterprises can also help expand higher technical training through in-house programs. Firms can help to consolidate training activities across industries to create dedicated training and research programs, improving upon the current emphasis on firm-specific training. With proper incentives such activities could contribute to the firms as well as to the wider economy. Such training facilities could also be embedded in existing universities. For example, Safaricom is financing a namesake academy at Strathmore University in Kenya that offers a Master of Science degree in mobile telecommunications and innovation.

Creating Innovation Universities from Infrastructure Projects

Fourth, large infrastructure projects offer unique opportunities for expanding technical training and innovation. Infrastructure projects are important reservoirs of technical skills and entrepreneurial talent that could be consolidated into an *in situ* engineering and business university. South Korea's high-speed rail shows how infrastructure projects can be used to build up the associated engineering and managerial capabilities. One of its key outputs was the establishment of the Korean Rail Research Institute in 1996. The aim of the institute is to develop railway transportation and enhance competitiveness in the sector.

Adding engineering colleges to large infrastructure projects could be justified as part of the costs of long-term maintenance. In fact, any such projects should provide for higher technical training from the outset. The failure to design the projects as learning centers is a wasted opportunity to promote innovation universities.

Platform for the creation of an innovation university is the Square Kilometer Array (SKA) radio telescope to be built in Australia and South Africa with outstations in Botswana, Ghana, Kenya, Madagascar, Mauritius, Mozambique, Namibia and Zambia. SKA is strategic research infrastructure that will include a wide range of engineering skills as well as data analysis capabilities beyond its core astronomical objectives. It can form a suitable basis for creating a regional innovation university on all aspects of space engineering.

Creating Innovation Universities from Private Universities

Fifth, the rise in the number of private universities across Africa offers new avenues for strengthening national innovation capabilities. Proactive Government policies and incentives can help encourage private investors to create engineering-oriented universities. Examples that illustrate the feasibility of such an approach include the creation of the Future University in Sudan and the Nile University in Egypt. Both are private universities that focus on information and communications technologies.

Requisite Reforms towards Innovation Universities

Innovation universities need clear visions and strategic plans that focus on practical applications and include comprehensive roadmaps for moving research from the lab to the marketplace. They also need to define how to best recruit, retain, and prepare future graduates. These plans should be prepared in partnership with key stakeholders. They should also serve as innovation hubs. Give students more opportunities to gain work experience outside the classroom. This can be done through research jobs, traditional internships, or community service. These activities will help facilitate the transfer of knowledge from universities to local communities and vice versa: students would bring back practical feedback and lessons that could make curriculum more relevant.

NRIs have a mandate to conduct outreach programs to work directly with farmers, industrialists, and other producers. A “reverse outreach” approach under which entrepreneurs can selectively participate in “open classroom” programs would help to strengthen innovation and would give faculty and students the opportunity to interact with entrepreneurs in a classroom setting.

Research universities must incorporate vocational training or experiential training into their curricula. They can contribute to “factory or farm schools” or conduct programs in conjunction with high schools. These links will be particularly important considering Africa’s demographic structure. With the majority of the population in school, educational institutions form an integral part of the community. Continuous faculty training and research are critical for maintaining high academic standards. The new universities should invest more in undergraduate educators to promote effective research and teaching and to design new courses. Researchers at NRIs would only need minimum training to acquire the necessary pedagogical skills.

Roadmap to Innovation Universities in Africa

One of the key sources of innovation is the ability to identify worldwide trends and to assess their relevance for development. The first area of mapping could include a better understanding of trends in higher education and innovation around the world. The mapping should also include detailed assessments of the policies and incentives used in various countries to promote innovation and entrepreneurial activities in universities. The second area could include mapping emerging technologies of relevance to African development, emphasis should be on identifying technologies that offer opportunities for leapfrogging.

Creating innovation universities will require supportive policies and possible legislative reform. New legal instruments such as amendments in existing laws or the creation of new laws may be needed to foster the creation of new research-oriented universities. Amendments to laws on higher education, science and technology, research, or agriculture could provide for innovation universities that include research, training, commercialization, and extension.

Building innovation management capacity can be achieved by offering executive education courses to high-level leaders responsible both for policy promotion and for the ultimate implementation of innovation programs. The newly established Technology, Innovation, and Entrepreneurship in Africa (TIE-Africa) Executive Program at Harvard Kennedy School offers an opportunity to strengthen innovation management capabilities among African high-level policymakers as well as universities.

Piloting the idea of innovation universities at the national level will result in best practices for advancing the idea of innovation universities. The lessons learned from the execution of the pilots should be regularly shared by African countries and countries could use incremental strategies starting at polytechnic or college levels with the aim of upgrading successful initiatives into universities.

Creating incentives for domestic mobilization of financial resources is essential for leveraging external support. African policymakers must leverage the global wealth of knowledge on how to finance innovation. Approaches include public as well as private funding.

Regional and international partnerships should pursue horizontal relationships and open networking to generate more synergy and collaboration, encourage sharing of resources, and foster the exchange of students and faculty. This can be accomplished through regional exchanges that involve the sharing of research facilities and other infrastructure. Prizes for outstanding contributions to innovation would go a long way toward recognizing the dedication, courage, and commitment of leaders who undertake the tasks described above. The prizes would recognize achievements in research, teaching, commercialization, and extension.

Strengthening science and technology advice can be achieved by creating Offices of Science and Innovation Advice under the President or Prime Minister mandated to provide the head of state with advice so there are no conflicts with operational ministries.

Conclusion

Creating innovation universities outside the traditional structure of education ministries may help to broaden the base for funding and reduce the pressure on budgets allocated to primary and secondary education. Financial support for such universities would come from line ministry budgets. Many of the technical ministries have private sector partners that might be interested in providing additional funding.

Internally, the new universities should allow their curricula to adjust to the challenges facing the continent. Governance systems that allow for such continuous feedback to universities must be established. One way to achieve this would be to ensure that the governing bodies of innovation universities include the relevant stakeholders or beneficiaries of the universities.

A combination of creativity across sectors and flexibility in Government policy would go a long way in helping Africa to reinvent its higher education systems to encourage young innovators. For the system to work, bodies responsible for higher education would need to see themselves as champions of expanding the sector across the economic landscape. They should serve as midwives for the new universities wherever they are located.

References

- Abramovitz, M. (1986). "Catching Up, Forging Ahead, and Falling Behind," *Journal of Economic History*, Vol. 46, No. 2, pp. 385-406.
- Ben-Ari, G. & Vonortas, N. (2007). "Risk Financing for Knowledge-based Enterprises: Mechanisms and Policy Options," *Science & Public Policy*, Vol. 34, No. 7, pp. 475-488.
- Bjørgum, Ø. & Sørheim, R. (2015). "The Funding of New Technology Firms in a Pre-commercial Industry – The Role of Smart Capital," *Technology Analysis & Strategic Management*, Vol. 27, No. 3, pp. 249-266.
- Camisón, C. & Forés, B. (2010). "Knowledge Absorptive Capacity: New Insights for its Conceptualization and Measurement," *Journal of Business Research*, Vol. 63, No. 7, pp. 707-715.
- Chen, D. & Li-Hua, R. (2011). "Modes of Technological Leapfrogging: Five Case Studies from China," *Journal of Engineering and Technology Management*, Vol. 28, pp. 93-108.
- Cusmano, L., Morrison, A. and Rabbellotti, R. (2010). "Catching up Trajectories in the Wine Sector: A Comparative Study of Chile, Italy, and South Africa," *World Development*, Vol. 38, No. 11, pp. 1588-1602.
- Fagerberg, J. & Srholec, M. (2008). "National Innovation Systems: Capabilities and Economic Development," *Research Policy*, Vol. 37, No. 9, pp. 1417-1435.

- Feuer, M.J. & Maranto, C.J. (2010). "Science Advice as Procedural Rationality: Reflections on the National Research Council," *Minerva*, Vol. 48, No. 3, pp. 259–275.
- Juma, C. (2014). "Complexity, Innovation, and Development: Schumpeter Revisited," *Journal of Policy and Complex Systems*, Vol. 1, No. 1, pp. 4-21.
- Juma, C. (2015). *The New Harvest: Agricultural Innovation in Africa*. Oxford University Press, New York.
- Juma, C. and Lee, Y.C. (2005). *Innovation: Applying Knowledge in Development*. Earthscan, London.
- Konde, V. (2004). "Internet Development in Zambia: A Triple Helix of Government-University-Partners," *International Journal of Technology Management*, Vol. 27, No. 5, pp. 440-451.³²
- Lee, K. (2014). "Catching-up or Leapfrogging in the Indian IT Service Sector: Windows of Opportunity, Path-creating, and Moving up the Value Chain," *Development Policy Review*, Vol. 32, No. 4, pp. 495-518.
- Lee, Y.-S. & Tee, Y.-C. (2009). "Reprising the Role of the Developmental State in Cluster Development: The Biomedical Industry in Singapore," *Singapore Journal of Tropical Geography*, Vol. 30, No. 1, pp. 86-97.
- Metcalf, S. & Ramlogan, R. (2008). "Innovation Systems and the Competitive Process in Developing Economies," *Quarterly Review of Economics and Finance*, Vol. 48, No. 2, pp. 433-446,
- Mok, K.H. (2012). "The Quest for Innovation and Entrepreneurship: The Changing Role of University in East Asia," *Globalisation, Societies & Education*, Vol. 10, No. 3, pp. 317-335.
- Pietrobelli, C. & Rabellotti, R. (2011). "Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?" *World Development*, Vol. 39, No. 7, pp. 1261-1269.
- Sun, Z. (2015). "Technology Innovation and Entrepreneurial State: The Development of China's High-Speed Rail Industry," *Technology Analysis & Strategic Management*, Vol. 27, No. 6, pp. 646-659.
- Trencher, G., Yarime M., McCormick, Kes, Doll, C., Kraines, S., & Kharrazi, A. (2014). "Beyond the Third Mission: Exploring the Emerging University Function of Co-creation for Sustainability," *Science and Public Policy*, Vol. 41, No. 2, pp. 151–179.

This keynote paper is excerpted from the paper presented at the First Meeting of the Specialized Technical Committee on Education, Science, and Technology; Department of Human Resources, Science, and Technology; African Union Commission; Addis Ababa, Ethiopia, October 27-30, 2015 by Prof. Calestous Juma. The full discussion paper can be accessed via the link; <http://www.belfercenter.org/sites/default/files/files/publication/JumaDP-Education-Africa2.pdf>

Author's profile

Calestous Juma is Professor of the Practice of International Development; Director of the Science, Technology, and Globalization Project at the Belfer Center for Science and International Affairs; and Faculty Chair of the Edward S. Mason Fellows Program. He also directs the Center's Agricultural Innovation Policy in Africa Project and Health Innovation Policy in Africa projects funded by the Bill and Melinda Gates Foundation. He also serves as Faculty Chair of the "Innovation for Economic Development" and "Technology, Innovation and Entrepreneurship in Africa" executive programs. Juma is a former Executive Secretary of the UN Convention on Biological Diversity and Founding Director of the African Centre for Technology Studies in Nairobi. He co-chaired the African Union's High-Level Panel on Science, Technology and Innovation and was on the jury of the Queen Elizabeth Prize for Engineering and the Africa Prize for Engineering Innovation. He has been elected to several scientific academies including the Royal Society of London, the US National Academy of Sciences, the World Academy of Sciences, the UK Royal Academy of Engineering and the African Academy of Sciences. He has won several international awards for his work on sustainable development. He holds a doctorate in science and technology policy studies and has written widely on science, technology, and environment. Juma serves on the boards of several international bodies including the Aga Khan University and the Pan-African University. He is editor of the International Journal of Technology and Globalisation and the International Journal of Biotechnology. Follow @Calestous on Twitter. Email: calestous_juma@harvard.edu

**Adequacy of Post Graduate Research Methodology Training: A Case of the School of
Education, Kenyatta University**
Dr. Mukirae Njihia and Dr. Hellen Kiende

Abstract

Sub-Saharan Africa which trails other regions with regard to key Human Development Indicators produces less than 1 percent of the global research output despite having 12.5 percent of the global population. If the region is to improve on its Human Development Indicators, it must embrace research in addressing the many developmental challenges facing it. Therefore, the need for quality training in research methodology in Sub-Saharan Africa especially for its postgraduate students is critical for the region to raise its research output. Quality training in research methodology would help impart skills and competencies to the upcoming scholars to enable them address the various problems facing the community. There is a need then to constantly evaluate the relevance and adequacy of the research methodology training given in the universities in the region. This study, therefore, captures the perceptions of postgraduate students in the School of Education, Kenyatta University on the relevance, quality, effectiveness and adequacy of the research methodology training. The study employed the cross sectional descriptive survey design. The target population comprised of all the post-graduate students in the school of education. Data were collected using questionnaires and interview schedules. Some of the major observations made were that the course content as well as the pedagogy employed were more theoretical than practical thereby failing to give them exposure to real practical research experience; the breadth and coverage of the course did not adequately cover all critical aspect; and that the credit hours given for the course were not sufficient.

Key words: Research, research methodology, research output, quality, adequacy

Introduction

Research plays a critical role in development. Research helps achieve this by offering solutions to the various societal problems as well as by coming up with innovations which help improve the quality of life and advance the development process. Consequently, research occupies a central position in the development agenda of many countries. Indeed, statistics show that countries which have a high Human Development Index (HDI) spend a considerable amount of their GDP on research and vice versa. HDI is a social tool developed by the United Nations to measure and rank countries' levels of social and economic development based on four criteria: life expectancy at birth, mean years of schooling, expected years of schooling and gross national income per capital (UNDP, 2015). Sub-Saharan Africa which trails other regions with regard to key Human Development Indicators produces less than 1 percent of the global research output despite having 12.5 percent of the global population (World Bank, 2014). If the region is to improve on its Human Development Indicators, then it must embrace research in addressing the many developmental challenges facing it.

Universities play a key role in building capacity in research. However, for the university graduates to provide leadership in research geared towards solving societal challenges, they need to be adequately trained in research methodology. Therefore, the need for quality training in research methodology in Sub-Saharan Africa especially for its postgraduate students is critical for the region to raise its research output. Quality training in research methodology would help impart skills and competencies in the graduates and upcoming scholars to enable them address the various problems facing the community. There is, therefore, a need to constantly evaluate the relevance and adequacy of the research methodology training given in the universities in the region.

This study focused on the School of Education of Kenyatta University. This is the largest School of Education in Kenya and in the East African region serving over 20,000 undergraduate students pursuing various Bachelors of Education degrees and about 1,700 post-graduate students in various fields of education. The school plays a critical role in the production of human capital for the education sector for Kenya and the region.

The study was inspired by the researchers' observation that most of the post graduate students in the School of Education were covering the course work within the stipulated time but many took long to conceptualize and execute their research projects. This led to delayed completion rates for different cohorts of students.

The overall objective of the study, therefore, was to capture the views of the post-graduate students on the adequacy of the research methodology training given in the School of Education. The specific objectives of the study were to:

- i. Establish the students' views on the adequacy of the content of the research methodology course unit.
- ii. Establish the students' views on the effectiveness of the teaching methods employed in the research methodology course unit.
- iii. Assess the capacity gained by students from the research methodology course.

Literature review

Effective teaching of research methodology in universities is important for several reasons. As noted by Diana (2013) the focus of all educators at the universities is to have learners who are able to access meaningful professional development opportunities that will enable them to make transformations in their own areas of work. Adequate mastery of research is critical for these transformations to be realised. Furthermore, the role of research is indispensable for as Stewart (2011) opines, in most of the developed countries, teacher education has moved from training teachers to transfer knowledge to enabling them to practice a new role of producing knowledge.

Melanie, Daniel, and Rebekah (2015) point out that "arguments have emerged around the importance of advancing training in research methods to build capacity within the workforce to undertake sophisticated research tasks in response to current social challenges." They further add that a discursive and institutional connection between research capacity, individual employability and collective competitiveness therefore appears increasingly pervasive.

However, in spite of the undisputed importance of research methodology training in universities, teaching the course is sometimes beset with challenges. One such challenge is the high technical complexity of the course content which may dampen the students' interest. The other key challenge gravitates around the instructional techniques (pedagogy) employed to teach the course. Research has shown that the pedagogy involved in teaching the research methodology course determines the kind of skills and competencies that learners of the research methodology course acquire (Johnson et al., 1991).

Studies suggest that the teaching of research methodology course in most universities is wanting and therefore most graduates are not able to acquire the relevant skills and competencies that are critical for them to do research. Wagner, Garner, and Kawulich (2011) pointed out the lack of a 'pedagogical culture' surrounding social research methods in general. Earley (2014) also noted that comparatively little attention has been paid to questions of how certain research methods are taught within higher education.

A study by Gutierrez and Guadalupe (2014) established that teaching of the research methodology is often done by teachers with inadequate profile to provide content related to the epistemological dimension of the process of knowledge generation. Gutierrez *et al* recommended that teachers of research methodology should be equipped with the skills and methodological practice of action research which would greatly improve their teaching skills and in turn develop their students' research skills and practices. This argument was reiterated by Sharlene (2015) who notes that there is an overall deficit of a pedagogical culture with regard to teaching research methods in general. Melanie et al. (2015), Sarah and Melanie (2016) raise similar arguments as they point out that despite the attention given to research methods, the pedagogical dimension has surprisingly received little academic engagement and there are few sources of detailed or systematic insights into research methods pedagogy. There is, therefore, a need to constantly evaluate the relevance and adequacy of the research methodology training given in the universities in the region.

Methodology

The study employed a cross-sectional survey design. The target population was 1700 postgraduate students in the School of Education at Kenyatta University. The study drew a sample of 191 students which is 11 percent of the population. Data were collected through an on-line questionnaire which was sent to the students through their email addresses. The researchers got the students' email addresses from their respective departments. In the few instances where a student's email address was not available at the department, the researchers were given the student's mobile phone number through which they called and got the email.

The questionnaire captured the respondents' opinion on three key areas of the research methodology course units given at post-graduate level, namely:

- i. Adequacy of Content
- ii. Adequacy of teaching methods (pedagogy)
- iii. Rating of capacity gained from research methodology course

The questionnaire employed both closed-ended and open ended questions to capture the views of the students. A five-point Likert scale was used for the close-ended questions with responses ranging from Strongly-Agree to Strongly-Disagree on various aspects of the research methodology course training. The response by gender was 50.3% males and 49.7% females. The age distribution of the respondents was as follows: 43-48 years (30.8%), 25-30 years (22%), 37-42 years (17%), 31-36 years (15.4%) and 49-54 years (12.1%). With regard to programme, 51.4%, 47% and 1.7% of the respondents were enrolled for a doctorate, a masters and Post Graduate Diploma in Education respectively.

Results

One of the objectives of the study was to capture the perception of the students on the adequacy of the content covered in the research methodology course. To address this objective, respondents' opinions were sought on various aspects of the content covered in the research methodology course as captured in Table 1.

Table 1*Students' Views on Various Aspects of the Research Methodology Course Content*

Aspect of Course Content	Strongly Disagree	Disagree	Not sure	Agree	Strongly agree	Total	Weighted Average
Content was more theoretical than practical	7.03% (13)	17.84% (33)	1.08% (2)	48.65% (90)	25.41% (47)	185	3.68
Content did not expose me to real research experiences	10.16% (19)	32.62% (61)	1.07% (2)	36.36% (68)	19.79% (37)	187	3.23
Content imparted relevant skills and competencies to enable me do research	4.30% (8)	18.82% (35)	10.22% (19)	54.30% (101)	12.37% (23)	186	3.52
Content was broad and covered all aspects of research	4.92% (9)	39.89% (73)	12.57% (23)	33.88% (62)	8.74% (16)	183	3.02
Credit hours allocated the course are adequate to allow in-depth coverage of all topics	12.16% (18)	54.05% (80)	8.11% (12)	21.62% (32)	4.05% (6)	88	2.51

From Table 1, it is clear that a majority of the respondents were in agreement with the statement that the research methodology course content was more theoretical than practical with a mean of 3.68. Indeed, 48.65% and 25.41% agreed and strongly agreed with the statement respectively giving a combined total of 74.06%. In relation to this, one of the respondents noted that:

The entire research methodology course should be totally restructured to make it more practical based rather than theoretical. Students should be given the opportunity to practically use various statistical tools in the conduct of research. They need to be taken through real practical application of the theoretical knowledge.

Another aspect of the research methodology course content that respondents were asked to give their opinion on was whether the research methodology unit gave the students exposure to real research experiences. The results show that with a mean of 3.23, that a majority of the

respondents concurred with the statement that the content covered in research methodology course did not expose them to real research experiences. Indeed, 36.36% and 19.79% of the respondents agreed and strongly agreed with the statement giving a combined total of 56.15%. One respondent pointed out that “...more practicality is required in this course, for example, going out to conduct a real research within the process of learning, analyzing the results, and presenting them, just for the sake of acquiring that hands-on skills.”

The students also gave their opinion on whether the content covered in the Research Methodology course imparted relevant skills and competencies to enable them do research. The results (mean 3.52) show that most of the respondents agreed that the research methodology course grounded them with the relevant skills and competencies needed to undertake the research process effectively. Indeed 54.3% and 12.37% agreed and strongly agreed respectively giving a combined agreed total of 66.8%. However, qualitative data revealed that there were some skill deficiencies in some areas.

Nevertheless, many respondents decried the fact that the course did not give them enough exposure on utilization of ICT resources for research activities. One respondent stated “students should be introduced to statistical packages for analysis of quantitative and qualitative data such SPSS, Stata, Nvivo, Maxda as well as referencing software such as Zotero and End Note.”

Another aspect the study covered was the breadth of the scope of the content of the research methodology course. The respondents were required to agree or disagree with the statement that the ‘content covered in the research methodology course in the School of Education was broad and covered all aspects of research’. A mean of 3.02 shows that there was no agreement with the statement that the content covered in the research methodology course in the School of Education was broad and covered all aspects of research. Only 33.88% and 8.74% agreed and strongly agreed respectively with the statement. On the other hand, 39.89% and 4.92% disagreed and strongly disagreed respectively with the statement giving a combined total of 44.81%. If one takes into account the 12.57% of the respondents who were not sure, then one can conclude the students had an issue with the breadth and coverage of the research methodology course. Respondents expressed the view that the content of the research methodology course unit was

tilted in favour of quantitative research methods. One respondent noted that, “Post graduate students should be more exposed to qualitative research methodology than is currently the case.” Another one pointed out that, “...there is need for more exposure to new research paradigms such as mixed method.”

The study also sought the adequacy of the credit hours allocated to the unit to determine the adequacy in the content coverage. A mean of 2.51 is a clear indicator that majority of the respondents did not support the statement that credit hours allocated to the research methodology course are adequate to allow in-depth coverage of all topics. In fact, 54% and 12.16% disagreed and strongly disagreed with the statement giving a combined total of 66.21%. Thus a majority of the respondents were of the view that the credit hours allocated to the research methodology course were not enough to allow in-depth coverage of all the topics. One of the respondents noted that:

The course should be spread out over all four teaching semesters at Masters level. The course gives out too much information all at once which we cannot assimilate. If it was broken up into portions with mini projects allowing students to explore the various types of research/data collection methods then it will be easier to tackle the thesis/project.

One of the respondents suggested that “the course should be split into two as it is too wide and the time allocated is not adequate.”

The second objective of the study was to establish the effectiveness of the instructional strategies employed in the teaching of the research methodology course. The study therefore sought to capture the views of the students on the instructional strategies employed by lecturers in teaching the research methodology unit. The results are given in Table 2.

Table 2**Students' Views on Various Aspects of Instructional Strategies Used in the Teaching of the Research Methodology Course**

	Strongly Disagree	Disagree	Not sure	Agree	Strongly agree	Total	Weighted Average
My prior understanding/experience of research was taken into consideration by the course instructor at the commencement of learning	8.02% (15)	29.95% (56)	8.02% (15)	46.52% (87)	7.49% (14)	187	3.16
Teaching of course was learner centred and build on my prior understanding of research	8.51% (16)	37.77% (71)	6.91% (13)	41.49% (78)	5.32% (10)	188	2.97
Teaching of course places more emphasis on theoretical concepts rather than practical aspects of research	2.67% (5)	16.58% (31)	2.14% (4)	55.08% (103)	23.53% (44)	187	3.80
Embraced use of practical research case studies to teach specific research skills	11.23% (21)	51.34% (96)	8.56% (16)	25.67% (48)	3.21% (6)	187	2.58
Embraced use of ICT	26.74% (50)	39.04% (73)	3.74% (7)	24.60% (46)	5.88% (11)	187	2.44
Entailed analysis of Research Reports	22.75% (43)	49.74% (94)	5.82% (11)	17.46% (33)	4.23% (8)	189	2.31

One aspect that the study sought to establish was whether lecturers took care of students' prior knowledge/experience in research at the commencement of learning. From Table 2, a mean of 3.16 suggests that a majority of the respondents concurred with the statement that the course instructors took into consideration their prior understanding of the research process. Indeed, 46.52% and 7.49% agreed and strongly agreed respectively giving a combined total of 54%. However, the 29.95% and 8.02% of the respondents who disagreed and strongly disagreed respectively with the statement giving a combined total of 37.97% is quite significant to be ignored.

The study also sought to establish whether instruction was learner centred and if it build on learners' prior knowledge of research. The responses to this question gave a mean of 2.97 which shows that opinion was divided on whether the teaching of research methodology course was

learner centred and built on learners' prior experience of research. In fact there was a tie between those who supported the statement and those who refuted it as 41.49% and 5.32% agreed and strongly agreed respectively with it while 37.77% and 8.51% respectively strongly disagreed. One respondent pointed out that "lecturers should make use of an individualized teaching and learning method to help the weak students." Similarly, another respondent called for a "more student centered teaching approach through discussions and individual participation rather than lectures."

The study sought to find out whether the instructors put emphasis on theoretical or practical aspects when teaching the course. Responses to this question realized a mean of 3.8 which suggests that a majority of the students felt that the instructional techniques employed by lecturers of the research methodology unit gave more emphasis to theoretical concepts as opposed to practical aspects. Indeed, 55.08% agreed and 23.53% strongly agreed respectively with the statement that teaching of research methodology course places more emphasis on theoretical concepts rather than practical aspects of conducting research. This finding on instructional technique concurs with the earlier finding on the content where the respondents felt that it was skewed more towards theory than practical aspects of research. Many respondents called for a more practical oriented approach in the teaching of the course. One of the respondents stated that: "the teaching of the research methods course should be more practical oriented. Most students get stuck immediately they start conducting their research due to lack of practical skills."

Another respondent called on the lecturers to "teach to impart practical knowledge to the learner other than merely helping them pass the examination." This view was further buttressed by another respondent who stated that: "...they should practically teach us how to conduct research. The notes they give are not sufficient enough to enable us understand. Like now I do not know how to get a relevant theoretical framework because I was not taught."

The study also sought the views of the students on the use of practical research case studies to teach specific research concepts. This item yielded a mean of 2.58 which suggests that a majority felt that teaching of research methodology course did not embrace the use of practical research

case studies. Indeed, 51.34% and 11.23% disagreed and strongly disagreed with the statement respectively. Many respondents pointed out the need to employ practical case studies to teach various research concepts. One respondent stated that “lecturers should use real situation, for example, how and when to apply different research designs.”

Students were also of the view that not much effort was dedicated towards embracing the use of ICT in the teaching of research methodology. The response in support of the statement that ICT was embraced in the teaching of research methodology scored a mean of 2.44 indicating lack of agreement with the statement. In fact, 39.04% and 26.04% disagreed and strongly disagreed with the statement respectively. Many of the respondents were of the view that the lecturers need to exploit the potential given by ICT to enhance the teaching of specific aspects of the course. One respondent pointed out that “there is need to use computer based/web programmes for teaching practical research sampling and data analysis techniques.” Another respondent called for “online delivery of content before the actual contact hours.” This suggests that lecturers could exploit ICT to give content to students prior to the lecture so that the actual contact hours are used for practical learning activities, for example, discussions, analysis of case studies etc. Another respondent advocated that “instructor should use ICT to create a platform where he or she can engage the students in a lot of discussion on research methodology.”

Students were also asked if they agreed with the statement that the teaching of research methodology unit entailed analysis of research reports. This statement scored a mean of 2.31 meaning that a majority disagreed with the statement. Indeed, 49.74% and 22.75% disagreed and strongly disagreed respectively with the statement. There was consensus among the respondents that use of actual research reports should be enhanced in the teaching of the course. One respondent called for “analysis of actual research reports to teach various components and concepts of research.” While another observed that “learners should be provided with best samples of written proposals, thesis and journals articles.” The study also sought to capture the views of the students about their course instructors. This was done for a number of variables as captured in Table 3.

Table 3
Students' Views on Course Instructors Delivery Methods

The course instructors:	Strongly Disagree	Disagree	Not sure	Agree	Strongly agree	Total	Weighted Average
Have systematic way of delivering the content	4.76% (9)	15.34% (29)	11.11% (21)	56.61% (107)	12.17% (23)	189	3.56
Are competent in the delivery of the content	1.06% (2)	7.94% (15)	11.64% (22)	55.56% (105)	23.81% (45)	189	3.93
Have relevant instructional materials to expose the students to real world of research	5.85% (11)	35.11% (66)	17.55% (33)	30.85% (58)	10.64% (20)	188	3.05
Are focused on teaching to pass examinations rather than giving practical research process knowledge	5.82% (11)	27.51% (52)	7.41% (14)	40.21% (76)	19.05% (36)	189	3.39

Table 3 shows that most students were in agreement that their instructors had a systematic way of delivering content. The mean for the statement was 3.56. Indeed, 56.61% and 12.17% agreed and strongly agreed respectively with the statement that the course instructors have a systematic way of delivering content. Similarly, the students rated their instructors highly with regard to competency in delivery of content with a mean of 3.93. In response to the statement, 55.56% and 23.81% of the students agreed and strongly agreed respectively. However, the students were of the view that the instructors lacked relevant instructional materials needed to expose them to the real world of research. The statement that the course instructors have relevant instructional materials drew a mean of 3.05 and only 30.85% and 10.64% of students agreed and strongly agreed with the statement. Respondents also gave their views on the statement that the teaching by the instructors is focused on helping the students pass their examinations rather than giving them practical research process knowledge. Support for this statement was high with a mean of 3.39. Indeed, 40.21% and 19.05% of respondents agreed and strongly agreed with the statement. The third objective of the study was to assess the contribution of the research methodology course on building students' research capacity. The students responded to questions focusing on some specific skills and competencies that are critical in the research process. The results are shown in Table 4.

Table 4**Students' Views on Capacity Gained from Research Methodology Course**

The course on research methodology has given me capacity to:	Strongly Disagree	Disagree	Not sure	Agree	Strongly agree	Total	Weighted Average
Fully understand the research process	6.38%; (12)	28.19% (53)	9.04% (17)	48.94% (92)	7.45% (14)	188	3.23
Write an effective study background	4.26% (8)	21.81% (41)	9.57% (18)	52.13% (98)	12.23% (23)	188	3.46
Identify and state a research problem	3.70% (7)	17.99% (34)	8.99% (17)	56.61% (107)	12.70% (24)	189	3.57
Understand how to formulate good hypothesis	2.63% (5)	17.89% (34)	13.16% (25)	54.74% (104)	11.58% (22)	190	3.55
Understand how to formulate good objectives	1.60% (3)	14.44% (27)	9.09% (17)	63.10% (118)	11.76% (22)	187	3.69
Identify appropriate theory for my study	4.79% (9)	26.06% (49)	11.17% (21)	48.94% (92)	9.04% (17)	188	3.31
Develop a conceptual framework in research	4.30% (8)	22.58% (42)	9.68% (18)	53.76% (100)	9.68% (18)	186	3.42
Conduct critical literature review	3.21% (6)	22.46% (42)	10.70% (20)	52.41% (98)	11.23% (21)	187	3.46
Select an appropriate research design for my study	4.71% (9)	24.08% (46)	7.85% (15)	52.88% (101)	10.47% (20)	191	3.4
Select appropriate data analysis techniques	8.56% (16)	29.95% (56)	10.16% (19)	44.92% (84)	6.42% (12)	187	3.11
Interpret research results	8.51% (16)	27.13% (51)	11.70% (22)	44.15% (83)	8.51% (16)	188	3.17
Write a research report	5.82% (11)	23.28% (44)	13.23% (25)	48.68% (92)	8.99% (17)	189	3.32
Disseminate research findings	6.84% (13)	23.16% (44)	17.89% (34)	46.32% (88)	5.79% (11)	190	3.21

Table 4 shows that a majority of the students (Mean 3.23) were of the view that the research methodology course helped them with full understanding of the research process.

Indeed, 48.94% and 7.45% agreed and strongly agreed respectively that the research methodology course helped them fully understand the research process. Nevertheless, the 28.19% and 6.38% who disagreed and strongly disagreed respectively is still a sizeable constituency which cannot be ignored.

A majority of the students (mean 3.46) were of the view that the course equipped them with skills that enabled them write an effective study background. In fact, 52.13% and 12.23% agreed and strongly agreed with the statement that the course had built their capacity to write an effective study background.

A majority of the students also felt that the course had built their capacity in identifying and stating a research problem with a mean of 3.57. A total of 56.61% and 12.70% of the respondents agreed and strongly agreed respectively with the statement that the course had boosted their capacity to identify and state a research problem. Similarly other areas where the students felt the course had built their capacity are formulation of hypothesis (mean 3.55), formulating objectives(3.69), development of conceptual framework(3.42), critical literature review(3.46) and selection of research design(3.40). However, there are some three areas that many respondents felt the course did not cover. Selection of an appropriate research design is one. The other was data analysis and lastly how to write a research report.

Discussion

The study established that the research methodology course content was more theoretical than practical. There was a consensus among the respondents that students would have preferred that the course be more practical oriented both in terms of content and instruction. Research is a combination of both theory and practice and therefore if the training is tilted more towards the theoretical domain, the students may face challenges when they start doing their research projects when theory is translated to practice. This perhaps explains the observation made by the researchers in the course of their teaching duties that students' progress slows down after they finish their course work and enter the research stage. Some take long to identify a research problem and write a proposal while the failure rate during the oral proposal defences is at times high.

The study also established that the course content is broad and the time allocated is insufficient to adequately cover all areas especially for Postgraduate Diploma in Education (PGDE) and Master of Education degree students. At these levels, the two major research designs (quantitative and qualitative) are combined in one course unlike at the doctorate level where they are taught as distinct units. The broad course content at these two levels may lead to failure to master some skills and competencies because the course instructors would be rushing against time to cover the bulk content.

The instructional strategies are as important as the content. The content may be good in many aspects but if the methods of delivery are wanting, then the curricula objectives may not be realized. Theorists of learning have argued that good learning should be centred on the learner and the teacher's role should be majorly facilitative. The study established that the teaching of the course was not learner centred. Thus, there is a need for instructors to put more effort in tapping students' entry behaviour with regard to their experience in research as learning is usually effective when it starts on the already established foundation. This means that there is a need for instructors to put more effort in embracing learner centred instructional techniques.

It was also established that lecturers were also more theoretically than practically inclined in their teaching methods. Just like with content, there is also need to embrace an instructional technique that strikes a balance between theory and practice as the students will need both if they are to be successful in their research undertakings. This lack of balance could explain the numerous challenges the post graduate students encounter when it comes to the actual execution of their research projects making some of them take longer to graduate. The study established that there is little use of ICT in the teaching and learning of the research methodology course. This is unfortunate as ICT is an indispensable tool today for any researcher throughout the research process from literature search, data analysis, report writing and dissemination. There is need, therefore, to teach practical ICT applications relevant for research, for example, data analysis programmes like SPSS, Stata, Nvivo etc. as well as referencing and plagiarism softwares.

The study established that the research methodology course did not adequately equip learners with skills in three key areas, namely, selection of research design, data analysis and research report writing. This could be attributed to the theoretical orientation of both the course content and the instructional techniques. The broad course content amid limited time may also be a significant factor.

Conclusion

There is a need to change the orientation of the content of the research methodology course unit by striking a balance between theory and practice. As currently offered, the scale is tilted in favour of the theoretical and there is need to expose students to real/practical research experience. There is also need to increase the credit hours allocated to the unit to allow for in-depth coverage of all aspects of the research process. This could be realised by splitting the course unit at the PGDE and Masters levels. On instructional techniques, there is also need, just like with the content, to raise the scale in favour of practical as most lecturers majorly employ a theoretical approach to the teaching of the course. This can be achieved through the use of case studies, analysis of research reports and practical research sessions. This would help banish the view held by students that teaching by the instructors is focused on helping them pass their examinations rather than giving them practical mastery of the research process. The lecturers should also embrace learner-centred instructional techniques which will cater for the entry behaviour and individual differences of the students. There is also need to embrace the use of ICT in the teaching of research methodology unit as it would expose the students not only to the great reservoir of on-line research but also relevant applications that aid the research process, for example data analysis, referencing and anti-plagiarism software.

References

- Diana, T. J. Jr (2013). Developing the reflective teachers with the Research- Based Rationale, kappa Delta Pi Record, v49 p26-29 2013
- Earley, M. (2014). A synthesis of the literature on research methods education, Teaching in Higher Education, 19 (3), 242–253. doi:10.1080/13562517.2013.860105

- Gutierrez, D.C., Guadalupe, E.V. (2014). The importance of teaching methodology in higher education: a critical outlook. *Procedia-Social and Behaviors sciences* 174(2014) 377-382
- Johnson, D.W., Johnson, R.T., & Holube, E.J... (1991). *Cooperation in the classroom*. rev. ed. Edina, MN. Interaction Book Co.
- Melanie, N., Daniel K. & Rebekah L. (2015). The teaching and learning of social research methods: developments in pedagogical knowledge, *International Journal of Social Research Methodology*, 18:5, 455-461, DOI: 10.1080/13645579.2015.1062631
Retrieved from: <http://dx.doi.org/10.1080/13645579.2015.1062631>
- Sarah, L. & Melanie N. (2016). Teaching Research Methods in the Social Sciences: Expert Perspectives on Pedagogy and Practice, *British Journal of Educational Studies*, 64:4, 413-430, DOI: 10.1080/00071005.2016.1197882.
Retrieved from: <http://dx.doi.org/10.1080/00071005.2016.1197882>
- Sharlene, H.B. (2015). The problems and prospects in the teaching of mixed methods research, *International Journal of Social Research Methodology*, DOI: 10.1080/13645579.2015.1062622 Retrieved from: <http://dx.doi.org/10.1080/13645579.2015.1062622>
- Stewart, V. (2011). Raising Teacher Quality around the world. *Educational Leadership* v68, n4, p 16-20 Dec 2010-jan2011. ASCD: USA.
- UNDP (2015) Human Development Report, Retrieved from <http://hdr.undp.org/en/content/human-development-index-hdi>
- Wagner, C., Garner, M. and Kawulich, B. (2011). The state of the art of teaching research methods in the social sciences: towards a pedagogical culture, *Studies in Higher Education*, 36 (1), 75–88. Doi: 10.1080/03075070903452594
- World Bank (2014). A Decade of Development in Sub-Saharan African Science, Technology, Engineering & Mathematics Research Retrieved from: <http://worldbank.org/africa/stemresearchreport>

Authors Profile

Dr. Mukirae Njihia is a Lecturer in the Department of Educational Management, Policy and Curriculum Studies, School of Education, Kenyatta University. He holds a PhD degree in Educational Planning as well as an Advanced Certificate in Education Sector Planning from IIEP/UNESCO. Dr Njihia is engaged in educational research and he was the lead researcher for a UNESCO/IIEP research project on school grants in Kenya between 2011 and 2014. Dr. Njihia has written and presented academic papers in numerous international conferences. He also undertakes consultancy projects in the fields of education and social sciences. Email: mukiraeus@gmail.com; njihia.mukirae@ku.ac.ke

Dr Hellen Kiende is a Lecturer in the department of Education Management, Policy and Curriculum Studies, School of Education, Kenyatta University, Kenya. She holds a PhD in Education Management. Dr Kiende has special research interests in Gender issues in Management, Education policy, Education Reforms and social Science Research. She has attended both local and international conferences on matters of Education. She has participated in the development of online modules in Education management that are used for teaching both undergraduate and post graduate students. Email: kiende.hellen@ku.ac.ke or kiendehellen15@gmail.com

Postgraduate Research Training in Sub-Saharan Africa: Shall Petals Blossom in Kenya

Prof. Judith S. K. Achoka

Abstract

Postgraduate research training is the hallmark of university education. It is important for the provision of the much needed manpower for sustainable development the world over. However, training at this level in Sub-Saharan Africa (SSA) suffers various challenges. I have likened required improvements to petals. The purpose of this article was to discuss bottlenecks in postgraduate research training in SSA and suggest alleviation of the same for the blossoming of petals (improvements) to flourish in SSA and in Kenya specifically. The methodology used for this paper was entrenched in desktop internet literature research. The data were analyzed, synthesized and presented herein. This article concludes that petals of postgraduate research training in SSA (Kenya included) can blossom. This is possible at the removal of challenges such as brain drain and equipping of Higher Education Learning centers with research facilities among others. It is recommended that national policies that designate specific discipline training in particular universities be developed and implemented.

Key words: Postgraduate, Training, Research, Development, Facilities, Petals, Challenges & Policy

Introduction

The Sub-Saharan African region hosts about one billion inhabitants with over two hundred public universities and a fast growing number of private universities (Friesenhahn, 2014; Adams, et al., 2010). Many scholars agree that higher education especially at the university level is most significant for the region's fast development and future sustainability (Friesenhahn, 2014; Mouton, 2011; Mohamedbhai, 2011; Sifuna & Sawamura, 2010; Azcona, 2008). Hence higher education in Sub-Saharan Africa (SSA) has been expanding since the 1970s, after most African Nations gained their independence from their colonial masters. However, it was not until the 1990s that postgraduate studies got focused attention from their respective Governments (Friesenhahn, 2014; Bloom, et al., 2005).

In 1997, post graduate enrolment in SSA was 6.9 percent of the total universal enrolment. This figure rose to about 9.3 percent in 2014 (Hayward and Ncayiyana, 2014). The underlying understanding in this paradigm shift is that it is at the post-graduate training and research level that one's skills are concretized, further knowledge secured and later applied beyond national boundaries. Not surprisingly, enrolment in higher education in SSA rose from 200,000 learners in 1970 to the current about 10 million students (Friesenhahn, 2014). Consequently, at the African Summit held in Senegal in March, 2015, an Action Plan was drawn calling for "...dramatic increase in higher education" by 50 percent across Africa in the next 50 years from 8 percent in 2012, compared to 26 percent in Arab states and about 76 percent in the developed world (UNESCO, 2008). In other words, the African Union recognizes the importance of post-graduate studies within which research training is entrenched. The training of our learners at this level should therefore be aggressively engaged (African Union, 2005) for the purpose of manpower and national development in our globalized and fast-paced existence.

True to say, any nation or region that produces quality personnel is best suited to thrive in this era of Sustainable Development Goals (SDGs) and beyond (British Council, 2013). The implication for Kenya is that as a nation she must endeavour to achieve effective postgraduate research training for her to be able to efficiently participate in processes and consequences of quality research training competitively globally. For these reasons, the SSA regions higher education sector is undergoing radical change. For instance, Globalization and privatization processes are reshaping universities while mechanization and the internet are altering the industry and employment in new ways uncommon to our history. Yet, unfortunately, research and training in SSA seem beset by various challenges.

The gist of this paper focused on the challenges of postgraduate research training in SSA and by implication Kenya which is within the region. It also provides suggestions for alleviation of discussed impediments.

Methodology

This article focused on responding to two critical aspects of postgraduate research training in Sub – Saharan Africa. The aspects which were then turned into researchable questions were: What challenges does post graduate research training in Sub – Saharan Africa encounter? How can petals of post graduate research and training in Kenya blossom?

Thus, while designing the study, the author well understood that Kenya lies within the region of interest. Moreover, whatever happened in the region had impact on Kenya and vice versa. Keeping this understanding in mind, the design was found most suited for this study was survey of literature. Two hours per day of the five working days in a week for three consecutive weeks were spent in the libraries seeking relevant data. The literature was sourced also with the help of computer. At the same time, the author used her own experience of 25 years' of teaching postgraduate students to better understand and reinforce points herein shared. Accumulated data were carefully analyzed, synthesized, augmented and presented for consumption.

Some Challenges of Post Graduate Research Training in SSA

Despite Ph.D. studies being relatively new in SSA compared to those in the developed nations, they are developing fast. Moreover, the present knowledge society in which we live in consistently demands reforms in our research and training institutions to stay relevant to the fast changing knowledge demands of today. Increase in the number of universities and enrolment rates add pressure to higher education institutions offering postgraduate studies to realize quality training and research (Bloom, et. al, 2005). This however shall take long to be realized. Presently, the region posts low scientific results and visibilities on a global level developed in the few competitive research centers in SSA (Quintana and Calvet, 2012; World Bank, 2008).

To concretize this point, only 35 scientists and engineers per every one million inhabitants in Africa may be cited compared to 168 in Brazil, 2,457 in Europe and 4,103 in the United States of America (Hayward & Ncayiyana, 2014). In fact, the number of scientific articles published in the African continent (273/year) is comparable with half of the production of the Netherlands only (Hook, 2010). Various challenges have made research to almost become a personal objective, which makes competitive research too difficult to achieve (UNESCO, 2008). For instance, a

large percentage of about 60-70 of the doctoral candidature enroll as part time students. This makes cumulative learning or a solid knowledge base elusive (Mohamedbhai, 2011). Furthermore, the students are confined to the rush to acquire certification as their zone of operation and acceptance is limited to: family, job and school, (see Figure 1).

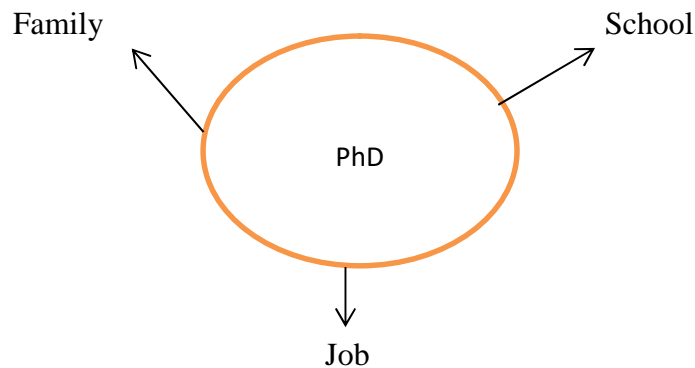


Figure 1. Limited PhD part time operations – low quality research findings

Source: Created by author from literature (2016)

Their work is largely directed by the urge to acquire certification and not necessarily a solution to an impending problem. Moreover, many doctoral studies tend to perpetuate individual research paths, short term calendars, little impact on large region and little, if any direct impact on industry (UNESCO, 2008; IAU, 2010). Not surprisingly, hardly is there much meaningful internationalization of doctoral programmes and exchange of students in SSA. The results of these bottlenecks include lack of innovative practices and strategies at international levels to give a positive impact on the quality of training and research not to mention also a lack of greater integration of research findings (UNESCO, 2008). Moreover, a lack of high rate of collaboration and cooperation processes between and or among universities greatly hampers quality research findings at institutional, national and SSA at large. Coupled with the difficulty to access information about doctoral programmes in each SSA university/nation, one is highly disabled in the quest to share visions, knowledge and achievements. This consequently, results in near duplication of research findings, making some doctoral students highly vulnerable to plagiarism! This is a global issue and real problem for SSA that is struggling to develop a niche in the world of research training (Sifuna & Sawamura, 2010).

Another challenge that blurs the image of research and training in SSA is poor research infrastructure (Mouton, 2011). The lack of, for example, well equipped laboratories; libraries; adequate information storage retrieval and utilization systems, appropriate management systems; lecture halls/rooms; common rooms and policies that facilitate and support the research enterprise including incentives that recognize and reward high caliber research and institutional culture that is supportive of research and inquiry, contribute to meager research and training at the postgraduate level in SSA (Mouton, 2011; Shaban, 1996). In many countries, physical planning in public universities is not commensurate with their rate of growth and expansion as more students are enrolled. To say the least, Kenya is among such nations since the dawn of the 21st century. This issue leads to an overstretching of available facilities, inadvertently disadvantaging the postgraduate doctoral students the most. It is more deplorable in the science and technology disciplines (Sifuna and Sawamura, 2010) making the lack of distinctive research training in Information Communication and Technology (ICTs) to be better housed by the private sector than universities. It is in these ICT hubs that innovative research is sprouting and flourishing faster than in the universities (Azcona, 2 008); a matter that should be urgently attended to in order to harness and disseminate knowledge in an orderly hence meaningful ways for local regional and global consumption as well as acknowledgement.

Policy encumbrances is another issue in post graduate research training in SSA. For a university to gain and sustain its stature, it must have clear legal frameworks that link its management; research trainings as well as the doctoral students; lack of relevant policies push back accurate research training due to insufficient support and goodwill. Said differently, SSA imperatively needs strong national and political goodwill yielding supportive policies for competitive research findings. Such policies should cut across political boundaries allowing a permeable research training membrane for exchange of scientific findings at the post graduate level. For these matters the International Association of Universities (IAU) and the African Union (AU) are commended for spearheading such breakthroughs for the SSA region, (IAU, 2010; AU, 2005).

It is true that there are traces of policies in some countries in SSA region. But, they suffer being limited to their respective universities autonomy; leading to negative impact on research training (Adams, et al 2010), for the region. In other cases, research training in identified priority areas

does not always hold strategic position in university agenda (IAU, 2010; UNESCO, 2008). Unfortunately, such studies can only be noted in few universities; whose strategic plans define and elaborate medium and long-term objectives for doctoral studies and identify priority research areas (UNESCO, 2008). Furthermore, a clear policy framework linking postgraduate research training to industry is not easily located (Materu, 2007). This scenario reflects poor guidance from universities in SSA and deficient strategic steering through national policies.

Inadequate academic staff, especially professors, to effectively teach and mentor postgraduate students in SSA is a big challenge to scientific competitive research training (UNESCO, 2008). The few senior professors available for graduate supervision are overworked and this impacts poorly on the quality of their work outputs. The clear absence of senior scholars designated “research professors” in most universities coupled with indifferent research support staff reflect low priority attached to research training in SSA (Quintana & Calvet, 2012). This situation does not encourage serious training in research and specialization in knowledge skills and attitudes – perpetuating absence of competitive research and development of competencies.

Moreover, heavy teaching loads with the benefit of modern teaching aids or even the traditional support of teaching assistants, poor incentive systems, low promotions arising partly from the limited access to publishing outlets and international conferences and seminars/workshops due to financial constraints and now the requirement to have raised millions of money in the case of Kenya specifically; add to the disheartening of many senior scholars at the universities leading to low and poor scientific research and training.

Poor handling of research methodology produces shallow knowledge and understanding by students, especially those in science-based subjects requiring analytical methodologies that use computer technologies. Thus many postgraduate students leave universities without having accomplished innovative or imaginative rigor to produce new ideas for present practice (Njuguna & Itegi, 2013).

Insufficient funding and brain drain are combined in presentation due to the intertwined nature and effects. In the last few decades, the development of research training in SSA has been

boosted through investment in Science, Technology and Innovation (Gast, 2005). However, the global financial crunch has not spared the SSA region; severe shortage of funding in every nation forces research and training to compete with all other sectors of the economy (Njuguna & Itegi, 2013). It is noted that SSA spends less than 0.5% of her GDP on research and training, posing a challenge to the development of advanced research (Hyward & Ncayiyana, 2014). Among the young African scientists surveyed by the Global Young Academy for their perception of research training, 70.3 percent noted that poor or scarce funding opportunities were among their most severe career obstacles (Friesenhahn & Beaudry, 2014). Accordingly, the serious issue of brain drain sets in to further destabilize serious research and training in SSA. Qualified academic staff move on to pursue more attractive opportunities in research and training outside the universities and or country. For instance, about 10 percent of every cohort of Sub-Saharan Africans with graduate degrees emigrate leaving low number of personnel behind (Friesenhahn & Beaudry, 2014). In countries such as Nigeria, Ethiopia, Uganda and Zambia, there are about 0-500 research scientists in every one million inhabitants. This Figure compares poorly with those of developed countries like Canada, Germany, France, Australia, and the United Kingdom where there are 5,000 – 8,000 research scientists (British Council, 2013; UNESCO, 2012).

Stiff competition for funding has forced sponsors to limit most of their donations to short term research projects. Yet, research training is long term undertakings (World Bank, 2008; Gast, 2005). This picture leaves Governments and universities unable to train researchers who would in turn train and mentor their postgraduate students to internationally competitive standards. Paradoxically, many Governments of the SSA regions sacrifice to pay for individuals to train abroad but are unable to absorb them after graduation. Financial squeeze notwithstanding, perhaps our Governments have not yet fully appreciated the contributions of competitive research findings to national and regional development; therefore do not prioritize funds for research and training in all disciplines.

Petals of Postgraduate Research Training in Kenya shall Blossom

As one of the nations within SSA region, Kenya suffers all the shortfalls discussed above. Thus, as Kenya positions herself to become a semi industrialized nation by achieving her Vision 2030 in less than 13 years as well as effectively and efficiently participate in the achievement of the 17

Global Sustainable Development Goals, she is obliged to delve into research training for tangible findings and practical implementation. Kenya cannot escape this obligation; she is duty bound to ensure that her blue print vision 2030 is actualized and transforming her into a “newly industrialized, middle income country providing a high quality life to all citizen in a clean and secure environment (GoK, 2013). This means that Kenya focuses and improves reforms and development in the eight key sectors outlined in the Blue Print, see Figure 2.



1.	Macroeconomic stability
2.	Continuity in governance reforms
3.	Enhanced equity and wealth creation
4.	Infrastructure
5.	Energy
6.	Science, Technology and innovation
7.	Land reform
8.	HRD, Security and timely justice

Figure 2. 8 key sectors for emphasis in vision 2030. **Source:** Government of Kenya, 2013.

The above sectors are coined from Kenya’s three pillars for Vision 2030, see Figure 3. The universities that are privileged to host postgraduate students should aim at aggressively researching and training manpower in the eight regimes above; sprint away from allowing doctoral students to simply go through the system without having meaningful and regime specific findings. Clearly, each of the three Pillars: Economic, Social and Political, needs this type of aggressive approach for Kenya to glow and prosper through research and training at the postgraduate level.

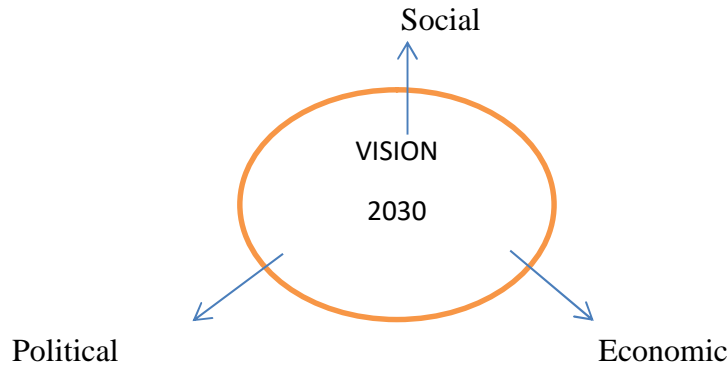


Figure 3. The 3 Pillars anchoring Vision 2030 **Source:** Government of Kenya (2013)

Incidentally, the year Kenya hopes to achieve her Vision 2030 is the same year the Globe hopes to realize her 17 Sustainable Development Goals (SDGs). This means that Kenya has to aggressively double her efforts to appear like a hunter in the forest aiming at two birds with one stone! Kenya therefore must strive to train her human resources not only excellently but also speedily in order to also achieve the 17 SDGs, see Figure 4.



Figure 4. The 17 Global Goals for SD **Source:** Developed by author from the literature (2016)

Achievement of the goals above shall be made possible through research and training especially at the postgraduate level. This calls for Kenya to heavily finance research and training in postgraduate studies with an aim to turn findings into practical knowledge for implementation and achievements. Needless to emphasize, this approach dictates easing strain on professors concerned; establishing required facilities; mandatory requirement of especially doctoral students to enroll in full time programmes; implement exchange of programmes, students and staff among others. The fixture of these challenges shall make ways for “petals” of research training in Kenya to blossom and flourish. This shall take courage and good will of our professors and the Government respectively to turn the wheel of research and training for postgraduates from being less effective to the required quality standards that are globally competitive.

Summary

As the SSA region strives to develop, her Governments find themselves obliged to invest heavily in higher education and especially at the post graduate level. This need is inescapable given our knowledge-based economies of the 21st century. The more this fact glares at the face of every Government involved, the more it becomes apparent that most countries have been unable to fund quality research training adequately.

The lack of sufficient funding for postgraduate programmes in SSA generates several other challenges such as: brain drain and inadequate facilities for quality training. Nonetheless, as the region strives to facilitate growth in her postgraduate research and training it is herein reiterated that, the sector remains the most suitable conduit for the transfer, adaptation and dissemination of information in our current knowledge based economies. Alleviation of noted challenges shall usher in blossoming of the petals in the region and Kenya specifically, which in turn shall facilitate globally competitive research training.

Conclusion

It is noted that research training in SSA is still below required global standards. The SSA region is within the system of struggle to make a niche. This is possible albeit various and varied challenges. Kenya being a part of the region, is not barred from excellence; the Petals shall blossom.

Suggestions for way forward

Various suggestions are provided for the way forward:

- Encouraging development of and support policy frameworks that provide for the formation of research teams linked to industry, technology development and grant programmes for postgraduate students. Resulting research findings should be tailored towards national and regional development.
- Development of national policies to allow designation of specific universities' specialization in particular disciplines. This approach shall enable emergence of more centers of excellence for better utilization of resources, enhancement of development of skills, competencies and attitudes for concrete research findings for dissemination and application.
- Develop research professors, improve academic staff remuneration, nurture talent and award scholarship. These approaches may deter brain drain and concurrently motivate academic staff to maximize their input in research and training.

References

- Adams, J. King, C and Hook, D (2010). Africa Global Research Report. Evidence Ltd and Thompson Reuters, Leeds
- African Union (2005). Africa's Science and Technology Consolidated Plan of Action. African Union.
- Azcona, G (2008). Harvesting the Future: The Case for Tertiary Education in Sub-Saharan Africa. The Maxwell School of Syracuse University.
- Bloom, D; Canning, D.I and Chan, K (2005). Higher Education and Development in Africa. Harvard University Research Commissioned by World Bank.
- British Council (2013). Why the UN must include Higher Education in the Post Millennium Goals Agenda
- Friesenhahn, I (2014). Marking Higher Education Work for Africa. Facts and Figures.
- Friesenhahn, I and Beaudry, C (2014). The Global State of Young Scientists. Young Academy.

- Gast, J.W (2005). The Visions Policies and Programmes of a Sample of Northern Donors Regarding their Support for Higher Education. Development in the south. Paper for Nuffic Conference.
- Government of Kenya (2013). Vision 2030. NBI: GoK.
- Hayward, F and Ncayiyana, D (2014). Confronting the Challenges of Graduate Education in SSA and Prospects for future. Chronicles of African Higher Education.
- International Association of Universities (2010). Changing Nature of Doctoral Studies in SSA. Challenges and Policy Development Opportunities.
- Materu, P (2007). Higher Education Quality Assurance in SSA: Status, and Promising Practices. A World Bank Working Paper No. 124. Washington DC
- Mohamedbhai, G. (2011). Strengthening the Research Component of the space of Higher Education in Africa. AAU Conference of Rectors, Vice Chancellors and Presidents. Stellenbosch.
- Mouton, J. (2011). The State of Doctoral Training in SSA: Statistics Analysis and Challenges. AAU Conference of Rectors, Vice Chancellors and Presidents. Stellenbosch.
- Njuguna, F and Itegi, F (2013). European Scientific Journal Vol 1. PP. 352 – 361.
- Quintana, I and Calvet, A (2012). Current Situation and Future Challenges of PhD Studies in Sub-Saharan Africa. Barcelona: African Spanish Higher Education Platform
- Shaban, J. (1996). Research Management in African Universities. Accra: Ghana: Association of African Universities. Unpublished Paper
- Sifuna, D.N and Sawamura, N. (2010). Challenges of Quality Education in Sub-Saharan African Countries Nova Science Publishers.
- UNESCO (2008). Draft Regional Report on SSA. Study on National Research Systems. UNESCO, Paris.
- UNESCO (2012). Institute for Statistics Fact Sheet, No. 21
- World Bank (2008). Accelerating Catch up: Tertiary Education Growth in SSA. World Bank, Washington DC

Authors Profile

Dr. Judith Serah K. Achoka, an Associate Professor of Education is the Director of Research and Extension, Masinde Muliro University of Science and Technology, Kakamega. She is a holder of, B.Ed (Hons) from UoN, M. A. (Education) from McGill University, PhD from Kenyatta University, and Post Doc Cert in Higher Education Management from University of Kassel. Her contacts are; Tel: (254) 721232432 and email; achokajudith@yahoo.com

Assessment of State of Research Utilization among University Academic Staff in Kenya: A Case of Education, Arts and Social Sciences

Dr. Wambua Benjamin Kyalo and Prof. Marcella Mwaka

Abstract

The Government of Kenya recognizes the importance of research in its higher education policy objectives. Effective research utilization is considered instrumental in the realization of Vision 2030 and development in general. This study assessed research utilization among the academic staff in three public and two private universities in Kenya, and sought to examine the following: the areas of research concentration by university academic staff, the purpose of research utilization, Institutional support towards research utilization, the perceived barriers to research utilization, and the determinants of research utilization. The study adopted cross sectional research design, and was both qualitative and quantitative in nature. It was anchored on Diffusion Innovation Theory. Sample size, which comprised of university academic staff members, Heads of departments, Deans of faculties and Library managers from both public and private universities, was determined using both probability and non-probability techniques. Questionnaires, interview guides and observation schedules were employed in data collection. Descriptive statistics, multiple linear regression analysis and two independent t-tests were adopted for quantitative data analysis. Qualitative data were categorized and analysed according to themes. The study established that institutional support, academic qualifications, and innovation qualities of research-based evidence determined participation in research utilization. Barriers to research utilization were created by the complexity of research reports and their lack of relevance, timeliness and accessibility. Both private and public universities demonstrated commitment to research utilization in terms of budgetary allocation and infrastructural facilitation. The findings indicated that academic staff concentrated on educational management, policy, curriculum matters and Information and Communication Technology (ICT), institutional governance, society and development, disaster management and gender perspectives and educational finance. The findings of this study will be of interest to policy-making institutions, educators, quality management system analysts, and university management. The study recommends increased institutional support towards research activities in form of budgetary allocations, ICT facilities and training programmes on statistical analysis, integration of research-based evidence in policy formulation and pedagogy and increased participation in applied research.

Key Words: Research Utilization, Determinants, Barriers, Purpose, Diffusion Theory

Introduction

In the age of globalization, the knowledge economy discourse has become a way to characterize the new relationship between higher education, the state and society, and the economy. Institutions of higher education core functions consist of teaching, research and community extension service (United Nations Education, Scientific and Cultural Organization (UNESCO 2010). The output by Higher Education (HE) institutions becomes increasingly important for international competitiveness of a nation through generation, application, and dissemination of knowledge. The past decade provides evidence that HE and research contribute to the eradication of poverty, sustainable development and progress towards reaching the internationally agreed upon development goals which include Millennium Development Goals (MDGs) and Education for All (EFA), (UNESCO, 2007).

Utilization of research based evidence possesses the capacity to inform innovative and pragmatic policy formulation in education. Integration of utilitarian and multidisciplinary research output into education theory and practice should be embraced by education system. The relevance of given knowledge for the development of modern society and the rise of knowledge-based economy has increased the viability of those institutions that create and disseminate knowledge (Guená & Muscio, 2009). It should be noted that knowledge transfer is a multifaceted and complex process. Knowledge transfer agencies have inbuilt qualitative and quantitative dimensions, which in practice tend to hinder smooth flow of innovations.

Knowledge is a critical factor for sustainable development. Without the appropriate context and application, knowledge cannot successfully catalyse sustainable development. Thus HE that guarantees access to research outputs is an enabling infrastructure for all sectors of the economy for democracy and good governance (Bailey, 2010). Despite the infrastructural development for research activities in Institutions of higher learning in Africa, knowledge transfer is influenced by the absence of proper coordination between knowledge generation agencies and end users.

Higher education research advocacies in Africa are geared towards developing a network that will provide evidence-based information about some crucial links between higher education and development. The advocacy component aims to drive dissemination, communication, and

utilization of research (Bailey, 2010). There is need to ensure that, commitment and efforts geared towards improving knowledge transfer in developing countries have the capacity to propel socio-economic development. Most of the research conducted in the institutions of higher learning in Kenya is not specifically tailored towards solving problems affecting the education sector. Graduate students carry out research for the purpose of degree awards. Scholarly publishing by academic staff is motivated by the quest for promotion. The type of research utilization by academic staff in Kenyan Universities is conceptual and to some extent instrumental. Symbolic utilization which possesses the capacity for improving governance and management of higher education is yet to be entrenched within the university system (Bickel & Cooley, 1985). Mechanisms for determining the extent of utilization of research based evidence for improving governance and management are not clear.

Literature review shows that significant involvement by organizations throughout the research process, the implementation of favourable organizational culture, and presence of positive research values foster the acquisition and translation of research knowledge into practice (Barwick et al., 2008). On organisational level, an organization's receptivity to research knowledge, utilization, and its leadership have an important influence on user efforts to acquire, understand and even participate in the development of knowledge (Barratt, 2003). On individual level, receptivity and attitudes of potential users towards research knowledge have been identified as being important factors in knowledge utilization (Amara, Quimeit & Landry, 2004). Individual attitudes pose difficulties when it comes to integration of research knowledge into professional practice. Other aspects that may complicate proper adoption and adaption of innovations include organisational culture, vision and mission of individual university.

Statement of the Problem

Research utilization forms a basis for quality in higher education in Kenya. Quality in Higher Education (HE) is perceived as consisting of synthesis, conformity, adaptability and continuous improvement. Research utilization creates the capacity and environment for educators to understand specific purposes and methods employed in previous studies. Utilization of research related to emerging issues and future perspectives is critical in shaping current and future teaching and learning processes (Askew, Matthews & Partridge, 2002). The Government of

Kenya recognizes the importance of research utilization in its Higher Education Policy objectives.

Research utilization creates the capacity and environment for educators to understand specific purposes and methods employed in previous studies. Utilization of research related to emerging issues and future perspectives is critical in shaping current and future teaching and learning processes (Askew, Matthews & Partridges, 2002). Effective research utilization strategies are considered instrumental in the realization of Kenya Vision 2030 and general development. The Government of Kenya recognizes the importance of research and its dissemination in its Higher Education Policy objectives. However, little or no research outputs are disseminated and integrated in the mainstream policy framework (Government of Kenya, 2007).

Harle (2010) established that most institutions of higher learning in Africa have considerable levels of research oriented activities, but decried low levels of research utilization by the institutions. Onsongo (2005) investigated the role of research and publication of academics in Kenyan Universities. The findings revealed that academic promotions were strongly linked to research and publications. Migosi (2009) explored factors influencing research productivity among academic staff in selected public and private universities in Kenya.

According to Ezema (2010) there are low levels of utilization of research output in Humanities and Social Sciences in Africa. Literature reviewed indicates that there exists a gap between knowledge generation and application (Sally, Jeffery, Christian & Leslie, 2007). Oduwaiye, Owolabi, and Onasanya (2009) note that university academic staff gives more attention to dissemination than utilization and commercialization. The studies reviewed revealed limited accessibility to research outcomes, and failed to identify both qualitative and quantitative factors and conditions influencing research utilization in higher education institutions in Africa. It is against this background that this study was designed to assess research utilization among university academic staff in Kenya.

Research Questions

- 1) What are the areas of research concentration by University academic staff in Kenya?
- 2) What factors determine university academic staff involvement in research utilization?
- 3) For what purpose is research outcome utilised by academic staff in Kenyan universities?
- 4) How does institutional support influence research utilization?
- 5) What are the perceived barriers to research utilization among university academic staff?

Null Hypothesis

The null hypothesis examined the factors determining the extent of academic staff involvement, namely innovation qualities, institutional support, academic qualifications and individual characteristics. Multiple linear regression analysis was employed to investigate the relationship.

H₀1 There is a significant relationship between research innovation qualities and research utilization in Kenyan Universities.

H₀2 There is a significant relationship between institutional support and research utilization

H₀3 There is a significant relationship between Lecturers' Academic qualifications and research utilization

H₀4 There is a significant relationship between individual characteristics and research utilization.

Significance of the Study

This study was designed to provide an understanding of factors influencing research utilization in higher education institutions in Kenya. It generated vital information on support and facilitation mechanisms for knowledge transfer prevalent in both private and public universities in Kenya. The findings will be especially of interest to policy making institutions, educators, quality management system analysts, and university management as regards predictors of research utilization.

The Commission for University Education (CUE) in Kenya is expected to utilise the outcome of this study to significantly influence it to determine potential need for increased funding for research activities in higher education. The findings will provide the University administrators with feedback regarding institutional support for the research activities. Faculty and school

deans will be provided with necessary data on the extent of academic staff involvement in research dissemination and utilization. This will serve as a basis for strengthening research activities of their colleges, schools, or faculties. The study outcome provides relevant information for strengthening and enhancing research utilization in higher education.

The outcome of the study forms basis for strengthening the campaign for training and development on research utilization. The study has made significant contribution to scholarship and theory by shedding light on both qualitative and quantitative dimensions which influence knowledge transfer process in the institutions of higher learning. Think tanks like the Organisation for Social Science Research in Eastern and Southern Africa (OSSREA) and Kenya Institute for Public Policy Research and Analysis (KIPPRA) are expected to find the findings of this study relevant. This may have a positive impact in terms of increased funding for research utilization. The research outcome of this study is also expected to benefit the National Commission for Science, Technology and Innovation (NACOSTI), which is mandated to coordinate, promote and advise on national matters of science, technology and innovation.

Scope and limitations of the Study

Ethical considerations require guaranteeing confidentiality and anonymity to research participants, hence the adoption of pseudo names for participating universities. The study was delimited to only five universities in Kenya, which comprised of three public universities (A, B & C) and two private universities (D & E). The selection of the universities was based on Education, Arts and Social Sciences orientation. The universities were selected using stratified sampling from the two categories, and the choice was guided by orientation in the teaching of humanities. The study population comprised of Lecturers, Heads of Departments, Deans of Faculties, and Library managers. The study was designed to examine the status of research utilization. The following dimensions were covered: areas of research concentration by academic staff, purpose of research utilization, organizational factors, institutional support, individual characteristics and innovation qualities of research. The study was limited to the activities applied by academic staff to utilize research outcomes. It was confined to utilization by university academic staff and did not consider the involvement of other stakeholders in research utilization in Kenya.

Theoretical Framework

The theoretical orientation for this study is anchored on the diffusion of innovation theory. Diffusion theories have their origin in the explanation of the adoption of technological change by farmers. Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system (Rogers, 1995).

Over the last few decades the scope of diffusion theories and associated empirical research has broadened to encompass healthcare and education spheres (Nutley & Davies, 2000). Rogers (1995) defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. This definition highlights some important features - innovation, communication, and a dynamic process happening in a social context. This paper presents an argument that, academic qualifications and professional qualifications of an individual tend to influence the ability and frequency to communicate an idea or innovation. Communication of innovation paves way for effective absorption.

The process of diffusion is considered to revolve around four key elements, namely idea or innovation, channels of communication to spread knowledge of the innovation, time during which the diffusion takes place and a social system of potential adapters in which this occurs. Rogers (2003) argues that media and interpersonal contacts provide information that influences a person's opinion and judgment. The theory incorporates three components, namely the innovation–decision process, innovation characteristics, and adopter characteristics. The innovation decision process categorizes the steps an individual takes from awareness of innovation, through formulation of an attitude to the innovation, on to decision as whether to implement and finally confirmation of this approach, i.e. knowledge, persuasion, decision, implementation and confirmation.

Finally, Rogers (2003) defines socio-economic characteristics of early adopters under the three broad categories; personality values, characteristics, and communication behaviour characteristics. Diffusion of innovation theory presents a way of explaining and predicting the adoption or rejection of new ideas and practices. Rogers (1995) reports on the potential benefits of a systematic approach to educational research for a theory of diffusion of innovation.

Research utilization in institutions of higher learning in Kenya should be viewed and understood within the diffusion of innovations framework. Adaptation, adoption and application of research outcome tend to follow a linear pathway. It should be noted that there are factors which may constrain the expected smooth flow of research outcome in institutions. The study embraced mixed research approach in order to overcome the above limitations associated with diffusion of innovation theory.

Conceptual Frameworks on Research Utilization

The study is conceptualized on the basis of the Commission for University Education mandate that underscores the interplay of the three functions of higher education institutions, namely research, teaching and community extension (Republic of Kenya, 2008). Diffusion theory also forms the basis for the conceptual framework since it describes how individuals within an organization receive, adopt and adapt evidence. The theory also helps us to understand how the organizational factors constrain or facilitate the adaptation or implementation of the evidence and the interests and values at play within organizations that influence responses to the evidence policy issue. The dependent variable of the model was research utilization, while the independent variables included academic qualifications, individual factors, innovation qualities of research evidence, institutional factors. $Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4$; Dependent Variable: Y= Research Utilization, β_0 =Constant; $\beta_1, \beta_2, \beta_3, \beta_4$, = Coefficients: Independent Variables= χ_1 (Institutional support), χ_2 (Academic qualifications), χ_3 =Innovation qualities); χ_4 =Individual factors.

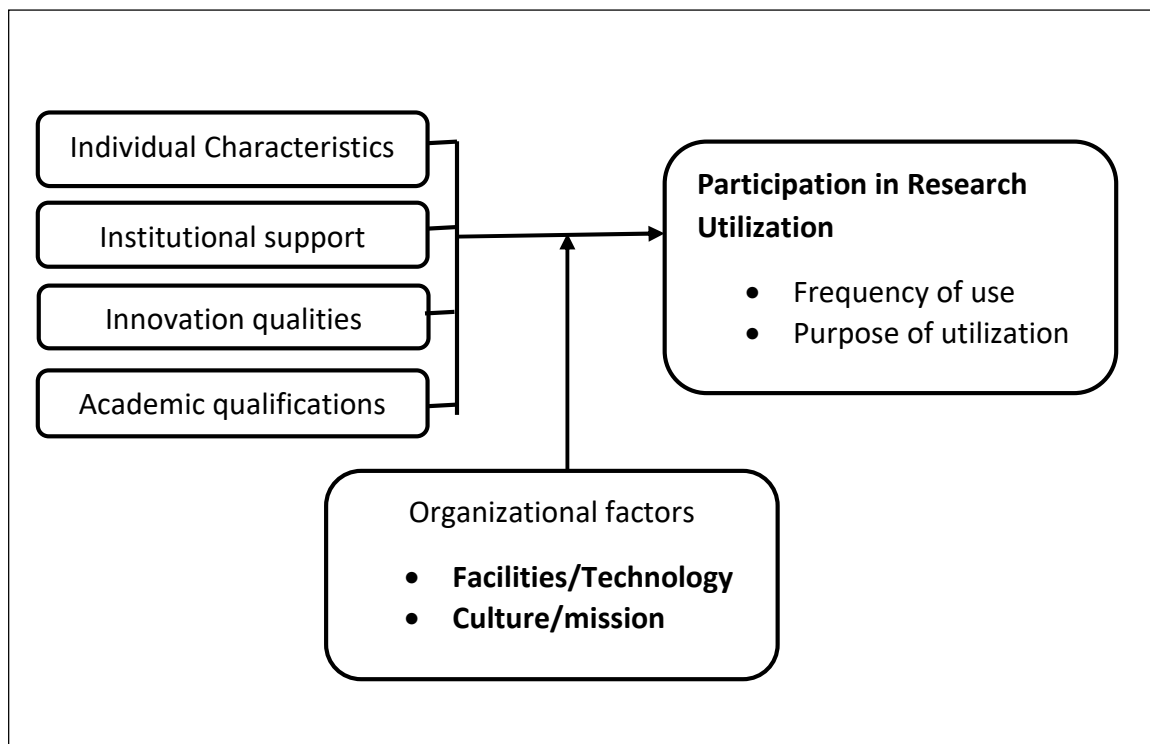


Figure 1. Conceptual framework on Research utilization

METHODOLOGY

Research Design

The study embraced a mixed method research design called concurrent triangulation strategy (convergent parallel design), combining both quantitative and qualitative research methods (Creswell, 2012). Triangulation is defined to be a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study (Creswell & Miller, 2000). Triangulation included multiple methods of data collection and data analysis (Cohen & Manion, 2001).

The quantitative approach employed was cross sectional survey research design. A cross sectional study is a type of descriptive study, which involves identifying a defined population at a particular point in time (Hulley, Cummings & Newman, 2013). Descriptive survey research design was used as it enabled the researcher to analyse and describe conditions or perspectives related to research utilization as they existed within the institutions of higher learning in Kenya. Descriptive research studies involve hypothesis formulation and testing; use the logical methods

of inductive-deductive reasoning to arrive at generalizations, and application of methods of randomization (Best & Kahn, 2008). The quantitative approach in this study embraced post-positivist worldview. In this scenario, information was analyzed using statistical procedures and hypothesis testing.

The qualitative design employed borrowed heavily on Grounded Theory research. This comprised of explaining events, activities and actions related to participation in research activities (Creswell, 2012). The researchers proceeded through systematic procedures of collecting data, identifying themes, connecting these categories and formed a theory that explained the process of research dissemination. Qualitative approach was hinged on constructivist worldview, which required the researcher to seek to establish the meaning of status of research utilization phenomenon from the views of participants (Creswell, 2009). Whilst qualitative methods raise methodological and ethical issues pertaining to the influence of the researcher on the data collected and the informants, quantitative approach is limited to highly structured data extraction methods (Creswell, 2012).

Target Population, Description of Sample and Sampling Procedures

The target population of this study comprised public and private universities in Kenya. The sampling units were Lecturers, Heads of Departments, Deans of faculties of Education and Social Sciences, and Library Managers in both public and private universities in Kenya. Library managers were considered appropriate subjects for the study since they are in charge of ICT infrastructure which is necessary for research dissemination and utilization. There were twenty-two public and seventeen private universities in Kenya (CUE, 2014) during the period the study was conducted in 2015. The study considered the public and private universities with Education, Arts and Social Sciences faculties. The study employed both probability and non-probability sampling procedures to select target groups in the study. Stratified random sampling technique (probability sampling) was employed to select Lecturers from faculties and departments. Library Managers and Deans of Faculties/Schools were selected through purposive sampling method (non-probability sampling).

Sampling matrix

The distribution of academic staff of all the universities selected is shown in Table 1, which shows the total population of university academic staff and the expected sample size in each category of university respectively. The expected sample size was to comprise of 80 percent of the total population of university academic staff in each Category of university and faculty respectively.

Table 1

Distribution of Academic Staff per University

Higher Education Institutions	Expected sample size (Academic staff)	Total Population
University A	96	120(male;89, female;31)
University B	170	212(male;180, female;32)
University C	12	16(male;10, female;6)
University E	26	32(male;20, female;12)
University D	32	40(male;28, female;12)
Total	336(male;261:female;75)	420(male: 327:female;93)

Stratified random sampling technique (probability sampling) was employed to select Lecturers from faculties and departments. Library managers and Deans of Faculties/Schools were selected through purposive sampling method (non-probability sampling). The distribution of academic staff category of respondents is indicated in Table 2.

Table 2

Actual Number of Respondents in Participating Universities

Name of University	Respondents				Total
	HODs	Lecturers	Deans	Library managers	
A	10	63	2	1	76
B	10	124	2	1	137
C	5	10	1	1	17
E	3	16	1	1	21
D	3	15	1	1	20
TOTAL	31	228	7	5	271

Sampling of Universities

There were twenty-two public and seventeen private universities in Kenya. Sixteen public and thirties private universities according to the Commission for University Education in Kenya (2013) have Education, Arts and Social Sciences faculties. The selected universities, three public and two private, each constituted 18% of their respective population. This choice was justified by homogeneity criterion of 10 % as advanced by Kerlinger (2004), who recommends a sample size of at least 10% and 25% for homogeneous and heterogeneous population respectively. In this study the homogeneity was in terms of Education, Arts and Social Sciences orientation.

Sampling of lecturers

The study employed probability sampling technique to select lecturers who participated in the study. The lists of lecturers were obtained from Deans of Faculties. A total of 336 questionnaires were administered to the lecturers, 261 for male and 75 for female respectively. The lecturers, who participated in the study, were selected using stratified then systematic sampling techniques.

Sampling of Deans

All the deans from both categories of universities were automatically included in the study. Deans of faculties were considered instrumental in providing relevant data on various dimensions of the study.

Sampling of Heads of departments

The study was not interested in the types and nature of departments within the faculties. All heads of departments were targeted.

Sampling of Library Managers

Library Managers play a critical role in the process of knowledge transfer. This category of respondents was charged with the responsibility of managing and overseeing information communication and technology infrastructure for research dissemination and utilization.

Description of Research Instruments

Questionnaires, interview guides and observation schedules were considered to be appropriate instruments for data collection for the study. As stated by Kothari (2004), the survey questionnaire provided the broad coverage which could be credibly applied to a wider population from which the sample of the study was drawn. The interview method offered the depth and useful insights regarding status of utilization in both public and private universities in Kenya. The questionnaire consisted of detailed statements on research utilization perspectives.

Return Rate of Instruments

The study intended to include all the Deans of faculties, Heads of department and Library Managers. Seven out of nine (77%) Deans from the faculties of Education, Arts and Social Sciences, five Library Managers, 20 out of 25(80 %) Heads of departments from public universities and six out of ten (60%) from private universities participated in the study. Academic staff members were drawn from the faculties of Education, Arts and Social Sciences. A total of 336 questionnaires were administered to the university academic staff, 261 for male and 75 for female respectively. The number of returned questionnaires comprised of 197(75%), by male and 31(41%) by female lecturers respectively. This return rate was considered adequate owing to the level of heterogeneity of the population. The distribution of return rate of respondents per university is presented in Table 3.

Table 3

Return Rate of Instruments per University

University	Male	Female	Total
University A	55	8	63
University B	115	9	124
University C	6	4	10
University D	11	5	16
University E	10	5	15
Total	197	31	228

Validity, Reliability and Trustworthiness of Research Instruments

In order to judge the accuracy of the research instruments, content validity was ascertained. Content validity approach measured the degree to which the test items represented the domain or universe of the trait or property being measured. In order to ascertain content validity, the instruments were constructed and handed to three research experts for constructive criticism.

The reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials (Mohsen & Dennick, 2011). In order to ascertain the reliability of the questionnaire a pilot study was conducted in two other different universities (one public and one private), and involved 20 participants. The twenty participants from all categories of respondents were selected as follows: Two Heads of Departments, Six Lecturers, a Dean and a Library Manager from each category of university. The method of computing reliability preferred in this study was internal consistency method. The questionnaire was tested for reliability, using Cronbach's alpha correlation. Cozby (2004) defines Cronbach's Alpha as an indicator of internal consistency reliability assessed by examining the average correlation of each item (question) in a measure with every other question. Cronbach's alpha determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability. George and Mallery (2003) provide the following rules of thumb: a reliability coefficient of greater than 0.9 is considered excellent, greater than 0.8 is considered good, and greater than 0.7 is said to be acceptable. Reliability coefficients for this study were (estimated at Cronbach's alpha) for research dissemination items (0.828); utilization items (0.846), giving an average of 0.837, which is considered good.

Credibility for the interview guide required ensuring that the theoretical framework generated is understood and is based on the data from the study. To ensure reliability in qualitative research examination of trustworthiness is crucial. Trustworthiness is viewed as the extent to which one can believe in the research findings (Creswell, 2009). The study employed several strategies for achieving trustworthiness or credibility, namely prolonged engagement with informants, peer debriefing (colleagues), and thick description (to reflect complexities in the data), maintaining a journal to enhance self-reflection, triangulation (multiple sources of data) and use of systematic process during data analysis.

Quantitative Data Analysis Techniques

Both descriptive and inferential statistics were adopted in analysing data. Inferential statistics employed included two independent T-tests and regression analysis. Two independent T-tests were used to examine difference in the following situations: frequency of use of research-based and status of institutional support for research activities between private and public universities. Regression relationship analysis, specifically Multiple Linear Regression, was performed to determine whether regression model was significant, and to establish which of the independent variables were significant in predicting the Research Utilization Model.

Qualitative Data Analysis Techniques

Data collection and data analysis occurred simultaneously. This process is called constant comparison (Creswell, 2012). The researchers were able to constantly compare new data to already existing data. Qualitative data collected through interview methods were transcribed, categorized and analysed according to themes and by items and then corroborated across instruments used. The analysis involved recognizing relationships and developing categories.

Ethical Considerations

The ethical considerations addressed the following aspects: informed consent, voluntary participation, confidentiality and anonymity, and integrity as regards plagiarism. Since mixed methods research combines quantitative and qualitative research, ethical considerations need to attend to typical issues that surface in both forms of inquiry. Quantitative issues relate to obtaining permissions, protecting anonymity respondents, not disrupting sites, and communicating the purpose of the study. The researcher sought permission from the National Council of Science and Technology to gain access to Universities by applying for a research permit, which was duly issued. Voluntary participation of all categories of respondents was solicited through the signing of Informed Consent Forms. In qualitative research these issues relate to carrying the purpose of the study, avoiding deceptive practices, respecting vulnerable populations, being aware of potential power issues in data collection, respecting indigenous cultures (institutional), not disclosing sensitive information and masking identities of participants (Creswell, 2012).

Information obtained from participants remained confidential between the researcher and the participants. This was achieved by ensuring that anonymity and confidentiality were strictly adhered to. The interview guide captured elaborate data as per all the research questions and hypothesis. Adoption of appropriate data analysis techniques was observed so as to improve and enhance generalization of the findings.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

Areas of Research Concentration by University Academic Staff in Kenya

Table 4 presents data analysis on areas of concentration by academic staff.

Table 4

Category of University and Areas of Research Concentration by University Academic Staff over the Last Five Years

Area of research	Public		Private		Total
	Frequency	Percentage	Frequency	percentage	
Educational finance	12	6%	4	12.90%	16
Culture & Language	6	3%	3	9.70%	9
Educational Management, Curriculum & Policy	63	32%	9	29.10%	72
ICT	27	14%	3	9.70%	30
Institutional Governance	67	34%	4	2.90%	71
Emerging Issues	22	11%	8	4.80%	30
Total	197	100%	31	100%	228

The findings indicated that academic staff had conducted research on educational management, policy, curriculum matters and information communication and technology, institutional governance, society and development, disaster management and gender perspectives and educational finance. Faculty of education had a heavy concentration on educational management, curriculum and policy, and low preference for educational finance, disaster management and gender perspectives. Faculties of Arts and Social Sciences concentrated on research related to institutional governance, disaster management and gender issues.

Faculty orientation determined areas of research concentration by academic staff. Research activities among academic staff tended to be influenced by quest for academic pursuit as well as the desire for upward mobility. Ary (1999) proposes that research by school practitioners should have immediate application for curriculum improvement. This is not the case as far as researches conducted by faculty members were concerned. Deans of faculties described the types of researches by academic members as basic research.

Purpose of Research Utilization among Academic Staff in Kenyan Universities

The findings on purpose of research utilization are illustrated in Table 5

Table 5

Purpose of Utilization of Research-based Information by Academic Staff

Purpose	Extent of agreement				
	Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree
	F (%)	F (%)	F (%)	F (%)	F (%)
Achieving better understanding in my practice	7(3.1)	8(3.5)	29(12.7)	54(23.7)	130(57.0)
Satisfying intellectual curiosity	2(0.9)	11(4.8)	17(7.5)	77(33.8)	121(53.1)
Improving professional practice, developing learning and teaching resources	3(1.3)	4(1.8)	17(7.5)	53(23.2)	151(66.2)
Reflecting on my attitudes and practices	9(3.9)	17(7.5)	53(23.2)	71(31.1)	78(34.2)
Resolving problems in your daily practice	7(3.2)	40(17.5)	36(15.8)	74(32.5)	71(31.1)
Justifying or validating my actions and my decisions	25(11.0)	26(11.4)	40(17.5)	71(31.1)	66(28.9)
Develop new activities, programs guidelines and materials	6(2.6)	28(12.3)	39(17.1)	87(38.2)	68(29.8)
Using research findings to improve instructional practices and strategies	5(2.2)	24(10.5)	13(5.7)	76(33.3)	110(48.2)
Integrating relevant research findings in class lessons	4(1.8)	22(9.6)	28(12.3)	72(31.6)	102(44.7)
Presenting areas for appropriate utilization application in the research locale	11(4.8)	24(10.5)	41(18.0)	81(35.5)	71(31.1)
Utilization of relevant research findings to community extension services	20(8.8)	68(29.8)	36(15.8)	63(27.6)	41(18.0)

The findings of this study show that academic staff applied research findings to achieving better understanding in their practice, in improving their professional practice, resolving problems in daily practice, in developing new activities, programme guidelines and materials, and to improve instructional practices and strategies.

Deans of faculties and Heads of departments utilized research-based information by integrating research findings in educational practice and policies. Utilization of relevant research findings to community extension services was quite minimal. Two Independent Samples T-test for category of university and frequency of use revealed that there was no significant difference in the frequency of use of research-based information between public and private universities. Literature review indicates that research utilization has been adopted in providing guidance for practical decision making (Huang, Raser, Muniec & Salvuci, 2003). Prince, Felder and Brent (2007) found out that potential synergies exist between faculty research and teaching; however they further established that research is not widely and effectively integrated into teaching. Hearn (2006) established that policy makers and educational leaders were adopting research productivity to provide answers to emerging issues in education. Research results can also provide relevant data to politicians, public officials, programme implementers, Non-Governmental Organizations (NGOs), international organizations, and service delivery bodies (Hennink & Stephenson, 2005).

Institutional Support for Research Utilization in Kenyan Universities

The analysis of the institutional support towards research in Kenyan universities is presented in Table 6.

Table 6***Institutional Support for Research Utilization***

Statement	Indicators				
	No support	Inadequate Support	Substantial support	Adequate Support	Total
	F (%)	F (%)	F (%)	F (%)	F (%)
Provision of travel and allowances allotted for faculty research utilization	70(30.7)	106(46.5)	35(15.4)	17(7.5)	228(100%)
Access to internet	34(14.9)	81(35.5)	71(31.1)	42(18.4)	228(100%)
Access to library services /e-resources	27(11.8)	62(27.2)	89(39.0)	50(21.9)	228(100%)
Access to statistical services	88(38.6)	78(34.2)	43(18.9)	19(8.3)	228(100%)

Findings indicated that universities were committed to facilitating research utilization among academic staff. Support towards research utilization was in form of access to internet, access to library services and e-resources, and access to statistical services. The study found out that e-journal platform was not well exploited by academic staff.

Deans of faculties and Heads of departments indicated that universities provided facilitation and support for research utilization. Fixsen, Naum, Blask, Friedman and Wallace (2005) recommend provision of training, on-going follow-up coaching, and other support for academics in analysing and applying evidence. Literature review also identified access to statistical services or systems as effective mechanisms for facilitating research utilization (Hemsley–Brown & Sharp, 2003). Recommended also was application and adoption of plain and non-technical language, with light referencing and minimal statistical data. This view was also supported by Jewell and Bell (2008). Another form of facilitation identified was offering staff access to timely data in useful formats through technology that integrates and links multiple types of data (Lachat & Smith, 2005). Kirkland, Mounton, and Coates (2010) observed that there was evidence in universities of a willingness to improve their capacities. Weiss (1995) argues that administrative support towards research services is a motivating factor for the faculty to meet the actualization of developing their research capability.

Perceived Barriers to Research Utilization among University Academic Staff

In discussing the barriers encountered when using research evidence, the study focused on individual expertise, organizational factors, communication, presentation and accessibility of research-based information, innovation qualities of research evidence, and characteristics of adopters. In summary, both literature review, and responses by the study established that research reports were complex, irrelevant, and inaccessible (Hemsley-Brown & Sharp, 2003). It is difficult to access the appropriate data when they are needed (Lachat & Smith, 2005).

Determinants of Research Utilization among University Academic Staff

There were four null hypotheses that were tested using multi-linear regression analysis. The outcome of hypothesis testing in Figure 2 revealed that institutional support and academic qualifications positively influenced academic staff participation in research utilization. Increase in innovation qualities impacted negatively on extent of academic staff participation on research utilization. Individual factors were found to be poor predictor of extent of academic staff participation in research utilization. Institutional support was identified to be the most significant predictor. The overall model was significant. Individual factors were found not to be significant predictors of research utilization, therefore eliminated from the final model.

The estimated model is $(DV_RESEARCH\ UTILIZATION) = 1.934 + .428(Inst\ itutional\ Support) + .238(Academic\ qualifications) + .138 - 0.184 (Innovation\ qualities\ of\ research) + .410$.

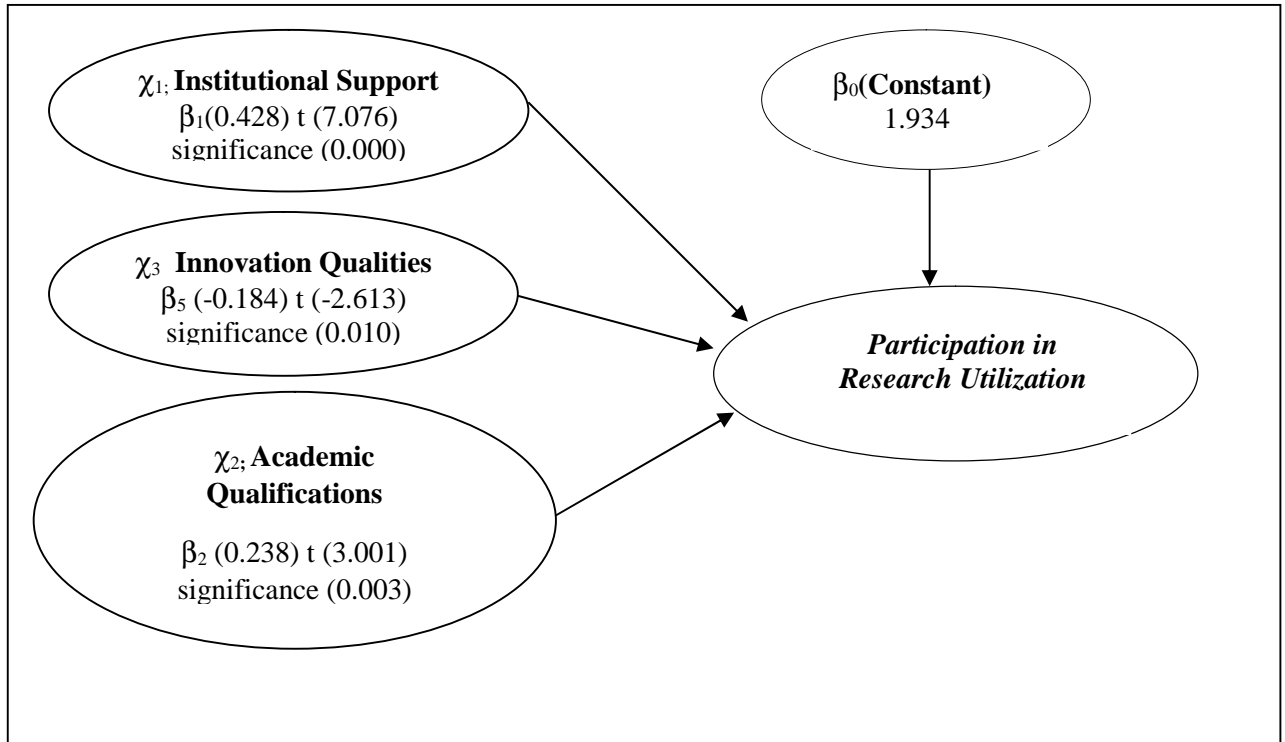


Figure 2. Prediction Model for Research Utilization

This model implies institutional support, and academic qualifications, positively influenced the extent of participation in research utilization. Increase in innovation qualities negatively impacted on extent of academic staff participation. The overall model is significant. Individual factors were not found to be useful predictor of academic staff participation in research utilization. The null hypotheses on relationship between independent variables, namely research innovation qualities, institutional support, and academic qualifications, and dependent variable participation in research utilization were rejected.

Conclusions

Faculty orientation determined the areas of research concentration by academic staff. Research activities among academic staff tended to be influenced by quest for academic pursuit as well as the desire for upward mobility. Deans and Heads of departments alluded to the fact that, university promotion criteria motivated academic staff to participate in research utilization.

The extent of academic staff involvement in utilization of research-based information was characterised by different forms of knowledge utilization that applied to the education context. Utilization of relevant research findings was restricted to adoption within the university teaching and learning landscape. Instrumental and conceptual forms of research utilization were quite evident.

Both private and public universities demonstrated commitment to research utilization in terms of budgetary allocation and infrastructural facilitation. However this commitment was not adequate for supporting staff involvement in research activities. Research utilization among academic staff was hampered by staff inability to embrace ICT effectively. Heavy workload limited involvement in research activities. Inaccessibility of research-based information and innovation qualities of research evidence impact negatively on research uptake.

Recommendations

The study recommends promotion of staff involvement at faculty level in applied research since it portends the capacity for generating solutions to existing and emerging issues on educational practice. Involvement in research activities should be demand driven. Therefore there is need for faculties to develop an elaborate policy to guide, direct and motivate involvement in research activities. Universities should encourage academic staff to embark on research activities that are utilitarian and multidisciplinary in nature.

The study recommends improvement of symbolic utilization of research findings. Symbolic utilization of research findings, as compared to instrumental and conceptual utilization, was identified as a missing ingredient in the institutions of higher learning. Symbolic utilization is application of knowledge to legitimize, justify and support decision making. This type of research utilization has the capacity for innovative and transformational leadership. Its adoption by university management cadres could greatly improve and strengthen institutional governance and management in Kenya institutions of higher learning.

The study recommends increased budgetary allocation by the Government for training and development for university academic staff in ICT application, establishment of open access journals within the universities as well as training academic staff on research utilization. The Commission for University Education in Kenya should lobby for increased investment by the Government in research activities in higher education.

References

- Amara, N., Quimeit, M., & Landry, R. (2004). New Evidence on Instrumental Conceptual and Symbolic utilization of University Research by Government Agencies: *Science-Communication*; 26 (1) 75 – 106
- Ary, D. (1999). *Introduction to Research in Education*: New York: Holt, Rinehart and Winston, Inc.
- Askew, I., Matthews, Z., & Partridges, R. (2002). *Going beyond Research: A Key Issues Paper Raising Discussion Points Related to Dissemination, Utilization and Impact of Reproductive and Sexual Health Research: Drawn from a two-day Meeting of Researchers and Policymakers*. <http://www.socstats.soton.ac.uk/choices/workshop>.
- Bailey, T. (2010). *The Research - Policy Nexus, Higher Education Research and Advocacy Network in Africa (HERANA):Weinberg, 7800: Centre for Higher Education Transformation (CHET)*.
- Barwick, M. A., Boydell, K. M. Stasiulis, E., Ferguson, H.B., Blask, K., & Fixsen, D. (2008). Research Utilization among Children’s Mental Health Providers, *Science*, 2008 3 (19); available: [http://www. Implementation-science.com/content/3/19](http://www.Implementation-science.com/content/3/19).
- Barratt, M. (2003). Organizational Support for Evidence Based Practices within Child and Family, *Social Work*: 2003: 8:143-150.
- Best, W. J., & Kahn, J.V. (2009). *Research in Education*, 10th Edition. New Delhi – Pearson; Prentice Hall.
- Bekhodja, O., Amara, N., Landry, R., & Gourmet, M. (2007). The Extent and Organizational Determinants of Research Utilization in Canadian Health Services Organizations, *Science-Community* 28(3) pp377-417.

- Bennet, J., & East African Cooperation. (2000). Science and Technology Policy: country papers and Cooperative Reviews. Arusha (Tanzania): EAC Secretariat in Conjunction with Germany Agency for Technical Cooperation.
- Bickel, E., & Cooley, J. (1985). "Decision Oriented Educational Research in School District: The role of Dissemination Processes," *Studies in Educational Evaluation II* (2): 183-203.; Retrieved from: <http://exp.sagepub.com/Cgi/content/refs/22/4/578> On 2nd September, 2012.
- Cohen, L., & Manion, I. (2001). *Research Methods in Education*, 5th edition. London and New York: Routledge Falmer.
- Commission for University Education (2013). *Universities in Kenya: www.or.ke/Services/accreditation/Status of Universities*; Retrieved in February, 2013. Commission for University Education (2013). *Planning and Research: <http://www.cue.or.ke/services/planning-and-research>*.
- Commission for University Education (2014). *Universities Standards and Guidelines, 2014 <http://www.cue.or.ke/approved-academic-programmes/category/1-general%3Fdownload%3D50:draft>*.
- Cozby, P.C (2004). *Methods of Behavioural Research*: New York, McGraw-Hill Publishing Company.
- Creswell, J. W. (2009). *Research Design, Qualitative, Quantitative and Mixed methods Approaches*; London, SAGE
- Creswell, J. W. (2012). *Research Design, Qualitative, Quantitative and Mixed methods Approaches*; London, SAGE
- Creswell, J. W. (2008). *Educational Research* (3rd ed.). Upper Saddle River: Pearson Education, Inc.
- Ezema, I.F. (2010). Trends in Electronic Journal of Publishing in Africa: an Analysis of African Journal Online (AJOL) *Open access journals*, <http://www.webology.org/2010/v7n1/a74.html>
- Fixsen, D.I., Naum, S.I., Blask, K.A., Friedman, R.M., & Wallace, F. (2005). *Implementation Research; A Synthesis of Literature*, Tempa, FL: University of Florida, National Implementation Research Network, Retrieved March, 12, 2013: from, www.fpg.unc.edu/wnorm/resources/publications/monograph/pdf/monoragph_full.pdf.

- George, D., & Mallery, P. (2003). *SPSS for Windows Step by Step: A single guide and reference 11.0 update (4th)*. Boston, Allyn & Bacon.
- GoK (2007). *The Kenyan Vision-2030*. Nairobi: Government Printer.
- Guená, A. & Muscio, A. (2009). The Governance of University Knowledge Transfer: A Critical Review of literature. *Minerva*. 47(1):93-114.
- Harle, J. (2010). *Growing knowledge Access to Research in East and Southern Africa Universities*. The Association Commonwealth Universities: London.
- Hearn, J (2006). *Student Success: What research suggests for policy and Practice*: nces.ed.gov/npec/pdf/synth_Hearn.pdf
- Hemsley-Brown, J., & Sharp, C. (2003). "The Use of Research to improve professional practice: A systematic Review of Literature." *American Educational Research Journal* 27(2): 363-391.
- Hemsley-Brown, J. (2004). Facilitating research utilization: a cross sector review of the research evidence; *International Journal of Public Sector Management*. 17, 6 pp., 534-553.
- Hemsley-Brown, J. (2005). "Using Research to Support Management Decision making within the field of education" *Management Decision* 43(5/6):424-446.
- Hemsley-Brown, J., & Sharp, C. (2003). The use of Research to Improve Professional Practice: A systematic Review of Literature, *Oxford Review of Education*; 29(4), 449-471.
- Hennink, M., & Stephenson R. (2005). *Using Research to Inform Health Policy: Barriers and Strategies in Developing Countries*. Health Communication 2005.
- Huang, G., Raser, M., Muniec, J., & Salvuci, S. (2003). Institute of Educational Sciences findings from Interviews with education policy makers, Arlington, VA; Synthesis for Management decisions, Retrieved, August 8, 2012 from, www.ed.gov/rschstat/research/pubs/findingsreport.pdf.
- Hulley, S.B., Cummings, S.R., & Newman, T.B. (2013). *Designing Cross-Sectional and Cohort Studies*: <http://bookpromos.lww.com/wp-content/uploads/2013/07/Hulley9781608318049-ch007.pdf>
- Jewell, C.J., & Biro, L.A. (2008). "Developing Good Taste in Evidence" facilitators of and hindrances of evidence informed health policy making in state Government *Milbank Quarterly*, 86(2), 177-208, retrieved, 25 Nov 2012 from www.milbank.org/quarterly/MQ%2086-2%20realArt.pdf.

- Kerlinger, F. N. (2004). *Foundation of Behaviour Research*; New Delhi: Sarbjeet Publications.
- Kirkland, J., Mounton, J.; & Coates, D. (2010). *Communicating Research for Utilization (CRU), Specialist Professional and Institutional Capacity Building in Sub-Saharan Africa; Final Report for the CRU Scraping Study 2010, Stellenbosch, The Association of Commonwealth Universities:(Retrievable; www.cruonline.net).*
- Lachat, M.A., & Smith, S. (2005). Practices that Support Data Use in Urban High Schools – *Journal of Education*; 10(3) 333-349.
- Maureen, D., Ciliska, D., Cockerill, R., Barnsley, J., & DiCenso, A. (2002). A Framework for the Dissemination and Utilization of Research for Health Care policy and practice. *The Online Journal of Knowledge Synthesis for Nursing 2000: Sigma-Theta Tau International.*
- Migosi, J.A. (2009). Factors Influencing Research Productivity among Academic Staff in selected public and private Universities in Kenya: Unpublished PhD dissertation. The Catholic University of Eastern Africa. Nairobi
- Mohsen, T. & Dennick, R. (2011). Making Sense of Cronbach's Alpha. *International Journal of Medical Education*.2011; 2; 53-55. ISSN 20426372;DOI;105116/ijme.4dfb.8dfb; retrieved from www.ijme.net/archive/2/cronbachs_alpha.pdf October 2014
- Oduwaiye, R. O., Owolabi, H.O., & Onasanya, S.A. (2009). Research Dissemination, Utilization and Commercialization by Academic Staff of a Nigerian University. *African Higher Education Research Online:*
http://ahero.uwc.ac.za/index.php?module=cshe&action=viewtitle&id=cshe_532
- Onsongo, J. (2005). *The Role of Research and Publication in the Promotion of Academics in Kenyan Universities. Eastern Africa Journal of Humanities and Sciences*.Vol.5 No. 2 Catholic University of Eastern Africa, Nairobi.
- Patton, M.Q. (2002). *Qualitative Evaluation and Research Methods (3rd)*; New Jersey. Prentice Hall.Inc.
- Republic of Kenya.(2009).Research, Innovation and Technology Sector, Medium Term Expenditure framework sector, medium Term Expenditure Framework – 2009/10 – 2011. Nairobi. Government Printer.
- Republic of Kenya. (2007).Kenya Vision 2030; Nairobi; Government printer.
- Rogers, E. (1995). *Diffusion of Innovations. Fourth Edition.* New York, The Tree Press.

- Rogers, E.M. (2003). *Diffusion of Innovations*, New York; Free Press.
- Sally, M., Jeffery, C.P., Christian, D.H., & Leslie, C.S. (2007). Introduction and Conceptual Model for utilization of previous research, *American Journal of preventive medicine*, New Mexico, Elsevier Inc. *sciences Research and Policy*, 10(4), 203-211.
- Weiss, C.H. (1995). *Evaluation Research: Methods for Assessing Program Effectiveness*, New Jersey. Prentice Hall. Inc.
- UNESCO (2010). *Education for Sustainable Development – UN decade 2005 – 2014*, www.unesco.org/education/desd. UNESCO (2005) *EFA Global monitoring Report* (Online) <http://www/portal.unesco.org/education/en/ev.php.url> (April 27, 2005).
- UNESCO (2007). *Education for All, Global Monitoring Report 2008: Education for All by 2015, we will we make it?* UNESCO, Paris.

Authors' Profile

Dr. Wambua Kyalo Benjamin is a Senior Lecturer, Department of Educational Management and Policy Studies, School of Education at Moi University. He holds a Doctor of Philosophy (PhD) degree in Educational Research and Evaluation from the Catholic University of Eastern Africa, a Master of Philosophy in Economics of Education from Moi University, Eldoret, Kenya, and Bachelor of Education (Arts), Upper Second Class (Hons) majoring in Business Education and Economics from Kenyatta University. His email contact is kyalowmb44@gmail.com

Professor Marcella Mwaka is an Associate Professor of Moi University and currently serves as a Senior Assistant Commission Secretary and Head of Programme Accreditation Department at the Commission for University Education. She holds a Doctor of Philosophy (Ph.D), in Educational Communication and Technology from Moi University, Master of Philosophy, Educational Communication & Technology from Moi University, and Bachelor of Education Upper Second Class (Hons), majoring in French and Secretarial Studies from Kenyatta University, Nairobi. Her email address is mmwaka@cue.or.ke

Assessment of Lecturers Perceptions on Students-Lecturers Evaluations in Universities in Kenya: A Case Study of Kibabii University
Prof. Julius K. Maiyo

Abstract

The common approach method of evaluating instruction in higher education classes is to have students provide feedback on "effectiveness" of learning in a given period. Evaluations generally request specific feedback on measures of teaching effectiveness and on particular aspects of a course, as well as global rating questions. Countless myths and misperceptions regarding course evaluations exist and inevitably influence faculty, university administrators and student perceptions. In spite of solid research to counter these assumptions, such beliefs persist and continue to spread. The study was envisaged to focus on assessing lecturers perceptions on students' lecturer evaluations in universities. Its specific objectives were; to examine lecturers' perception on students' competence in evaluating their teaching effectiveness, to determine the influence of gender, experience, professionalism, departmental discussions and designation on lecturer's perception of student's competency in evaluating lecturers teaching effectiveness and to examine lecturer's perceptions on the formative and summative purpose of students in the evaluations. The study was conducted in Kibabii University and targeted all the teaching staff of the University. The study adopted a descriptive research design. The data was collected using a questionnaire that was validated and reliability of 0.917 was attained. Data was analyzed using both descriptive and inferential statistics. The results indicate that there was no significant difference between male and female lecturers about their perception on students' evaluation. The study revealed that feedback on students' evaluation helps lecturers to improve their teaching and interaction. The respondents disagreed that reports from the students' evaluation be used for promotion and increment of their salary. The study concludes that inadequate instructional materials is among the key factors that affect the quality of teaching and learning. The study recommended that the University should provide adequate instructional materials and enhance conducive environment for learning.

Keywords: Assessment, Quality, Evaluation

Background

Investing in education is widely recognized as a key component for a country to use in development. An increase in the quantity and quality of education provided is associated with a wide range of benefits including increased productivity, reduced poverty and inequality of income, and improved health and economic growth (Lockheed et al., 1991). Spurred by such evidence, Governments in developing countries devote a substantial portion of their total expenditure to education (UNESCO, 2005) and Kenya is no exception. Since independence, the Government of Kenya has devoted a substantial portion of its resources to education. Education and more particularly University education is a critical pillar of human development world over. Besides, it is perceived as a process by which individuals are prepared to assume their respective responsibilities within a social setting and it is a powerful tool for achieving social mobility (Otunga, 1998). This is quite true in regard to expectation of university education all over the world.

Recognition of quality in achieving customer satisfaction and competitiveness in the global marketplace began in the late 1980s and into the 1990s. Quality refers to “fitness for purpose” meeting or conforming to generally accepted standards as defined by quality assurance bodies and appropriate academic and professional communities. In the diverse arena of higher education, fitness for purpose varies tremendously by field and program (Hayward, 2006). Universities exist to fulfill certain mandates. These mandates include: training, research and innovation, technology transfer, maximizing the stakeholders’ interest, social responsibility, ethics, and market leadership. However, the achievement of this mandate has not been easier due to increased demand for university education in Kenya while the resources are still minimal. The Government, as the chief financier of university education in Kenya, has reduced its contribution to universities over the years in relation to the number of the universities which have been chartered, while at the same time pushing the same institutions to admit more students. This has led to universities resorting to other income generating activities to subsidize Government sources, thus overstressing the internal resources that in turn affect quality (Chacha, 2004). Most institutions have developed quality assurance units whose core responsibilities include maintaining the quality and standards of the universities that are commensurate with other international universities.

Notable also, issues of educational quality, rather than mass production, need to move to the forefront of the educational agenda of policy makers at this level of education in Kenya. Considering this huge public and private investment in university education, there is an urgent need to evaluate the effectiveness of this investment by examining the quality of the educational infrastructure, the cadre of qualified tutors and teaching facilities in place, and the quality of teaching and learning. This is necessary in order to determine how universities in Kenya translate the resources at their disposal into learning outcomes (UNESCO, 2003).

Elaine and Iain (2005) pointed out, the aim of student evaluation process is to promote good-quality teaching and support academic staff in assuming the challenging and complex role as an educator. Machingambi and Newman (2011) stated, if students' evaluations of lecturers' teaching are conducted in the right manner, it can yield potential benefits to many stakeholders in the higher education context. Students are required to express their views through a well-designed questionnaire since lecturers are an important component of the evaluation process. By combining views of both lecturers and students, more information is available to improve the existing teaching and learning process.

Johnson (2012) after an online study of 1883 students from ten universities in Europe revealed that students' evaluation proved to be most effective technique of evaluating lecturers' effectiveness as it provides specific information for formative and summative purposes which is an important part of learning evaluation. It is out of such background that the study was envisaged to assess lecturers' perceptions on students-lecturers evaluations in Universities.

Objectives of the Study

- i. To examine lecturers' perception on students competency in evaluating their teaching effectiveness
- ii. To determine the influence of gender, experience, professionalism, departmental discussions and designation on lecturers perception of students' competency in evaluating their teaching effectiveness
- iii. To examine lecturers' perception on the formative and summative functions of students evaluation report

Literature Review

Gardener and Milton (2002) asserted that the question of whether or not lecturers should be evaluated is not the issue; rather, a key problem with the practice are largely who should do the evaluation and for what purpose and by what means should it be done. The opinion of some researchers was that the students who are directly involved in teaching and learning processes from the teachers are in the position to evaluate their teaching because they observe the teachers directly in the class and that their findings could help to improve lecturers teaching performance. Norazuwa and Dahlan (2007) found that students are generally willing to do the evaluation and provide feedback without any particular fear or feeling of repercussions. Scriven (1995) also suggested that students are in unique position to evaluate their own increased knowledge and comprehension since it will be easy for students to know when schemes are covered and when test items covered the course contents. These notwithstanding, most people however believed that students rating may not be objective enough.

Ede (2005) carried out a survey involving 2000 lecturers from five public universities in Nigeria to investigate how lecturers perceived the importance of students' evaluation. The general conclusion was that lecturers do not accept students' evaluation, especially when it is used for promotion or salary increment purposes. They also viewed students' evaluation of lecturers appropriate and necessary but their observation was that the lecturers receiving the best evaluation were not always the most effective. This therefore reveals that students' are not adequate or competent enough to assess lecturers' teaching effectiveness and at the same time the aforementioned renders their response invalid. Some researchers also received contradicting comments from some lecturers. Some of these comments were that if lecturers are good but strict, or the subjects taught are difficult, the students would give a wrong and bad evaluation. Other contradictory comments were that students evaluations were based on emotion since strict lecturers were evaluated badly compared with lazy but friendly ones. They also discovered that grades of students in a particular course could influence their evaluation of the course. All these could affect the validity and reliability of the evaluation results.

On the contrary, David (1997) discovered some benefits in student's evaluation. Among these were the fact that it increases the chances of recognizing and rewarding excellence in teaching, it provides means of interaction between the lecturers and the students taught, it provides direct and extensive information about the lecturers and also provides tangible evidences of students' recognition i.e. students' evaluation could be used to improve classroom instruction, students' learning and also foster professional growth of the lecturers. Gold (2001) also opined that the results could be useful for administration and personnel decision like promotion, salary increase, demotion, dismissal and award.

Several empirical studies on students' evaluation of lecturers teaching effectiveness revealed gender differences. Some studies reported that students generally awarded lower rating for female educators than their male counterparts. According to Farley(1996) and Menny (2000) they found out that students perceived that female lecturers are biased, having an agenda, rigid, grumpy and angry while the male were seen as objective, relaxed, comfortable, flexible ,open-minded, with a good humor and fair. Irrespective of all these short comings, students' evaluation if conducted in a right way will be of benefits to many, both to the stakeholders and to the university itself. It will also provide the opportunity to understand lecturers' feeling and opinion as regards the students evaluating their teaching effectiveness. This information will bring improvement to teaching and learning processes in our universities.

Research Methodology

The study adapted descriptive survey approach, which attempted to collect data from members of a population in order to determine the current status of that population with respect to one variable (Mugenda & Mugenda, 2003). Descriptive research designs make it necessary to acquire a lot of information through description as it is useful in identifying variables. Descriptive research design was appropriate for this study due to the fact that the study aimed at generating and describing findings which facilitated a general understanding and interpretation of an assessment of lecturer's perceptions on student's lecturer's evaluation. This study utilized mixed research methodology thus both qualitative and quantitative approaches were used.

Orodho (2009) states that target population, also called universe are all members of a real or hypothetical set of people, events or objects to which the researcher wishes to organize the results of the study. The study targeted all the academic staff at the university. The study used census technique to have all the 105 academic staff at the university participate in the study but the response rate turned out at 67%. Based on the study statistical techniques used in the analysis, Richardson (2005) stated that 50% is regarded as an acceptable response rate in social research postal surveys. Thus 67% response rate was deemed acceptable for the study.

Reliable data depends on the precision of the research instrument to be used. Therefore to have reliable data, suitable instruments necessary to provide high accuracy for generalization was used. This research employed the use of questionnaires to collect information from the respondents. The authority to collect data was sought from the relevant offices and the respondents were taken through the objective of the study, their need to participate in study was discussed and their consent sought before data collection.

Data was analyzed using both descriptive and inferential statistics. Lecturers' perception on students' competence and their perception on formative and summative functions of evaluation reports were analyzed using frequencies, percentages, Binomial test and Chi-square tests. The influence of lecturers' professionalism, gender, experience and designation to perception on students' competence were analyzed using frequencies, percentages, Chi-square tests and Binary logistic regression. Qualitative data was analyzed thematically using the detailed responses from the respondents on their views on their perception of student's evaluation. Themes identified by respondents were considered into common themes and ultimately coded, accordingly in relation to the variables under study. The findings were presented using tables, graphs and pie charts.

On ethical consideration, the study sought permission from the relevant authorities before proceeding for research. Before an individual became a respondent, he/she was notified of the aims, methods, and anticipated benefits of the confidential nature of his/her reply. No pressure or inducement of any kind was applied to encourage an individual to become a participant in the research. The identity of individuals from whom information was obtained in the course of the research was kept strictly confidential.

Findings and Discussions

General Information about the respondents.

Gender and Highest level of education

Table 1

Response across 'sex and highest education level'

Gender		Highest education status				Total
		First degree	Master's degree	PHD	NR	
Female	Count	4	5	5	0	14
	% of Total	5.7%	7.1%	7.1%	0.0%	20.0%
Male	Count	2	35	13	6	56
	% of Total	2.9%	50.0%	18.6%	8.6%	80.0%
Total	Count	6	40	18	6	70
	% of Total	8.6%	57.1%	25.7%	8.6%	100.0%

Majority of the respondents, 57.1% (40 out of 70 respondents) were lecturers with a Master's degree as the highest educational level as shown in Table 1. Basing on gender, 80.0% of the respondents were male lecturers while 20.0% were female.

Professional ranks

Majority of the respondents, (47%) were lecturers as shown in Figure 1. It also emerged that Senior lecturers and Professors are the minority. This contravenes the Commission for University Education (2014) Universities Regulations and Guidelines that requires majority of the staff at the university to be senior lecturers and above to assist as programme leaders.

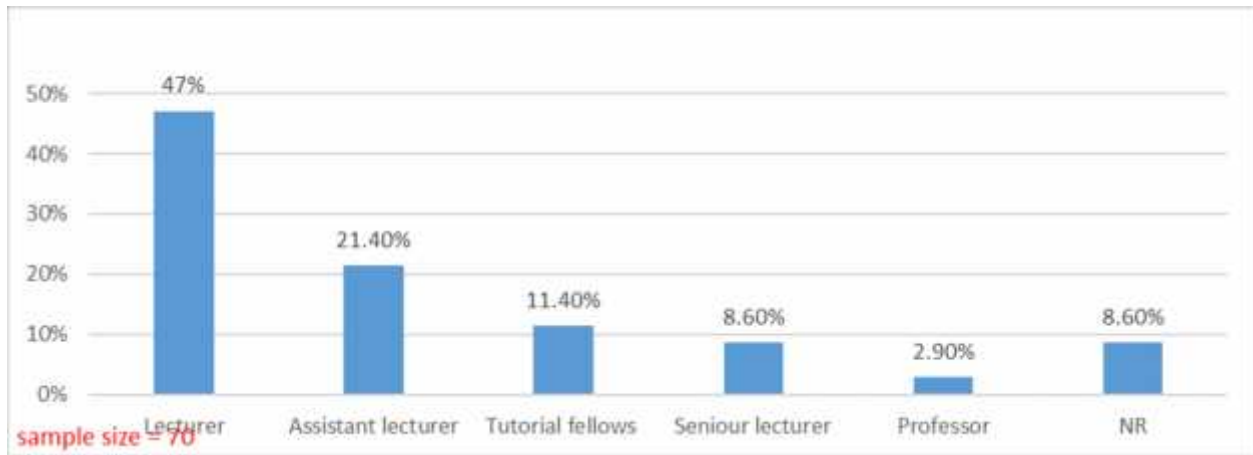


Figure 1. Distribution of response across professional ranks

University years of experience

Table 2

Response across ‘awareness about QA’ and ‘University years of experience’

Awareness about Quality Assurance	University years of experience					Total
	Utmost 1 yrs.	2-5 yrs.	6-10 yrs.	11-15 yrs.	At least 16 yrs.	
Count	10	34	14	8	4	70
% of Total	14.3%	48.6%	20.0%	11.4%	5.7%	100.0%
Count	10	34	14	8	4	70
% of Total	14.3%	48.6%	20.0%	11.4%	5.7%	100.0%

All the respondents were aware about the existence and role of Quality Assurance in the university as shown in Table 2. A larger proportion of lecturers in the university seems to have 2-5 years of experience at university level as indicated by majority of respondents, (48.6%). The findings collaborate with a study by Olatuji (2013) which revealed that, at the point of entry into university workforce, 40% of the lecturers in the sampled universities do not have any teaching experience. A number of studies findings also confirm that on average, brand new lecturers are less effective than those with some experience under their belts (Clotfelter, Ladd & Vigdor 2007; Ladd 2008; Sass 2007).

Discussion of the students' evaluation reports at departmental level

Results of the students' evaluation need to be discussed at departmental level for each lecturer to get to know his fate in the evaluation by students. The study asked the respondents whether they discussed the findings of the student's evaluation at the departmental level, the findings are summarized in Figure 2.

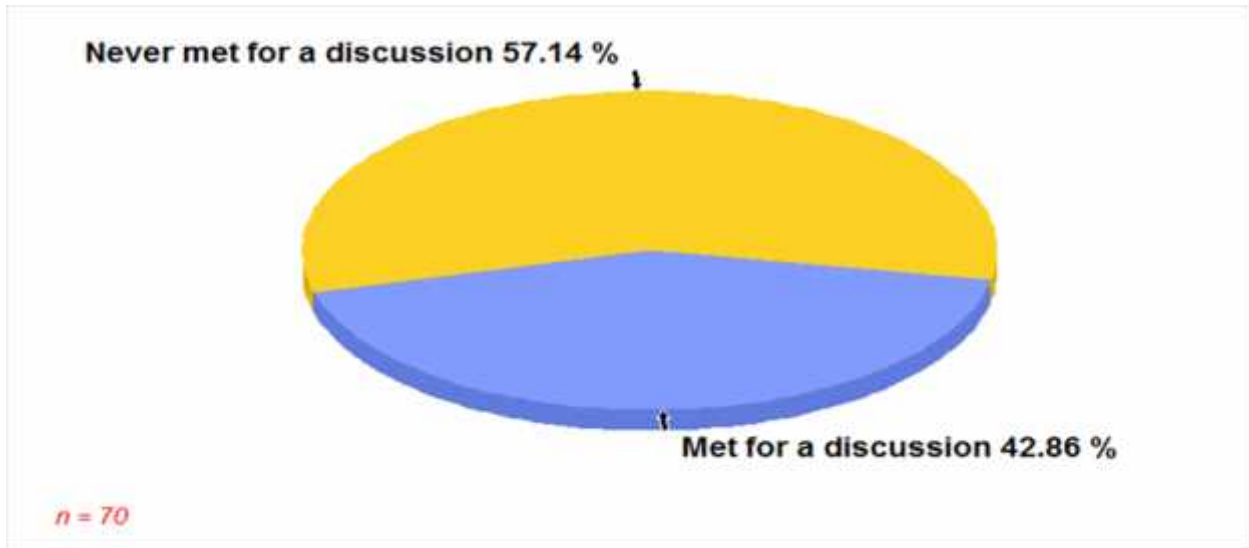


Figure 2. Lecturers' discussion on the students' evaluation reports at departmental level

It is unfortunate that majority of the respondents (57.14% of 70 respondents) claim not to have had any departmental meeting to discuss on students' evaluation reports as shown in Figure 2. This is a clear indicator that some departments don't hold departmental meetings to discuss on the students' evaluation reports.

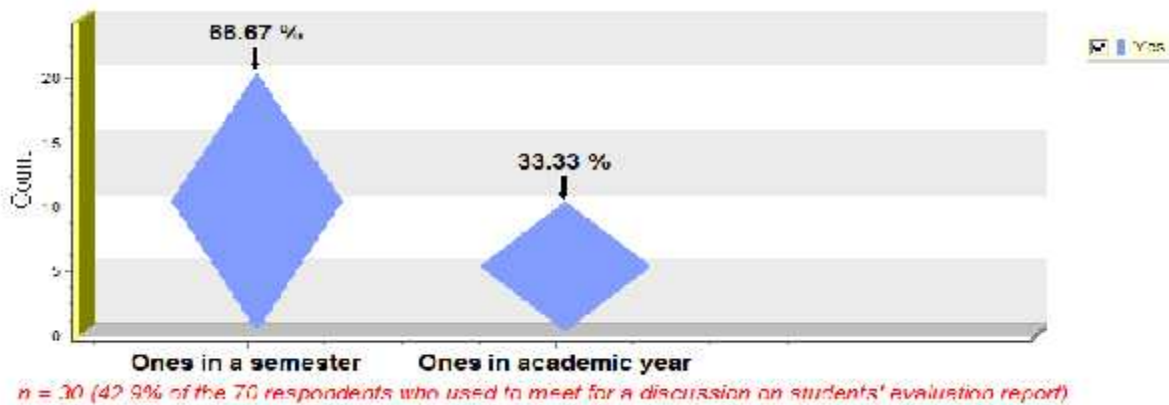


Figure 3. Frequency of meeting for the discussion on students' evaluation report

Of the 30 respondents who claim to have been meeting at departmental level to discuss students' evaluation reports, a significant proportion of them, 33.33% (10 respondents) claim to have only met once in academic year as shown in Figure 3. This is a clear indicator that most departments do not organise for meetings to discuss on the 'evaluation by students' reports so that lecturers can get to know where they may be having a problem with teaching.

Lecturers' perception towards students' competence in evaluating their teaching effectiveness

The study reveals the perception of lecturers towards being evaluated by students in Figure 4.

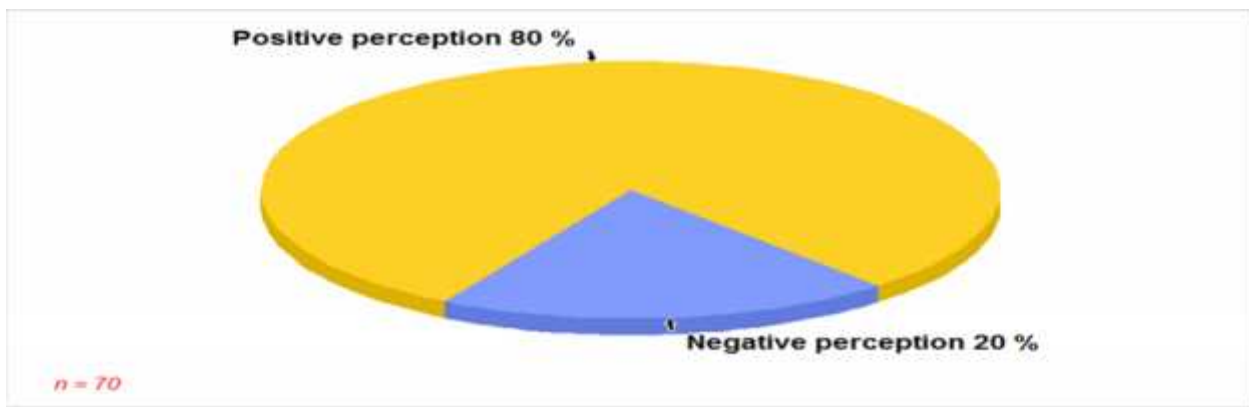


Figure 4. Lecturers' perception on being evaluated by students

A Chi-square test, $\chi^2_1 = 25.20$, $p = 0.00 < 0.05$, shows that majority of lecturers are willing to be evaluated by students and admit that students are competent enough to do the evaluation. This was indicated by 80% of respondents as shown in Figure 4. As much as majority of them are willing, a Binomial test indicates that the 20% proportion of those who are against the idea of student evaluation say that they are incompetent is significant, $p = 0.01 < 0.05$.

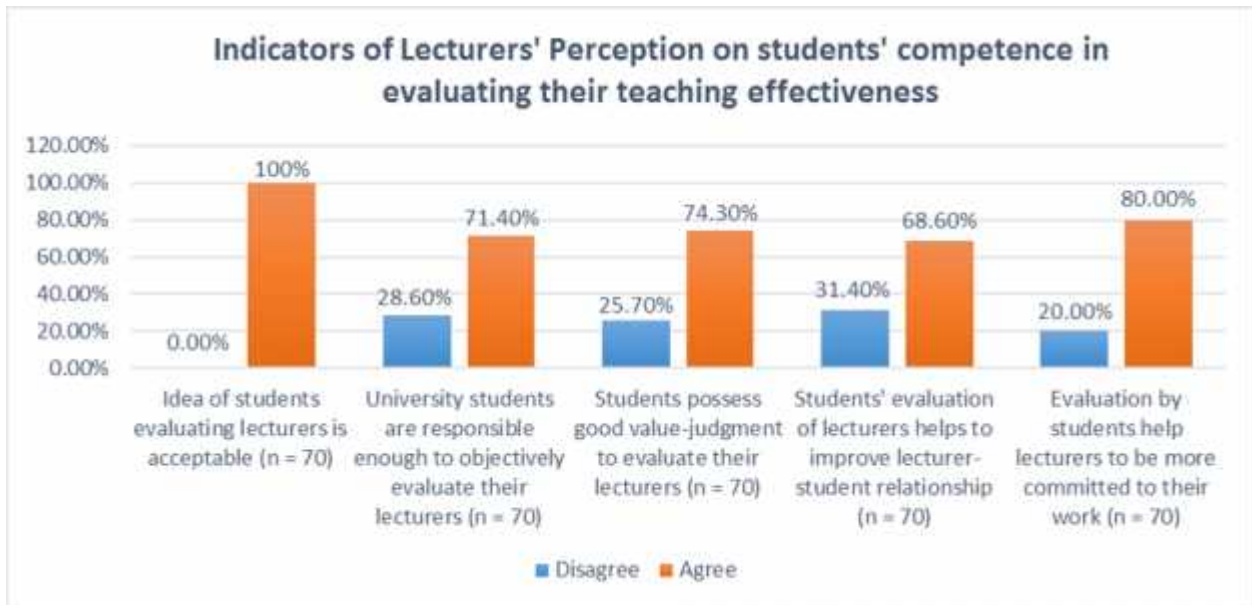


Figure 5. Perception indicators on being evaluated by students

The indicators shown in Figure 5 give supportive evidence suggesting that most likely majority of the lecturers seem to support the idea of being evaluated by students.

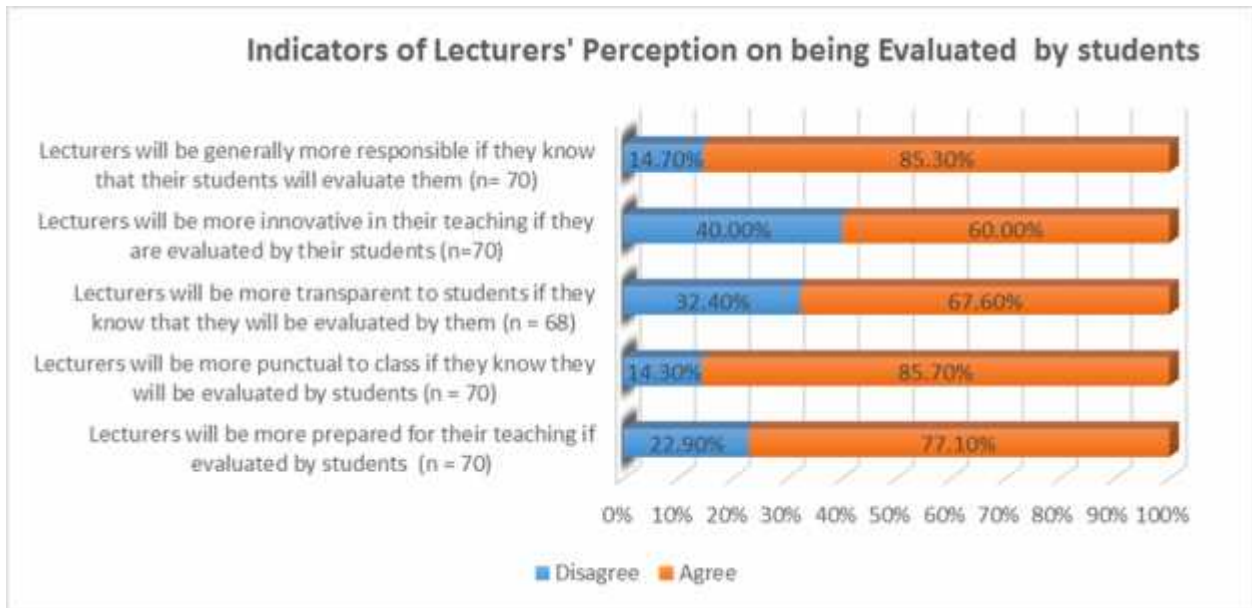


Figure 6. Perception indicators on idea of lecturers being evaluated by students

The indicators shown in Figure 6 also give evidence suggesting that majority of the lecturers seem to support the idea of being evaluated by students. For example, 77.1% of the respondents

agreeing that lecturers will be more prepared for teaching if evaluated by students is a clear indicator of supporting the idea of students evaluating lecturers.

Influence of gender, experience, professionalism and designation on lecturers' perception towards students' competence in evaluating their teaching effectiveness. The study also revealed the influence of gender, experience, professionalism, departmental discussions and designation on the perception of lecturers towards being evaluated by students.

Table 3
The Chi-square test of independence of perception

Test	Gender	Professional in teaching	Highest education status	University years of experience	Designation	Discussion of evaluation report at departmental level
Pearson 2		7.037		6.008	6.513	9.728
df		1		1	1	1
Sig.(2-sided)		0.04		0.042	.043	0.036
Fisher's exact test	0.434		0.415			
Exact Sig.(2-sided)						

The chi-square test reveals that lecturers' perception on students' competence in evaluating their teaching effectiveness significantly depends on professionalism in teaching ($\chi^2_1 = 7.037$, $p = 0.040 < 0.05$), years of university experience ($\chi^2_1 = 6.008$, $p = 0.042 < 0.05$), designation ($\chi^2_1 = 6.513$, $p = 0.043 < 0.05$) and holding departmental meetings ($\chi^2_1 = 9.728$, $p = 0.036 < 0.05$) as shown in Table 3.

Gender and Education status have no significant impact on the lecturers' perception on students' competence in evaluating their teaching effectiveness as shown in Table 3 ($p > 0.05$). From Figure 4, it is evident that a significant proportion of the lecturers, 20%, are against the idea of being evaluated by students. A binary logistic regression was carried out to determine the influence of professionalism in teaching, years of university experience, designation and holding

departmental meetings on the lecturers' negative perception towards students' competence in evaluating their teaching effectiveness.

The Hosmer and Lemeshow Test indicated that the model was good, ($\chi^2_{(3)} = 5.563$, $p = 0.791 > 0.05$). The model correctly classified 78% of cases overall, an improvement over the 56% of the model without the predictor variables. Our predictor variable explains 23.0% (Cox & Snell R square) to 28.7% (Nagelkerke R square) of why lecturers negatively perceive the idea of being evaluated by students.

Table 4

Valid test on the contribution of each variables in the equation

Factors (predictor variables)	B	S.E.	Wald	df	Sig.	Exp.(B)	95% C.I. for EXP(B)	
							Lower	Upper
Professionalism (Not professional teacher)	1.982	0.355	2.348	1	0.035	3.704	2.694	6.771
University experience (Below 5 years)	1.548	0.83	1.902	1	0.042	2.282	1.452	3.515
Designation (below rank of lecturer)	1.4	0.904	1.71	1	0.045	1.941	1.256	3.124
Never discussed the evaluation at department	2.494	0.289	3.588	1	0.028	4.342	3.048	7.053
Constant	-1.047	0.989	1.12	1	0.29	0.351		

The results are significant as indicated by the $p < 0.05$. A lecturer who has never had a chance to discuss students' evaluation report at departmental level is four (4) times likely to have a negative perception towards the idea of being evaluated by students than a lecturer who has ever attended departmental meetings as indicated by the odds ratio greater than one (Exp.B = 4.342).

A lecturer who is not professional is approximately four (4) times likely to have a negative perception towards the idea of being evaluated by students than a lecturer who is not professional as indicated by the odds ratio greater than one (Exp.B = 3.704).

Lecturers with less than five years of university experience are approximately two (2) times likely to have a negative perception towards the idea of being evaluated by students than a lecturer with more than five years of university experience (Exp.B = 2.282). The findings are in agreement with a number of studies findings which confirmed that on average, brand new lecturers are less effective than those with some experience under their belts (Clotfelter, Ladd & Vigdor 2007; Ladd 2008; Sass 2007) and thus may feel more insecure with ratings as may affect their academic progression.

A lecturer who has never had a chance to discuss students' evaluation report at departmental level is more likely to have a negative perception towards the idea of being evaluated by students than a lecturer who is not professional, have below five years of experience and of a designation of below the rank of lecturer as indicated by the highest regression coefficients (B=2.494 and B=1.732 respectively).

Thus, we conclude that lack of holding departmental meetings to discuss students' evaluation reports has the greatest influence on lecturers' negative perception towards students' competence in evaluating them while designation below a rank of a lecturer has the least significant influence. Gender and education status has no influence on the same.

Lecturers' Perception on both formative and summative assessment functions of students' evaluation report

Lecturers were asked to state their perception towards formative and summative functions of students' evaluation reports.

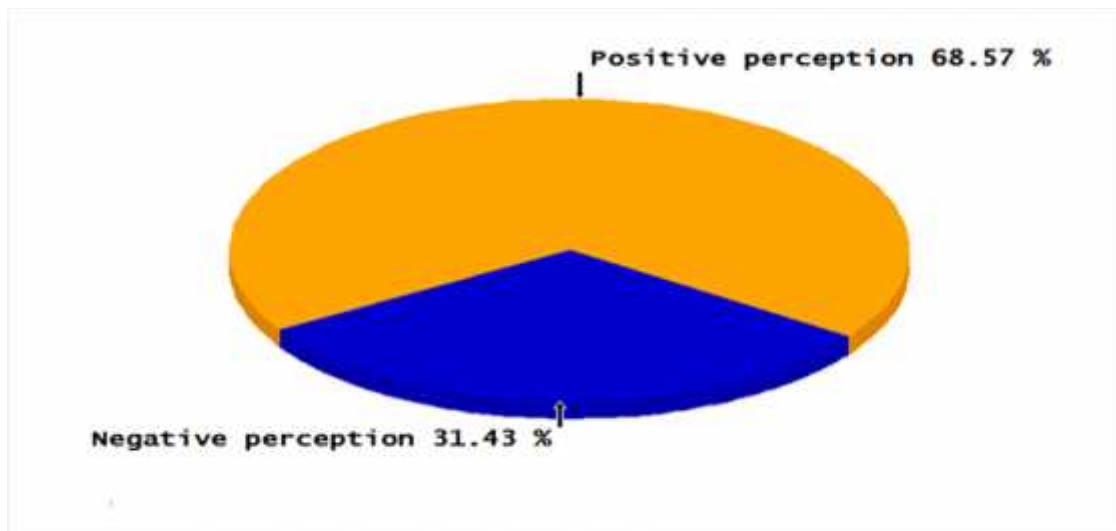


Figure 7. Lecturers' perception on being evaluated by students

A Chi-square test, $\chi^2_1 = 9.657$, $p = 0.002 < 0.05$, shows that majority of lecturers accept the use of formative and summative assessment functions of the students' evaluation report. But there was a significant drop from 80% proportion of respondents (in Figure 4) who supported being evaluated by students, to 68.57% proportion of respondents (in Figure 7) who support the use of formative and summative assessment functions of the students' evaluation report. The 20% proportion of respondents (in Figure 4) who were against being evaluated by students rose to 31.43% proportion of respondents (in Figure 7) who are against the use of formative and summative assessment functions of the students' evaluation report. This shows that as much as lecturers' would allow being evaluated by their students, they won't like the evaluation report to be used for formative and summative functions, a clear indicator that they don't have confidence in the competence of students evaluating their teaching effectiveness.

Lecturers' perception on formative assessment functions of students' evaluation report

The study reveals that majority of lecturers are willing to allow the use of students' evaluation report for formative assessment functions than use for summative functions.

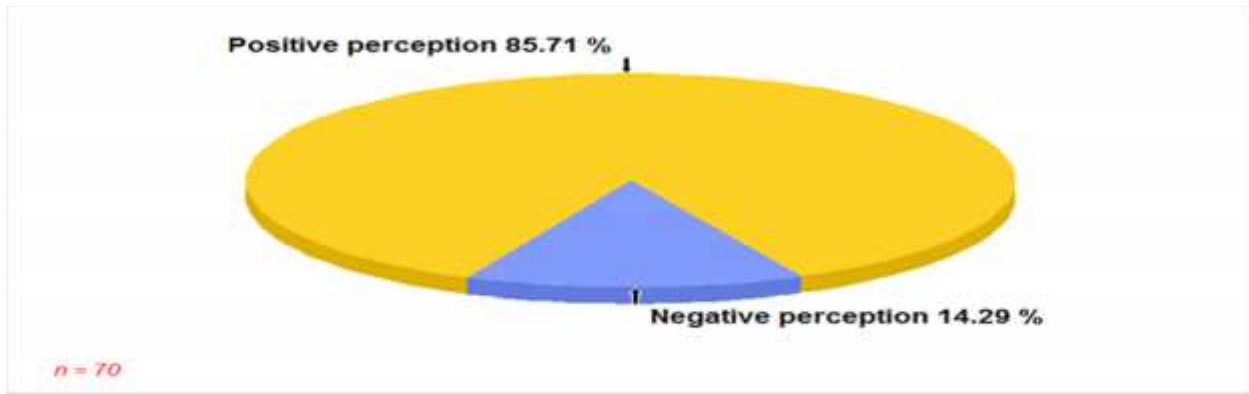


Figure 8. Lecturers' perception on use of evaluation reports for formative assessment functions

A Chi-square test, $\chi^2_1 = 35.714$, $p = 0.000 < 0.05$, indicates that majority of lecturers accept the use of formative and summative assessment functions of the students' evaluation report. This is supported by 85.71% of the respondents as shown in Figure 8.

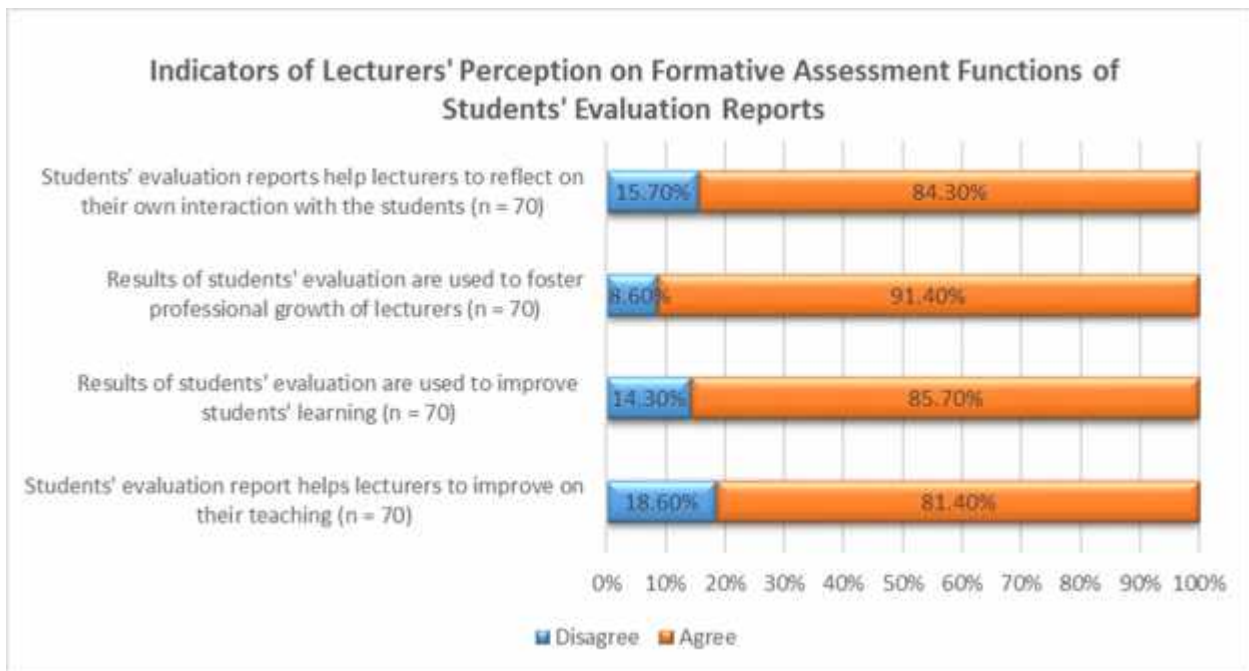


Figure 9. Perception on formative assessment functions of students' evaluation report

The indicators shown in Figure 9 give supportive evidence suggesting that majority of the lecturers seem to support the idea of using students' evaluation reports for formative assessment functions. For example, 91.40% of the respondents agree that students' evaluation report should

be used to foster professional growth of lecturers. This is a clear indicator of majority lecturers supporting the idea of using students' evaluation reports for formative assessments functions.

Table 5

Perception on 'formative assessment functions' across 'being assessed by students'

Lecturers' perception on being evaluated by students	Lecturers' perception on formative assessment function of student evaluation report	Total	
		Negative Perception	Positive perception
Negative perception	Count	4	10
	% of Total	5.7%	14.3%
Positive perception	Count	6	50
	% of Total	8.6%	71.4%
Total	Count	10	60
	% of Total	14.3%	85.7%

It is clear from Table 5 that majority of lecturers in the University seem to support the idea of being evaluated by their students and the formative assessment functions of the students' evaluation report. This is indicated by majority of the respondents, 71.4% of the 70 respondents, who had a positive perception on both.

Lecturers' perception on summative assessment functions of students' evaluation report

The study reveals that majority of lecturers are against summative assessment functions of students evaluation report.

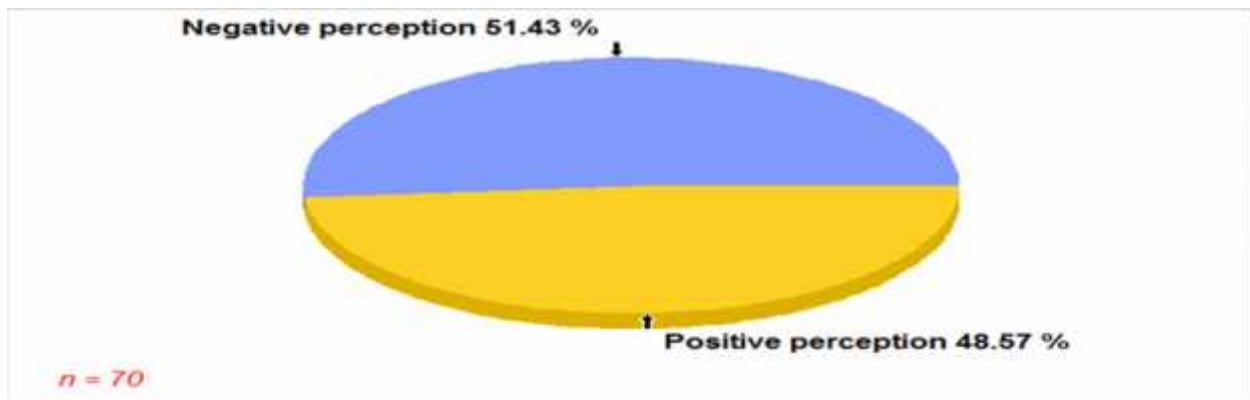


Figure 10. Perception on the use of summative assessment functions of the evaluation report

A Chi-square test, $\chi^2 = 0.057$ $p = 0.811 > 0.05$, indicates that there is no significant difference between the positive perception (48.57%) and negative perception (51.43%) on summative assessment functions of students evaluation report. This provides strong evidence that majority of lecturers have no confidence in the competence of students evaluating their teaching effectiveness.

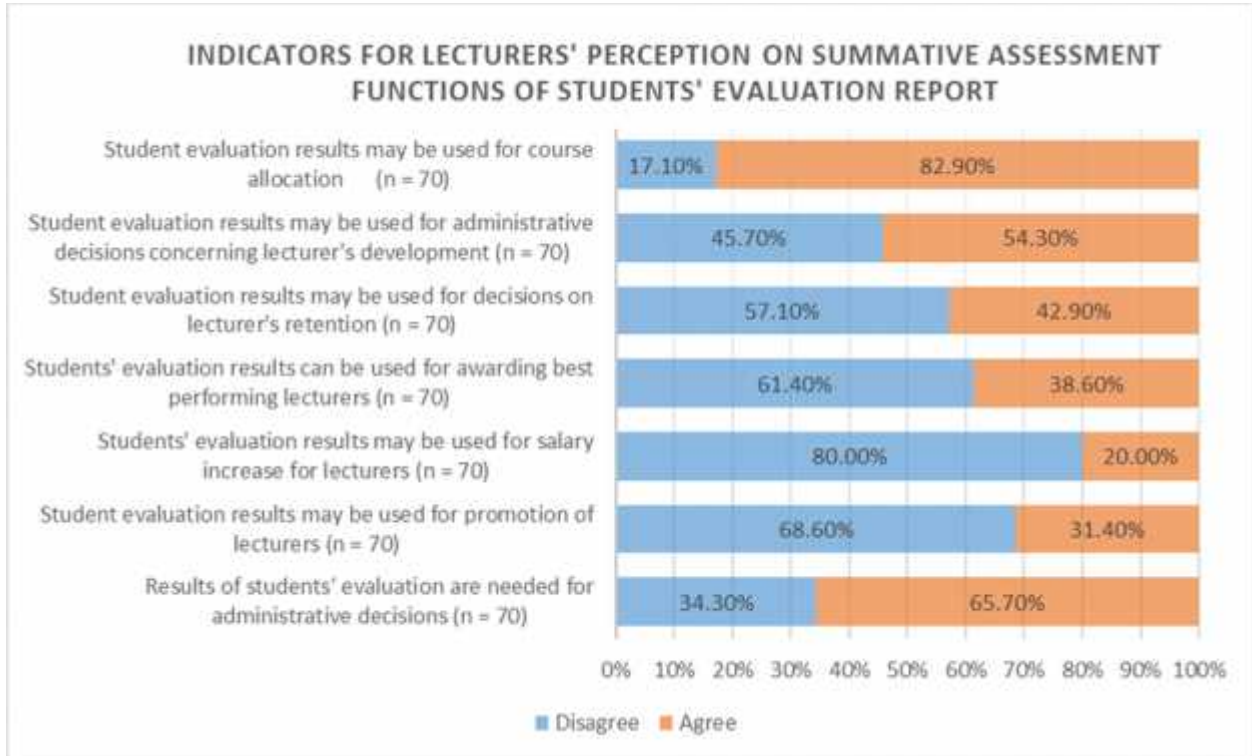


Figure 11: Perception on summative assessment functions of students' evaluation report

The indicators shown in Figure 11 give supportive evidence suggesting that majority of the lecturers seem to oppose the idea of using students' evaluation reports for summative assessment functions. For example, 80.0% of the respondents disagree with the idea of using students' evaluation results to increase salary for lecturers. The fear among most lecturers on using students' evaluation results for summative assessment functions suggest that they don't have confidence in their students' competence in evaluating their teaching effectiveness.

Table 6**Perception on ‘summative assessment functions’ across ‘being assessed by students’**

Lecturers’ perception about being assessed by students		Lecturers’ Perception on summative assessment functions of students’ evaluation report		Total
		Negative Perception	Positive perception	
Negative perception	Count	9	5	14
	%	64.3%	35.7%	100.0%
Positive perception	Count	27	29	56
	%	48.2%	51.8%	100.0%
Total	Count	36	34	70
	%	51.4%	48.6%	100.0%

Of the 56 respondents (80%) who supported the idea of being assessed by students, a significantly larger proportion of them, 48.2% (27 respondents) opposed the idea of students’ evaluation results being used for summative functions as shown in Table 6. This is a clear indicator that most of University lecturers feel students are not competent enough to assess their teaching effectiveness.

Conclusion

It has come to a realization that although majority of the University lecturers view students’ evaluation appropriate and important in enhancing and improving the learning process, they are very much against the idea of the reports being used for summative assessment functions such as promotions and salary increment. This therefore reveals (according to lecturers) that students are not competent enough to assess lecturers’ teaching effectiveness.

The study therefore recommends that the university should not only use students’ evaluation reports for summative assessment functions in judging lecturers’ teaching effectiveness, but also incorporate multi modal approach to assess the teaching process and lecturer’s competency. The university should provide a conducive working environment, this will support the teaching process and motivate the lecturer’s to give their best.

References

- Beran, T., Violato, C., Kline, D. & Frideres, J. (2005). The Utility of Student Ratings of Instruction for Students, Faculty, and Administrators: A “Consequential Validity” Study. *The Canadian Journal of Higher Education*, 35 (2), 49-70.
- Chang, T.S. (2000). Student Ratings: What Are Teacher College Students Telling Us about Them? Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 24-28).
- Clotfleter, C.T., Ladd, H.F., & Vigdor, J.L. (2007). “How and why teacher credentials matter for student achievement.” National Bureau of Economic Research Working Paper.12828. Also available on the Caldercenter.org web site.
- David W., Adebowale A. (1997). Student evaluation of teaching effectiveness: A Nigerian investigation. *Higher Education*, 24(4): 453- 463 (1997).
- Ede, I.O (2005). Lecturers’ perception of student evaluation in Nigerian Universities. *International Education Journal*, 6(5), 619625.
- Elaine Keane and Iain Mac Labhrainn (2005). “Obtaining Student Feedback on Teaching & Course Quality.” Ghana. Centre for Excellence in Learning & Teaching.
- Emery, C. R., Kramer, T. R. & Tian, R.G. (2003). Return to Academic Standards: A Critique of Student Evaluations of Teaching Effectiveness. *Quality Assurance in Education*, 11(1), 37-46.
- Farley C.H (1996). Confronting Expectations: Women in the Legal Academy. *Yale Journal of Law and Feminism* 15(2), 40-47.
- Gardener M. and Milton B. (2002). Competent and the incompetent teacher. *Journal of Education*, 10: 5365.
- Germain, M.L. & Scandura, T. A. (2005). Grade Inflation and Student Individual Differences as Systematic Bias in Faculty Evaluations. *Journal of Instructional Psychology*, 32(1), 58-67.
- Gold. R. (2001). Evaluation of instruction. *Educational Studies*, 15(1), 31-42.
- John C. Hattie. (2009). Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement. London & New York. Routledge.

- Johnson, B. (2012). Should students evaluate their teachers? : <http://edutopia.org>. Retrieved 01/07/2013
- Kupermintz, H. (2003). Teacher Effects and Teacher Effectiveness: A Validity Investigation of the Tennessee Value Added Assessment System. *Educational Evaluation and Policy Analysis*, 25 (3), 287-298.
- Ladd, Helen F. (2008). "Value-Added Modeling of Teacher Credentials: Policy Implications." Paper presented at the second annual CALDER research conference, "The Ins and Outs of Value-Added Measures in Education: What Research Says," Washington, D.C., November 21. http://www.caldercenter.org/upload/Sunny_Ladd_presentation.pdf
- Lang, J. W. B. & Kersting, M. (2006). Regular Feedback from Student Ratings of Instruction: Do College Teachers Improve their Ratings in the LongRun? *Instructional Science*, 35, 187-205.
- Machingambi, S. and Wadensanyo, N. (2011). University lecturers' perception of evaluation of their instructional practices. *Anthropologist* 13 (3). 167-174
- Magno, C., & Sembrano, J. (2008). The Role of Teacher Efficacy and Characteristics on Teaching Effectiveness, Performance, and Use of Learner-Centered Practices. *The Asia Pacific-Education Researcher*, 16(1), 73-90
- Menny M. A. (2000). White Guy Habits in the Classroom. *Men and Masculinities* 2 no 4 pg. 457-469
- Morgan, D.A., Sneed, J. & Swinney, L. (2003). Are Student Evaluations A Valid Measure of Teaching Effectiveness: Perceptions of Accounting Faculty Members and Administrators? *Management Research News*, 26(7), 17-32.
- Mugenda, A. & Mugenda, O. (2003). *Readings in Research Methods: Quantitative and Qualitative Approaches*. Nairobi. African Centre for Technology Studies.
- Mukherji, S. & Rustagi, N. (2008). Teaching Evaluations: Perception of Students and Faculty. *Journal of College Teaching & Learning*, 5(9), 45-54.
- Norazuwa N. and Dahlan, N. (2007). A measurement of teaching effectiveness for public higher education institution in Malaysia. Proceedings of International conference of Teaching.
- Orodho, J.A. (2009). Elements of Education and Social Science Research Methods. Maseno. Kanezja Publisher
- Otunga R.N. (1998). Foundation of Adult Education in Africa. South Africa. Pearson

- Richardson, J.T.E. (2005). Instruments for obtaining student feedback: a review of the literature. *Assessment & Evaluation in Higher Education* 30, no. 4: 387–415.
- Rindermann, H. & Schofield, N. (2001). Generalizability of Multidimensional Student Ratings of University Instruction A cross Courses and Teachers. *Research in Higher Education*, 42 (4), 377-399.
- Roach, K. D. (1997). Effects of Graduate Teaching Assistant Attire on Student Learning, Misbehaviors, and Ratings of Instruction. *Communication Quarterly*, 45 (3), 125-141.
- Rocca, K. A. & McCroskey, J.C. (1999). The Interrelationship of Student Ratings of Instructors' Immediacy, Verbal Aggressiveness, Homophily, and Interpersonal Attraction. *Communication Education*, 48, 308-316.
- Sass, Tim R. (2007). "The Determinants of Student Achievement: Different Estimates for Different Measures." Paper presented at the first annual CALDER research conference, Washington, D.C., October 4.
- Scriven, N. (1995). Students' rating offer useful input to teachers' evaluation. Practical assessment. *Research and evaluation*. 4 (7). Retrieved 01/07/2013
- Stankeviciene, J. (2007). Assessment of Teaching Quality: Survey of University Graduates. Paper presented at the European Conference on Educational Research (University of Ghent, September 19-21, 2007).
- Theall, M. & Franklin, J., (2001). Looking for Bias in All the Wrong Places: A Search for Truth or a Witch Hunt in Student Ratings of Instruction? *New Directions for Institutional Research*, No.109. San Francisco: Jossey Bass.
- UNESCO. (2005). EFA Global Monitoring Report 2006. Education for All: Literacy for Life. Paris, UNESCO.
- Worthington, A.C. (2002). The Impact of Student Perceptions and Characteristics on Teaching Evaluations: A Case Study in Finance Education. *Assessment and Evaluation in Higher Education*, 27(1), 49-64

Authors Profile

Julius Kiprop Maiyo, is an associate professor at the Department of Educational Foundation, Planning and Management, Kibabii University. He holds a PhD in Education (interdisciplinary) from the University of Pune, MBA from ISBM and Mphil from Moi University. He has more than ten years' experience working at the University, in research, teaching and consultancy. Currently, he is the Director Performance Contracting and Quality Assurance at Kibabii University. Telephone contact: +254-721-223-154 and Email: maiyojulius@yahoo.com

**Aligning Higher Education Curricula with the Green Concept:
A Case Study of Kenyan Universities**
Prof. George M. Ndegwa

Abstract

With the recent declaration of Sustainable Development Goals to 2030 at the United Nations, all nations need to ensure inclusive and equitable quality education and promote life-long learning opportunities for all. In this respect, a well-structured and holistic curriculum is an important first entry point in guiding teaching and learning processes. This paper discusses the current status and efforts made in mainstreaming of green curricula in higher education institutions (HEIs) in Kenya so as to engender an environmental conscious generation. It was carried out through a survey of on-going environment and sustainability courses offered, present curriculum development process in universities, and case studies of curricula re-orientation by the HEIs. A review of on-going environment and sustainability courses offered by 70 HEIs in Kenya indicated that about 83% of all public universities offer environmental and sustainability-related courses. However, only about 12% of the private-chartered universities offer such courses, while other categories of HEIs do not offer them. A review of the universities indicated that only a few of the public universities have made efforts to mainstream environment and sustainability issues into their teaching and learning processes. There is therefore need to regularly review content of a given academic programme in order to address current trends in the discipline in focus and also align it to the institutional, national and global goals and trends in order to promote the vision and mission of the institution and national goals. There is also need to make sustainability part of a university's culture so as to enhance both the university's brand and marketability of its students. This may require courage to remove course contents that no longer contribute to a viable and healthy future for students, and even introduction of new courses that incorporate environment, low carbon-climate resilience development strategies, and sustainability aspects in education, training, campus operations and enhanced student engagement. There is also need to advance the agenda of education for sustainable development through policy support, whole institution approaches to education and training, building capacities of educators and trainers, among other recommendations.

Key words: Sustainable Development, Green Curriculum, Environment, Sustainability

Background

In 2002, the United Nations General Assembly, through resolution 57/254, declared the period 2005- 2014 as the UN Decade of Education for Sustainable Development (UNDESD), with UNESCO designated as the lead agency (UN, 2002). Education for Sustainable Development (ESD) is a vision of education that seeks to balance human and economic well-being with cultural traditions, and respect for the earth's natural resources. In 2005, UNESCO released an International Implementation Scheme for the UN Decade of Education for Sustainable Development (UNESCO, 2005), which has led to implementation processes across the world at regional, sub-regional and national levels. These interventions are in recognition of the role that education can play in bringing about sustainable development and re-affirm other recommendations such as those in Agenda 21 (UNESCO 1992). Environmental education hence provides a strong foundation for sustainable development.

The reach and influence of the higher education sector in the realization of sustainable development cannot be ignored, with over 20,000 institutions and 150 million students every year (UNESCO 2014) contributing to decision-making in all sectors of the global economy. Many of the higher education institutions (HEIs) have created sustainability plans with a whole-institution approach. Also, the Rio+ 20 declaration of '*The future we want*' explicitly calls for mainstreaming of sustainable development at all levels (UN, 2012). The Rio+20 conference profiled the contribution of HEIs in sustainable development advocating for more support to this sector (UN, 2012). Sustainability is now recognized by Governments and international agencies as a key element of '*graduateness*' and the skills set of all people throughout their lives (Blewitt & Ross, 2008).

In Africa sustainability needs to address issues related to poverty alleviation at community and national levels (Togo & Sisitka, 2009). Africa's 54 countries, with over 300 universities, serving close to 5 million students, represent a powerful force for change (UNEP, 2008). To transform this potential into reality, universities need to be multi-purpose institutions that invoke the public good. This can be achieved by making them development universities and partners for regional cooperation (UNEP, 2008).

Several sustainable development initiatives have been rolled out targeting the higher education sector in Africa. They aimed at leveraging teaching and learning as avenues for social change (Taylor, J, 2010). One such intervention was the project on Mainstreaming Environment and Sustainability in African Universities (MESA) that was run by the United Nations Environment Programme (UNEP, 2008) and a toolkit that was developed for use in sustainability assessment (Togo & Lozt-Sisitka, 2009). The MESA programme (UNEP, 2008) is aimed at revitalizing African Universities through diverse approaches to respond to the Millennium Development Goals (MDGs), the African Ministerial Conference on Environment (AMCEN), and the New Partnership for African Development (NEPAD) commitments to sustainable development in Africa. Both the African Union and NEPAD have envisioned the transformation of institutions of higher learning on the continent into ‘development universities’ that are responsive to local and international needs, while promoting cooperation and integration in Africa (UNEP, 2008). Sustainability in higher education integrates positive aspects of environmental sustainability and environmental responsibility (Nicolaidis, 2006).

UNEP’s Environmental Education and Training Unit (EETU) has been working with Higher Education Institutions through their Flagship programme, Global Universities Partnership on Environment and Sustainability (GUPES). The aim has been to promote integration of environment and sustainability concerns into teaching, research, community engagement, and the management of universities. This includes greening of university infrastructure /facilities/operations, as well as enhancing student engagement and participation in sustainability activities both within and beyond universities. A recent development has been the inauguration of the Kenya Green University Network (KGUN) in February 2016. This functional network aims to provide a strategic platform for HEIs in Kenya to incorporate environment, low carbon-climate resilience development strategies and sustainability aspects in their education, training, campus operations and management through enhanced student engagement. These university systems will hence incorporate environment and sustainability aspects through collaborative efforts.

This paper aims to evaluate the current status and efforts made in mainstreaming of green curricula in universities in Kenya, so as to engender an environmental conscious generation. The specific objectives were to establish the present HEIs that provide environment and sustainability courses, curriculum development process in HEIs, and how environment and sustainability can be mainstreamed into curricula of HEIs. The study was carried out through a survey of on-going environment and sustainability courses offered by the HEIs from available information sources. The present curriculum development process in HEIs, according to the Commission for University Education (CUE) guidelines, was also reviewed, while an effort of curricula re-orientation by the HEIs was observed through some case studies.

On-going environment and sustainability courses at Kenyan universities

In Kenya, university education has expanded rapidly since introduction of the 8-4-4 system in 1985. The total university enrolment stood at 324,560 in 2013 (GoK, 2014). Currently, about 400,000 students are studying at Kenyan universities for various degrees. University enrolment is expected to keep increasing due to a young growing population, free primary education, and higher transition rates. The combined undergraduate and postgraduate enrolment is estimated to reach 1 million by 2020. There is hence need to mobilize the numbers, innovation, and energies that youth have, especially those in institutions of higher learning in Kenya, to help surmount the sustainable development challenges facing the country. This would be aligned with what for instance European universities are doing to assist their countries and regions deal with emerging issues such as biodiversity loss, the debt crisis, oil prices etc. (Sterling, 2011).

Presently, there are 70 higher education institutions in Kenya, where the term institution will be used to mean an organization founded for purposes of university education and research. These HEIs comprise of 23 public universities, 10 public constituent colleges, 17 chartered private universities, 5 private constituent colleges, 14 private universities with letter of interim authority, and 1 registered private institution. These 70 HEIs are expected to play a critical role in the realization of the country's development and in securing a sustainable future for the country. This is largely through their products (the students), linkages with industry and communities, and in shaping public discourse in many different spheres. Higher education institutions offering environmental and sustainability-related courses in Kenya are presented in Table 1.

Table 1***Institutions offering environmental and sustainability-related courses in Kenya***

	Category of Institution	No	Remarks
1	Public universities	19/23	<ul style="list-style-type: none"> - Uni. of Eldoret (15 courses, BSc, MSc, PhD) - JKUAT (13 courses, BSc, PG, MSc, PhD), - KU (12 courses, BSc, MSc, PhD), - UoN (7 courses, BSc, MA, PhD), - Pwani (6 courses, BSc, MSc, PhD), - MMUST (4 courses, BSc, MSc, PhD); - Maseno (4 courses, BSc, MSc, PhD); - EU (3 courses, BSc, PhD); - Chuka (3 courses, BSc, MSc, PhD); - SEKU (3 courses, BSc, MSc); - Kabianga (3 courses, BSc, MSc) - TUK (2 courses); - Maasai Mara (2 courses, BSc, MSc); - Karatina (2 courses, BSc, MSc); - Kibabii (2 courses, BSc) - MU (1 course, BSc); - TUM (1 course, BTech), - Kisii (1 course, BSc); - Laikipia (1 course, BSc).
2	Public university constituent colleges	2/ 10	<ul style="list-style-type: none"> - Machakos (KU); (BSc, Env'tal Studies); - Embu (UoN); (BSc, Env'tal Conservation & Natural Resources);
3	Private chartered universities	2/17	<ul style="list-style-type: none"> - Daystar (BSc, Environmental Health), - Kabarak (BSc, Environmental Science)
4	Private university constituent colleges	0/ 5	None
5	Private universities with letter of interim authority (LIA)	0/ 14	None
6	Registered institutions	0/ 1	None
	Total	23/70	None

Source: Records from CUE (2015); where abbreviations above are: *JKUAT- Jomo Kenyatta University of Agriculture and Technology; KU- Kenyatta University; UoN- University of Nairobi; MMUST- Masinde Muliro University of Science and Technology; EU- Egerton University; TUC- Technical University of Kenya; SEKU- South Eastern Kenya University; MU- Moi University; TUM- Technical University of Mombasa.*

Table 1 shows that presently, about 83% (or 19 of 23) of all public universities in Kenya offer environment-related courses. However, only about 12% (or 2 of 17) of the private-chartered universities offer environment-related courses, while no such courses are offered in all the 5 private constituent colleges, 14 private universities with letter of interim authority, and 1 registered private institution. This indicates that environment and sustainability-related courses are mostly offered in the public universities and constituent colleges, while other categories of HEIs, especially private-chartered universities, offer minimal of such courses.

Table 2 shows the various variations of the Bachelor of Science (BSc) programmes, such as BSc in Environmental Science/ or Studies, BSc Environmental Education/ or Health, to BSc in Water and Environmental Engineering, and Bachelor of Technology (BTech) in Renewable Energy. However, the MSc courses are mostly progressions of the BSc courses, though a few new ones have been introduced, such as MSc in Global Environment and Arid and Semi-arid Lands (ASAL) Engineering, MSc in climate change, adaptation and Sustainable Development, and MSc in Environment Legislation & Management, among others.

On the other hand, PhD courses that relate to environment and sustainability are also offered in the various universities, which include Environmental Earth Science, Environmental Planning and Management, among others.

Table 2***On-going Environment and sustainability-related courses at universities in Kenya***

	Level	Remarks
1	BSc	<ul style="list-style-type: none"> - Bachelor of Science in Environmental Science/ studies/ Education; - Bachelor of Science in Environmental Management; - Bachelor of Science (Environment Conservation& Natural Resources) - Bachelor of Environmental Planning and Management - Bachelor of Science in Environmental Horticulture and Landscaping Technology - Bachelor of Science in Environmental & Bio-systems Engineering; - Bachelor of science in Water and Environmental Engineering - Bachelor of Built Environment (Urban & Regional Planning) - Bachelor of Technology in Renewable Energy & Environmental Physics - Bachelor of Science on Environmental Health, others.
2	MSc	<ul style="list-style-type: none"> - Master of Science in Environmental Science/ Studies/ Legislation & Management, - Master of Science in Environmental Planning and Management, - Master of Science in Environmental Biology/ Health/ Law/ Economics, - Master of Science in climate change, adaptation and Sustainable Development, - Masters in Environmental Studies (Climate Change And Sustainability) - Master of Science in Environmental Information Systems - Master of Science in Global Environment and ASAL Engineering - Master of science in Environmental Engineering and Management, others
3	PhD	<ul style="list-style-type: none"> - Doctor of Philosophy Environmental Science/ Biology/ Health/ Law/ Economics, - Doctor of Philosophy in Environmental and Occupational Health - Doctor of Philosophy in Environmental Legislation and Management - Doctor of Philosophy in Environmental Management & Governance - Doctor of Philosophy in Global Environmental and ASAL Engineering - Doctor of Philosophy in Environmental & Bio-systems Engineering - Doctor of Philosophy in Environmental Earth Science - Doctor of philosophy in Agricultural and Environmental Biotechnology - Doctor of Philosophy in Environmental Information Systems - Doctor of Philosophy in Environmental Planning and Management

Source: Records from CUE (2015)

Present Curriculum Development Process in Universities

In Kenya, there is no central body responsible for curriculum development at the university level, hence universities have the freedom to develop their own programs and adapt them to market needs. Each university designs its curriculum based on its peculiarities and uniqueness. Irrespective of this, however, curriculum design is guided by CUE, which is responsible for maintaining quality standards in higher education. According to CUE guidelines, university curriculum is often designed by individual departments, with the more experienced lecturers giving their input regarding the content to be included in the curriculum. Other stakeholders also participate in the process, such as external experts teaching the same programme at university level, and industry players such as relevant professionals and/ or regulatory authorities. The content is often internally peer reviewed at the department and school/faculty before it is presented to the senate for adoption. After the senate has adopted the programme, it is then presented to the commission for external review. Once it has been accepted by CUE, the university can go ahead and implement the curriculum after incorporating any suggested recommendations by the commission. The process can hence be long and costly.

The portfolio of course units and programmes that are offered by the university are compiled in the university course catalogue. The catalogue, among others, contains a detailed description of the course content to be covered at a particular time of the programme offering and the respective lecture hours for that particular course. However, the course description does not specify the depth and breadth of content coverage in respect of the particular course. This in essence means that the course lecturer has the freedom to design a course outline skewed to his /her competencies in the subject.

Mainstreaming environment and sustainability in curricula

Case studies on mainstreaming of curricula in HEIs

Curriculum re-orientation was a major focus area for the DESD (2005-2014). A well-structured and holistic curriculum is an important first entry point in guiding teaching and learning processes, and in making sustainability part of the university culture (Sterling, 2011). This is because it facilitates a balance between global dynamics and local contexts, and it also spurs student interest, and creates opportunity for work across disciplines and beyond lecture halls.

Embedding sustainability in courses goes on to address the problems of communities and future-compliant development demands (de Haan, 2010). In this way, knowledge and information-flow becomes two-directional, i.e. from the university to communities and vice versa, thereby opening up enormous windows for co-learning experiences to take place.

Various case studies on mainstreaming environment and sustainability in university curricula were also carried out. The first involved a review for sustainability of two sample programmes in JKUAT, where the review suggested incorporation of various changes in the natural science programme, such as expounding the value of natural resources to include other social benefits such as aesthetics, provision of goods and services such as oxygen, nutrient cycles, pollination etc., which entailed working across disciplines. It also suggested more use of the whole campus for such a practical oriented course. Results of the computer studies review included more environmentally friendly production of materials for ICT equipment, which should also have a low energy usage; safe disposal of ICT equipment, recycling for re-usable components, and safe disposal of hazardous components; and deployment of ICT tools as a driver of growth across all sectors. However, most participants were persuaded that both the university brand and marketability of its students would be enhanced by mainstreaming sustainability issues into their curricula. Also, the university developed an Education for Sustainable Development (ESD) Policy (JKUAT, 2010).

Kenyatta University, in partnership with other institutions, had also started a project on Education for Sustainable Development in Africa (ESDA), which emphasizes strengthening of problem-solving capacities for practical application in the industrial and community settings in Africa. The other case study was from University of Nairobi, which supports activities that ensure environmental objectives of waste minimization, energy and water use efficiency, air quality, transportation, and noise are carried out.

Mainstreaming environment and sustainability

A 'green curriculum' aims to nurture respect for the natural world, heighten students' environmental awareness, promote stewardship, and develop deep ecological values. Such curricula therefore need to have a green aspect evolving from ecology to sustainability,

appreciate the local geographical and cultural context, and they should also be based on relevant academic scope and sequence. It offers breadth and depth of new ways to cover mandated learning outcomes while increasingly placing learning about nature, the earth, environmental solutions and sustainable development at the heart of teaching. It is not meant to be a bunch of "add-ons", which add to workload of lecturers. However, it needs courage to remove course contents that are no longer relevant and don't contribute to a viable and healthy future for the students. It also needs to foster a love for learning about themselves, each other, and the wider world community in ways that are respectful, have depth of understanding, and compassionate co-existence. It should also instill pride, responsibility and cooperation among students as life-long learners and future leaders in the world.

The process needs to reference various considerations such as competencies (e.g. critical thinking, systemic thinking, soft skills, ICTs, etc.), curriculum structure (e.g. flexibility, such as options for intermediate exits, student-centered, action research, incorporated out-reach programmes), life-long learning, and orientation to the world as proposed by various authors (Goldfinch, et al., 2007; Gertenmaier & Mandl, 2001; de Haan & Harenberg, 1999; de Haan, 2010). The mission is hence to deliver a generation of global citizens who are knowledgeable about and inspired to take responsibility for the sustainability of the world. This may require introduction of specialized courses that incorporate environment, low carbon-climate resilience development strategies, and sustainability aspects in the education, training, campus operations and enhanced student engagement. A few examples of new courses that promote environment and sustainability include the ones on green economy, green energy, virtual learning for students (e-learning), among others, some of which are expounded below.

i) **Green Economy.** This is a course that aims to build an understanding of sustainable development without degrading the environment, and results in reducing environmental risks and ecological scarcities. It is an economy whose growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. A green economy is based on six main sectors, i.e. renewable energy, green buildings, sustainable transport, water management, waste management, land management. Such a course would require learning materials from each sector.

ii) **Green Energy.** This requires a curriculum that develops skills and expertise in alternative energy sources that reduce carbon emissions, including fossil fuel alternatives, such as biomass/biofuel, nuclear, geothermal, solar, and wind. These supplement the continent's energy shortages, especially where there is no access to grid electricity. This requires development of curricula that can train personnel on green energy, such as solar photovoltaic systems that can be used in the making and installation of solar panels to supplement traditional electrical power sources. Also, curricula can be developed in wind energy and wind power technology so as to generate electricity from wind turbines to supplement other sources.

iii) **Virtual learning** (e-learning). This is the use of technology to enable people to learn anytime and anywhere by overcoming the limitations of time, distance and resources. According to standards and guidelines of CUE, 2014 (fourth schedule), the scope of the standards for open, distance and e-learning (ODEL) include courses offered by universities through traditional distance education, e-learning provision and interactive CD ROMs, blended learning and virtual education. Open learning means policies and practices that permit entry to learning with no or minimum barriers with respect to age, gender, or time constraints and with recognition or prior learning, while distance education means delivery of learning or training to those who are separated mostly by time and space from those who are teaching or training.

Virtual learning typically means using a computer to deliver part, or all of a course. It is largely web-based, but it also uses multimedia and, besides delivering content, also enables a high level of interaction among learners, content, teachers, peers and administration both synchronously and asynchronously. Smartphones and tablets are now embraced in the classroom and office, allowing the use of a wealth of interactive designs, making distance learning not only engaging for the users, but also valuable as a lesson delivery medium. Electronic learning hence offers anyone the chance to take their on-line training to the next level.

On-line learning can be cost-effective and saves time by reducing the time taken away from the office, removing travel costs and doing away with printed materials. Also, many face to face courses only operate within normal office hours, but virtual learning allows staff to complete the course when and where they like, hence disruptions to a busy working schedule are minimized. Also, e-learning is discreet since it allows each individual to tackle a subject at their own pace, with interactive tasks to ensure a thorough understanding throughout each module. However, virtual colleges may need to work with industry professionals to ensure all on-line course materials are approved and available to help one prepare for final qualifications. Also, there may be need to implement 'blended learning', which is to use e-learning alongside traditional face to face training so as to combine their benefits. Blended learning is the perfect approach for environments where e-learning can teach the theory, but there is a need for practical training to ensure competency.

Global Action Programme (GAP) recommendations

The end of the UN ESD decade in 2014 signaled the onset of the Global Action Programme (GAP) on ESD as a successor to the Decade. UNESCO, as the lead agency of the Decade, developed GAP so as to build on achievements and create new momentum in the post-2015 development and education agendas. This was adopted in the final conference on ESD (UNESCO, 2014), and ratified by the UN General assembly via resolution A/RES/69/211.

The overarching goal of GAP is to generate and scale up action in all levels and areas of education and learning to accelerate progress towards sustainable development. It contributes to achieving the vision put forward by the Decade of ESD of “a world where everybody has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation”. The GAP will deploy a two-fold approach to multiply and to scale up ESD actions, i.e. by (1) integrating sustainable development into education, and (2) integrating education into sustainable development. Corresponding to this overall approach, the Programme has two objectives, where the first relates directly to the education sector and the second goes beyond this sector, i.e.

- 1) To re-orient education and learning so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development, and
- 2) To strengthen education and learning in all agendas, programmes and activities that promote sustainable development.

The GAP focuses on five priority action areas in order to enable strategic focus and foster stakeholder commitment, i.e. (1) Policy support; (2) Whole-institution approaches to education and training; (3) Building capacities of educators and trainers; (4) Youth; and (5) local communities. All these action areas are of relevance to African universities today. These priority action areas are expounded below.

- 1) **Policy Support:** An enabling policy environment is crucial for mobilizing education and learning for sustainable development and the scaling up of ESD action in formal, non-formal and informal education and learning. Actions in this priority action area include integrating ESD into international and national policies on education and sustainable development. The Ministries of Education around the globe have an important responsibility to ensure that education systems are prepared for, and responsive to, existing and emerging sustainability challenges. These include, among others, integrating ESD into curricula and national quality standards, and developing relevant indicator frameworks that establish standards for learning outcomes.

ESD needs to be seen as an important contributor to educational quality, and needs to be included in the national education system measures of quality. National and international strategies dealing with the social, economic, and environmental dimensions of sustainable development, ranging from disaster management plans to low carbon development strategies, should hence include ESD. ESD should also become a systematic part of bilateral and multilateral development cooperation frameworks.

The main stakeholders in this Priority Action Area are policymakers in both the education and the sustainable development sectors. Stakeholders in education need to set out policies and agendas to integrate ESD into the various processes and structures of the

sector. These education stakeholders need to allocate and mobilize resources to translate these policies into actions, especially building necessary capacity at national and sub-national levels. Policymakers working in climate change, disaster risk reduction, sustainable consumption and production, biodiversity, and other sustainability challenges are invited to recognize and to adopt ESD to tackle these issues. They can support inter-ministerial and multi-stakeholder coordination and collaboration, where education is an integral part of discussions on sustainable development.

- 2) **Whole-institution approaches to education and training:** This is transforming learning and training environments by integrating sustainability principles into education and training settings. Whole- institution, or institution-wide, approaches require reorientation of teaching content and methodology, and campus and facility management that is in line with sustainable development, as well as the cooperation of the institution with the community. The process is organized in a manner that enables all stakeholders (i.e. leadership, teachers, learners, administration) to jointly develop a vision and plan to implement ESD across the institution. It may also require provision of technical and, where possible, financial support to the institution to support its reorientation. This can include provision of relevant good practice examples, training for leadership and administration, the development of guidelines, as well as associated research. It may also require mobilization and enhancement of existing relevant inter-institutional networks in order to facilitate mutual support such as peer-to-peer learning, and to increase visibility of the approach to promote it as a model for adaptation. Particular successes in this regard can be found in higher education and secondary schools.

Sustainable learning environments, such as eco-schools or green campuses, allow educators and learners alike to integrate sustainability principles into their daily practice. Transforming learning and training environments concerns not only managing physical facilities more sustainably, but also changing the ethos and governance structure of the whole institution. The main stakeholders are leaders and managers of all types of learning and training institutions, such as school principals, presidents of universities, community colleges, and private companies. Institutional leaders are prompted to take a holistic view

of ESD, focused on transferring content about sustainable development, and also on participating in sustainable development practices, including taking actions to reduce the institution's ecological footprint. Community leaders, parents, learners and trainees are important partners for these main stakeholders.

3) **Building capacities of educators and trainers to more effectively deliver ESD:**

Educators and trainers are powerful agents of change for delivering the educational response to sustainable development. Hence this Priority Action Area is about building the capacity of these change agents, including acquiring the necessary knowledge, skills, attitudes and values, and developing the requisite motivation and commitment. There is therefore an urgent need to build the capacity of educators, trainers and other change agents, on relevant issues related to sustainable development and appropriate teaching and learning methodologies. This may start with the inclusion of ESD in specific subject areas but will ultimately lead to the integration of ESD as a cross-cutting issue. This includes integrating ESD into faculty training in higher education institutions to enhance capacity in teaching sustainability issues, conducting and supervising solution-oriented interdisciplinary research, and informing policy-making on ESD and sustainable development. Sustainable development perspectives, such as resource efficiency and social and corporate responsibility, can also be integrated in an enhanced manner in post-graduate education, capacity-building and training of decision-makers, public sector personnel, and other thematic specialists relevant to sustainable development. This includes “train-the-trainers” ESD programmes, integration of ESD into executive education, as well as aligning in-house training programmes of private company staff with ESD.

The main stakeholders are educators and trainers who deliver ESD, and faculties of colleges and universities, especially professors of business, journalism, public policy, development studies, international relations or other relevant specialties. They play a vital role in making professionals in these areas aware of sustainability issues, and ultimately in guiding their decision-making processes to support sustainable development.

- 4) **Empowering and mobilizing youth:** This involves supporting youth in their role as change agents for sustainable development through ESD. Youth have a high stake in shaping a better future for themselves and generations after. In many countries, youth are clamoring for a greater say in how their societies are being configured. Also, they make up an important group in consumer societies, and the habits they develop now will have a major impact on future consumption patterns. Moreover, youth are increasingly drivers of the educational process, especially in non-formal and informal learning. Young people hence need to be provided with opportunities to harness the enormous benefits of ICT, including social media for both learning and networking. Promising approaches include more quality e-learning and mobile learning opportunities on ESD, and on-line platforms, where young people can share their own ideas and actions on sustainable consumption and sustainable lifestyles. This Priority Action Area hence requires empowering youth with information on the impacts of their daily choices and actions, while tapping into their creativity and determination to find workable and innovative solutions and alternatives. Stakeholders include youth-focused and youth-led organizations, as well as institutions that serve youth in the public and private sectors, ranging from mass media and faith-based organizations to local and national Governments.
- 5) **Accelerating sustainable solutions at local level:** This action area requires the search for sustainable development solutions to be accelerated at the local (community) level through ESD. ESD supports multi-stakeholder learning and community engagement, e.g. between local Governments, non-Governmental organizations, the private sector, media, education and research institutions, and individual citizens, and links the local to the global. The action area includes, as appropriate, supporting local level integration of ESD in formal education, as well as the provision of, and support to, non-formal and informal learning opportunities in sustainable development for all members of the community.

Summary and Conclusions

A review of ongoing environment and sustainability courses offered in Kenyan universities indicated that about 83% of all its public universities offer environment-related courses, while no such courses are offered in almost all private HEIs.

A review of CUE standards and guidelines related to environment and sustainability courses, like other programmes in HEIs, shall have content that is relevant, aligned to the institutional, national and global goals and trends in order to promote the vision and mission of the institution and national goals, and presented in a systematic manner as foundational courses, courses focusing on concepts and principles, application and skills development courses, and practical and project-based courses.

The present curriculum development process in universities was also presented. According to CUE guidelines, university curriculum is often designed by individual departments, with input from relevant industry stakeholders. The content is also internally peer-reviewed at the school/faculty level before it is presented to the senate for adoption. It is then presented to CUE for external review, then the university implements the curriculum after incorporating any suggested recommendations by CUE.

Various case studies were carried out in the HEIs to establish efforts made to mainstream environment and sustainability in their curricula. The review indicated that only a few of them have made efforts to mainstream environment and sustainability into some of their curricula. These included Jomo Kenyatta University of Agriculture and Technology, which sort to understand what sustainability means to the university community and how it could be integrated into the teaching and learning process of the institution. This resulted in a high level of awareness about sustainability principles amongst university staff, which made the introduction to course review a bit easier. Also, the university developed an Education for Sustainable Development (ESD) Policy (JKUAT, 2010). Others included Kenyatta University, which started a project on Education for Sustainable Development in Africa (ESDA), in partnership with University of Nairobi and other institutions, while UoN had also made various efforts to re-orient a few of their curricula on environmental sustainability.

Recommendations

The proposed green curricula should not be a bunch of "add-ons", which add to workload of lecturers. However, it needs the courage to remove course contents that are no longer relevant and don't contribute to a viable and healthy future for our students. Possible new courses that can be introduced to promote environment and sustainability include green economy, which is a course that aims at development without degrading the environment; green energy, which requires a curriculum that develops alternative energy sources that reduce carbon emissions; and virtual learning (e-learning), which is the use of technology to enable people to learn anytime and anywhere.

Further recommendations relate to the global action programme (GAP), whose priority action areas are:

- i) An enabling policy environment for mobilizing education and learning for sustainable development and the scaling up of ESD action, including integrating ESD into curricula and national quality standards;
- ii) Whole-institution approaches to education and training, which require reorientation of teaching content and methodology, sustainable campus and facility management, and cooperation of the institution with sustainable development stakeholders in the community;
- iii) Building capacities of educators and trainers, so as to help these change agents to first acquire the necessary knowledge, skills, attitudes and values, and requisite motivation and commitment to usher in the transition to a sustainable society;
- iv) Empowering youth with information on the impacts of their daily choices and actions, while tapping into their creativity and determination to find workable and innovative solutions and alternatives; and
- v) Accelerating sustainable solutions at local level, which requires the search for sustainable development solutions to be accelerated at the local (community) level through ESD. This includes integration of ESD in formal education and in informal learning opportunities in sustainable development for all members of the community.

References

- Blewitt, J. (2008). *Understanding Sustainable Development*, ISBN 9781844074549
- Bone, E. and Agombar, J. 2011: *First Year attitudes towards, and skills in sustainable development*. York: Higher Education Academy
- Brennan, J., King, R. and Y. Lebeau (2004). *The role of universities in the transformation of societies; An international research project*
- BITC (Business in the Community) (2010). *Leadership skills for a sustainable economy*. London
- Cade, A. (2008). *Employable graduates for responsible employers*. York: Higher Education Academy.
- CUE (Commission for University Education) (2014). *Accredited programmes of universities in Kenya*. www.CUE.org.ke.
- Dawe, G., Jucker, R. and S. Martin (2005). *Sustainable Development in Higher Education: Current Practice and Future Developments: A report for the Higher Education Academy*
- de Haan, G. (2010). *The development of ESD-related competencies in supportive institutional frameworks* *International Review of Education*, 56(2-3),315-328
- de Haan, G. & D. Harenberg (1999). *Bildung für eine nachhaltige Entwicklung* Defra (department for environment, food and rural affairs) (2011). *Securing the future: delivering UK sustainable development strategy* Policy paper
- Gertenmaier, J. and H. Mandl (2010). *Einleitung: Die Kluft zwischen Wissen und Handeln*
- GoK (Government of Kenya) (2007). *VISION 2030 – Transforming National Development; First Medium Term Plan 2008-2012*, Nairobi: Government Printers
- GoK (Government of Kenya) (2009). *Population and Housing Census*
- GoK (Government of Kenya) (2014). *Economic Survey Report*
- GoK (Government of Kenya) (2008). *Education for Sustainable Development; implementation strategy*
- Goldfinch, T., Carew, A. L., Cook, C., Olivares, P., Cooper, P., McCarthy T., S. Nightingale (2007). *Initiating curriculum review: The Chilean experience*
- JKUAT (Jomo Kenyatta University of Agriculture and Technology) (2010). *Education for Sustainable Development Policy*
- Pontin, J. & I. Roderick (2007). *Converging world: connecting communities in global change* ISBN 9781903998922

- GoK (Government of Kenya) (2010). Population and Housing Census
- Leonard, M. S., Beasley, D. E., Scales, K. E., J. D. Elzinga (1998). Planning for curriculum renewal and accreditation under ABET engineering criteria 2000. Proceedings of the 1998 American Society of Engineering Education Annual Conference (session 3257). Seattle, W.A: ASEE
- Maurrasse J.D. 2001: Beyond the campus: how colleges and universities form partnerships with their communities, ISBN 0415926211
- Mezirow, J. (2000): Learning as transformation: critical perspectives on a theory in progress, San Francisco
- Nicolaides, A. (2006). The implementation of environmental management towards sustainable universities and education for sustainable development as an ethical imperative. International Journal of Sustainability in Higher Education, 7(4), 414-424
- Sterling, S. (2011). The Future Fit Framework; An introductory guide to teaching and learning for sustainability in Higher Education.
- Taylor, E.W. (2006). Teaching for change: fostering transformative learning in the classroom; new directions for adult and continuing education no 109. San Francisco, Calif; Jossey-Bass (ISBN 978-0-7879-8584-4
- Taylor, J. (2010). Education for sustainable development: perpetuating myths or bringing about meaningful change? Global Environmental Research Vol 14 No.2 187-192
- Togo, M. & H.Lotz-Sisitka (2009). Unit Based Sustainability Assessment Tool. A resource book to complement the UNEP Mainstreaming Environment and Sustainability in African Universities Partnership. Howick, Share-Net; ISBN: 978-1-919991-2
- UN (2012). (Rio+20) United Nations Conference on Sustainable development: The future we want
- UN (2002). Report on the World Summit on Sustainable Development
- UNEP (2008). Mainstreaming Environment and Sustainability in African Universities Partnership (2004-2008 Report)
- UNESCO (1992). Agenda21 – Chapter 36: Promoting Education, Public Awareness and Training. United Nations Conference on Environment and Development.
- UNESCO (2005). United Nations Decade of Education for Sustainable Development (2005-2014) International Implementation Scheme. www.unesco.org/education

UNESCO (2014). Shaping the future we want; UN Decade of Education for Sustainable Development (2005-2014) Final Report. ISBN 9789231000539
WCED (1987). World Conference on Environment and Development.

Authors Profile

Prof. George Ndegwa is a senior member of the Department of Land Resources Planning and Management, Jomo Kenyatta University of Agriculture and Technology (JKUAT). He is a former deputy director, Institute of Energy and Environmental Technologies (IEET) and he has worked closely with the National Environmental Management Authority (NEMA) and the United Nations Environmental Programme (UNEP) on various issues related to Education for Sustainable Development (ESD). He was also closely involved in the formulation of the JKUAT ESD Policy (2010) which aimed to make JKUAT a sustainable university. He is presently involved in improvements of academic quality in the region. His contacts are +254 722 391539, or email: georgemndegwa@gmail.com

Towards Evidence Based Approach in Education Policy-Making for Social and Economic Development in Kenya

Merecia, Anne Sirera and Christine Wasanga

Abstract

Empirical evidence is important in policy making especially in the era of globalization that is marked by constant changes and developments. Research provides empirical evidence that not only helps to point out the needs that should be addressed in policy, but also solutions. Informed by research, education policy makers are able to accurately match policy with national education goals. Education has evolved in Kenya with major changes taking place in curriculum development. However, limited comprehensive reviews have been conducted to establish the extent to which research informs education policy making and specifically curriculum development in Kenya. Using critical theory of education, this article systematically analyzes education policy making and the impact on achievement of national goals in Kenya. The article demonstrates that Kenyan policy makers seldom employed research evidence to inform education policy making and this has contributed to a mismatch between education outcome and the national needs of education. Based on the analysis, the article proposes evidence based approach in education policy-making to enable Kenyan education system meet the social and economic needs and education development.

Key words: Critical theory, Evidence-based policy, Participatory, Curriculum Policy

Introduction

There have been major education policies in Kenya since independence. Yet despite the improvements brought by many years of sustained attempts to reform education, mismatch between education outcome and the needs of the society persist. For example, there is a large population of educated unemployed yet one of the major goals of education is to equip the learners with the skills for economic development. Education is also expected to act as a catalyst towards development of equitable and a just society based on democratic ideals (Government of Kenya 2013). A good education system depends on good policy making. When policies fail, the costs can be significant; repeated failure can erode confidence in education system and the Government itself. Towards this end, many Governments worldwide Kenya included scout for good policies to improve their education systems.

Policy reviews in education in Kenya can be traced back to the colonial times but perhaps it is the reforms in education from the dawn of independence that raises concerns for many Kenyans. According to Ojiambo (2009) education reforms have been long standing objectives since independence in 1963. This can be evidenced by numerous inquiries into the education system that has characterized the historical development of Kenyan education system. Among the inquiries that have been commissioned to inform curriculum policy are: The Kenya Education Commission-Ominde Commission (Republic of Kenya, 1964, Republic of Kenya, 1965a, Republic of Kenya, 1965b), The National Committee on Educational Objectives and Policy-Gacathi Report (Republic of Kenya,1976), The Presidential Working Party on the Second University-Mackay Report (Republic of Kenya, 1981a), The Presidential Working Party on Education and Man-power - Kamunge Report (Republic of Kenya, 1988) and Commission of Inquiry into the Education system of Kenya- Koech Commission (Republic of Kenya, 1999). These are major inquiries that have provided valuable information that has shaped education policy in Kenya.

In addition, the review of education policy has been continuous in line with the major national happenings. For example, the Kenya Constitution 2010 and the Vision 2030 have led to education policy reviews to align education system with the Constitution and Vision of Kenya. Similarly, Kenya has subscribed to global education goals such as education for all (EFA) and the Millennium Development Goals for education MDG (Kenya Government, 2015) that has also shaped the education policies. Although these were initiated and continue to shape education, it is not clear whether any studies were conducted to facilitate mainstreaming these national and global policies in the national education goals.

Policy represents decisions that are designed to guide (including to constrain) future decisions, or to initiate and guide the implementation of previous decisions (Hada & Damsky, 1995). However, policy is not all uniting despite the fact that people in a nation may share similar end goals of national education. Studies have shown that policies are more often tenacious than consensual. Fitz, Davies and Evans, (2006), for example, view policy as outcomes of contested preferences expressed within the state and civil society. Ball (1990) on the other hand observed

that policies are authoritative allocation of values. Values that guide education policy are drawn from the society in which education will serve. The multiplicity of education actors in any society contributes to the tension that is inherent in the policy process. Accordingly, Cheru (2002) argued that education is a contested terrain. In relation to this view, Ozga (2000) defines policymaking as a process involving negotiation, contestation or struggle between groups who may lie outside the formal policy making machinery.

Acknowledging tenacity in policy process calls for an approach that would provide information that is evidence based (EB) to shape policy. Research, which is a scientific approach to understanding of the realities in the world, becomes a viable approach in informing the policy process. Research provides EB information that can help counter the contestations that are inherent in policy making thus making it possible to arrive at policy decisions that are more uniting than any other approach. Evidence based policy (EBP) can serve a nation not only in arriving at consented decisions but also countering the resistance from those who hold different views about policy.

In this article, we argue for EBP as an alternative approach that can improve education policy making in Kenya. Education is embedded in the society hence policy process has to take in consideration the realities of the people that education serves (Young, 1989). Using critical theory as a conceptual framework, the article analyzes the strengths of research to demonstrate the superiority of scientific approach in policy process. Based on the findings of the analysis, we propose EB approach for education policy process based on five main characteristics of research or the scientific approach. These are: (1) systematic methods (2) searching for causes (3) provisional results 4) participatory and 5) objectivity. Analysis is used to suggest the contribution of research as an important aspect in policy processes for desired education outcomes. In conclusion, we offer implications for future policy processes and practice concern with national education goals, but first a brief overview of critical theory of curriculum.

Critical curriculum theory

Critical theory that is directed towards social and political complex as a whole (Ozga, 2000), provides means of probing into different social spheres to gain insights in some factors that cause tensions in the forces that shape education policy in Kenya. Critical approaches emphasizes that knowledge is structured by existing sets of social relations (Harvey cited by Ozga, 2000). From this perspective critical theories allow exploration of a multiplicity of concepts as viewed by different groups in their understanding of social issues such as education policy. In this article, we discuss how characteristics of research can serve to achieve consensual and robust ideas for education policy. Curriculum theory is viewed as a lens that enables the analysis of social reality in the context of a globalised economy. It is also seen as a tool that can provoke reflection and creativity that are important in EBP. In addition through the lens of curriculum theory the article explores the benefits of evidence based approach.

Curriculum policy in independent Kenya

Historical forces more than any other factor account for the curricular and practice in education in most countries of the world; Kenya included (Kamens, Meyer, & Benavot, 1996). Throughout the colonial administration in Kenya, secondary education for example, was used to prepare a few Africans who were to take up some clerical jobs in colonial economy (in Kivuva, 2002, Elimu Yetu Coalition, 2003). The Ominde Commission (1964) had observed that there was need to change this trend if Kenya had to meet her economic needs.

Accordingly, there was need for a new philosophy of secondary education to be able to deal with the challenges of the desired ‘modern economy’ in Kenya. It required the broadening of the concept of secondary education to bring into the picture of the secondary schooling, not only for the formal economy, but also other sectors of the informal economy that are crucial if modernization had to be achieved (King, 2006; Republic of Kenya, 1976). This could only have been possible if research was employed to inform policy. However, there was no evidence of any study conducted then. Instead, the political approach towards education policy was adopted. It is important to note that the independent Government retained colonial education structures (Chege

and Sifuna, 2006). As a result dual economic activities continued to encourage division between manual and academic skills.

Prior to the introduction of the current system of education, which is commonly known as the 8-4-4 system, secondary education was predominantly academic with only a few (35) schools offering technical education (Chege & Sifuna, 2006; Elimu Yetu Coalition, 2003; Barasa & Kaabwe, 2001; Bogonko, 1994; King, 1977). These 35 schools are what later evolved into technical secondary schools (Lauglo, 2003, 1985; Kamau & Mclean, 1999; Narman, 1995; King, 1977). They offered a broad foundation of practical/technical skills and related theory. The limited number of technical secondary schools could be partly attributed to the focus of the Government immediately after independence to produce Kenyan personnel to replace the Whites in the civil service.

On the other hand, there was need to develop industries in Kenya to provide employment for the expanding education which required industrial based education, but instead emphasis was put on academic education. Cheru (2002) described this as missed opportunities. The over-emphasis on the academic education meant that the education system was producing people with no competencies to exploit the varied economic resources in the country (King, 1977), leading to educated unemployed people. The rising unemployment forced the Government to rethink about its approach to education development. Several Commissions that were conducted to review education recommended a practical based education as a measure to address the rising unemployment (King, 2006; Elimu Yetu Coalition, 2003; Republic of Kenya, 2003; Atchoarena & Delluc, 2002; ILO, 2001, 1972). This led to the introduction of the 8-4-4 education system.

The education system was restructured to adopt the current 8-4-4 system from the recommendations of a Presidential Working Party of 1981'which had been commissioned to look into the possibility of establishing a second university in Kenya (Republic of Kenya, 2003; Elimu Yetu Coalition, 2003). The system was introduced on a platform of technical/vocational education for all. A diversified curriculum was put in place in an effort to address the increasing unemployment among the youth and the general poor economic development. The main objective was to radically reorient the education policy to make it more relevant to the world of

work and to meet the skill needs of the modern economy (Government of Kenya 2003; Mwiria, 2002; King & McGrath, 2002). Notably, these major education changes were not backed by empirical data but data that was gathered through Commissions. Although this was useful data, it was not gathered through the rigours of research that follow scientific inquiry. It generally consisted of opinions and views from various stakeholders.

The Kenya Institute of Education (KIE) now known as Kenya Institute of Curriculum Development (KICD) was mandated to develop a curriculum for the new practical subjects and make modification on the existing subjects in the syllabus to reflect the changing education needs in the society (Mwiria, 2002). However, these were not backed by any empirical evidence of national education needs. In addition, the policy process lacked objectivity leading to contestation at different stages of curriculum development and implementation. In a study on skill formation for economic development in a globalized economy in Kenya (Sirera, 2008) observed that the stakeholders in education were not allowed to critique the 8-4-4 system of education because of political undertones that supported it. Cheru (2002) observes that absence of empirical data, weakness in policy analysis and failure to involve the citizens are all recipes of poor education reforms. Whereas the need for education reform that could inculcate some aspects of vocational/technical learning in the Kenyan education system cannot be disputed, the circumstances surrounding its introduction did not go down well with the majority of the population in Kenya (Elimu Yetu Coalition, 2003; Mwiria, 2002; Kivuva, 2002).

The system was also introduced in a hurry without any planning or putting in place facilities to support practical learning (Republic of Kenya, 2005, 2003, 1999 and 1998). Mwiria (2002) describes the introduction of the new system as a 'rushed political event'. He argues that the curriculum had been hastily prepared by the KIE and disseminated by high ranking senior Government officials, an indication of the high level of the political influence. As a result, the delivery of the curriculum was hampered by lack of facilities for practical learning (Kivuva, 2002, Mwiria, 2002).

In summary, administrative decisions based on opinions have been the main approach in education policy process, and education is one area that has offered opportunity in swaying national psyche or gaining electoral favour (Elimu Yetu Coalition, 2003, p: 17).

Many policy reforms in education couched in the language of economic improvement have been initiated through Commissions. Commissions of inquiry lack methodological approaches that consist mainly of personalized opinions, and biasness. Therefore, Commissions of inquiry in education as the preferred approach to education issues is hollow, because it lacks capacity to even verify the data collected. In addition, it is not compelled to observe ethical issues that contribute to credible data collection. Further, because they are politically initiated, the loyalty may be to the appointing authority rather than goals of education. This affects the outcome of policy which could be costly to the country, not only in resources used, but in terms of missed opportunities. In summary, the approach adopted for policy process in Kenya has greatly contributed to failures in achieving national education goals. It is from this perspective that we propose evidence based approach as an alternative approach to policy making in Kenya

Evidence based policy approach

Public policy refers to the actions taken by Government to solve problems that arise and improve the quality of life for its citizens. These actions may be taken on the spur of the moment or after a process of gathering relevant data to inform the decision. The Evidence Based Policy (EBP) approach is a technique that links research evidence, policy and practice. Sutcliffe and Court (2005) define EBP as a discourse or set of methods which informs the policy process, rather than aiming to directly affect the eventual goals of the policy. EBP uses research to guide decision making at all the stages and advocates a more rational, rigorous and systematic approach. It helps to identify gaps, effectiveness of existing programmes and various options or alternatives that can be adopted. It is generally believed that a policy that is based on evidence produces better outcomes. Usually, a policy goes through the following stages: problem identification; agenda building; policy formulation; choice of preferred policy option; policy design; policy implementation and evaluation (Young & Quinn, 2002).

The benefits of evidence are explained by Shaxson (2005: 102-103) who argues that that we need evidence to: understand the environment; assess the likely effects of policy changes so as to

choose different options; show the connections between strategic direction, intended outcomes and policy objectives; establish what is needed to meet the intended goals and objectives; influence others so that they help us achieve our policy goals and communicate the quality of our evidence base to meet the open Government agenda.

Evidence based approach to policy making has had positive outcomes. For instance, in the United Kingdom, evidence based approach was applied to literacy, labour market participation and pre-schooling. Davies (2004) highlights some notable examples as being: the Sure Start Programme; the Educational Maintenance Allowance; the Connexions programme (DfES); many of the New Deal employment and welfare-to-work programmes (DWP); the New Deal for Communities; the Neighbourhood Renewal Programme and the Home Buying and Selling policy (ODPM).

In the United States of America, National Research Clearing Houses are used to collect data and evidence that has been used to come up with policies on child welfare, substance abuse and youth services among many others. Notable clearing houses are “What works Clearing House” and the PEW MacArthur Results First Initiative, which is a central data base that compiles information from eight clearing houses in areas like adult criminal justice, juvenile justice among others (the PEW Charitable Trusts and MacArthur Foundation, 2014).

Nearer home, the Government of Tanzania implemented health service reforms informed by the results of household disease surveys which contributed to over 40% reductions in infant mortality between 2000 and 2003 in two pilot districts (Sutcliffe & Court, 2005).

EBP as a discourse provides a forum through which policy makers are able to engage with stakeholder communities to be able to understand the needs of education. The challenges posed by new world order (Cox & Sinclair, 1996) demand that new spaces for communities and civil societies are created to develop effective education policies (Cheru, 2002; Sirera, 2008; Sirera & Chelimo, 2011). EBP provides a forum through which stakeholder communities can work together to improve policy process to achieve education goals.

The inherent complexity at different stages of education policy process also calls for empirical studies to provide policy relevant information that could be applied in education development. Policy relevant information in this article refers to data which can be validated and qualifies as inputs at different stages of policy process. Accordingly, EBP is an approach that facilitate making well informed decisions about policies, programmes and projects by putting the best available evidence from research at the heart of policy development and implementation’ (Davies, 2004: 3).

From general perspective, EBP is research driven and it is the characteristics of research that make it attractive to various players in the policy process. Osuola (1993) defined research as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis, and interpretation of data. Kenyan education system is scouring for good policies that are reliable in achievement of national education goals. EBP if positioned well can offer good policies. Below, we discuss research as a superior method in policy process based on its basic characteristics.

Research : Evidence Based Approach and Policy Process

Research is governed by several features that facilitates gathering of evidence that can enhance policy processes at different stages. These include;

1. Systematic approach in evidence gathering

The procedures used by scientists are organized, methodological, public and recognized by other scientists. These characteristics make research the best alternative in policy process in the contemporary society. Research use designs that are systematic leading to clear approaches on how to collect information. The designs in research guide the researchers to a population that is able to offer information that is helpful in policy process. The sample drawn from the population are carefully selected to ensure validity and reliability of the information. Further the use of different methods of data collection that are then triangulated help in strengthening the information gathered.

Through the theoretical framework, researchers are able to systematically focus on relevant information that can guide policy. As argued earlier, there are multiple players in education

system that hold multiple views. Theories used in research can help integrate multiple observations from different stakeholders in a way that would enrich policy process without compromising the quality of information (Sullivan, 2001, Cohen et al 2000).

Moreover, researchers are encouraged to adopt organized skepticism to be able to engage critically in information sourced. Evidence based policy can thus offer more valuable information at different stages of policy proces.

2. Searching for Cause

Scientists assume that there is order in the universe; that there are sustainable reasons for occurrence of all events and that science can be used to discover the orderliness of the world (Sullivan, 2001). With this assumption, the researchers seek to identify barriers to the orderliness of the world of their interest in an objective way. In education policy process for example, research could help discover causes of poor policy outcomes and how to respond in order to achieve individual and societal goals of education. Identifying the factors/causes that would help align education to the needs of the society would guide education practices clearly to achieve national education goals. To discover, cause/factors that impinge on education, researchers design tools that help in measuring constructs that reveal the issues at hand in relation to the area of interests through observable behavior. This helps them guard against wild claims that cannot be verifiable or addressed. For example, in previous inquiries there have been reports of devil worshipping as the main cause of school unrest. The question raised is; what is devil worshipping and how can it be addressed? Such claims could only be geared towards maintaining the status quo. Science on the other hand searches for causes and solutions to resolve the problems. Evidenced based policy has the capacity to identify causes and solutions to help improve education system

3. Science is Provisional

Scientific conclusion is always accepted as tentative and subject to question and possible contestation. This has the implication that scientific information is not 'cast on stone'. It can change any time. This aspect of science prepares the researchers not to be attached to the findings in the research giving room for debates and critiques that go a long way in improving policy. For some reasons, there were very few debates or critiques of the 8-4-4 system of

education. Consequently, despite the fact that the system had strengths that would perhaps have worked well for Kenyan society, it failed in many aspects. According to Brock and McGee (2002: 6), debates and arguments are key components of the way the participants in policy process, learn and change. Accordingly, policy debates not only give people opportunity to put forward their ideas but also provide opportunity for people to adjust the views they hold as the result of the debate. EBP is open to critique as debates and critiques that improve and solidify the policy process are accommodated.

Another important aspect of provisional nature of scientific findings is that it gives room for evaluation and change. Science is not resistant to change; it is therefore open to evaluation. This gives room for monitoring of policy for better outcome. EBP has inbuilt mechanism that allow frequent evaluation and accommodates changes which augurs well with the globalized world full of constant changes.

4. Research is Participatory

Research uses information from stakeholders to identify causes and solutions to the problems that afflict the society. Different designs used in research are participatory although in varying degrees. According to Brock and McGee (2002), participatory approaches in studies broaden understanding that help not only identify the problems but also helps in blending the top down and bottom approaches in policy process. Towards this end, research opens spaces through which the voices of powerless groups articulate their interests. This helps in inculcating ownership of policy while at the same time cultivating support for the implementation of the policy made. Cheru (2002) observes that many education reforms in Africa have failed because of failure to involve the stakeholders. EBP approach provides a forum through which stakeholders in education can articulate their interest irrespective of their status. This is in line with the Constitution of Kenya, 2010.

5. Science Strives for Objectivity

Scientists avoid attempts of having their own personal biases and values influence their scientific conclusions. Although the issue of objectivity is controversial in that true objectivity is hard to come by especially in social research, deliberate attempt is made to reduce the likelihood of

biased conclusions. This is achieved through certain procedures such as giving detailed information about procedures used, using more than one method to collect data, sampling participants from different strata in the population of interests and being guided by established theoretical frameworks. Hence if proper procedures are used, errors are greatly minimized or corrected by researchers in future. Another aspect that helps to increase the chances of objectivity is that there are laid down ethics that obligate scientists to avoid imposing their personal biases for societal interest. EBP thus, has the capacity of developing objective policies which addresses the needs of the society.

Conclusion

To conclude, EBP approach in policy process has high chances of providing quality, accurate and objective information that can be used to develop good education policies for Kenya. In addition the approach is participatory which incorporates voices of different stakeholders in policy processes increasing the chances of ownership that is critical for successful policy outcome. Further, EBP allows room for debates thus strengthening the policies made alongside helping participants to learn and adjust their views in line with education policy and practice. The provisional nature of scientific knowledge inherent in EBP process gives room for monitoring and evaluation of policy performance, which is an important aspect in the globalized economy that is marked by constant changes. In a nutshell, EBP is a credible approach that offers a better alternative to the current methods used in policy making in Kenya. It is therefore highly recommended for use in developing countries including Kenya.

References

- Atchoarena, D. & Delluc, A. (2002) *Revising Technical and Vocational Education in Sub-Saharan Africa An update on trends, innovations and challenges* UNESCO France
- Ball, J. S (1990) *Politics and Policy Making in Education Exploration in Policy Sociology*. Routledge London
- Bogonko, S.N (1994) *A history of modern education in Kenya (1895-1991)* Evans Brothers Nairobi
- Brock, K. & McGee, R. (2002) *Knowing Poverty Critical Reflection on Participatory Research and Policy*, Earth scan Publications Ltd, London

- Cheru, F (2002) *African Renaissance Road Map to the Challenge of Globalization*. Zed Books
London
- Chege and Sifuna (2006) *Girls' and Women's education in Kenya gender perspectives and trends*. UNICEF
- Cohen L. Manion, L. and Morrison, K. (2004) *Research Methods in Education* 5th Edition.
Routledge Falmer, London
- Cox, W.R. & Sinclair J. T (1999) *Approaches to World Order* Cambridge University Press
- Davies (2004) 'Is evidence-based Government possible?' Jerry Lee Lecture presented at the 4th
Annual Campbell Collaboration Colloquium, Washington DC.
- Elimu Yetu Coalition (2003). *Reform Agenda for Education Sector in Kenya*. Elimu Yetu
Coalition- Nairobi, Kenya
- Fitz, J., Davies, B. and Evans, J. (2006) *Educational Policy and Social Reproduction:
Class Inscription and Symbolic Control*, London: Routledge.
- Haddad D. W & Demsky T (1995) *Education policy-planning process: an applied framework*.
UNESCO: International Institute for Educational Planning Paris
- Wells, J., & International Labour Organisation. Sectoral Activities Programme (ILO). (2001).
*The construction industry in the twenty-first century: its image, employment prospects and
skill requirements: report for discussion at the Tripartite Meeting on the Construction
Industry in the Twenty-first Century: Its Image, Employment Prospects and Skill
Requirements, Geneva, 2001*. International Labour Office, Geneva, Switzerland.
- ILO (1972) *Employment, incomes and equality: a strategy for increasing productive
employment in Kenya*. Report of an Inter-Agency team financed by the United Nations
Development Programme and Organised by the International Labour Office
- King, K (2006) *Post Basic and Training for growth and Poverty Reduction. Towards a History
of policy in Kenya 1963-2005* Working paper Series Center of African studies University
of Edinburgh
- King, K & Palmer, R. (2006) *Skills Development and Poverty Reduction*, Centre of African
studies, University of Edinburgh
- King, K. (1977) *The African Artisan* Heinemann London
- Kivuva, A.L., (2002). *Secondary Education Reform in Kenya: The Quest for Quality, Relevance,
and Equity*. American Institute for Research.

- Lauglo, J. (1985) *Technical Secondary schools in Kenya an Assessment*, SIDA
- Lauglo, J. (2003). *Education, Training and Contexts, Studies and Essays*. Peter Lang
McGrath, 2002
- Mwiria K. (2002) *Vocationalization of Secondary Education: Kenya Case Study* Regional
KimKam Development Consultants (Africa) Ltd
- Ojiambo C. P (2009) *Quality of Education and its Role in National Development: A Case study
of Kenya's Educational Reforms*
- Ozga, J. (2000) *Policy Research in Educational Settings* Open University Press Buckingham –
Philadelphia
- Republic of Kenya (1964) *Kenya education commission report: part 1* English press Nairobi
- Republic of Kenya (1976) *Report of the National Committee on Educational objectives and
policies* Government Printer, Nairobi-Kenya
- Republic of Kenya (1988) *Report of the Presidential Working Party on Education and
Manpower Training for the Next Decade and Beyond* Republic Printer, Nairobi
- Republic of Kenya (1998) *Master Plan on Education and Training 1997-2010* Jomo Kenyatta
Foundation
- Republic of Kenya (1999). *Totally Integrated Quality Education and Training (TIQET)
Report of the Commission of Inquiry into the Education system of Kenya* Government
Printer, Nairobi- Kenya
- Republic of Kenya (2003) *National Action Plan on Education for All*, Ministry of Education
Science and Technology
- Republic of Kenya (2003) *Report of the Sector Review and Development* Ministry of Education
Science and Technology
- Republic of Kenya (2005) *Kenya Education Sector Support Programme 2005-2010*, Ministry of
education Science and Technology
- Republic of Kenya, (2015). *National Curriculum Policy*, Government of Republic of Kenya
Nairobi
- Shaxson, L (2005) 'Is your evidence robust enough? Questions for policy makers and
practitioners' *Evidence and Policy: A Journal of Research, Debate and Practice*, Vol. 1,
No. 1, pp.101-111.

- Sirera M.A & Chelimo K. K (2011) Towards Education Policy Making in a global era: A Collaborative approach Journal of Technology & Socio-Economic Development Vol 1pg 360-367
- Sirera M. A (2008) Global, National & Local Factors that shape Education in Kenya PhD Dissertation, Bristol University UK
- Sutcliffe S & Court J (2005) Evidence-Based Policymaking: What is it? How does it work? What relevance for developing countries? Overseas Development Institute
- The PEW Charitable Trusts and MacArthur Foundation (2014) Evidence based policy making. A guide for effective Government. A report from the PEW-MacArthur Results First Initiative.
- Young, E. and L. Quinn (2002) *Writing Effective Public Policy Papers: A Guide to Policy Advisers in Central and Eastern Europe*, Budapest: LGI

Authors Profile

Dr Ann Meresia Sirera is Researcher, Psychologist/Counselor and Educator. She holds PhD in Curriculum Studies and Master of Science (MSc) in Research methods in Psychology from University of Bristol United Kingdom, Master of Education (M.ED) (Guidance and Counseling) from Egerton University Kenya and Bachelor of Education (BED) (Arts) from University of Nairobi. She is a long serving teacher, counselor and researcher. Currently, she is a Senior lecturer in the Department of psychology at Kenyatta University where she lectures, supervises PhD and Masters students in addition to Researching and other duties. She can be reached through email at amsirera@gmail.com

Dr. Christine Wasanga is a senior lecturer in the department of psychology, Kenyatta University. She holds a PhD in Educational psychology from Kenyatta University; an MA in counselling psychology from Daystar University; a MED from Kenyatta University and a B.ED from the University of Nairobi. She is the Director of the Centre for Teaching Excellence and Evaluation in Kenyatta University. She has a wealth of experience in Administration, Teaching, training, research and supervision of postgraduate students in counselling practicum and dissertation writing. She has a wealth of experience in quality assessment of programmes and institutional audit. She can be reached through email at christinewasanga@gmail.com

Potential Benefits of Using Teaching Kits In Inquiry-Based Learning in Geosciences

Dr. Anthony Macharia

Abstract

Geosciences or earth science is a branch of planetary science that deals with the study of earth's geosystem components (i.e. lithosphere, atmosphere and hydrosphere). This review explores the use of teaching kits in geosciences, mainly hydrogeology, and meteorology, that involve studies of complex concepts (e.g., hydraulic conductivity, hydraulic, pressure and elevation heads associated with groundwater flow; geostrophic forces and pressure gradients) driving natural processes oceanic and atmospheric circulation. Attempts by instructors to present such concepts in a simplified and less rigorous forms in order to enhance the understanding, may result and perpetuate misconceptions or poor grasp underlying interplay of factors governing such processes. In classroom settings, teaching kits become indispensable part of the pedagogical process. Teaching kits when combined with field-based programs (e.g., field trips or campus-based field laboratory facilities) can strongly augment classroom experience, exposing the students to the real-world scenarios. This paper argue that inquiry-based learning, using teaching kits would greatly aid our students' understanding and intuition about the complexity of natural phenomena. This paper discusses experiences gleaned from literature of using teaching kits to demonstrate how students may marshal their army of ideas and articulate important concepts to study and understand natural phenomena.

Key words: Geosciences, Pedagogy, Pedantic, Teaching kits,

Introduction

Geosciences comprises of many disciplines in earth sciences including; meteorology, geomorphology, geochemistry, hydrology, ecohydrology, among other disciplines of physical geography and environmental sciences. Just like other sciences within the Kenyan 8-4-4 curriculum, where learners attend eight years of primary school, four years of secondary school, and those who are selected to join universities take at least four years to complete can best be described as a 'cook book' (Ogunniyi, 1986). Generally, science teaching methodology is rather rigid and ineffective (Martinez-hernandez & Kimaru, 2015; Menjo, 2013) because it is largely

teacher-centred and places great emphasis on theory, imitation and memorization prescribed by the teacher. Further, concepts presented in class by instructors are considered fallible since there are no actual tests or experiments performed to authenticate the concepts discussed in class (Mackin, Cook-smith, Illari, Marshall, & Sadler, 2012). The focus of this review is to evaluate potential benefits of inquiry - based learning using kits as an alternative to ‘cook book method’ for teaching geoscience concepts, using hydrogeology and oceanography as examples.

Geoscience kits are easy to set up from inexpensive commercially-available materials (e.g., glassware and sand) or common household and laboratory equipment such as the turntables (Allègre, Lehmann, Ackerer, Jouniaux, & Sailhac, 2012; Bowen, Devlin, & Schillig, 2012; Seifert & Engesgaard, 2012) that are also highly reproducible. Using these kits, students can conduct experiments to probe and address misconceptions and preconceptions about the natural phenomenon (Anyanwu, Grange, & Beets, 2015) and at the same time acquire intuitive understanding of concepts. Such an assessment of may include: pre- and post-instruction survey of concept taught in class.

The potential benefits of geoscience kits are demonstrated in the conceptual model presented in Figure 1 that shows how inquiry-based learning in geoscience influence problem solving skills, (applications is modified from the experiential learning model of Kolb, (1984). For instance, abstract knowledge about hydrogeological and oceanographic processes forms the core, while scientific inquiry and problem- solving skills are in the inner and outer circle respectively. In that learning model, students pose questions on the concepts taught and conduct experiments (scientific inquiry) where factors governing various processes are evaluated and misconceptions addressed. For instance, students may use sand box kits to examine forces associated with groundwater flow in confined aquifers (Bowen et al., 2012; Illman, Zhu, Craig, & Yin, 2010), contaminant transport in groundwater under isotropic and anisotropic conditions (Close, Bright, Wang, Pang, & Manning, 2008; Dunnivant & Olsen, 2007; Lim & Lynch, 2011; Ojuri & Ola, 2010), explore the influence of fluid pressure and rock permeability on hydraulic head (Seifert & Engesgaard, 2012; Vithanage, Engesgaard, Jensen, Illangasekare, & Obeysekera, 2012), water pumping in coastal areas on salt water intrusion (Jakovovic et al., 2012; Werner, Jakovovic, & Simmons, 2009), or the fate of various contaminants on the groundwater (Barnhoorn et al., 2015;

Dunnivant & Olsen, 2007). Similarly, turntable kits can be used to evaluate forces driving oceanic circulation (Hogg & Griffiths, 2010; Illari et al., 2009). The understanding gained from the groundwater flow experiments allows students to develop useful problem-solving skills that include; borehole drilling and water pumping skills relating to a variety of hydrogeological conditions and aquifer conditions and suggest appropriate waste management options. Similarly, turntables are useful teaching aids for exploring the role of Coriolis, centrifugal, and pressure gradient forces on oceanic circulation (Illari et al., 2009).

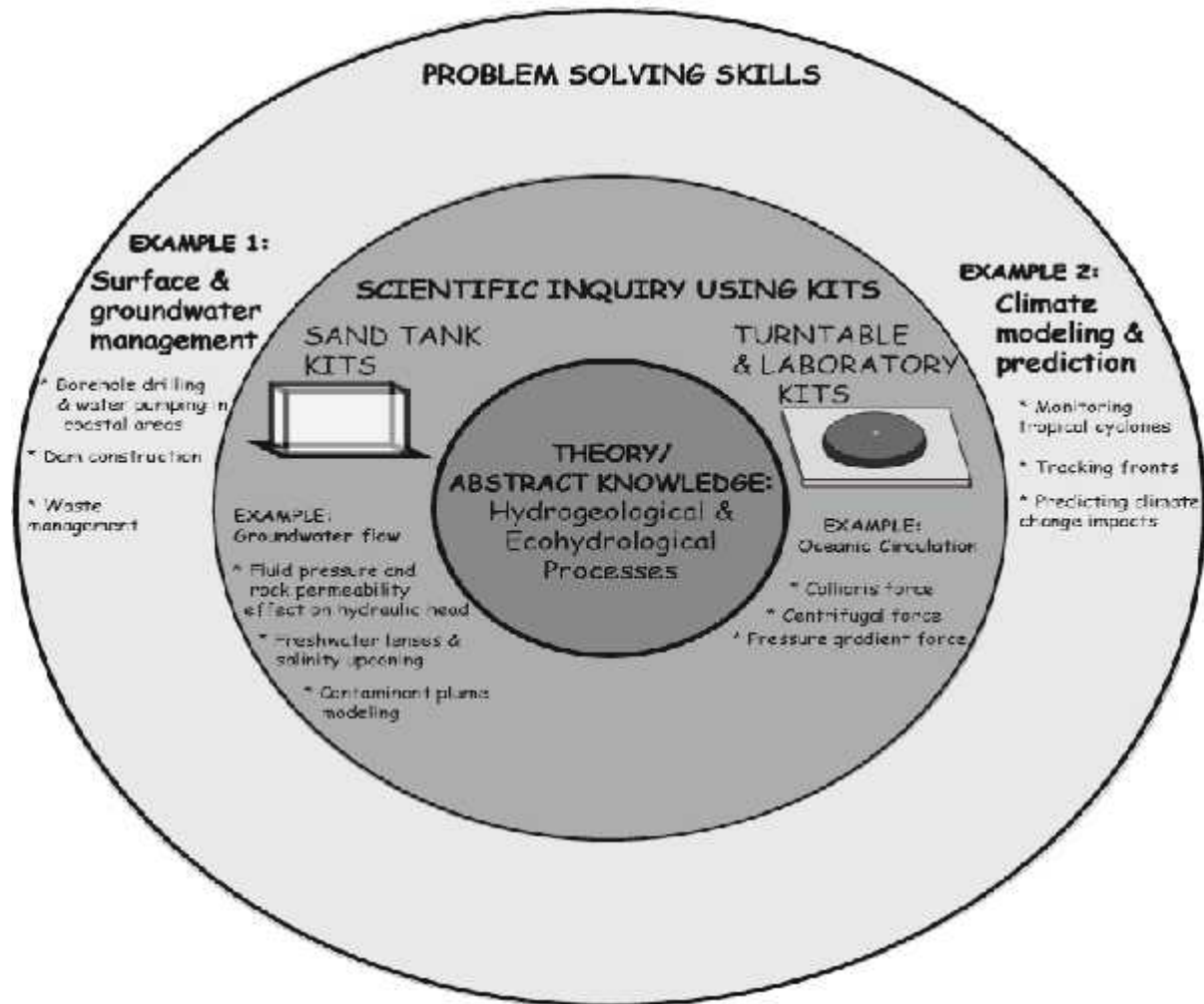


Figure 1. The conceptual model of the inquiry-based learning experience in geosciences using teaching kits for enhancing enduring understanding processes such as groundwater flow and oceanic circulation, and developing problem solving skills

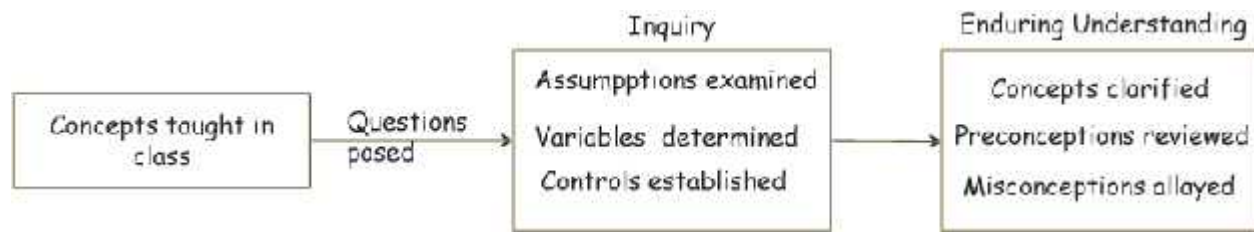


Figure 2. The process of inquiry-based learning for enhancing enduring understanding of natural phenomena

In addition to teaching kits-based experiments, it is also necessary to expose students to the ‘real world’ scenarios so that processes observed under laboratory-based abstractions can be related to those in the natural environments (Lautz & Bauer, 2007). For instance, a field station may be established as an instructional facility on campus premises to take advantage of particular geologic settings or instruments to explore how one may conduct water sampling, perform on-site chemical analysis, map water table contours, among other activities (Iqbal & Chowdhury, 2007; Laton, 2006). The fieldwork experience fosters problem-solving skills gained from the use of kits and may aid (Alon, 2009; King, Donnell, & Caylor, 2012; Swanson, Bahr, & Wilcox, 2006) such as locating a suitable solid waste disposal site (Swanson et al., 2006). To foster problem-solving skills through scientific discourse, cooperative learning whereby students may work in groups should be encouraged (Orkwiszewski, 2006).

Teaching kits for Quantitative Skills

Teaching kits also provide a forum to gain quantitative skills necessary to solving environmental problems such as climate modelling, ground and surface water modelling, among other techniques. Students can also formulate problem that may be solved via tractable mathematical methods. For instance, students may compare data collected in a laboratory study to that from the field, and characterize the uncertainty in parameter estimation between the two datasets (Kumar, Sekhar, Reddy, & Kumar, 2010). Such approaches reinforce and build on conceptual understanding of phenomena. Students can generate models using mathematical functions such as Kalman filter to model and predict three-dimensional groundwater flow-and-transport (Kollat, Reed, & Rizzo, 2008).

Conclusion and Recommendations

Teaching kits are versatile tools for enhancing learning experience and ensuring enduring conceptual understanding of complex phenomenon taught in geosciences as well as fostering problem-solving skills. Moreover, these kits provides greater flexibility to students, allowing them to explore a variety of ideas and concepts, clarifying preconceptions, addressing misconceptions and enhancing active-learning. Therefore, adopting these kits in undergraduate and postgraduate geoscience curricula allows for comprehensive understanding of concepts and principles governing natural phenomena using student-centred learning, which is ordinarily complex to teach theoretically using teacher-centred learning. These kits should be incorporated in teaching modules, constituting a comprehensive implementation of the project experiments and associated curriculum materials.

References

- Allègre, V., Lehmann, F., Ackerer, P., Jouniaux, L., & Sailhac, P. (2012). A 1-D modelling of streaming potential dependence on water content during drainage experiment in sand. *International Journal of Geophysics*, 189, 285–295. <http://doi.org/10.1111/j.1365-246X.2012.05371.x>
- Alon, U. (2009). How To Choose a Good Scientific Problem. *Molecular Cell*, 35(6), 726–728.
- Anyanwu, R., Grange, L. Le, & Beets, P. (2015). Climate change science: The literacy of Geography teachers in the Western Cape Province , South Africa. *South African Journal of Education*, 35(3), 1–9. <http://doi.org/10.15700/saje.v35n3a1160>
- Barnhoorn, I. E. J., van Dyk, J. C., Genthe, B., Harding, W. R., Wagenaar, G. M., & Bornman, M. S. (2015). Organochlorine pesticide levels in Clarias gariepinus from polluted freshwater impoundments in South Africa and associated human health risks. *Chemosphere*, 120(March), 391–397. <http://doi.org/10.1016/j.chemosphere.2014.08.030>
- Bowen, I. R., Devlin, J. F., & Schillig, P. C. (2012). Design and Testing of a Convenient Benchtop Sandbox for Controlled Flow Experiments. *Groundwater Monitoring & Remediation*, 32(4), 87–91. <http://doi.org/10.1111/j1745>
- Close, M., Bright, J., Wang, F., Pang, L., & Manning, M. (2008). Key features of artificial aquifers for use in modeling contaminant transport. *Ground Water*, 46(6), 814–828. <http://doi.org/10.1111/j.1745-6584.2008.00474.x>

- Dunnivant, F. M., & Olsen, R. (2007). A simple sand column laboratory exercise to illustrate pollutant hydrology in groundwater systems. *Journal of Geoscience Education*, 55(1), 51–55.
- Hogg, A. M., & Griffiths, R. W. (2010). A coupled ocean – atmosphere laboratory model of the Antarctic Circumpolar Current. *Ocean Modelling*, 35(1), 54–66. <http://doi.org/10.1016/j.ocemod.2010.06.004>
- Illari, L., Marshall, J., Bannon, P., Lee, S., Najjar, R., Botella, J., ... Tandon, A. (2009). WEATHER IN A TANK Exploiting Laboratory Experiments in the Teaching of Meteorology, Oceanography, and Climate. *Bulletin of the American Meteorological Society*, 90(11), 1619–1632.
- Illman, W. A., Zhu, J., Craig, A. J., & Yin, D. (2010). Comparison of aquifer characterization approaches through steady state groundwater model validation : A controlled laboratory sandbox study. *Water Resources Research*, 46(4), 1–18. <http://doi.org/10.1029/2009WR007745>
- Iqbal, M. Z., & Chowdhury, S. H. (2007). Using on-campus monitoring wells to enhance student learning in geo-hydrology courses. *Journal of Geoscience Education*, 55(5), 364–370.
- Jakovovic, D., Post, V. E. A., Werner, A. D., Männicke, O., Hutson, J. L., & Simmons, C. T. (2012). Tracer adsorption in sand-tank experiments of saltwater up-coning. *Journal of Hydrology*, 414, 476–481. <http://doi.org/10.1016/j.jhydrol.2011.11.024>
- King, E. G., Donnell, F. C. O., & Caylor, K. K. (2012). Reframing hydrology education to solve coupled human and environmental problems. *Hydrology and Earth System Sciences*, 16(11), 4023–4031. <http://doi.org/10.5194/hess-16-4023-2012>
- Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Kollat, J. B., Reed, P. M., & Rizzo, D. M. (2008). Addressing model bias and uncertainty in three dimensional groundwater transport forecasts for a physical aquifer experiment. *Geophysical Research Letters*, 35(17), 2–6. <http://doi.org/10.1029/2008GL035021>
- Kumar, S., Sekhar, M., Reddy, D. V., & Kumar, M. S. M. (2010). Estimation of soil hydraulic properties and their uncertainty : comparison between laboratory and field experiment. *Hydrological Processes*, 24(23), 3426–3435. <http://doi.org/10.1002/hyp.7775>

- Laton, W. R. (2006). Building Groundwater Monitoring Wells on Campus A Case Study and Primer. *Journal of Geoscience Education*, 54(1), 50–53.
- Lautz, L. K., & Bauer, R. L. (2007). Dye tracing through Sinks Canyon: incorporating advanced hydrogeology into the University of Missouri's geology field camp. *Journal of Geoscience Education*, 55(3), 197–201.
- Lim, L. L. P., & Lynch, R. J. (2011). Feasibility study of a photocatalytic reactor for in situ groundwater remediation of organic compounds, 194, 100–108. <http://doi.org/10.1016/j.jhazmat.2011.07.087>
- Mackin, K. J., Cook-smith, N., Illari, L., Marshall, J., & Sadler, P. (2012). The Effectiveness of Rotating Tank Experiments in Teaching Under- graduate Courses in Atmospheres , Oceans , and Climate Sciences. *Journal of Geoscience Education*, 60(1), 67–82. <http://doi.org/10.5408/10-194.1>
- Martinez-hernandez, K., & Kimaru, I. (2015). Perspectives on Science Literacy : A comparative study of United States and Kenya Perspectives on Science Literacy : A comparative study of United States. *Educational Research International*, 4(2), 25–34.
- Menjo, E. (2013). An Assessment of Effectiveness of the Secondary School Science Pedagogy and Curriculum Relevance to Students ' Needs in Baringo Central , Kenya. *Journal of Emerging Trends in Educational Research and Policy Studies*, 4(3), 433–441.
- Ogunniyi, M. B. (1986). Two decades of science education in Africa. *Science Education*, 70(2), 111–122.
- Ojuri, O. O., & Ola, S. A. (2010). Estimation of contaminant transport parameters for a tropical sand in a sand tank model. *International Journal of Environmental Science & Technology*, 7(2), 385–394.
- Seifert, D., & Engesgaard, P. (2012). Sand box experiments with bioclogging of porous media : Hydraulic conductivity reductions. *Journal of Contaminant Hydrology*, 136, 1–9. <http://doi.org/10.1016/j.jconhyd.2012.04.007>
- Swanson, S. K., Bahr, J. M., & Wilcox, J. D. (2006). A Solid Waste Landfill Siting Exercise for an Introductory Environmental Geology Course. *Journal of Geoscience Education*, 54(4), 458–463.

- Vithanage, M., Engesgaard, P., Jensen, K. H., Illangasekare, T. H., & Obeysekera, J. (2012). Laboratory investigations of the effects of geologic heterogeneity on groundwater salinization and flush-out times from a tsunami-like event. *Journal of Contaminant Hydrology*, 136, 10–24. <http://doi.org/10.1016/j.jconhyd.2012.05.001>
- Werner, A. D., Jakovovic, D., & Simmons, C. T. (2009). Experimental observations of saltwater up-coning, 373, 230–241. <http://doi.org/10.1016/j.jhydrol.2009.05.004>

Author's profile

Dr. Anthony Macharia is a Lecturer of Geography at Kenyatta University since 2014. He has Knowledge in GIS, Remote sensing, Database programs, high level scientific coding programs. He is a Subcommittee member of the Kenyatta University Alumni Relations Chapter, Kenyatta University Strategic Plan, 2015-2025; Board Member, School of Pure and Applied Sciences and at the Department of Geography he serves as the Coordinator of Postgraduate seminars, member of ISO Committee and member of Units Allocation Committee. He is a researcher and has supervised Masters Students as well as participated in many conferences and made presentations at many academic and professional conferences. He has published widely in his area of expertise. He earned his PhD in Geography (Paleoecology) at University of Utah, USA. He also has an M.Sc in Biology from the same University and M.Sc in Ecology and Systematics from San Francisco State University. His contact email is macharia.anthony @ku.ac.ke

Curriculum Change: The Fluidity of Knowledge and Technology. A Case of University Education in Kenya

Prof. Edward K. Tanui

Abstract

The new Information Technology is challenging the future existence of university education in universities. Technology affects the way of thinking of the teacher, the student, the classroom environment and the curriculum. Curriculum describes the knowledge planned for learners to change their behavior. The 21st century technology will continually bring changes in the curricula of the universities and thus introducing the aspect of fluidity. Fluidity therefore, describes curricula as unstable because of technology. The fluidity of knowledge as a result of technology dictates the state of curriculum in higher education. The study sought to find out the status of university education in Kenya in light of fluidity of knowledge and technology. Content analysis was used to collate data for this study. The study found that Website education is slowly taking over the school. The Multi-media integration of concepts, facts, images, data and sound is creating meaning in complex ways in the learner. The challenge is enormous as there are over 550 million websites and billions of searches of information. The study also found that instruction will not be deficient in subject content but university education faces challenges whether all knowledge will lead to achieving the old time educational objectives. The study further challenges universities to ask themselves whether whatever students learn in the four years will still be beneficial or applicable when they graduate because of fluidity of curriculum. The study observes that there will likely be need for “unlearning” of what was learned because the world outside university will have changed. The study recommends that the life span of university curriculum should not be fixed at four years or five or six years but should be flexible enough to change even in two years. Commission for University Education accreditation procedure could be overtaken by technology.

Keywords: Curriculum, Change, Fluidity, Knowledge, Technology

Introduction

The 21st century is witnessing the largest period of substantial change in education ever experienced by any civilization. The new information age that will challenge future existence of schooling and our way of thinking about Learning. Futurist Alvin Toffler (Wiles & Bond, 2007) observes that the information we have in this century will bring change in many aspects of life. He notes that work will change; workers can stay at home and work whenever they want. These developments in technology will have greater implication to university curriculum. This paper discusses curriculum change in the perspective of fluidity; of knowledge and technology.

Curriculum describes all that takes place in a learning situation. Technology has brought a paradigm shift in curriculum (Wiles & Bond 2007). The authors describe paradigm as shared set of assumptions on the basic or familiar way of perceiving, thinking, valuing and doing things associated with particular realities. The term refers to laws, theories and models that form a basis for coherent traditions of curriculum and instruction. The paradigm held about university curriculum represents the old set of concepts that are facing challenges from the 21st century paradigms. The definition that knowledge is education may not continue to hold ground in the new dispensation of technology thus confirming the concept of fluidity in knowledge (Barnett & Coate (2004). The question that now *suffice for* university education is how to organize curriculum in the midst of fluidity of knowledge and technology.

Methodology

Content analysis was used on literature and documents to find solution for curriculum change in the universities. The study observed content, instruction and technology.

Results and Discussion

The current university curriculum is structured. Its lifespan depends on the degree duration. That majority of degree programmers are taken to be four years, others five while others are six years. The belief underlying this theory is that the curriculum will remain static for the period and thereafter change may be effected during the next review. This goes contrary to current knowledge and technology. The study found that the information available courtesy of

technology will most likely overwhelm the thinking of present curriculum. Wiles and Bond (2007) note that currently there exists 550 million websites and billions of searches of information which confirm the speed and volume of knowledge creation which according to the authors is increasing geometrically and therefore making the curriculum process more fluid. This therefore threatens the present university practice of static curriculum. The four year life span theory may not be good because new knowledge will likely replace old knowledge mid-stream.

Computer chips in the future will carry the volume of organized knowledge in small and even molecular sizes. Digitized information broken down into bits will fly across the earth in wireless forms. Knowledge will be accessible to anyone through tiny receivers disguised as jewelry. In the future technology will eliminate keyboards and data storage will be external. Universal translator and “smart” computers are on the way. The question is whether the traditional instruction view will be relevant when learners are required to use technology to learn. Literature reveals that there is difficulty of how information available in the 21st century websites can be assessed, shaped or organized. In effect, knowledge and technology is like fluid moving and never static carrying with it anything it comes across like the glacier movement in the Arctic Zone (Barnett & Coate, 2004). The university education is therefore likely to be of no use if policy makers do not wake to the reality of fluidity.

The myopic and bit by bit approach to knowledge mastery currently found in schools is simply the result of our perceptions in education (Kiboss, 2000; Oberprieler, 1991). Technology has changed forever how university work and learn. Knowledge in the traditional view is impermanent as organized knowledge is doubling every hour and in 12 years that it takes a child to complete formal schooling, there will be need of a lot of “unlearning” as most known knowledge will have become obsolete and the university period of four years curriculum span will no longer hold. An educated person in this era is a person who has learned how to learn according to Carl Rogers (Wiles & Bondi, 2007). The authors observed that knowledge in the future will be universally accessible and no longer confined to a place or a medium.

On delivery the study found that the pencil and the chalkboard were predominant resources used in addition to the lecturer and the four walled lecture room. This is in contrary to current

technology driven delivery through electronic, not through print or live presentation, which changes like day and night. The 21st century will be increasing technological fusion from multimedia to monomedia (Tanui, Kiboss, Nassiuma, 2008). As delivery move from pencils to word processors, education will be leaving the school house. Individuals will use knowledge on need –to-know basis. Knowledge of the future will be largely digitized, broken down into parts and easily reassembled in new forms. Learning will not be linear as in the past, but convergent. Learners, children and adults will “paste together “existing knowledge for personal and impermanent reasons. There will certainly be many internets, each reflecting the values of those who sponsor them. The current belief on curriculum and schooling will have to change. As a result the question to be asked is; how is the Kenyan university system participating in all this change. Wiles and Bondi (2007) noted that despite accelerating social and technical change, the paradigm for education has remained static. They observe that the format of teaching where teachers speak as learners listen has remained the same as that of Socrates days.

Most universities are accused of adhering to the 19th Century curriculum that equates knowing with scholarship and education. In general they conclude that the present learning process reinforces the past rather than the future. They continue to emphasize the concept that learning counts only when done in a “school” way. In schools, time is structured, learning is always linear and the emphasis is on the place. This is termed as “paradigm palsies” by Joel Baker (1993). The internet facility will challenge this perception as knowledge will be readily available outside school.

Wiles and Bondi (2007) further observed that most peoples’ world view of technology seems to be on the machine and not on its ability to contribute to learning which was found to be predominant in the universities in Kenya. The universities tend to concentrate on the “product” and “outcome” rather than on the process of learning. The universities seem not to be willing to abandon the old world and enter the new world of interactive technologies.

The resources for teaching in the universities concentrate on hard copy print material in the four walled libraries. Technology is bringing changes in the resources; the future books will be replaced by computers, the “electronic textbooks”. These electronic textbooks will allow easy

searches of content and using binary code will communicate text, images, sound and animations. Curriculum leaders must begin to focus on the characteristics of the new technology and ask, what can we do with this that we could not do before? The digital information, the technical fusion of media, universal access, the possibilities of global connectivity and new strategic alliances in education such as are occurring in the business world. This change, paradigm shift, redefines education and learning which was found to be absent in Kenyan university education.

Technology has brought new and better ways of accessing, processing and applying information. The technology is changing the world, how we live, and learning outside the university (Baker & Digiovannin, 2005). The worry is that the realities seem not to be penetrating university paradigm in the way education is currently structured. The old definition is of education which occurs in buildings, textbooks, and all other things found in universities. Even though students can go home and secure and process the world's knowledge on their personal computers. The rush in technology seems to make educators feel powerless, only following what comes up in technology. It has been observed that schools are working hard to keep pace with technology but the problem is that universities have monumental commitment to avoid using it to improve learning (Wiles and Bondi, 2007).

The study further found challenges of accessing knowledge in universities. The universities continued to access knowledge based on the lecturer emphasizing course notes and handouts. This is opposed to influence of technology that has introduced new dimension of accessing knowledge. Technology has introduced internet access that is faster and richer in content. Internet provides prepared courses, websites evaluation tools and lesson plans and learners need to click on websites like www.mathsearch.com or www.colormathmastery.com (Wiles & Bondi, 2007). Schools can create a wonderful and rich curriculum from resources readily available on the internet.

Wiles and Lundt, (2004) opined that, “we are a product of today's form of schooling, we cannot think about education without a school because school prevents conceptions of new curricula. Facilities dictate practices; function follows form”. The study found that the university education following the age old structure emphasized the years to be taken to attain mastery for a

degree certificate. The structure represent the definition of school as was conceptualized in the industrial age in America and is no more than a factory with assembly line organization. The new technologies have given the world anywhere, anytime learning delivery system, accessible without the lecturer. The more efficient university does not belong to the highly structured 19th century school building because of fluidity of knowledge and technology. Goodland (1984) agrees with findings of the study that with technology, mastery can be realized like over 100 years ago when people went up to elementary school and the other learning was done in the family, the church and social groups. Today, the television, the computer, the telephone, and educated individuals in our society are all wonderful resources for learning. Because of fluidity in curriculum, self-education is attainable without the school or university buildings. Schools, if we must have them, can and should take many forms. They can no longer be places for acquiring knowledge and the school curriculum and the measurement for education or degree may not be counted in terms of years.

Tanner and Tanner (2007) define curriculum as all that takes place in school. The fluidity aspect of curriculum is discarded and new definition developed as technology takes centre stage in the 21st century. Ergas (2016) observes that the curriculum can be converted into an active process in which students learn survival skills, adaptation skills and the skills of creativity even without the university building structure. A new technological paradigm for curriculum is needed now. Michael Hudson (1999; 2001) author of, *Creating Futures* warns educators that the danger of the internet is that others will soon organize parallel education systems. Fluidity in curriculum therefore comes with its danger of many participants offering education through internet and other for that is give Commission for University Education and degree certificates which have to be standardized.

Hudson (1999) notes that technology has been found to make work easier for learners to comprehend curriculum which is a positive attribute. Fogg (2002), in *Persuasive Technologies* observes that software design can actually alter the way the brain processes information. In future it is observed that “charismatic computers that will offer suggestions, solicit information, simplify things, track users, and employ operant conditioning in the name of learning” will appear. This means in future there will be created different forms of brains in the learners who

may become too clever for the present curriculum or brains that are incapable solving any problem and students who will rely on “mwakenya”; sneaked in material to examination rooms.

The study observes that because of fluidity of knowledge new activities will have to be designed to match the wall-less classroom instruction of the future also referred to as the electronic classroom. E-learning is a new orientation in education that is reported to have great potential to improve teaching and learning in universities and also enhance administration and management of schools in general. John Cotton Dana (Somekh and Davis, 1997) observes that who dares to teach must never cease to learn. Tanui and Kiboss (2009) agree with Dana when he notes that computers enable learners and teachers to try out for themselves new approaches to teaching and learning. Cheterjee, Sarker and Siponnen (2016) claims that actual computer classroom practices promote development of social skills rather than inhibit as some writers would like to think. More (1993) argues that when computers are used to teach learners, they get isolated and points out that learning is not a private activity. Tanui and Kiboss (2009) on the contrary found that e-learning makes learning a social affair where learners work together in cooperative learning and are able to achieve higher mastery of content taught.

Information and Communication Technology (ICT) use in education enables information retrieval through internet facilities and communication within and without the school (Kamp, 2017; Slavin (1990), 1997; Wiles & Bondi, 2007). The authors observe that ICT through internet has brought about library resources that can be accessed by anybody anywhere in the world without a swipe card or proof of enrolment anytime of the day in a physical library and therefore e-learning has better promise for the 21st century learner.

The study established use of e-learning for delivery in universities. This has been made cheaper and faster by provision of computers and internet facilities. This technology is able to provide learners access to learning materials which would otherwise be difficult to reach (Barron, 1997). The importance of this delivery form to university education has been borrowed by the Kenya Government by introducing e-learning to learners at an early age. This is because ICT is believed to be able to facilitate more learner centered teaching, more self-learning and more peer-teaching, while providing opportunity for teacher to teacher, learner to learner

communication, collaboration and access to internet learning resources (Rotich, 2000; Tanui & Choge, 2012). This is a way universities are trying to appreciate technology in university teaching.

Despite the promising potential of ICT, studies show that there is little change in the way teaching and learning is conducted. The study found that the percentage of e-learning in universities is still low due to lecturer's inability to accommodate ICT in their teaching (Sarbarwal, 2012; Tanui & Choge, 2012). This is supported by assertion that technology come from the hands of teachers as the graduates who join industry develop the technology but the teachers themselves find it difficult to apply it as observed by Wiles and Bondi, (2007). Chatterjee, Sarker and Siponen (2016) observes that measurement of effectiveness are complicated and that integrating technology into education can be challenging, frustrating, time consuming and expensive. This could be described as provision of e-learning in an old wine skin that is likely to come with some challenges during implementation especially from the teaching fraternity giving different measurement in fluidity of curriculum and technology.

The point of implementation of change of innovations is the most important process especially in education and this is also a point where most innovations fail (Fuller, 1994). Barer and Richmond (1981) further notes that implementation of any innovation involves change in practice which is normally the most difficult. This on the part of a lecturer means possible use of new or revised materials, new teaching approaches and possible alterations which might not take place due to exposure or training. This is because implementation of technology involves change of attitude and values.

Kiboss (2010) and Wiles and Bondi (2007) agree that the role of a lecturer in implementation is critical at classroom level because the lecturer decides what goes on in the classroom the whole day. They stress that when implementing technology, the attitude, value and priority of a lecturer must be taken into consideration. Wiles and Bondi (2007) note that throughout history teachers have lagged behind in technological utilization during instruction. Plompet, Pelgrum, and Steer (1992) also observe that negative attitudes of teachers towards innovation, lack of clarity, the nature of teaching profession, lack of time and lack of appropriate training are some of the

possible reasons why innovation fails. The curriculum will therefore remain static and finally of no use because of none embracement of technology and new knowledge.

The study found that most lecturers have limited knowledge of ICT which Hawkrigde (1990) argues that when teachers have limited knowledge of ICT, they have a tendency of shunning its use. This could be the reason why curriculum change tends to stagnate in light of technological advancement. University should therefore assist the lecturers by encouraging them and training. Hawkrigde (1990) continues to reiterate that when there is full cooperation, suitable insight can be achieved and many staff can contribute immensely to learner development of ICT capability. In addition to implementation is the evaluation aspect of technology in schools. He further observed that an evaluation of ICT use in education may be done to ascertain instruction and use of technology by determining the following suggestions:

- i. How well evaluation meetings are facilitated;
- ii. The level of support given by the management of organizers and leader of the community involved in the evaluation process;
- iii. Stakeholders' beliefs, attitudes and experiences that influence performance;
- iv. The degree to which learning organization structures facilitate learning;
- v. The level and type of communication between and among stakeholders involved in the evaluation process; and
- vi. Amount of space given for stakeholders to explore issues and express their operations.

Further Chatterjee, Sarke and Siponen (2016) observe that Information and Communication Technology gives rise to organization fluidity that will likely influence curriculum in universities (Nutall, Romero &. Kalesnik, 1992). The fluidity they discuss includes task fluidity, team fluidity and control fluidity which touches on various forms of university curriculum.

Somekh (1997) argues that teachers hold the key to learning in schools and that effective use of ICT tools as teaching tools are highly dependent on professional development of a teacher which forms basic observation on university education in Kenya. It is therefore important to rethink what is taught, how it is taught and why it is taught at the university (Rotich, 2000). When

teachers are forced to have computers, they may have little choice of whether to use them but they retain great control over how and when to use them and more often than not, they choose not to use them. This is as a result of the fluidity nature of knowledge and technology that is also influenced by external factors like the lecturers observed by Hudson (1999).

The rationale for technological use in university education include; social, vocational, pedagogic and catalytic. Various studies support the idea that computers should be introduced to improve instruction, revitalize teachers and give students the experience to use them (Burbules & Densmore, 1991). It is therefore important to rethink what is taught, how it is taught and why it is taught as basis for curriculum change not forgetting the fluidity of knowledge and curriculum. The success of university teaching is to have productive graduates which is the ultimate national objective of university education. This is measured by teachers readiness in terms of content and technology used in class (Gardner, 1983). The expected curriculum changes will be measured by change in societal economic, social and environment development. University curriculum change or review will be determined by the strength of fluidity in technology and knowledge. Commission for University Education will need to gauge the strength of these forces if success is to be achieved in curriculum review or change. For Kenya, this has not been realized and is shown by degradation in social fabrics and environment degradation.

Conclusion and Recommendation

The 21st century has come with advanced technology and increased knowledge that is challenging curriculum change in university education. Technology has brought a paradigm shift in how curriculum is organized and defined. The shift has brought about easy access to information by learners through e-learning, and internet. The computer and internet has made learning easier and more learner-centered. The multimedia integration of concepts, facts, images data and sound create meanings in different ways. Technology has changed forever how students and lecturers interact. As technology changes, classroom instruction process also changes. Curriculum change and fluidity of technology and knowledge is challenging the old understanding of instruction. Lecturers need to think outside the physical classroom and organize instruction to fit technology-led university education. The fluidity of knowledge and technology will continue to influence curriculum change in universities. The fluidity of curriculum

mobilization will persist irrespective of whether universities have intellectual ownership over the process and or are involved in its creation. Therefore, since technology and knowledge are fluid; this paper recommends that, the universities should establish mechanisms to update learners and everybody else of new knowledge and new ways of doing things. University education should not continue putting timelines on curriculum review based on terms of years of a programme of fluidity of knowledge and technology. Flexibility in curriculum should be encouraged so that universities can introduce new knowledge to students without a lot of bureaucracy. Commission for University Education should embrace technology and the internet for instructions and quick reactions to change in curriculum.

If universities will cope with the new thought, education will be able to meet the age old dream of individualizing instruction to meet human differences. Using Aptitude-Treatment Interaction (ATI) technology and non-standardized curriculum designs, universities can be able to deliver personalized learning experiences to every student. What is needed in curriculum is a new conceptual architecture and a core ideology for providing education for all persons. This calls for the need to develop new perspective in curriculum. This is summarized by Kamp (2017) and Wilcox (2005) who asks, “How do you create a compelling picture of young person’s future with people who are technologically illiterate? How do we educate today’s kids for their future rather than for our past?”

The study recommends Commission for University Education to prepare for “relearning experiences” for graduates who will find that at the end of their degree course, what they were offered in the curriculum has been overtaken by events and is no longer worthy knowledge in the world of work due to fluidity of knowledge and technology. The study also recommends that universities relook at the course duration because as it was observed, the period was as a result industrial experience which was based on manual and not information communication of internet and classroom less 21st century electronic learning that has no barrier of the lecturer, or library. The information is out there in space that can be accessed any time of day or night.

References

- Baker, J. (1993). *Paradigms: The Business of Discovering the Future*. New York: Harper-Brown, D. (1997). *Innovation Management Tools. A review of selected methodologies*. European Commission. EUR 1701.
- Burbules, N., & Densmore, K. (1991). *The limits of making teaching a profession*. *Educational Policy*, 5(1), pp. 44–63.
- Barnett, R. & Coate K. Coate K. (2004). *Fluidity in Curriculum*. <http://dx.doi.org>.
- Barrer R. and Richmond Eds, (1981): *How Thinking is learning*. London, ILEA
- Chatterjee, S. Sarker, S, Siponen, M. (2016). How do Mobiles ICTS enable Organizational Fluidity: toward a theoretical Framework. P://dx.doi.org
- Cortes, C. E. (1978). Future will demand culturally literate citizens. *Thrust for Educational Leadership*, 7(3), 20-22. Education and Training in Developing Countries. Ed. By Alexander P.M. Pretoria: University of South Africa.
- Ergas, O. (2016). *The Ethics of Inner Curriculum*. <http://dx.doi.org>.
- Fuller B & Clarke P. (1994). Raising school effects while ignoring culture? The influence of classroom tools, roles and pedagogy. *Review of Educational Research* 64(1) 119-157.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.
- Goodland, J. (1984). *A Place Called School*. New York: McGraw-Hill. In C. C. Lee (Ed.), *Counseling for diversity: A guide for school counselors and related professionals* (pp. 21-40). Boston, MA: Allyn & Bacon. Joseph M. Jacob, (1999) *Doctors and Rules: A Sociology of Professional Values*, Transaction Publishers, New Brunswick and London,
- Hudson, B. (1999). A Social Perspective on teaching and Learning in the Context of Computer-Communication in Teacher Education. *Journal of Information Technology for Teacher Education*. 8(3). 349-360.
- Kamp, A. (2017). Humans, Non Humans and the Mediations of Workplace Learning in their Senior School Curriculum. <http://dx.doi.org>.
- Kiboss, J. K. (2000) Teacher/pupil perspective on computer augmented physics lessons on measurement in Kenyan secondary schools. *Journal of Information Technology for Teacher Education*. 9(3). 199-218.

- Kiboss, J.K. (2000). Impact of a computer –based physics instruction program on Pupils understanding of measurement concepts and methods associated with school science. *Journal of Science Education and Technology*, 11(2), 75-94.
- Kiboss, J.K. & Tanui, E.K. (2010).Impact of cooperative Learning on Secondary Students’ Attitudes towards Poetry. *Kenya Journal of Education Planning, Economics and Management*.
- Kiboss, J.K. (2010). Pupils Perception of Changing Roles in e-Learning Physics. *Creative Education* 1(1).
- Ludt F. (1990) *Meaning and Expression; Mary and Grice on Intentional Semantics*. Boston.
- Maker, C. J., Nielson, A. B., & Rogers, J. A. (1994, Fall).Giftedness, diversity, and problem solving. *Teaching Exceptional Children*, pp. 4-18.Malmah Thomas (1991) *Classroom Interaction*. Oxford, Oxford University Press.
- More A. (1993) Siuli’s Maths Lesson: Autonomy or control? In Beynon J. and Mackay H. (1993) *Computers in the classroom: More questions than Answers*. London: Falmer
- Mulligan K. ed (1990): *Mind, Meaning, and Metaphysics; The Philosophy and Theory of Language of Anton Marty*. Boston; KLuwer Academic Publishers.
- Nuttall, E. V., Romero, I., &Kalesnik, J. (1992). *Assessing and screening preschoolers: Psychological and educational dimensions*. Needham, MA. Allyn & Bacon.
- Oberprieler, G.M. (1995). *The use of computer technology in language for adults*. Computer-Assisted Office of Ethnic Minority Affairs (1995). *Communiqué*. Washington, DC: American Psychological Association.
- Plomp T, Pelgrum, W. & Steer A. (1992). Influence of computer use in school curriculum; Limited Integration. *Computers and Education* 14(2), pp 159-170.
- Schlesinger, A., Jr. (1991). Report of the social studies syllabus review committee: A dissenting opinion. In New York State Social Studies Review and Development Committee, *One nation, many people: A declaration of cultural interdependence*. New York: Author. School board will recognize other cultures, but as inferior. (1994, May 13). *The New York Times*, p. A16.
- Sarbarwal, S. (2012). *J-PAL Policy Bulletin: Supportive Learning through Technology*. Cape Town: Poverty Action Lab.

- Slavin, R. E. (1990). Research on cooperative learning: Consensus and controversy: *Educational Leadership*.
- Tanner, D. & Tanner, L. (2007). Curriculum Development: Theory into Practice. Upper Saddle Ohio: Pearson Prentice Hall.
- Tanui, E.K., Kiboss, J.K. Nassiuma, D. (2008). Teachers changing roles in a computer assisted learning. *Education Research and Review Journal*.
- Tanui, E.K & R. J. Choge, (2012). Students' Perception of the changing classroom environment in e-learning: A case of accounting instruction in secondary schools in Kenya. *Kenya Journal of Planning, Economics & Management*. Pg. 137-143.
- Tanui, E.K. & J.K. Kiboss (2009). Effects of Computer-based Instruction on Students' achievement and motivation towards school accounting in secondary schools in Kenya. *Kenya Journal of Education, Planning and Economics*.
- Wiles J. & Bondi J. (2007). Curriculum Development' A Guide to Practice. Columbus, Ohio; Pearson Prentice Hall.
- Wiles J. & Lundt, J. (2004). Leaving School: Finding Education. St. Augustine, FL: Mantazas Press.

Author's Profile

Prof. Edward Kiptabut Tanui is the Director, Board of Postgraduate Studies, Maasai Mara University. He joined Maasai Mara University in 2009 as senior lecturer and rose to current level of Associate Professor School of Education. Prof. Tanui has also served as the Chairman of Department, Curriculum, Instruction and Education Management (CIEM) 2009-2014; Acting Dean School of Education in several occasions in Maasai Mara University. He was a Lecturer at Egerton University between 1997 and 2009 teaching Curriculum, Instruction and Education Management, Faculty of Education; and acting Chairman CIEM Department and also coordinated Post graduate studies programmes in the faculty. He has published widely in refereed journals and successfully supervised seven PhD students and twenty masters' students. Prof. Tanui has undertaken UNESCO assignment in Somaliland where he was involved in developing Business Studies Curriculum for the country's secondary education in 2003. His past research work focused on effects of computer based learning on students' academic performance, motivation and classroom environment in secondary schools in Kenya. He holds Ph.D Degree in Education, (Curriculum and Instruction) from Egerton University, 2003; Master of Arts Degree in Communication from Daystar University, 1996 and Bachelor of Education (Arts) from University of Nairobi. His contacts are; mobile: 0722346419 and email; edtanui@gmail.com

Scaling Up Training in Forestry and Environmental Courses in Kenya: Reflection on Challenges and Opportunities in Newly Established Universities

Dr. Joseph Hitimana, Erick Koech, Peter Sirmah, Zablon Owiti, Anne Sitienei, Sheila Wachiye and Musa Apudo

Abstract

The period 2011-2012 observed expanded University education in Kenya. Some newly established Universities launched curricula and training in forestry, agroforestry and other environmental courses which are universally known pillars of sustainable development and social wellbeing. This paper presents information on student's admissions and enrolment in these programmes as well as challenges and opportunities in curricula delivery, form a national opinion and derive areas of improvement and recommendations. Findings in this paper contribute to streamlining forestry and environmental education, research and training while addressing emerging issues and challenges of the 21st century. Data was collected from University of Kabianga between 2011/2012 and 2015/2016 academic years. Data from University of Eldoret, Moi University, South Eastern Kenya University and Karatina University were used for comparison purposes. Statistics on students' admissions and enrolment from 2004/2005 to 2014/2015 were used to cover periods before and after expansion of Universities. The study revealed a positive strong correlation between increasing the number of Universities on the levels of students' admissions and rate of enrolment in Kenya. Diversification of programmes within any given University also indicated positive effect on levels of students' admissions and enrolment rates. However, high rates of late reporting and deferment of courses hint at University education challenges to be addressed. Kenyan Universities also face challenges in staffing, capacity for staff development, inadequate facilities, specialized field laboratories and internship opportunities. In short and midterm, promotion of digital learning platform such as video conferencing would enhance sharing of scarce academic staff, while purposive increased scholarships, exchange programmes and exchequer facilitation to support mobility to the field and develop field facilities for selected specializations would motivate the society and enhance relevant quality education.

Key words: Admissions, Enrolment, Professionalism, Scholarships, Specializations

Introduction

The forestry and environmental management sector in Kenya face challenges in building capacity for sustainable utilization and management of resources (Republic of Kenya, 2014). Objective 3.3 (i) of the 2014 Forest Policy in Kenya advocates for intensifying support to forestry research, education, communication and public awareness. Further, Chapter two, article 2.1.1 (g) acknowledges insufficient scientific information for technological development and informed decision-making as one of the key challenges of the forestry sector in the country. Therefore, the policy reiterates the need to give high priority to investment in forestry research, training and education. Quality forest management begins from having a strong educational foundation; and the right tools and resources (Society of American Foresters, 2015). During this era where forestry profession and allied courses are among the least preferred courses by the current generation in Kenya and elsewhere, there is a need to streamline and support forestry and environmental education through effective training and research with a view of reducing environmental challenges and attracting students to these disciplines.

Justification

To redeem the standard of forestry profession and allied programmes for the wellbeing of mankind and for sustainable development, there is need for self-evaluation of training institutions to align the curricula to relevant issues and enhance their popularity in the society and among stakeholders. Similar self-evaluation is needed by the employers, funding institutions and mainstream Government departments. Indeed, deep reflection is required from all the people concerned and touched by the degrading state of environment, forests and natural resources therein, water resources, biological diversity, tourism and wildlife as well as climate change and livelihoods issues in urban, rural, high potential and low potential areas including arid and semi-arid environments.

Purpose and Objectives of this Study

The purpose of this study was to inform and derive areas of improvement and recommendations, which authors believe will contribute to streamlining forestry education, research and training in addressing emerging forestry issues and challenges of the 21st century.

The following three objectives were addressed in this study to:

- (i) Analyze expansion of training in forestry and environmental courses in Kenya;
- (ii) Identify challenges within newly established Universities offering forestry and environmental courses;
- (iii) Determine opportunities to scale up quality training, research and innovation in forestry and environmental courses in newly established Universities.

Historical Perspective of Forestry and Environmental Education in Kenya

Bachelor of Science (B.Sc.) in Forestry programme for East African students (Kenya, Uganda and the United Republic of Tanzania) started in 1970 in the University of East Africa (now Makerere University) in Uganda. In 1973, the Government of the United Republic of Tanzania started a Department of Forestry at Morogoro Campus of the University of Dar es Salaam. Later, in 1984, the Department was elevated to full faculty status following the upgrading of the Morogoro Campus into a full fledged University, Sokoine University of Agriculture. Following the collapse of the East African Community and political unrest in Uganda, Kenyan students pursuing forestry in Makerere University Uganda were transferred to Department of Forestry at Morogoro Campus of the University of Dar es Salaam.

In 1977, Kenya started its own forestry degree programme at the University of Nairobi, using the curriculum borrowed from the Department of Forestry at Morogoro. In October 1984, the Department of Forestry at the University of Nairobi was transferred to Eldoret and was the pioneer program in the newly established Moi University. At the same time, BSc in Wood Science curriculum was introduced. In 2005, BSc Agroforestry and Rural Development curriculum was introduced in Moi University. Until 2011, training in BSc Forestry, BSc. Agroforestry and BSc. Wood Science was mainly done in Moi University at Chepkoilel University College (now University of Eldoret). To a limited extent, a few other Universities were teaching subjects in Forestry or Agroforestry. Moi University kept on reviewing its curricula in forestry to meet emerging needs and challenges. It expanded training in BSc Forestry and Agroforestry by establishing Campuses that evolved into Constituent Colleges and later Chartered Universities. University of Eldoret inherited the already existing Forestry, Wood Science and Agroforestry programmes of Moi University. The University of Kabianga and

University of Eldoret have been reviewing their curricula jointly to ensure international standards of mainstream forestry and agroforestry training are maintained and meet the country's and employers' expectations. The forestry curricula in University of Kabianga and University of Eldoret retain the backbone or traditional forestry courses while embracing emerging issues. Related to forestry and agroforestry, different curricula for environmental degree programmes have been developed by many other Universities in Kenya. In most institutions, environmental and forestry courses are housed and managed in different Schools / Faculties. At the University of Kabianga, they are managed under the same school to enhance multi-disciplinarity, maximize synergy of disciplines and optimize resources in delivery of the curricula.

Streamlining Forestry Training in Expanded University Education

During the period 2008-2016, University education in Kenya expanded to increase access to higher education and training of much needed skilled manpower to drive the national agenda of sustainable development and social wellbeing of citizenry. Environment and forestry are such universally well-known pillars of the above agenda. Environment, forests and trees outside forests are key ingredients for sustainable development and social well-being (UNASYLVA, 2015). There is a strong need for qualified and dedicated human resource to drive quality research and innovations to support knowledge-based policy making as well as management decision making to address emerging challenges of climate change and management of natural resources as well as persistent environmental degradation.

At present, Kenya has 70 chartered Universities and Constituent Colleges (33 public and 37 private) distributed across the Republic (KUCCPS, 2017). Most of the public Universities offer environmental and natural resource management courses but it is only University of Kabianga in Kericho County, University of Eldoret in Uasin Gishu County, South Eastern Kenya University in Kitui County, Maseno University in Kisumu County, Maasai Mara University in Narok County, Kenyatta University in Nairobi County, Karatina University in Nyeri County, and Egerton University in Nakuru County that offer full curricula of forestry and agroforestry programmes. No private institution so far has ventured into offering such courses that are labelled “unattractive” and require high capital for infrastructure and curriculum delivery.

Private Universities, driven by profit margins, shy away from these programmes that require heavy capital but attract low number of self-sponsored students.

From the list, a few of the newly established public Universities foresaw the need to strengthen this facet of social pillar of Vision 2030 by strategically launching curricula and training in forestry, agroforestry and other environmental courses.

Two questions are addressed in this paper: How meaningful is the expansion of Universities in Kenya on forestry, agro-forestry and environmental courses? and what capacity do newly established Universities have to offer such specialized courses

Conceptual framework and Study variables

The rate of University expansion in Kenya in the study period can be related to rate of growth of forestry and related courses. Two scenarios can count for this relationship. One could be as a result of former colleges that have had parent Universities offering these courses and had inherited such programmes. This is the case with University of Kabianga and Karatina University for example. The second case could be an influence of the geographical location of the University such as the version of the programme being offered at Maasai Mara which deals with forest resources and wildlife management; or the need for forestry intervention to address environmental situation such as the scenario of dry land forestry being emphasized in South Eastern Kenya University (SEKU) in Kitui. Increase in admission numbers can be attributed to increased numbers of student who qualify to join University and this can impact on enrolment. These may not however translate to popularising the programmes. It is opined that a wider geographical spread of Universities may popularize the programmes they offer and the specialization by Universities could strengthen training of human resource that would make a great impact in addressing specific challenges facing the society in the wider forestry, natural resources and environment sectors.

This study sought to examine University expansion in Kenya in relation to training in forestry and allied programmes. Statistics of students admitted by the Government into forestry and related programmes and the enrolment rates of the admitted students were used as a measure of popularity of these programmes over time, between 2004 and 2014 (before and after expansion of Universities). The impact of increasing number of Universities and that of diversifying

specializations on the admissions and actual enrolment in forestry and allied programmes were also evaluated.

Methodology

This paper is based on a self-assessment of five public Universities offering degrees in forestry, agro-forestry and allied environmental programmes in Kenya.

Sampled Universities

Five Kenyan Public Universities which offer forestry and related programmes were sampled to participate in this study but four provided feedback. These are University of Eldoret (UoE) and Moi University (MU) from Uasin Gishu County, University of Kabianga (UoK) from Kericho County, South Eastern Kenya University (SEKU) from Kitui County and Karatina University from Nyeri County.

Data collection

Data on chartered Universities and the clustering of Bachelors courses were obtained from Commission for University Education (CUE, 2017) and Kenya Universities and Colleges Central Placement Service (KUCCPS, 2017). Data on students' placements and reporting in courses under study were obtained from the four sampled Universities' records. Four informants from different institutions were provided with excel spreadsheet matrix online to fill in required details and to enable comparative quantitative data analysis. In addition an online questionnaire was designed and distributed for capturing qualitative information. The following 7 out of 13 academic years (54%) were sampled to generate time series data between 2004/2005 and 2015/2016: 2004/2005, 2006/2007, 2008/2009, 2010/2011, 2011/2012, 2012/2013, 2014/2015. Experts' views on challenges and opportunities in forestry education and training in Kenya were captured and documented.

Data analysis and interpretation

Geographical location of Universities was done using Google map and GIS software. The collation and analysis of information was done using simple statistical tools in MS Excel. Tabulated averages and percentage summaries as well as illustrations using bar charts and line

graphs were produced from MS Excel. To appreciate the rate of increase in admitted number of students as the number of Universities increased, we used the period when only one University offered Forestry programs as a bench mark. This initial period is from 2004 to 2007 when only Moi University (at former Chepkoilel Campus) was teaching Forestry and Wood Science degree programmes and thereafter in 2005 BSc Agroforestry. Regression analysis tool in SPSS was used to model the progressive increase of admitted students in forestry related programmes as the number of institutions offering those programmes increased. Based on feedback from informants, authors derived current needs that should be addressed by the Government and other stakeholders to enhance quality teaching.

Results and Discussion

Training in forestry and environmental courses in Expanded University Education

There exists 70 Universities and Constituent Colleges among which 36 are public. Table 1 shows the distribution of public universities across the Kenyan territory and indicates where forestry, agroforestry and environmental courses are presently.

According to KUCCPS database, 55% of Public Universities in Kenya (18 out of 33) train in diverse environmental studies courses. Five (5) Public Universities out of the 36 offer forestry courses and two (2) Universities (University of Kabianga and University of Eldoret) offer BSc in Agroforestry and Rural Development. A few other Universities such as Maseno, Kenyatta and Egerton teach Agroforestry as subjects or options within wider the environmental or natural resource management programmes. Thirty (30) different names have been used to capture undergraduate degree programmes under the cluster of environmental sciences such as; Bachelor of Environmental Planning & Management, Bachelor of Environmental Studies and Bachelor of Science (Agroforestry & Rural Development) that are found at University of Kabianga.

Table 1

Distribution of Forestry and Environmental related courses across Public Universities in Kenya (CUE, 2017; KUCCPS, 2017)*

Public University	Offering Forestry	Offering Agroforestry & Rural Development	Offering Environmental courses
University Of Nairobi			
Kenyatta University			
Moi University			
Egerton University			
Jomo Kenyatta University of Agriculture and Technology			
Maseno University			
Masinde Murilo University Of Science & Technology			
Technical University Of Kenya			
Technical University Of Mombasa			
Dedan Kimathi University Of Technology			
Pwani University			
Chuka University			
Kisii University			
Maasai Mara University			
Meru University Of Science And Technology			
South Eastern Kenya University			
Jaramogi Oginga Odinga University Of Science And Technology			
University Of Kabianga			
Multimedia University Of Kenya			
Laikipia University			
Karatina University			
University Of Eldoret			
Kibabii University			
Taita Taveta University			
Muranga University of Technology			
Kirinyaga University			
Co-Operative University Of Kenya			
Garissa University College			
Rongo University			
Embu University			
Machakos University			
Kaimosi Friends University College			
Alupe University College			

***Accredited Universities in Kenya as at October 2016.**

Thirty eight (38) different names have been used by different Universities for courses falling under natural resources management cluster. This cluster includes Bachelor of Science (Environmental Conservation and Natural Resources Management), Bachelor of Science (Forestry), Bachelor of Science (Integrated Forest Resources Management) and Bachelor of Science in Forestry Ecosystem Management courses. It is observed that, within the same County, different Universities name closely related programmes differently which leads to the question of standardization and quality assurance. Why modification of names? To what extent does the content vary among close but distinctly named programmes? How does this translate into professionalism? There is need to ensure that each programme meets minimum requirements for a course in a given profession such as Forestry, Agroforestry, environmental planning, environmental conservation and environmental education among others. The task remains to determine who should set the standards and when.

Scaling up training in forestry and environmental courses in Kenya

Students' admissions

Level of placement of students increased as the Universities offering the courses increased as shown in Table 2. Statistics revealed that increasing the number of Universities / University Colleges offering forestry related programmes enhanced students' placement by Government by up to 133%. This sharp and progressive increase of nationwide admissions in relation to number of Universities follows a perfect third order polynomial function (cubic function) as shown in Figure 1.

$$Y = 2x^3 - 23.5x^2 + 131.5x + 17 \text{ (R}^2 = 1.0, p < 0.001\text{); where}$$

Y= average number of students admitted by Government in forestry and related courses per year;

x = number of Universities / University colleges accredited to offer the same courses stated in Y.

Table 2

Students' admissions into forestry and related courses between 2004 and 2014 in various Universities of Kenya

Ac. Year	No. Univ.	Av.adm. /yr	%	% increase	Institutions
2004-2007	1	127	100		Moi University
2008-2009	2	202	159	59	UoE, UoK
2010-2011	3	254	200	100	UoE, UoK, SEKU
2011-2014	4	295	232	132	UoE, UoK, SEKU, Karatina University

Data on 2014/2015 were not reported. The percentage annual admissions across academic years were calculated using 2004- 2007 Academic Year average as the baseline record (denominator). Increment in percent for a given period was done with reference to the average of the period when one institution was offering forestry related programmes. For example, $100 \times [\text{annual average value of 2008-2009 Academic years (202)} - \text{annual average value of 2004-2007 Academic years (127)}] \text{ divided by baseline record (127) equals } 59\%$.

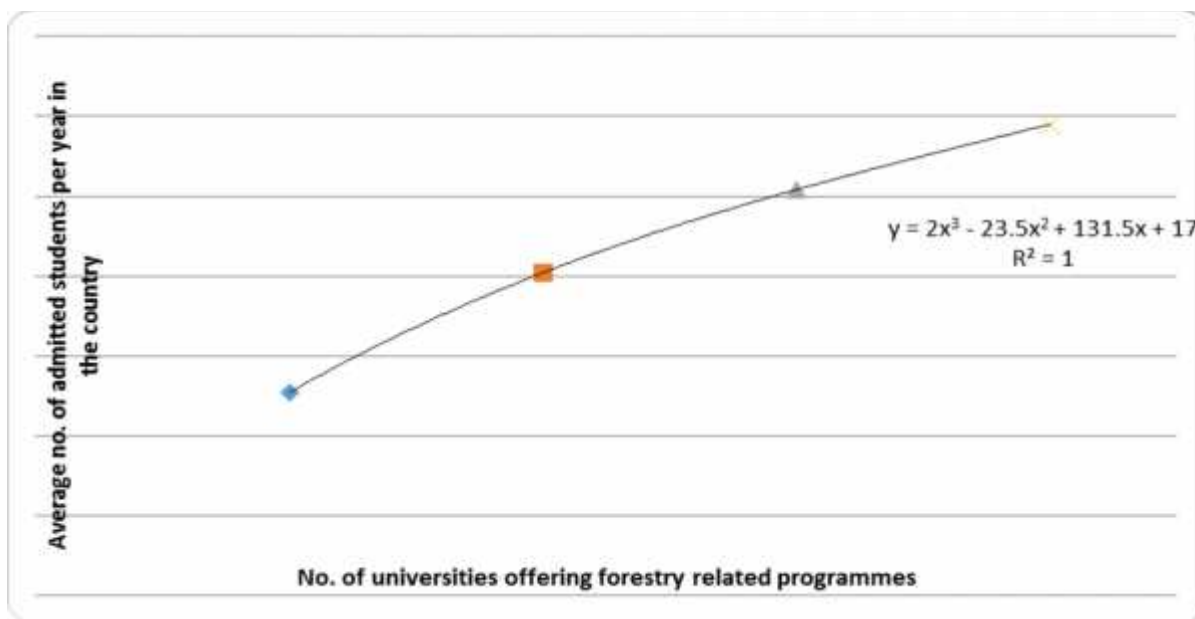


Figure 1. Trend of students admitted by the Government in Forestry and related degree programmes

Students' enrolment from 2004 to 2014

The percentages of those who enrolled (reported) out of those admitted in various Universities for forestry and related courses are generally lower than 50 % as shown in Figure 2. It was noted that students' placements (admissions) did not necessarily translate into actual number of students registered or enrolled into the course; some students transferred into other programmes on reporting while others did not report at all into the programmes they were admitted in.

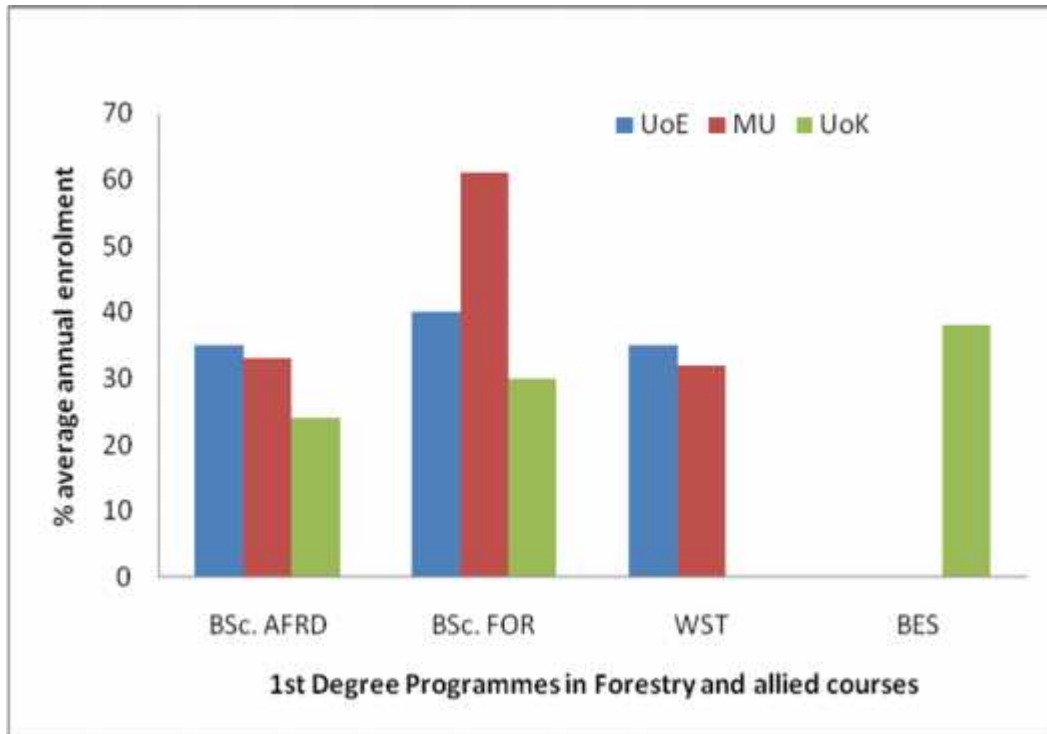


Figure 2. Enrolment rates in Agroforestry and Rural Development (AFRD), Forestry (FOR), Wood Science and Technology (WST) and Bachelor of Environmental Studies (BES) across Moi University (MU), University of Eldoret (UoE), University of Kabianga (UoK) from 2004 to 2014

Forestry in Kenya was more accepted before 2010 (Moi University with mean 61% turn up) than it is today (less than 50 % in University of Kabianga and University of Eldoret). Unlike at the University of Kabianga (started: 2011), programmes offered at Moi University (started: 1984) and University of Eldoret (started: 1990) have been in existence for long. Rate of enrolment at University of Kabianga is expected to increase as the University gets more and more known and popular. The overall declining rate of uptake of forestry related courses is neither recent nor unique to Kenya. Similar scenario was globally reported in an international workshop on forestry

education that was held in 2007 (Temu and Ogweno, 2008). Nyland (2008) also reported the decline in forestry education enrolment in North America. Several factors contribute to the decline including emergence of more lucrative and descent jobs. Challenges facing forestry training then remain nearly the same today, a decade later. Concerted efforts are still needed to motivate young generations to value and join nature-based professions and also to re-focus training curricula to embrace emerging and attractive technologies such ICT.

Matching admissions and enrolment rates in declaring capacity

Based on past records, experiences and statistics, there emerges a strategy to enhance class attendance in forestry and related courses. Figure 3 shows how class sizes in BSc Forestry, BSc Agroforestry and Rural Development and Bachelor of Environmental Studies at University of Kabianga (UoK) are nearly balanced (average class size of 20) by strategically managing the enrolment rates and number of students admitted into the various programmes. Declared capacity gives room (allowance) to those who might not take up the courses they are called for. For example, Agroforestry and Rural Development is given highest admission number because it has the lowest rate of enrolment. Having established the trend, the size of the class can now be envisaged to increase across the board by enhancing marketing of the programmes, increasing number of admitted students and or combining both strategies. Moi University (MU) no longer offers the courses being analysed having passed them over to various new Universities it nurtured.

The trend at University of Eldoret (UoE) shows Wood Science and Technology (now named Wood Science and Industrial processes) as the most disadvantaged programme in students' enrolment. This programme is critical in promoting wood-based industries and is only offered at University of Eldoret. There is need to enhance the student numbers, by applying similar strategy as used in University of Kabianga. Also we note that Agroforestry and Rural Development is a relatively new discipline being offered only in University of Kabianga and University of Eldoret. There is need to endeavour in promoting the same in both institutions by increasing the numbers and capitation for the same. Agroforestry professionals are being channeled out to be leaders in driving the development of technologies to enhance tree cover and tree resources on farm and

other landscapes outside forests for sustainable conservation of agro and pastoral ecosystems while improving livelihoods of same land owners through multiple tree products and services.

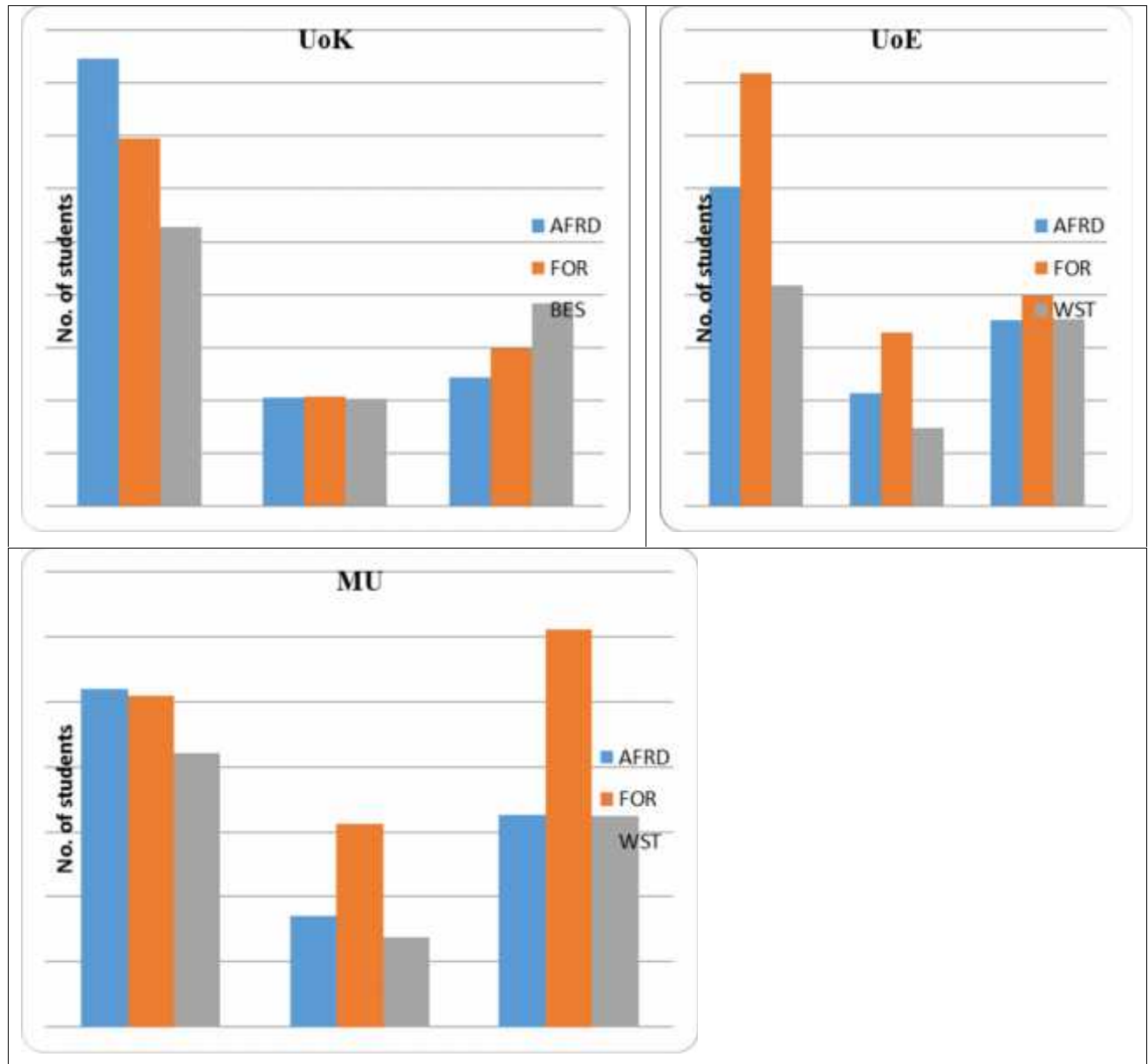


Figure 3. Average annual admissions and enrolment in Forestry & Environmental Courses between 2012 and 2014 (UoK, UoE and MU)

Impact of Diversifying Programs on Admissions and Enrolment

Results of this study revealed that institutions with more diversified programmes related to forestry have more admissions and enrolments in the same areas of specialization combined (Appendix 1). Correlation between the average number of students admitted and enrolled annually in forestry and related programmes and the number of forestry and related programs was positive, very high and significant (Figure 4).

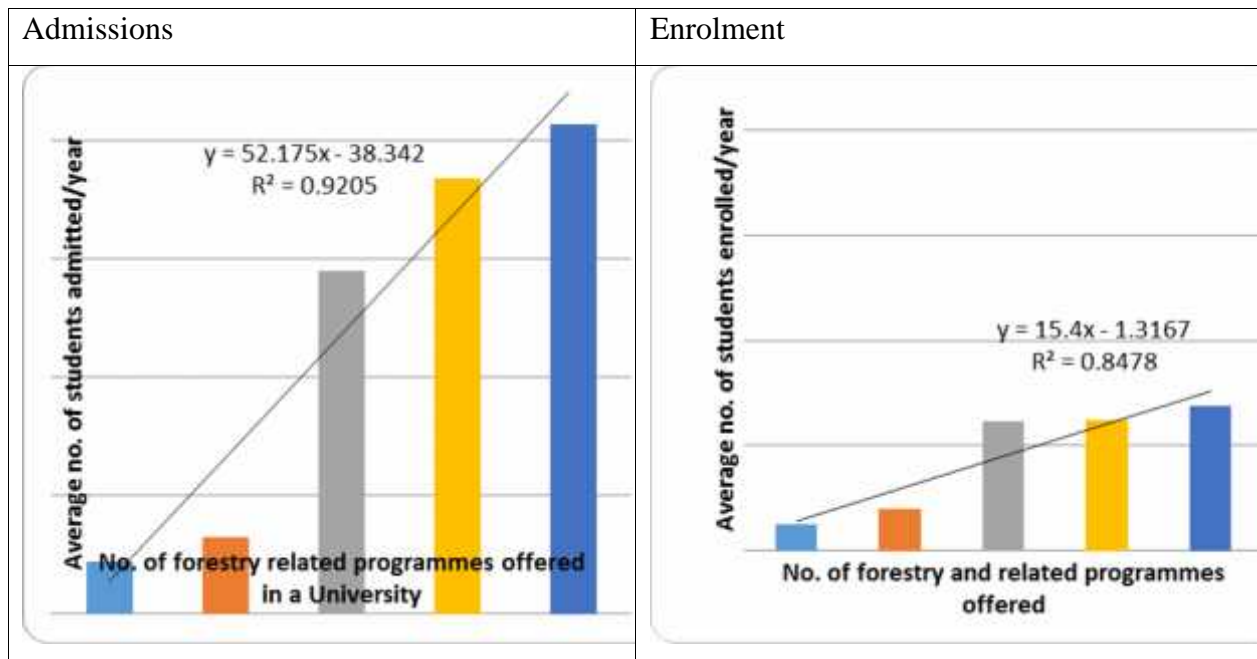


Figure 4. Correlation between the average number of students admitted and enrolled annually in forestry programs and the number of forestry and related programs in Kenya (n = 4 Universities).

On whether institutions should duplicate or diversify Forestry Curricula, there is a view that it would be good to diversify so that each University builds on its strength and be recognized as a centre of excellence for the same. Harmonization (duplication) of curricula has shown a weakness of having staff moving away at the least frustration and some students opting to stay around their homes, hence compromising the universality of the University institutions. It would perhaps be efficient to put in place a system of coordination of programmes in the country to ensure that each University becomes a known centre of excellence in specialized areas of forestry as opposed to one general degree course. Each institution could offer forestry degrees with different emphasis such as B.Sc. in Forestry (Community Forestry), BSc in Forestry (Agroforestry and Rural Development), BSc in Forestry (Industrial Forestry), BSc in Forestry (Environmental Forestry), BSc Forestry (Conservation Forestry), BSc (Urban Forestry) etc.

This rebranding could enhance popularity and relevance of the courses, professionalism and perhaps create more opportunities for foresters in the currently diverse job market. Environmental studies in Kenya have already embraced this diversification with several options on offer.

Forestry education challenges in Kenyan Universities

Inadequate facilities

The level of students' exposure to practical skills is good in the Curriculum but problems of facilities often play havoc to the good intentions. There was common expression about the lack of model forests in forestry training institutions, lack of adequate laboratory and field equipment among others. There is need for enhanced practical training and research skills to back up adequately articulated content in curricula. Funding is required for specialized laboratories (GIS, Studio labs, Green houses, and Seed technology) and field teaching facilities as well as adequate means of transport for field visits.

Staffing

Currently staff development scheme in sampled Universities is weak, and in some lacking. The ratio of external lecturers to internal lecturers is very high. The country is experiencing scarcity of expertise in many specialized fields of forestry that include Forest engineering, forest harvesting, Silviculture, Dendrology, Forest policy and law, Forest economics, Forest mensuration, Forest inventory, Forest entomology, Forest pathology, forest fire management as well as in environmental planning and management. There is need for Universities and the country as a whole to seek strategic partnerships to support postgraduate (Masters and PhD) curricula development and training of faculty in these fields.

Public Perception of lack of job opportunities

Environment and allied sectors are no longer employing their graduates in this era when food shortages, climate change and water scarcity are real and threatening humanity. Public perception of lack of job opportunities in the sector would be changed by taking specific measures towards promoting forestry and related courses in primary and secondary education as well as a profession. The deliberate engagement of University graduates across all sectors to

provide leadership in solving current and real forestry, environmental and natural resources management problems would see more people pursuing these "neglected" careers to University level. There is need to enhance incentives to promote not only the practice of forestry but also and foremost to motivate the youth in schools to purposively choose forestry and related disciplines as a career of their choice. There is also need to back the rich theories in curricula with relevant practical technological skills to increase returns in forestry and environmental management by enhancing the multipurpose of forest systems.

Opportunities to promote Forestry popularity and related disciplines in Education

Forestry is a specialized field of study with unique career opportunities. The following interventions have been identified as avenues towards the promotion of forestry education popularity in Kenya and are in concurrence with the National Forest Policy (Republic of Kenya, 2014):

- i. Expanding the modern communication system up to including rural areas where most foresters operate in forest stations;
- ii. Creating incentives for production and performance by innovating a diversity of a rewarding system in the sector such as increasing chances for upward mobility;
- iii. Sealing corruption loopholes in the practice of the profession;
- iv. Creating opportunities for long and open distance learning;
- v. Review curricula to reflect the broad nature of forestry, to capture all the emerging issues and provide specialization options;
- vi. Support infrastructural development to enhance learning, that is, invest more in forestry education;
- vii. Regulate and standardize the forestry curricula by setting some minimum requirements in content while removing a lot of duplication of curricula and increasing diversity of specializations which address the real challenges of the 21st century and embrace use of ICT;
- viii. Maintain healthy and vibrant linkages between institutions such as inter-Universities linkages; researchers- Kenya Forest Service –Universities linkages, linkages between Universities, industries and professional bodies and

- ix. Increase awareness through outreach activities by concerted efforts from all stakeholders; increase engagement of graduates to tackle emerging issues of environmental concerns through internships, volunteer programmes and conventional jobs and Pooling scarce resources together: innovative teaching models, co-researching.

Conclusion

The study revealed a positive strong correlation between increasing the number of Universities training in forestry and related programmes on the levels of students admissions and the rate of enrolment in Kenya. Diversification of programmes within any given University also indicated positive effect on levels of students' admissions and enrolment rates. The identified forestry education challenges in Kenyan Universities include low staffing, lack of adequate resources for staff development and inadequate facilities, few institutions offering forestry related courses, low enrolment of students, inadequate infrastructural development and learning facilities, rare internship opportunities to motivate young graduates. This study identified the following as opportunities towards promoting forestry and related disciplines in Kenya:

- i) Raising its popularity among primary and secondary schools, parents and the public at large;
- ii) Promoting and rewarding professionalism, innovative ways and means of curriculum delivery;
- iii) Support for infrastructural development to enhance quality learning;
- iv) Regulating and standardizing forestry and related curricula by setting minimum requirements for prerequisites and required professional subjects in curriculum content while promoting diversity of specializations which address the real challenges of the 21st century and embrace use of ICT and
- v) Maintaining vibrant linkages between Universities, industries and other stakeholders.

This study recommends that there should be:

- i) National rebranding of curricula for BSc training in forestry and related environmental courses to create and support centres of excellence, enhance more diverse (specializations) of programmes to create more opportunities for professionals and satisfy the demands for competent experts on the job markets, locally and internationally;

- ii) Internal and external institutional support for infrastructural development including learning facilities; equipped laboratories, field equipment and model tree nurseries. Deliberate action to enhance ex-chequer capitation for young institutions to support academic and research infrastructure and

- iii) Motivation of professionals in forestry and related disciplines through provision of internship opportunities to young graduates, and continual improvement of working conditions. Future studies to look at the rate of completion and placements of graduates in the various job market outlets are also recommended.

References

- CUE, Commission for University Education (2017). Universities Authorized to Operate in Kenya, www.cue.or.ke, 24 February 2017.
- KUCCPS, Kenya Universities and Colleges Central Placement Service (2017). 2017/2018 Programmes & Courses Groups. <http://students.kuccps.net/programmes/>, 24 Feb 2017
- Langin, D. And Ackerman, P. (2008). Transforming forestry education: challenges and opportunities – A South African perspective. *In: Temu AB, Chamshama SAO, Kung’u J, Kabogoza J, Chikamai B and Kiwia A (eds). New perspectives in Forestry Education.* Peer reviewed papers presented at the First Global Workshop on Forestry Education, September 2007. ICARF, Nairobi, Kenya: 83-102.
- Nyland, R.D. (2008). The decline in forestry education enrolment – some observations and opinions. *BOSQUE* (2): 105 – 108.
- Republic of Kenya (2014). *Forest Policy, 2014*. Ministry Of Environment, Water and Natural Resources, February 2014. Society of American Foresters (2015). *Forestry education*. www.safnet.org/education/index.cfm
- Temu, A.B. and Ogweno, D.O. (2008). Global forestry education guidance and monitoring: how imperative is it? *In: Temu AB, Chamshama SAO, Kung’u J, Kabogoza J, Chikamai B and Kiwia A (eds). New perspectives in Forestry Education.* Peer reviewed papers presented at the First Global Workshop on Forestry Education, September 2007. ICARF, Nairobi, Kenya. ISBN: 2-25.

UNASYLVA (2015). Forests, Trees and Disasters, FAO Publication 243/244, Vol. 66 2015/1-2, FAO, Rome.

Authors' Profile

Joseph Hitimana (BSc, MPhil), Lecturer and Ag. Dean, School of Natural Resource & Environmental Management, University of Kabianga (UoK). Forest Biology & Silviculture specialist. PhD fellow in Forest Conservation and Silviculture. His email; josephhitimana@kabianga.ac.ke

Eric K. Koech (BSc, MSc, PhD), Full Professor of Agroforestry, DVC (A&F), UoK. Former Board Chairman of Kenya Forests Service, Former Secretary to East and Central African Network for Agroforestry Education. His email; erickipyegon@yahoo.com

Peter K. Sirmah (BSc, MPhil, PhD), Senior Lecturer, HoD Agroforestry & Rural Development, UoK. Wood and Fiber Science specialist. His email; sirmahkipkosgei110@hotmail.com

Zablone O. Owiti (BSc, MSc, PhD), Lecturer, Former HoD, Environmental Studies and Integrated Natural Resource Management (ES&INRM), UoK. Climate System and Global Change specialist. His email; zowiti@gmail.com

Anne J. Sitienei (BED, MSc, PhD), Lecturer, Ag. HoD ES&INRM, UoK. Environmental Conservation and Natural Resource Sustainability expert. Her email; ayego2001@yahoo.com

Sheila A. Wachiye (BES, MSc), Tutorial Fellow, UoK. Geospatial Information System and Remote Sensing specialist. Her email; sawachiye@gmail.com

Musa G. Apudo (BSc, MSc), Assistant Lecturer, UoK; specialist in Environmental Forestry. Member of Forestry Society of Kenya. His email; musaapudo@yahoo.com

Appendix 1

The change in average number of students admitted or enrolled per year as the number of Forestry and related programmes changes

Admissions

Programmes / Options	Mean number of students admitted per year per institution				
	UoK	UoE	MU	Karatina	SEKU
BSc. Agroforestry & Rural Development	84.8	60.5	52.0		
BSc. Forestry	69.5	82.0	51.0	22.0	32.5
B. Environmental Studies	52.8				
BSc. Wood Science and Technology		41.8	42.2		
Total No. students per year	207.0	184.3	145.2	22.0	32.5
No. of options /Programmes	3	3	3	1	1

Enrolled

Programmes / Options	Mean number of students enrolled per year per institution				
	UoK	UoE	MU	Karatina	SEKU
BSc. Agroforestry & Rural Development	20.5	21.2	17.0		
BSc. Forestry	20.8	32.7	31.2	19.7	12.8
B. Environmental Studies	20.2				
BSc. Wood Science and Technology		14.8	13.7		
Total No. students per year	61.5	68.7	61.9	19.7	12.8
No. of options /Programmes	3	3	3	1	1

Knowledge and Attitude of Secondary School Students and Other Stake-Holders about TVET

Dr. Arun Datta

Abstract

Kenya envisions to become an industrialized nation by 2030. Besides the entrepreneur, the human input for industry is in the form of management and skilled workforce. Technical and Vocational Education and Training (TVET) is geared towards that. National policies and Visions can be achieved if the population concerned, comprehends and is willing to work in that direction. In the case of tertiary (higher) education, it is the school leavers who should understand what TVET stands for and be willing to pursue it. A brief survey was conducted in April, 2015, involving a few secondary school students, teachers, Parent- Teacher Association (PTA) and Board of Governors (BOG) members. Most of the parents, PTA and BOG members were aware of TVET and associated it with easy employability. However, they felt that such jobs are low and don't pay well. The general impression was that TVET programs are for those who don't do well in Kenya Certificate of Secondary Education (KCSE). The students were found to be completely confused and even ignorant, even if some of them had vocational guidance. A degree qualification is seen as prestigious, well-paying and desirous. Most students have vague, wrong or no knowledge about what TVET entails. They want to become professionals and a degree is the only, certain way. It was concluded that there is a strong need to make school leavers aware of the options and to portray TVET in a positive light. If the TVET institutions can attract students with analytical abilities, they can fulfill their mandate better and the National goals can be achieved.

Introduction

Besides the entrepreneur, the human input for industry is in the form of management and skilled workforce, at different skill-levels. The dictionary defines skill as *an ability to do something well, especially because you have learnt and practiced it*. There is requirement of people with a variety of skills, with ability to do; *hands-on*, and do it well. I stress on 'doing well' because the world is competitive and very small. The competitive edge favors the countries whose labors'

skills can compete internationally. Not only compete but also innovate. It is because the world is changing fast. On one side the technology, which produces goods and on the other side the needs, fashions and tastes of people who consume them. In situations where *change* is the only *constant*, innovation carries the day.

Education, in itself is good to have. But if it is aimed at personal or national goals, just *any* is not good enough. The nation, parents and community invest in a young person; they are the stakeholders, whose interests should be kept in mind. Of-course the person's own interests, ambitions and capabilities are primary.

It is the national policies that determine the possible future demand for specific skills. It is also the national ambitions that shape the type of education provided by the educational institutions. National policies and Visions can be achieved if the population concerned comprehends and is willing to work in that direction. In the case of tertiary education, it is the secondary school leavers. Kenya's Vision 2030 demands a large number of technologists and technicians with innovative capabilities. There are many Technical and Vocational Education and Training (TVET) institutions for that purpose. Technical University of Kenya (TUK) is one of the leading providers of TVET education. To fulfill its mandate in line with national goals, it must attract the bright school leavers with analytical abilities and potential for innovations.

There is need to find out what the school leavers know about TVET programs and their attitudes towards technical vs. degree courses. There is also need for a wholesome survey to assess the extent to which all the stakeholders comprehend TVET programs, their relevance to the job market and the overall National goals.

Literature Review

A World Bank Policy Paper was published in 1991. It studied the subject of TVET and its impact on productive employment. It stressed the need to reform the public TVET systems. It was noted that in Africa, there is low economic growth, high population and expansion of labor force. Substantial investment had been made in coming up with data from thematic and country case-studies. Such studies are conducted by UNESCO, International Institute of Educational Planning,

ILO and its International Training Centre, the German Adult Education association and the National Institute of Technology in Oslo, Norway.

The areas covered by such studies include the role of training when there is not enough employment. They question the importance of training within the enterprises and the need for states to intervene. It is estimated that there are 7 to 10 million new entrants in the labor market in Africa. This is inclusive of the large number of school-leavers. Eighty-five percent (85%) of these new-comers are absorbed by the informal sector. Unfortunately most of the public universities do not keep pace with the economic and social needs. Moreover the certification agencies are quite rigid making curriculum development difficult.

The studies stress the need to improve public information about training systems. However there is no study done to assess the current state and level of knowledge that the school-leavers, their parents, teachers or their advisors have on TVET programs, in Kenya. This study is the first of the type to provide data on such knowledge.

Hypothesis

The hypothesis involves four different groups:

NATION: It requires manpower which can help achieve industrialization. Vision 2030 can materialize into reality by TVET programs.

COMMUNITY: A young skilled person who is conversant with local language, customs, values and aspirations is a dream of every community. They are the link between modern, “hands on” technology and the real society.

FAMILY: Majority of Kenyans are financially challenged, although a middle class is emerging, it is an effort for a family to provide for tertiary education. Even if tuition is provided by the Government, there are many expenses involved. A tertiary program that is just long enough to make one economically independent without compromising future academic growth is ideal.

THE CANDIDATE: A majority of them are not aware of all of their options. Entering a university is considered an accomplishment in itself. A good KCSE grade decides for them. The assumption is that a university degree automatically translates into a life of luxury. They don't fully comprehend the relationship between education, training and wealth-creation.

Justification for Research

Kenya's vision is to be a middle income country by the year 2030. To achieve this vision, the country requires skilled personnel to run the industries. According to African Development Bank's Country Strategy Paper, 2014 – 2018, Kenya has an estimated gap of approximately 30,000 engineers, 90,000 technicians and 400,000 artisans. For one to become a technician or an artisan, they have to go through middle level colleges or technical universities. The capacity of the over 50 middle level colleges that offer diploma programs is about 44,828 students. However, according to KUCCPS, only 11,523 students this year indicated to join these colleges. There seems to be a strong pursuit for university degrees at the expense of producing a workforce that will meet the needs and aspirations of the country.

The Kenya Engineering Registration Board estimates that for the country to attain the middle income status the ratio of engineers, technicians and artisans should be 1:12:60. Currently there is a huge gap as the ratio stands at 1:3:13 and TVET programs can play a big role in reducing the gap. The gap is too wide and needs narrowing down. This study seeks to investigate the knowledge of secondary school students and their attitudes towards TVET programs and also seek insights of the school heads, BOG and PTA members. The information will be useful in strategizing to create awareness of the TVET programs.

Indirect Benefits

A degree holder is analytical but has lesser 'hands-on' training and inclination. If the TVET institutions attract better (C+, B+, A) candidates, with analytical abilities, they will produce skilled diploma and B.Tech. holders who can reason and innovate. Better intake improves the quality of graduates. Such workforce can bring forth an industrialized Nation.

Way forward

After the hypothesis is confirmed, the students would be guided and counseled. The counseling and guidance message can be in the form of booklets and CDs for schools. Private sector partners can be found who can sponsor short films of the same for TV stations to air in public interest. For optimum impact, counseling and vocational guidance have to be backed by research.

Methodology

Study design

This was a cross-sectional study. In a cross-section study data was collected at one point in time from the individuals sampled. Contact with the study participants occurred only during data collection and the variables of interest were measured once at a specific point in time. In a relatively short duration of time, the design could be used to collect information from a large group.

Target population

The target population for the study was secondary school students, school heads, BOG members and PTA members. The secondary schools students were those in form three and form four. Any PTA and BOG member in each selected secondary school was included as a key informant in the survey although priority was given to the chairmen.

Study area

The study was conducted in secondary schools in Kenya.

Sample size

For the quantitative method the following formula has been used for sample size calculation:

$$n = \frac{Z^2 PQ}{d^2}$$

Where: n is the sample size; Z(1.96) is the standard normal deviation corresponding to 95% confidence interval; P is the proportion of secondary school students in Kenya with knowledge of TVET programs; Q= 1-P; d is the precision of the study (5%).

Since there is no similar study that have been conducted in Kenya p is unknown and therefore it is assumed that there exist equal chance of finding secondary school students with knowledge just as those who do not have knowledge of TVET program, hence p is 50%. Therefore:

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

A sample size of 384 of secondary school students was used. For the qualitative method, one school head, one BOG member and one PTA member from each school was enrolled into the study. This means the total number of school heads, BOG and PTA members were nine.

Sampling technique

Multi-stage sampling has been used to select the secondary school students who participated in the survey. First, cluster sampling technique was used to select the secondary schools to participate in the survey. Then systematic sampling technique was used to select the secondary school students who participated in the survey. The sampling frame was the form three and form four students in the secondary schools and the class registers were used to determine the sampling interval. Purposive sampling was used for school heads, BOG member and PTA member selection.

Research instruments

The data collection tools used in this study, were a structured questionnaire and key informant interview (KII) guide (Appendix A). The structured questionnaire had questions on form three and form four students' knowledge and attitudes towards TVET. The KII had questions for the secondary school heads, BOG and PTA members.

Data collection

This study utilized mixed methods (both qualitative and quantitative) to assess the knowledge and attitudes of secondary school students and other stakeholders towards TVET programs in Kenya. In-depth interviews were used to collect the qualitative data. The quantitative data was collected through structured questionnaires.

Data processing and analysis

Quantitative data obtained was entered and analyzed using Statistical Package for Social Sciences (SPSS) software version 21. Bar graphs and frequency tables have been used to summarize the data. The qualitative data has been analyzed using Nvivo 10.

Ethical considerations

The names of the study participants will remain anonymous and have not been collected during data collection. Approval to conduct the survey was sought from NACOSTI, Ministry of Education and from the respective secondary schools administrations.

Results

Demographic characteristics of secondary school students

A total of 407 students from eight secondary schools filled the questionnaire (Figure 1). Majority 95.8% (n = 390) were from three students and a few (4.2%, n = 17) were from four.

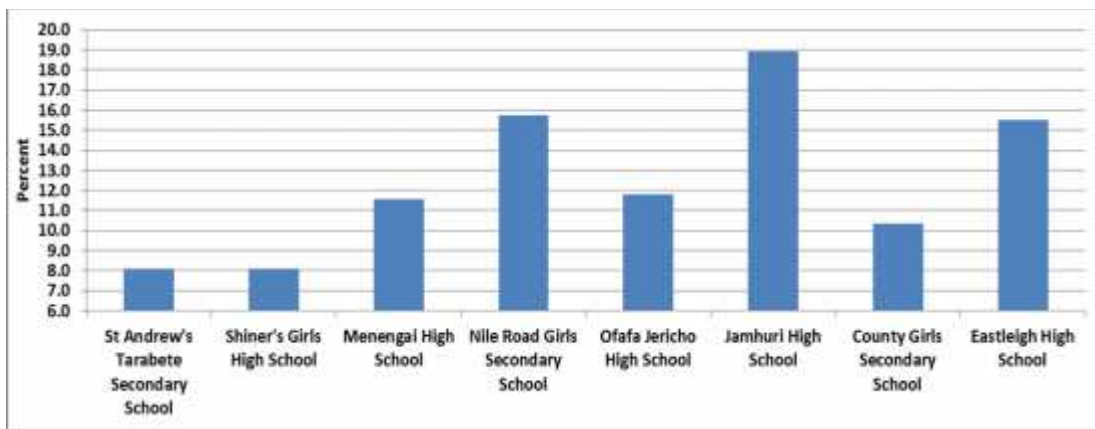


Figure 1. Secondary schools that participated in the study (n=407)

More male students (61.4%, n = 250) compared to females (38.6%, n = 157) participated in the study (Table 1). Slightly more than half (53.1%, n = 216) had 17, slightly below a third (30.2%, n = 123) had 18 and above, 16% (n = 65) had 16 while 0.7% (n = 3) had 15 years. Only 391 students indicated their religion. Most (59.6%, n = 233) were Protestant, 23.3% (n = 91) Catholics, 14.6% (n = 57) Muslims and others (2.6%, n = 10). A total of 381 students indicated the highest level of education of father and/or mother. Most (57.5%, n = 219) had either of the parent with tertiary level of education, a quarter (24.9%, n = 95) with secondary, 11% (n = 42) primary and a few 6.6% (n = 25) with none. A few 8.8% (n = 33) had family members enrolled in TVET while majority 91.2% (n = 343) did not. With regard to family monthly income half (49.9%, n = 176) of the respondents indicated more than 20000, 20.4% (n = 72) between 10000 and 20000, 15.9% (n = 56) between 5000 and 10000 while 13.9% (n = 49) had less than 5000 Kenyan Shillings.

Table 1a*Demographic characteristic of secondary school student*

Characteristic	Frequency	Percent
Gender		
Male	250	61.4
Female	157	38.6
Total	407	100
Age		
15 Years	3	0.7
16 Years	65	16
17 Years	216	53.1
18 years and above	123	30.2
Total	407	100
Religion		
Protestant	233	59.6
Catholic	91	23.3
Muslim	57	14.6
Others	10	2.6
Total	391	100

Table 1b*Demographic characteristic of secondary school student*

Characteristic	Frequency	Percent
Father's and/or mother's highest education		
None	25	6.6
Primary	42	11
Secondary	95	24.9
Tertiary	219	57.5
Total	381	100
Family member enrolment in TVET		
Yes	33	8.8
No	343	91.2
Total	376	100
Family monthly income		
Less than 5,000	49	13.9
5,000 - 10,000	56	15.9
10,001 – 20,000	72	20.4
20,000 and above	176	49.9
Total	353	100

Education pathway

Responses from the survey revealed that majority 86.7% (n = 353) of the respondents preferred joining University, 10.3% (n = 42) Technical College and 0.7% (n = 3) Vocational Centre after secondary education (Figure 2). Moreover, 31.7% (n = 129) indicated that other people affect their decision on the field to enrol and they include: family (52.7, n = 68), friends and neighbours (31%, n = 40), school (8.5%, n = 11) and others (7.8%, n = 10).

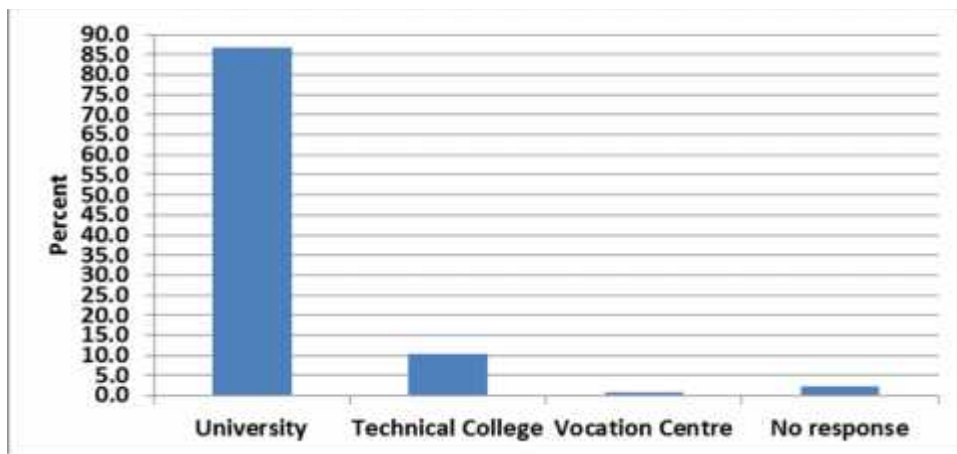


Figure 2. Desired institution to join after form four (n = 407)

Most (72%, n = 293) of the respondents indicated they were provided with guidance and counseling (Figure 3). According to the respondents career guidance and counseling was provided by parents (31.9%, n = 130), teachers (24.8%, n = 101), motivational speakers (3.4%, n = 14), pastors (1%, n = 4), mentors (1%, n = 4), friends (0.7%, n = 3) and others (12.6%, n = 37). However, only 19.1% (n = 56) indicated that the career guidance and counseling included TVET programs.

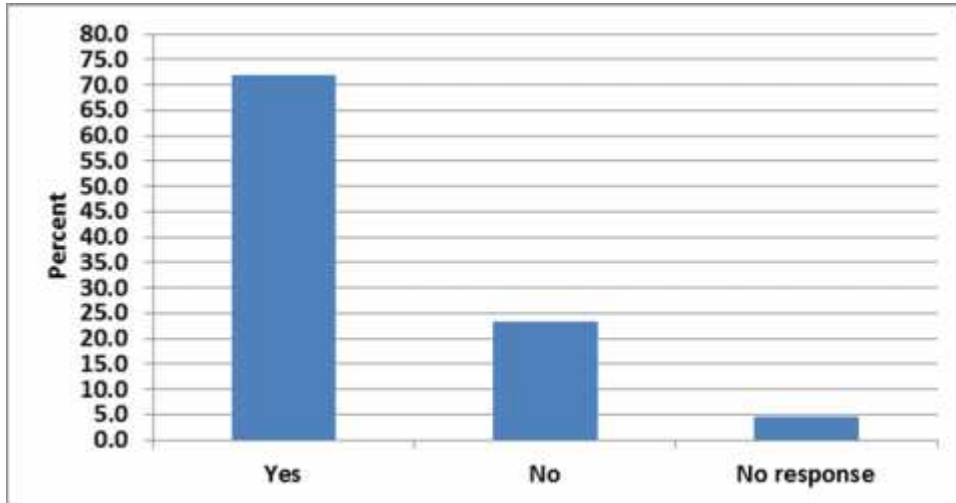


Figure 3. Provided with career guidance and counselling (n = 407)

Future career pathways of the respondents

Over half (55.6%, n = 219) of the respondents intend to have professional and private sector (17.5%, n = 69) careers in future (Figure 4). This is an indication of their preference to white-collar jobs which is not surprising considering 86.7% (n = 353) had intention of joining university.

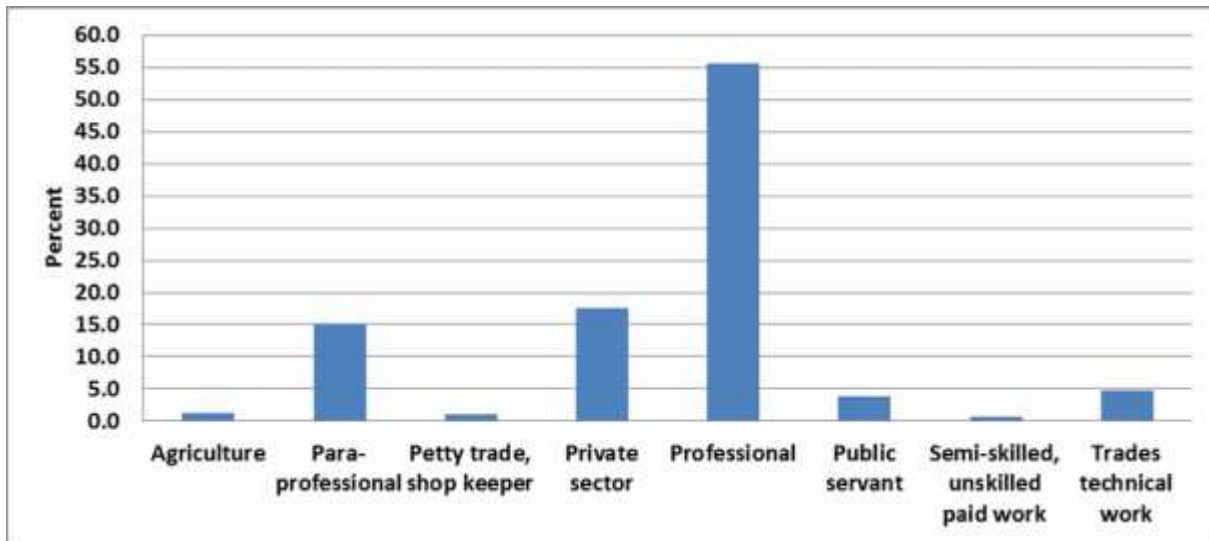


Figure 4. Dream job of the respondents (n=394)

Interestingly, only 15.2% (n = 60) of the respondents selected Para-professional careers in future. Most of the Para-professional jobs require technical skills that are acquired through TVET subjects. However, 70% (n = 42) of respondents that selected Para-professional career had no idea or had just heard about TVET with little knowledge of what it is all about (Figure 5).

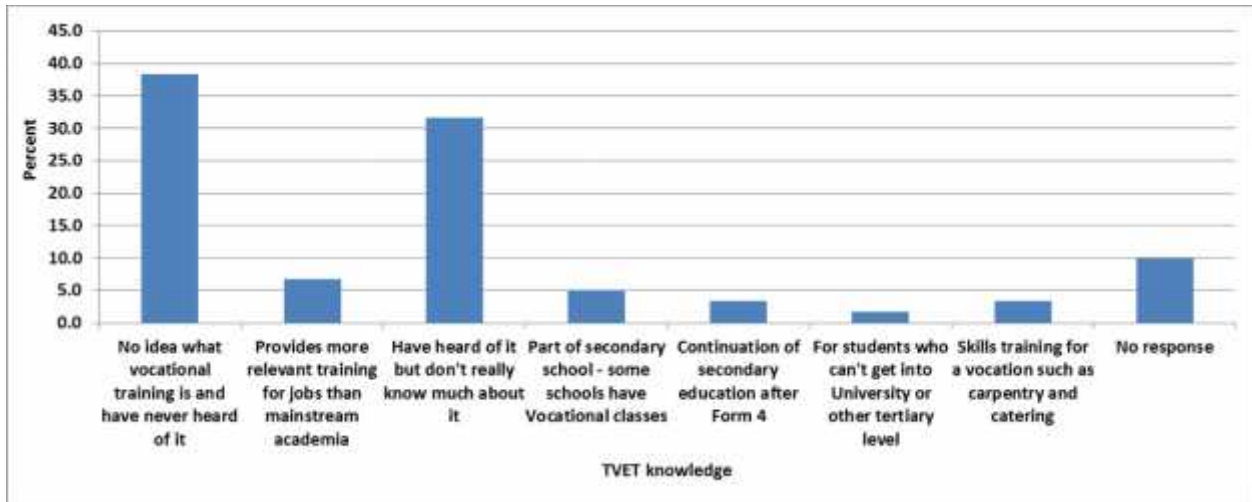


Figure 5. TVET knowledge distribution among respondents who selected Para-professional careers in future (n = 60)

Majority of the respondents had personal interest (69%, n = 281) and earning good income (11.8%, n = 48) as the motivation for chosen career (Figure 6).

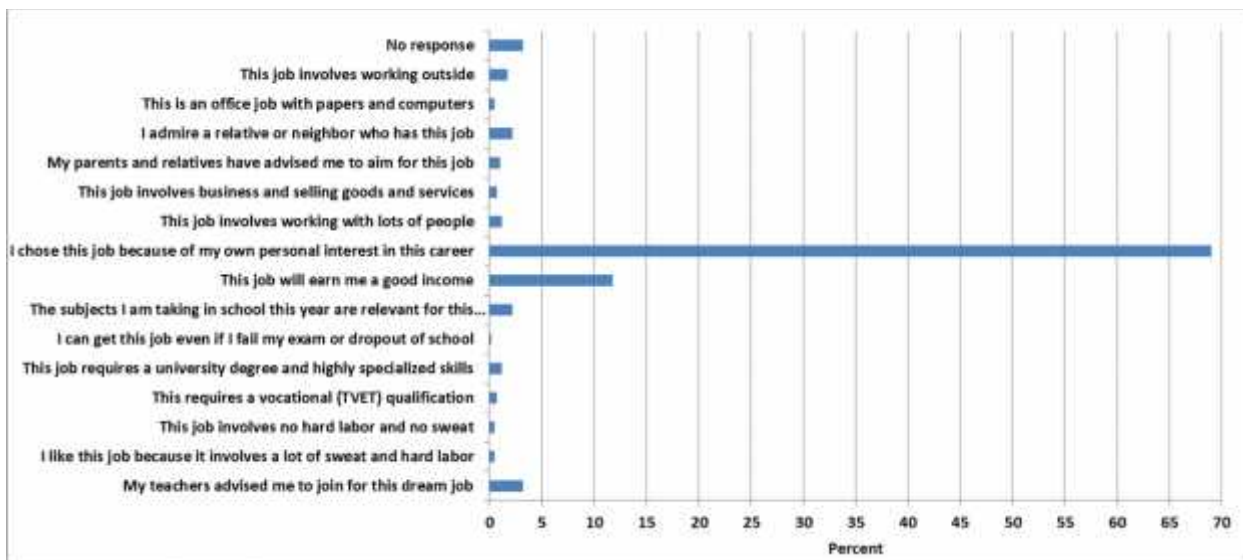


Figure 6. Reason for selected future career (n = 407)

TVET knowledge and awareness

Respondents were asked what they knew about TVET. About 42.8% (n = 174) indicated they had no idea and had never heard of it while a third (33.9%, n = 138) had heard about TVET but had little knowledge of it (Figure 7).

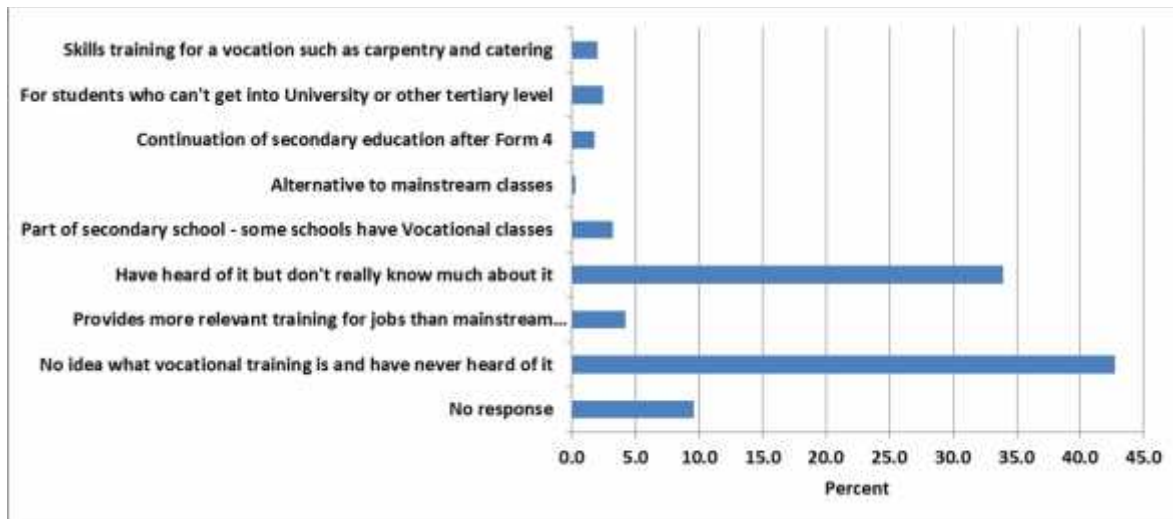


Figure 7. What respondents know about TVET (n = 407)

Respondents indicated that Technical Institutions (44.7%, n = 182) and Universities as where TVET courses are offered while 39.8% (n = 162) responded they don't know (Table 2). With regard to qualifications for one to join TVET courses only 17.7% (n = 72) indicted the correct response of 'C and above'. A high number of respondents indicated that TVET focuses on acquisition of employable (68.8%, n = 280) and practical skills (60.9%, n =248).

Table 2**Respondents' knowledge on TVET**

Statement	Frequency	Percent
Where TVET courses are offered		
Universities	32	7.9
Technical Institutions	182	44.7
I don't know	162	39.8
No response	31	7.6
Qualifications for one to join TVET courses		
B+ and above	13	3.2
C and above	72	17.7
C and below	25	6.1
I don't know	267	65.6
No response	30	7.4
TVET curriculum focuses on acquisition of employable skills		
Yes	248	60.9
No	66	16.2
No response	93	22.9
TVET focuses on acquisition of practical skills		
Yes	280	68.8
No	37	9.1
No response	90	22.1
Total	407	100

After scoring the knowledge responses with a score range of 0 – 6, three-quarters (75.2%, n = 306) had poor knowledge, 15.5% (n = 63) fair knowledge while only 9.3% (n = 38) had good knowledge about TVET (Figure 8). The low knowledge may be attributed to lack of awareness on TVET as indicated by slightly more than half (52.3%, n = 213) of the respondents. That notwithstanding, 55.3% (n = 225) of the respondents expressed their desire to join TVET schools or centres.

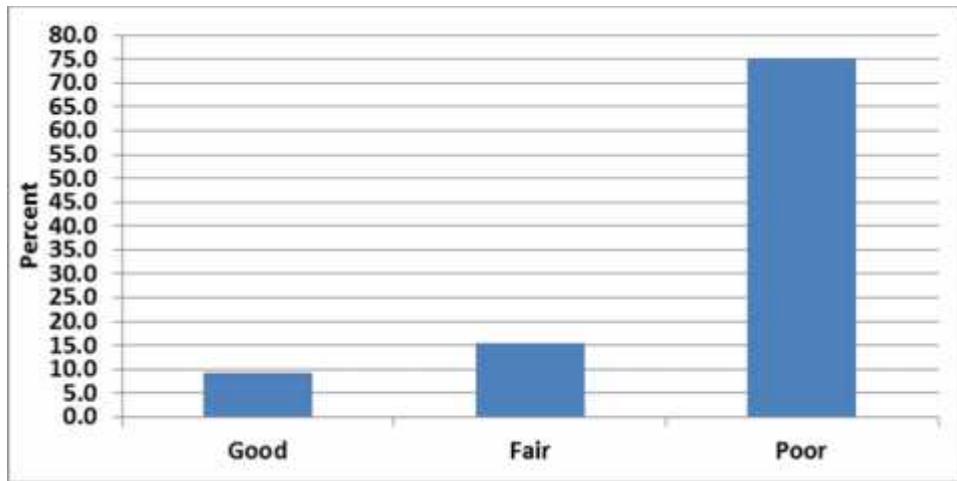


Figure 8. TVET knowledge score (n = 407)

Attitudes towards TVET

On a Likert scale respondents attitude towards TVET ranged from strongly disagree to strongly agree (Figures 9, 10 and 11). Only 348 (85.5%) responded to the attitude questions. A high proportion of the respondents were uncertain on hands-on approach (41.6%, n = 139) and high status (36.1%, n = 125) of TVET courses. Moreover a cumulative total of 56% (n = 191) of the respondents agreed and strongly agreed that academic courses have high status even though only 31.6% (n = 108) accumulatively agreed and strongly agreed that they are important than vocational. Responses from the survey revealed more than half of respondents accumulatively disagreed and strongly disagreed that people with degrees get the best jobs (53.4%, n = 186), make more money (53.6%, n = 183) and that TVET courses are difficult (60.4%, n = 204).

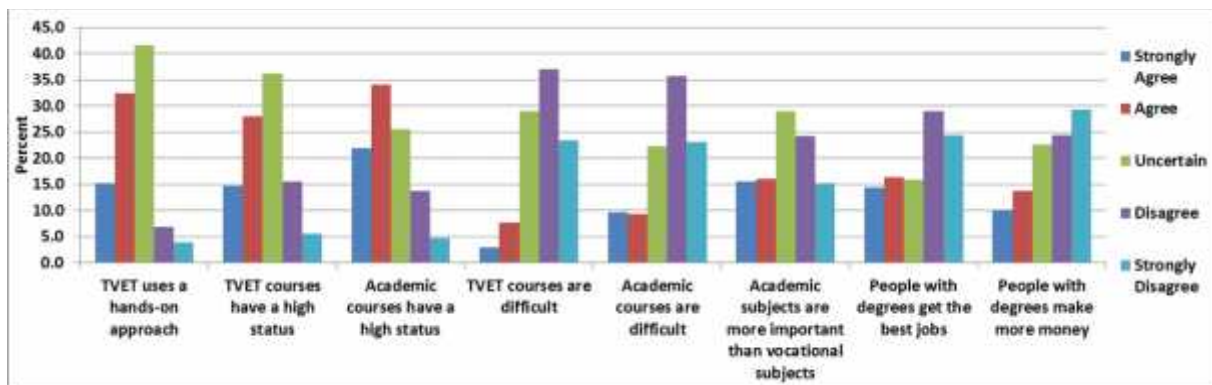


Figure 8. Attitude toward TVET (a)

With regard to higher recognition of university than TVET qualifications, a cumulative 56.2% (n = 199) either agreed or strongly agreed. The respondents think the society view those who pursue academic courses brighter than vocational. More respondents indicated agreed or strongly agreed that people think those pursuing degrees (48.1%, n = 172) are bright than those pursuing vocational course (18.6%, n = 65). About 34.7% (n = 120) agreed and 17.1% (n = 59) that TVET is an alternative for those unable to find a job while 29% (n = 102) agreed and 27% (n = 95) strongly agreed it is considered a second chance for those who want to further their education. More than half (56%, n = 195) strongly disagreed that TVET courses are designed to suit males and not females while 16.4% (n = 58) agreed and 21.5% (n = 76) strongly agreed that getting employed is more important than getting a degree.

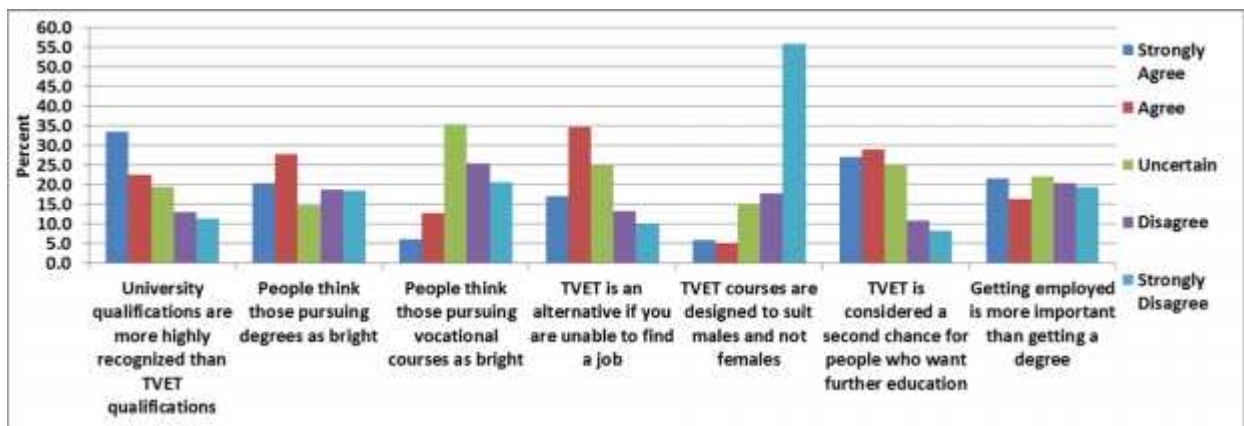


Figure 9. Attitude toward TVET (b)

Slightly more than a quarter (26.1%, n = 91) strongly agreed and a fifth (20.9%, n = 73) agreed that lack of highly-skilled technical manpower means poor infrastructure and institutions although 24.1% (n = 84) disagreed and 39% (n = 136) strongly disagreed that its shortage does not affect the economy. A higher proportion of the respondents were uncertain that there are more jobs available for TVET than degrees holders (39.3%, n = 134) and there are better self-employment opportunities for TVET graduates (37.9%, n = 130). Higher proportion (35.2%, n = 120) of the respondents agreed one can join degree program while a third (33.3%, n = 115) were uncertain whether lesser capital is required to start a business after TVET.

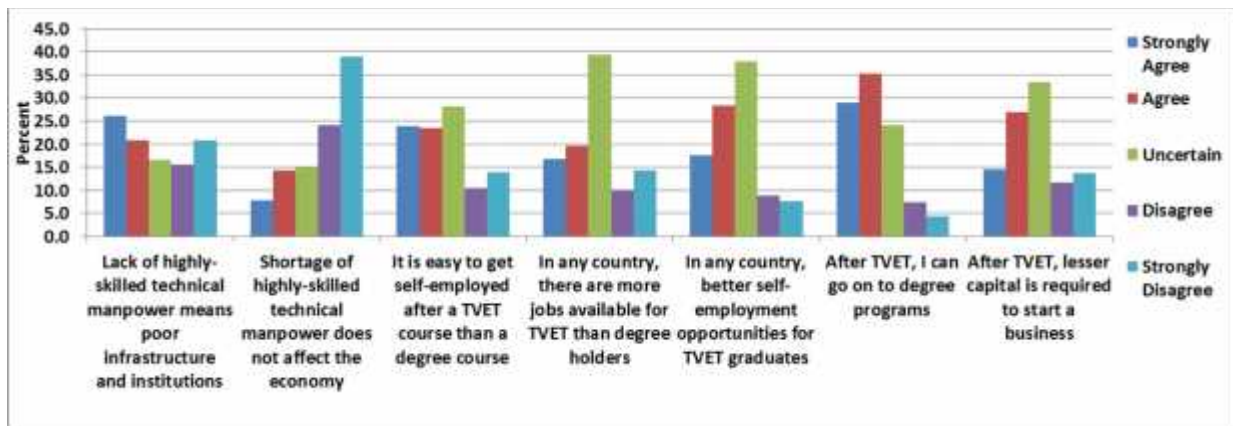


Figure 10. Attitude toward TVET (c)

The 23 attitude statements were scored with a score range of 0 – 92. A high proportion 57.2% (n = 199) of the respondents had fair attitudes, 40.8% (n = 142) had poor attitudes while 2% (n = 7) had good attitudes (Figure 11). This indicated that the respondents had negative attitudes towards TVET.

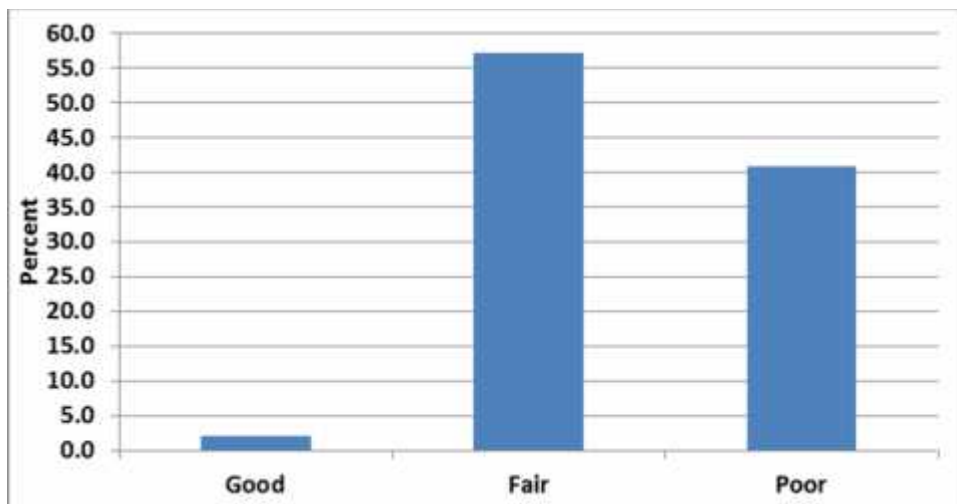


Figure 12. Attitude toward TVET scores (n = 348)

BOG and PTA members’ knowledge and attitude towards TVET

Most of the parents, BOG and PTA members were familiar with TVET. Mr. Mwendwa, a BOG member described TVET as ‘*Hands-on experience, you know, education training that is hands on. Not theory, educationthat is primarily practical as opposed to theory*’. They appreciated the role TVET played in providing youths with employable skills. They indicated

that the public has a negative attitude towards TVET since they preferred white collar jobs and associate TVET with odd jobs that are hard and dirty with low returns. A high number indicated that failures are the ones who join TVET centres and the decision to enroll is made by the student and the parent. The education system focuses more on those who join universities who are the minority and leave the majority to make their own career pathway. They indicated there is need to guide students into TVET programs to gain employable skills. They blamed the Government for not providing adequate resources to run TVET programs. They suggested that the curriculum should be revised to accommodate technical courses if Kenya is to achieve Vision 2030 besides establishment of more technical centres.

Teachers' knowledge and attitudes towards TVET

Teachers indicated that they don't have information to share with students on TVET. Despite display of information on TVET on careers day, very few show interest or interact with it, indicating that the students have a negative attitude towards TVET. They indicated that TVET could cater for those who fail to join university. According to secondary school principals and teachers the public has a positive attitude towards TVET but they lack information to guide the young students. It was indicated that there were no guidance and awareness programs to guide students into TVET at secondary school level. It was suggested that awareness on TVET should be created right from Form one, so that the students could make informed decision by the time they are through with secondary education.

Summary of Findings

The Form three and Form four students aged between 15 and 18 who were interviewed came from reasonably varied backgrounds. This was in terms of religious beliefs, economic strata, location and parents' educational levels. Some of them were from private schools but the majority were from public schools. Close to 90% of them wanted to join some University to pursue degree programs. Most of the respondents indicated that they were given career counseling. This was mostly from their parents. Over half wanted to have professional and private sector jobs. The 15% who showed interest in para-professional jobs, requiring technical skills, had little knowledge about TVET.

Most of the respondents claimed a personal interest in their choice of career, with almost no knowledge of the career path or qualifications required for it. A little explanation is provided by some of them saying that it is remuneration that guides their choice. Almost 50 % had never heard of TVET. Majority of those who had heard, had no idea of what it entails. Interestingly, many associated TVET with easy employability. However employability was not on their mind at all while answering the questionnaire.

In terms of attitude, high status was associated with degree course. TVET was seen either as lower or of unknown social standing. However, TVET was viewed as a second option in terms of jobs. Some of them were aware that skilled manpower is required for infrastructure development. Still, they could not associate it with opportunities. BOG and PTA members had mixed knowledge about TVET. They thought of TVET in terms of white or blue collar jobs only. The different cadres of technological personnel like artisans, technicians or technologists were the same for them. The head teachers or teachers, although aware, were not qualified enough to guide the students on the opportunities available. Most importantly, the attitude towards TVET is negative, inferior and 'menial'. It does not associate with creativity, innovation and pride. Most students did not show an eagerness to start earning and assisting their parents economically.

Hypothesis testing results

Candidates' actual responses matched with and validate, the hypothesis. PTA members represented the family in this brief survey. Their own knowledge seemed limited on this subject. Hypothesis about the economics of such education could not be established. BOG members represented the community. Again, their own views on TVET education were not grounded on knowledge and so, could not validate or otherwise, the hypothesis. There is need for a larger survey, particularly for other stake-holders than students, to establish the hypothesis. Under the heading of 'justification for research', the hypothesis about what the Nation needs, has been addressed.

Way forward

The sample size was rather small, considering the total number of secondary school-goers. However, from the responses received, it seems to be representative. It shows a sense of incoherence in the respondents' mind. They know that there is some correlation between education and economic returns and lifestyle. Surprisingly, there does exist some sort of career-guidance but it does not achieve its goals.

Despite the fact that a national goal or Vision exists, it has not rationally been translated into advice. The Nation wishes to be industrialized and the ratio of engineers to technologists and to technicians and artisans is proposed. It clearly demands a very large number of TVET graduates. This fact means a very high demand for such graduates and so employment opportunities. There is a mind-set that people in higher economic strata are white-collared only and that dignity is associated with them. Advertisements for luxury items and popular media strengthens such a view. The teenage mind gets influenced easily. In general, there is a lack of appreciation for honest, wholesome living with family, social and National values. Emphasis is on economic and not on holistic life. Teenagers are not motivated to help families or be patriotic. The way forward would include the following:

1. Inculcate a sense of patriotism. To understand, respect and follow national goals.
2. Give family values. Kenya is aspiring to be a middle-level economy. That means a majority of Kenyan house-holds are middle or low middle income level. Students should aspire for courses that are short (1 or 2 years), provide job opportunities so that they can support themselves, reduce burden on families and finance further studies. There is need to associate pride with being self-made and independent.
3. They should have pride in working with hands, be creative and innovative. There should be an eagerness to understand the workings and systems. The approach should be hands-on. Students should be encouraged to read success stories of entrepreneurs and inventors who excelled by such an approach.
4. Schools should have days set aside for teachers and parents to discuss career-routes available which are down to earth, available and achievable. Both the groups to be on the 'same page'.

5. The Government Ministries concerned, should produce spoken and visual material to be aired which advises the youth in an interesting way. For example, sports is intelligent, manual and physical activity; TVET programs prepare you for economic, intelligent, manual and physical activities; both can lead to success!

References

- Biggs, Tyler, Shah and Srivastav [1995a]. Technological Capabilities and Learning for African Enterprises. Technical paper no. 288, ATD Series. Washington, D.C.
- Eliakim and Ziderman [1990]. Investment in General Training: The Role of Information and Labor Mobility. *Economic Journal*, 100: 1147-58.
- Fluitman, and Alberts [2000]. Vocational Educational and training Reform: Matching Skills To Markets and Budgets. International labour Organization.
- Norton, G [1999]. Lessons from Education and Training for Youth: Five Percepts. Conference Proceedings, US Department of Labor. February 24-26, 1999, Paris.
- Philip, F [1992]. Vocational education and Training: A Major Shift in World Bank Policy. *Prospectus* 22(2): 149-55.
- Teichler, U [1999]. The Contribution of Education and Training to the Employability of Youth: Changing Concerns, Debates and Measures. Conference Proceedings, US Department of Labor, Washington, February 24-26, 1999: OECD.
- Wanjala, K.B. [1995]. Kenya: Cooperation and Vocational Education. Establishing Partnership in Technical and Vocational Education. Berlin; UNEVOC.
- Ziderman A. [2003]. Financing vocational Training in Sub-Saharan Africa. Africa

Author's Profile

Arun Datta holds a post-graduate degree in Mathematics, graduate degree in Physics, Chemistry, Mathematics and a second postgraduate degree in Philosophy. He holds a doctorate in Philosophy from university of Nairobi. Arun Datta has been an entrepreneur in Kenya for over two decades before joining academics. He is currently a Senior Lecturer at the Technical University of Kenya. His areas of interest include education, study of 'wisdom' and philosophy of science. Email: arundatta16@gmail.com

**Equity in Students' Enrolment in Public Universities in Kenya: An
Analysis of Undergraduates with Disabilities**
Dr. Beatrice Bunyasi Awori and Judith Chepkorir

Abstract

While access to higher education for the marginalized group is well established worldwide as a means to alleviating poverty towards an overall goal of achieving a sustainable society, equity in enrolment among students with disabilities in public universities is still a major challenge. This study examined equity in enrolment of students with disabilities (SWDs) in Kenyatta University and Maseno University. The study was limited to students with visual, hearing and physical disability. The study adopted a mixed method approach of enquiry and targeted all undergraduate SWDs (both regular and institutional-based) who were on session when data collection was being done in 2016. The target population was small and the study examined the entire target population of eighty two (82) students with disabilities comprising of seventy seven (77) regular students and fifteen (15) institutional based students. In order to address the research questions, quantitative data was collected using questionnaire and analyzed using descriptive statistics with the help of SPSS software. The findings revealed that there is a big discrepancy in enrolment per gender, programme of study, field of study and type of sponsorship. For instance, among SWDs who pursued the first degree, most of them at (68%) were self-sponsored while (32%) were direct entry students. In addition, majority of these learners at (50%) were registered in Education, while the remaining (17%) were registered in other courses. This findings point out the need to put in place explicit disability gender-based affirmative action which will encourage female SWDs to enroll in these institutions of higher learning.

Key words: Equity, Enrolment, Public Universities, Students with disabilities

Introduction

Access to higher education for the marginalized group is well established worldwide as a means to alleviating poverty towards an overall goal of achieving a sustainable society. Disability is recognized as one of the least visible yet most potent factors in educational marginalization (EFA Global Monitoring Report 2010). However, a dominant problem in the education of students with disabilities (SWDs) is that, despite the fact that most of them go through primary and secondary education, very limited number are included in higher institutions of learning (UNESCO, 2004).

As a result, disability having been identified as a disadvantaged equity group, there has been ongoing focus on increasing their access and retention to completion in post-secondary education both locally and internationally. Consequently most studies have attempted to identify the concerns of students with disabilities that challenge and jeopardize their retention in postsecondary education (The Youth Advisory committee of the National Council on Disability, 2003).

Most studies reveal that while the population of the general population of students in higher education has been on the rise, students with disability continue to be disadvantaged in terms of their access to and participation in these institutions of higher learning. A study by the National Center for Education Statistics, (2000) revealed that students with disability have a particularly low participation ratio of 0.48, with the participation ratio reflecting the share of places to estimate proportion of the population with students with disability represented 5.2 per cent of all domestic undergraduates, which is below the national reference target of their population share of 8 per cent. In terms of programmes of study, the study further established that only 15 per cent of people with disability have a bachelor degree or higher, compared to 26 per cent for individuals without disability. This exclusion per disability is also noted per gender. A study by OECD, (2003) indicates that disabled women and girls access to education is affected not only by their gender and disability, but also their type of disability among other factors.

The low enrolment rates of these learners may be attributed to several factors. This include curriculum barriers, which prevent them from attaining public university entry grade which forces them to enroll as parallel students, most of which they cannot afford as most of them come from poor economic background (Mugo et al., 2010). In addition, lack of adapted infrastructure in most public universities have prevented them from enrolling SWDs (Johnstone, 2004; Riddel et.al. (2005).

In Kenya, studies also reveal that participation of SWDs in higher education is very limited. A study by Wawire, (2008) established that inclusion of PWDs in six public universities in Kenya represented only 0.175% of the total university enrolments with the majority of this small population being included in only two public universities; Kenyatta University and Maseno University. In an attempt to curb these challenges, several affirmative action policies have been put in place. For instance, despite limited resources for public higher education, Governments and institutions developed a number of mechanisms to maintain access to higher education. Specific mechanisms include need-based scholarships and large-scale student loan programmes (Joshi, 2006). However, inadequate Government financial support to address the cost of higher education has exacerbated the exclusion of SWDs who lack finance to enroll to higher institutions of learning (Johnstone, 2004). As a result, there is need to lessen financial barriers to higher education participation for SWDs if sustainable society everywhere in the world is to be attained (Sawyer, 2002).

Statement of the Problem

Despite the fact that inclusion of SWDs spread over decades, their access, retention and completion in the mainstream higher institutions of learning is very limited. Out of about 115 million school-going population of SWDs world-wide, less than 40 million (35%) are included in higher institutions of learning. In Africa, out of the total 10% population of persons with disabilities, less than 1% is included in these institutions of higher learning, out of which the majority drop out during their first year (UNESCO, 2004). In Kenya, inclusion of SWDs in six public universities represents only 0.175% of the total university enrolments (Wawire, 2008).

While most of these studies focused on the general enrolment rates of students with disabilities, limited studies have examined the stratification in their enrolment per their demographic characteristics. In this paper, we examine equity in student's enrolment in Kenyatta University per demographic characteristics in Kenya. Using the variables of gender, mode of study, type of attendance, discipline of study, type of disability and field of study, we discuss how disability related limitations generate disadvantage and therefore a different experience in participation in higher education for students with disabilities.

Purpose of the Study

The purpose of this study was to establish equity in enrolment of students with visual, hearing and physical disabilities enrolled in Kenyatta University and Maseno University per demographic characteristics.

Objectives of the Study

- i. Establish equity in enrolment of undergraduate students with disabilities per gender
- ii. Establish equity in enrolment of undergraduate students with disabilities per field of study
- iii. Establish equity in enrolment of undergraduate students with disabilities at per program of study
- iv. Establish equity in enrolment of undergraduate students with disabilities at per type of sponsorship

Conceptual Framework

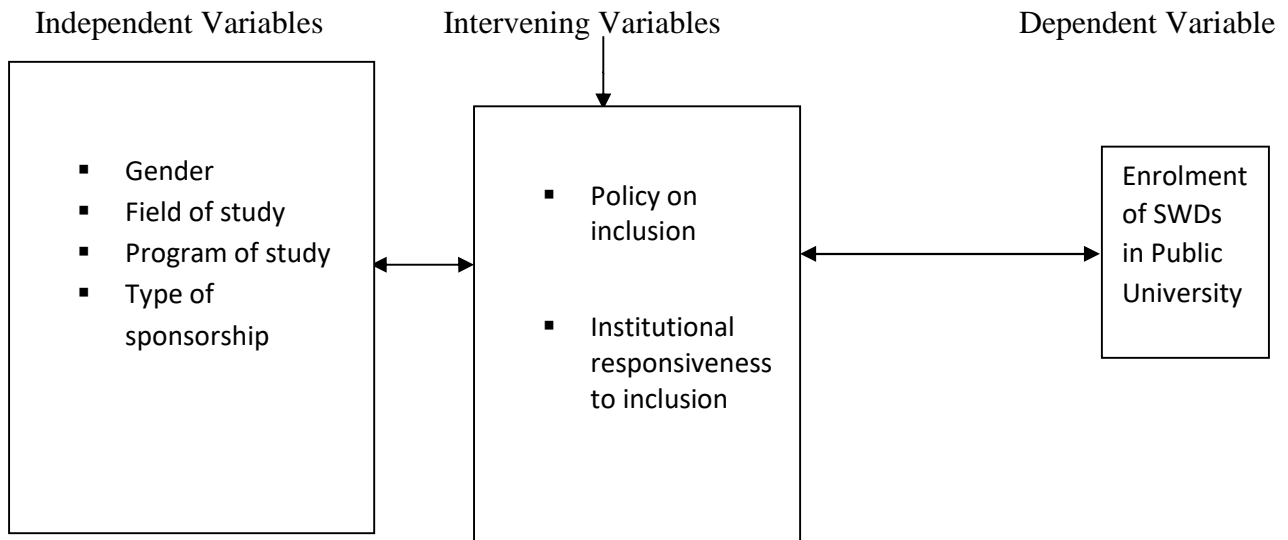


Figure 1. Equity in Enrolment of SWDs in Public universities in Kenya, 2016

Research Methodology

The study adopted a mixed method research design which employs both qualitative and quantitative methods. Qualitative method was used to collect data on regular and support services required for inclusion while quantitative method was used to collect data on cost of these requirements. This design was considered appropriate because it enabled the triangulation of results which ensured that the strengths of one method overcome the weaknesses of the other method thus strengthening quality and reliability of the findings.

Study Variables

The independent variables included the type of disability, regular and support provision, type of sponsorship and the amount of available financial support, the dependent variable was equity in enrolment of SWDs in public universities.

Location of the Study

The study was carried out at Kenyatta University main campus and Maseno University. Kenyatta University is located in Kahawa, about 23 Kilometers from Nairobi's City Centre, along the Nairobi-Thika road. This locale was selected purposively because it is the only public university

that integrates the highest number of SWDs into various degree programmes in Kenya. It is also the only university that has established a disability office known as KUDSO (Kenyatta University Disability Students Office) which is mainly concerned with the provision and other affairs of SWDs in the university. Maseno University is located in Kisumu County, approximately 5 km from Kisumu city centre.

Target Population

The study targeted all undergraduate (regular and institutional-based) SWDs who were on session when the data was being collected between August and December 2016. This comprised 85 students enrolled in regular education programme: 62, 21 and 2 students with visual, physical and hearing impairments respectively. It also comprised of 30 students enrolled in institutional-based programmes: 18 students with visual impairments, 7 students with physical disabilities and 5 students with hearing disabilities.

Sampling Techniques and Sample Size

Sampling Techniques

The study adopted a stratified random sampling technique. The total number of SWDs who were registered by the two universities at the time when the data was being collected was first classified per programme of study and was further classified according to the type of disability. The population sample of more than twenty students per disability category was sampled but populations of less than twenty students were all examined.

Sample Size

A total of 60 students with visual, hearing and physical disabilities were sampled as presented in Table 1.

Table 1

Sample Size of SWDs

Category of SWDs	VI	HI	PH	Total
SWDs enrolled in REG	21	2	7	30
SWDs enrolled in IBP	18	5	7	30
Total	39	7	14	60

Research Instruments

Questionnaire and interviews were used to collect data. Questionnaires were developed based on the research questions and they were used to gather information on the cost of support provisions and regular learning needs required for effective inclusion and the available level of funding for university education from the SWDs. Interview schedules were also used to collect data regarding regular and special learning needs required for inclusion of SWDs. This method calls for direct contact between the researcher and the respondent (Kothari, 2004). Interviews with students with hearing impairments were conducted with the help of sign language interpreter.

Pilot Study

Before the actual study, a pilot study was conducted in the University of Nairobi. The population sample comprised twenty (20) students with disabilities; ten (10) with visual impairments, seven (7) with physical disabilities and three (3) with hearing impairments. The same instrument was administered to the same group of respondents after one month. The findings were analyzed and compared to establish validity and reliability of the instruments.

Validity

The validity of the instrument was tested through content validity and criterion validity. The test items of the research instruments were examined carefully with the guidance of the experts to ensure that they exhaustively answered the research questions and met the expectations of the research while the criterion validity was determined by subjecting the instrument to a pilot study.

Reliability

Reliability of the instruments was determined through test-retest method. The instruments were administered to the respondents and analyzed. After one month, the same instruments were

administered to the same respondents and analyzed. The Spearman Rank Order was then used to compute the Correlation Co-efficient of the two answers. This helped in determining the extent to which the contents were consistent in producing similar results. Using the Pearson Product Moment Formula, a correlation of 0.05 confidence interval level was used to determine the reliability of the items in questionnaires. The internal consistency value of 0.98 was established and indicated the reliability of the instruments.

Data Collection Procedures

After the acquisition of a research permit from the Ministry of Education, Science and Technology, the data were collected by the researcher using questionnaires and interviews. First, the researcher made a courtesy call to sample population of SWDs two weeks before data collection using the list and contacts obtained from Kenyatta University Students with Disability Office (KUSDO) and Maseno University to seek their consent. All SWDs who expressed willingness to participate in the study were also contacted to arrange an appointment in a quiet place on campus or any other place according to their preference after two weeks of the first contact and one week before the data collection.

During data collection, the purpose and procedure of the study were explained to the students before they responded to the questionnaires. The print questionnaires were converted to Braille for students who were totally blind while the font size of the questionnaires was magnified for persons with low vision to enhance their eligibility by the resource room assistance. The students then answered the research questionnaires individually within approximately forty minutes. The researcher personally administered the questionnaires and assisted the students by clarifying the questions where need be. Researcher also conducted interviews with SWDs which assisted in triangulating the results.

Data Analysis

Quantitative data was computed with the help of Statistical Package for Social Sciences (SPSS) version 13.1 computer software. Interview data were converted into a write-up based on concepts embedded in each interview question and the data obtained were then summarized, coded and analyzed using ATLAS.ti software package.

Results and Discussions

Enrolment per Type of Disabling Condition

Students with disabilities were also asked to indicate the type of the disabling condition. Figure 2 represents the findings.

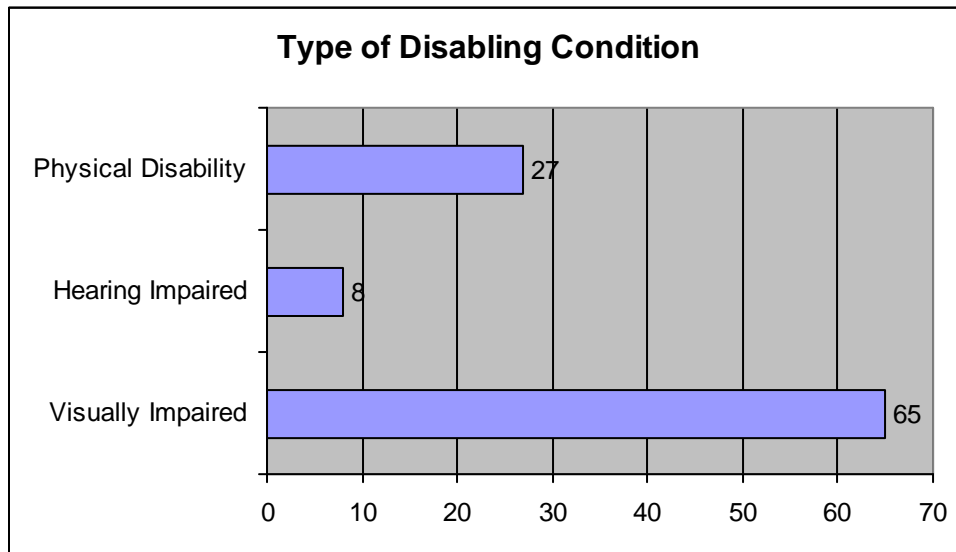


Figure 2. Enrolment per type of disabling condition

The result shows that the type of disability reported and registered in Kenyatta and Maseno Universities is visual, hearing and physical disabilities. The findings further revealed that the majority of this group of learners at 65% was visually impaired, as compared to students with physically disabilities representing 27% and students with hearing impairment representing only 8%. This findings revealed that students with hearing impairment are falling through the crack in university education system. This findings supports the findings by Jorgensen, Ferraro, Fichten, and Havel (2009) who established that factors such as demographic background among other factors affects access and retention of students enrolled in higher education and effects vary from one student sub-population including the type disabilities. This also supported the findings by Mugo, Oranga and Singal (2010) which established that SWDs are falling through the crack of higher education with the enrolment of students with hearing impairments being very limited. These findings suggest the need to put in place affirmative action to promote enrolment of students with hearing impairments in Kenyan public universities.

Enrolment per Gender

Fostered by a complex web of cultural, psychological, economic, historical, and political factors, gender imbalance in higher education is widespread across the developing world (Tefferra & Altbach, 2004). A study by Mama (2003) further established that this gender imbalance is magnified at higher quality and public institutions. Most studies reveal that this gender parity in these institutions of higher learning is mainly in favor of male students than female students with disabilities.

Data from Kenyatta University and Maseno University revealed that the composition of students with disabilities enrolled in both regular and institutional-based mode of study varied per gender. The findings revealed that the gender of the persons with visual, hearing and physical disabilities is in favor of male than female students as shown in the Figure below.

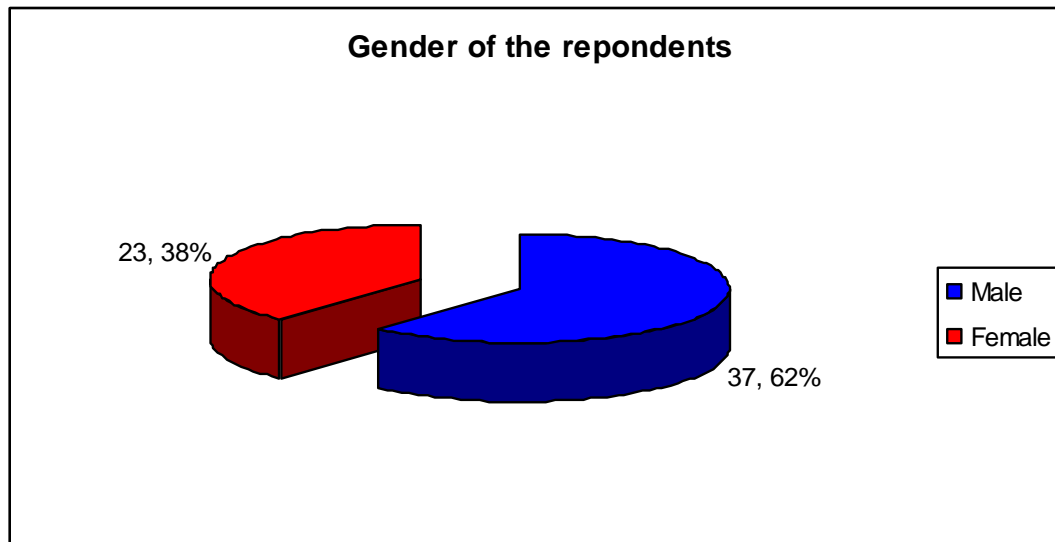


Figure 3. Enrolment per of SWDs per Gender

From Figure 3, it can be seen that 38% of the respondents were female while 62% were male. However, the finding contradict the findings by Jorgensen, Ferraro, Fichten, and Havel (2009) who established that when the age and entry grade of SWDs are controlled, male students dropped out at substantially higher rates than females.

This implies that very few female SWD enroll to public universities in Kenya. This may be attributed to the fact that female SWDs face double discrimination generates disadvantage, and

therefore a different experience in participation in higher education as compared to male students with disabilities. This finding points out the need instituted explicit disability gender based affirmative action policies which may include reduction of the cutoff score for admission to public universities and disability gender-based scholarships in order to encourage female SWDs to enroll in these institutions of higher learning.

Enrolment per Field of Study

The students were asked to indicate the course they are pursuing, the field and program of study and if self or Government sponsored. Table 2 presents the findings.

Table 2

Enrolment per Field of Study

Field of study	No. of students	%
Social Science	7	7
Science	2	3
Business/Commerce	1	3
Education	50	83
Social Science	7	5

Study findings revealed that while students with visual, hearing and physical disabilities not restricted in their choice of field of study, majority of the respondents (83%), were registered in education while the remaining (17%) were registered in social science representing (7%), Science representing (3%), Business/Commerce representing (3%) and social sciences representing (5%). This may imply that majority of SWDs tend to major in humanities courses that are well adapted to meet their learning needs as compared to science subjects. This finding support the finding by Mama (2003), who established that females which includes female SWDs are much less likely to enroll in math, science and business, and more likely to enroll in teaching and nursing.

The findings revealed that the significant discrepancy in enrolment per field of study experienced by the non-disabled students in public universities is more pronounced among female SWDs and therefore enrolment of SWDs in science and business courses is wanting. This findings point out the need to put in place explicit disability gender based affirmative action which will encourage female SWDs to enroll in science and business courses.

Enrolment per Program of Study

The students were asked to indicate the program of study and if self or Government sponsored. The following table presents the findings. Table 4 presents the findings.

Table 3

Enrolment per Program of Study

Program of study	No. of Students	%
Regular	77	84
Institutional based programme	15	16
Total	92	100

Study findings revealed that out of a total of ninety two (92) students with disabilities comprising, seventy seven (77) students representing 84% were enrolled in regular education programme while fifteen (15) students representing 16% were enrolled in institutional based programme.

Enrolment per Type of Sponsorship

The students were asked to indicate if they were either self or Government sponsored. Figure 4 presents the findings.

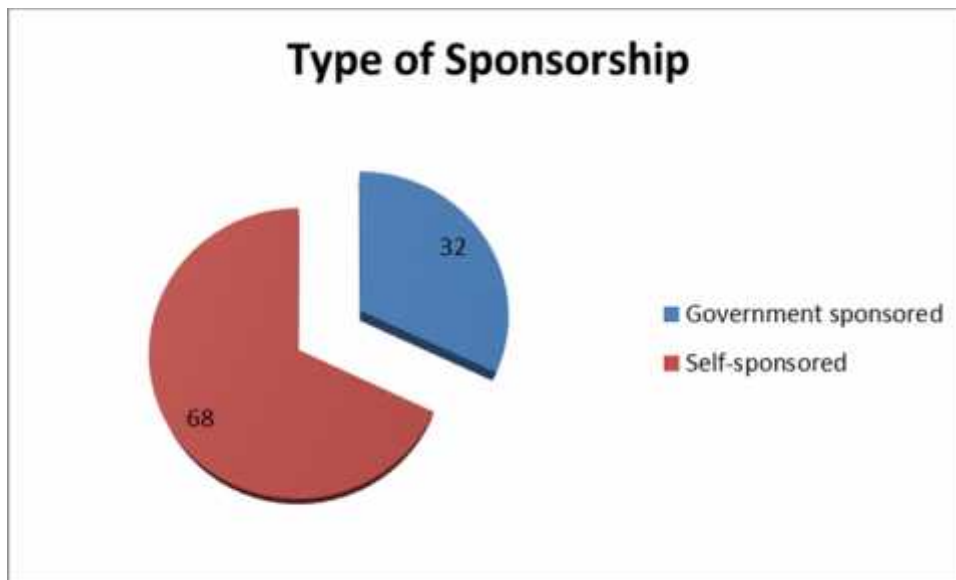


Figure 4. Enrolment per Type of Sponsorship

According to Figure 4, majority of students with visual, hearing and physical disabilities at 68% were self-sponsored while only 32% were enrolled as Government sponsored. This finding implies that majority of SWDs relies on Government financial support for their university education.

Summary

The findings reveal that there is disparity in enrolment of SWDs enrolled in public university and that it varies across gender, mode of study, type of attendance, discipline of study and field of study. The findings revealed that among the learners who pursued the first degree, most of them at (68%) were self-sponsored while (32%) were direct entry students. In terms of field of study, majority of these learners at (50%) were registered in education while the remaining (17%) were registered in other courses. In terms of programme of study, majority at eighty two (82%) were enrolled in regular education programme as compared to those enrolled in institutional based programme while majority at 68% were enrolled in self-sponsored programmes as compared to those enrolled through Government sponsored programmes.

Conclusion

The findings revealed that there was a big discrepancy in enrolment per gender, programme of study, field of study and type of sponsorship. For instance, among SWDs who pursued the first degree, most of them at (68%) were self-sponsored while (32%) were direct entry students. In addition, majority of these learners at (50%) were registered in education while the remaining (17%) were registered in other courses. This findings point out the need to put in place explicit disability gender based affirmative action which will encourage female SWDs to enroll in these institutions of higher learning.

References

- Gichura, S. (1999). *Education for all (EFA 2000): Assessment of progress*. Kenya country Report: Draft report. UNESCO. Retrieved July 18, 2010, from <http://www2.unesco.org/wef.countryreports/kenya/contents.html>
- Holloway, S. (2008). Experience of higher education from the perspective of disabled students. *Disability and society*, 18(4), 597-615
- Johnstone, D.B. (2004). Higher education finance and accessibility: Tuition fees and students loans in sub-Saharan Africa, *Journal of Higher education in Africa*, 2(2), 11-36.
- Mama, A. (2003). "Restore, Reform, but do not transform: The Gender Politics of Higher Education in Africa." *Journal of Higher Education in Africa*, 1(1):101-125
- Mugo, K.J., Oranga, and J & Singal, N. (2010) .Testing youth transition in Kenya: Are young people with disabilities falling through the cracks? RECOUP working paper No. 34.
- Teferra, D., and Altbach, P. (2004). "*African Higher Education: Challenges for the 21st Century*." *Higher Education*, 47(1): 21-50.
- Joshi, K. (2006). Human capital and economic benefits of education: Understanding investment arguments. Working paper
- National Center for Education Statistics, (2000). *An Institutional Perspective on Students with Disabilities in Post-Secondary Education*. Washington, D.C.: U.S. Department of Education.
- OECD, (2003). *Education Policy Analysis, Diversity, Inclusion and Equity: Insights from Special Needs Provision*. Chapter 1, p.9-37,
- Riddell, S., Tinklin, T., Wilson A., (2005). *Disabled students in higher education; Perspectives on widening access and changing policy*. Routledge: London
- Sawyer, A. (2004). *Challenges facing African universities: Selected issues*. Accra, Ghana: Association of African Universities
- UNESCO (2004). *World conference on special needs education: Access and quality* .Salamanca, Spain, Paris.
- Wawire, V. (2009). *Access and retention opportunities for students with disabilities in Kenya's higher education: Access and quality*. Salamanca, Spain, Paris

Authors' Profile

Beatrice Bunyasi Awori is a Senior Lecturer in the Department of Special Needs Education at Kenyatta University. She is a Ph.D holder from Kenyatta University and MPhil from University of Oslo. She has a vast wealth of knowledge in the area special needs with more emphasis in the area of Hearing Impairment, research and Inclusive Education. She has published her works in a number of journals and currently she teaches graduate and post graduate students at the university. She has actively participated in curriculum reviews for Special Needs curriculum at both national and at university level. She is a board member of Directorate of Disability at Kenyatta University as well as Kenya Society of Deaf Children and quite passionate about disability issues. Her email contact is bawori@yahoo.com

Judith Chepkorir is an Accounts Relations Officer working with Higher Education Loans Board. She holds a Master's degree in Special Needs from Kenyatta University. She has researched in the area of financing students with special needs and has a lot of interest in education for the students with disabilities. Currently she is pursuing her Ph.D studies at Kenyatta University. Her email contact is judychep529@gmail.com

An Analysis of Gender Dynamics and Staffing in the University Sector in Kenya

Prof. Jackson Too, Alice Kande and Silas Oure

Abstract

Over the years the clarion call to increase enrolments of girls at all school levels has been significant. Indeed, the just concluded Millennium Development Goals (MDGs) number three advocated for gender parity in school enrolment by 2015. Although good progress has been made in improving female representation in the different sectors in the country; data from universities has revealed that there are glaring disparities in qualification, rank and academic progression (CUE, 2016). Current data indicates that, of the total teaching staff of 16,301; 68% are male while 32% are female. That is, there are twice as many male teaching staff in the university as there are female. Of the academic staff with PhD qualification, 3,287 (27%) are male while 1,061 (9%) were female; those with masters are 3,885 (32%) male, while 2,068 (17%) are female (CUE, 2016). It is quite apparent from these statistics that female staff are not adequately represented in the university sector. More worrying is the distribution in ranks in the university: while there are 1,403 (9%) male Professors in the University, there are only 265 (2%) female Professors. The male Professors are more than four times the number of female Professors. The same pattern applies to the distribution of Senior Lecturer position. Most of the female staff in the university are concentrated in the lower ranks (Assistant Lecturer and Graduate Assistant). This scenario presents a challenge to any effort of trying to correct these imbalances. For female staff to make progress up the academic ladder, they must be in possession of a doctoral degree and it is in that level where they are least represented.

Key words: Academics, Staff Ratio, Gender, Career, Cluster, Disparity,

Introduction

University education is a critical component of human resource development. With the convergent impacts of globalization, the increasing importance of knowledge as a main driver of growth, and the information and communication revolution, an educated populace is vital in today's world. There is growing evidence that university education is critical to a country's efforts to increase social capital and promote social cohesion which is an important determinant of economic growth and development. It is pertinent to note that for a university to be globally

competitive and address the challenges of the 21st century, the programmes offered should be aligned to the dictates of the market to ensure quality and relevance. According to the Education For All National Review Report of 2015, enrolment in African countries has climbed sharply over the last 15 years, growing approximately 170% from 3.53 million students in 1999 (2.25 million in sub-Saharan Africa and 1.28 million in North Africa) to 9.54 million in 2012 (6.34 million in sub-Saharan and 3.2 million in North Africa).

Despite the overall increase of enrolment, female students enrolment continues to be threatened by cultural, social and economic factors (Beutel & Nelson, 2006). The spillover effect is the low levels of transition in tertiary institutions. According to Bunyi (2003) these can be attributed to a number of factors including; higher dropout rates, and poor performance of girls at the primary and secondary levels. In turn fewer females are accepted in institutions of higher learning. Other factors that exacerbate the gender gap in education include, insecurity, religion, child headed households, high levels of poverty, sexual abuse and long distances to schools. According to a study conducted by the African Population and Health Research Centre, girls are more affected by poverty, a factor that encourages early marriage (Mumah, Kabiru, Izugbara, & Mukiira, 2014).

In institutions of higher learning, women form a smaller percentage of students enrolled in public universities. More worrying is their representation in science and technically oriented disciplines such as engineering and architecture where male students continue to dominate over their female counterparts. This spills over to teaching in the university. Technical and science-based institutions also record a lower female enrolment as opposed to males. For instance female enrolment constitutes 44 percent of the total enrolment in Technical and Vocational Education Training (TVET) institutes. Enrolment and registration in science and technical areas is also low; for females in the Kenya Polytechnic, for example 52.4 percent have enrolled in business studies compared to 5 percent enrolled in engineering courses (Republic of Kenya, 2012). All these disparities in enrolments have implications to staffing at the university.

According to a study, *Gender Equity in Commonwealth Higher Education* (UNESCO, 2008), it was noted that a bias towards arts based disciplines in most East African institutions of higher learning can be attributed to lack of role models, fear of mathematics-related courses and “unapproving” attitudes towards females who showed an interest in non-traditional subjects such as agriculture, engineering and computing.

Although Kenya Vision 2030, places great emphasis on the link between Education, Training and the labour market as well as the need to create entrepreneurial skills and competencies among all irrespective of gender, ethnic background or religious affiliation; mid-term reviews of the Vision 2030 have shown that little progress has been made towards fulfilling that promise (Republic of Kenya, 2013).

Objectives

Based on data from universities, the following objectives guided this paper:

- i. Establish the gender representation of academic staff in the universities;
- ii. Determine the qualification of academic staff and its implications on faculty growth;
- iii. Interrogate mechanisms of bridging gender disparities among staff in the universities.

Methodology

The method used to generate this paper was mainly desktop analysis of data already collected by the Commission for University Education (CUE) from all universities licensed to operate in Kenya. Extensive references were made to data contained in the book: *The State of University Education in Kenya* (CUE, 2016) as well as *Gender and Diversity Report* (CUE, 2016) all published by the Commission. Data pertaining to the gender variable on staffing and enrolment at the doctoral level were interrogated incisively. Library and Internet search was undertaken to get current related literature.

Data presentation

Academic Staff by Gender in Universities

Table 1 provides a summary of staff distribution by gender within and between Private and Public universities. The total academic staff in the universities was established to be 16,318 - of which 11,154 or 68% were male and 5,164 or 32% were female. Notable in Table 1 is that there are more female staff (35%) representation in Private Universities than Public (30%) Universities.

Table 1

Academic Staff by Gender in Public and Private Universities

Category	Female		Male		Total
	Count	%	Count	%	
Public Universities	3,650	30	8,363	70	12,013
Private Universities	1,514	35	2,791	65	4,305
Total	5,164	32	11,154	68	16,318

Source: CUE, Data (2016)

Although these statistics resonate well with the policy of one-third gender rule enshrined in the Kenya Constitution, it does not translate in the female staff enjoying all the privileges in the university sector. For instance, the representation of female staff in high academic ranks and administrative positions is quite low. Similarly few female staff are engaged in research activities. There are also more male staff who participate in international conferences than female staff. As female academics are few in the senior ranks, the pool of female mentors is relatively small. Thus cultivating senior female academics that can advance gender-sensitive institutional policies and provide mentorship to their junior colleagues is severely constrained. So while it is commendable to celebrate the increase in the number of female academics generally, there is need to create policies and affirmative pathways, which will not only sustain the gains made so far but also, accelerate their movement in the academic ladder. Figure 1 is a graphic illustration of the distribution of the female and male staff in the University.

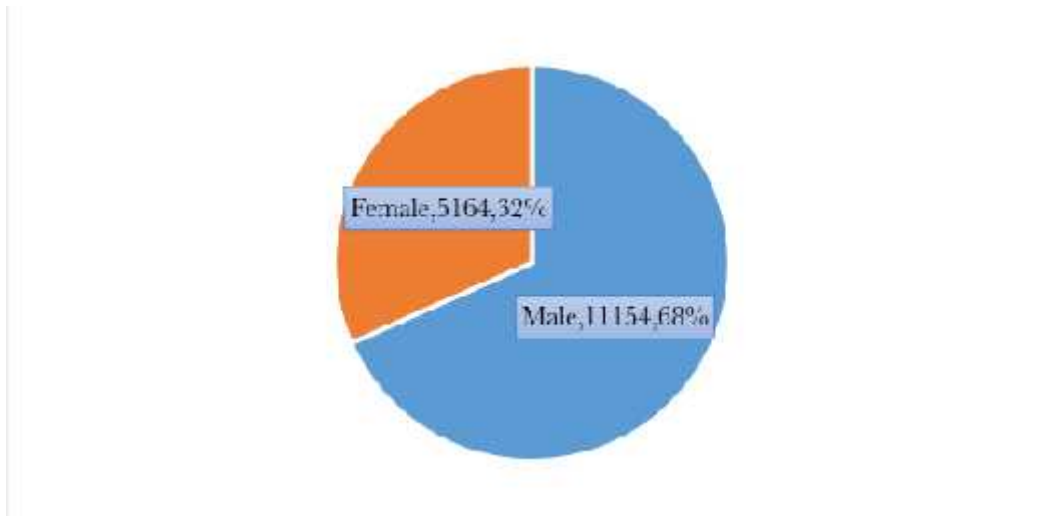


Figure 1. Academic Staff by Gender in Public and Private Universities (Source, CUE, 2016)

Ratio of Male to Female Enrolment per Academic Programme Level

In discussing gender dynamics in the university, it is important to look at some of the root causes of the imbalances currently obtained in the sector, which may explain these disparities. The overall ratio of male to female enrolment in all the universities is 3:2. However, there are more male enrolled students than females at PhD level, with a ratio of 2:1. At Bachelors level the ratio of male to female enrolment is 3:2. As more female students enrol at the Bachelors level the big gap at the graduate level reduces drastically.

The relatively rising numbers in female enrolments at Bachelors level may be attributed to the affirmative action policy which lowered the entry mark of female students by two scores. It is important that the numbers of female students enrolled at graduate level is boosted as this is the “breeding” ground for the university academics. There is therefore need to find an acceptable affirmative strategy to enhance female representation at that level. Table 2 shows the ratio of enrolment at each academic level.

Table 2***Ratio of Male to Female Enrolment per Academic Programme Level***

Level	Male	Female	Male to Female Ratio
Bachelors	278,511	197,238	3:2
PG Diploma	940	452	2:1
Masters	32,912	22,549	3:2
PhD	4,915	2,232	2:1
Total	317,278	222,471	3:2

Source: CUE, Data (2016)**Academic staff by Gender, Qualification and University Categories**

The total number of staff (PhDs, Masters, Bachelor and diplomas) in the universities was in the year 2015 was 16,318. Table 3 shows the number of academic staff by gender, qualifications and university category. Of the academic staff with PhD qualification, 4,215 were male while 1,389 were female; those with masters were 5,555 male while 3,138 were female. Of the academic staff with Bachelor's degree qualification; 913 were female while 452 were male.

Table 3***Academic staff by Gender, Qualification and University Categories***

Qualification	Gender	University Category			Total
		Public Chartered Universities	Private Chartered Universities	Universities with LIA*	
PhD	Male	3,287	756	172	4,215
	% of total	20	5	1	26
	Female	1,061	280	48	1,389
	% of total	7	2	0.3	9
Masters	Male	3,885	1,226	444	5,555
	% of total	24	8	3	35
	Female	2,068	801	269	3,138
	% of total	13	5	2	20
Bachelors	Male	759	102	52	913
	% of total	5	0.6	0.3	5
	Female	345	72	35	452
	% of total	2	0.4	0.2	2

Source: CUE, Data (2016)***Letters of Interim Authority**

A closer look at these statistics reveals some interesting dynamics. The proportion of female academics is less than those of males in the three categories of universities and along the three academic levels. However, female academic staff are more represented within private universities, than in public universities. For instance, in Public Universities 20% of the staff with PhD are male, while only 7% are female i.e. there is a gap of 13%. In Private Universities, 5% of the staff with PhD are male, while only 2% are female (i.e. difference of 3%). The same trend is obtained with those who hold master's degree. The gap between the male and female staff is greater (11%) in Public Universities than in Private Universities (3%). Although at this level, the male academic staff are dominant over the female academic staff, the gap is much narrower compared with the doctoral level.

When the female academics are few at the PhD level, it has far reaching implications to their career development in the university sector. Without a PhD, female academic staff do not stand a chance of being promoted to the level of Senior Lecturer and above. Similarly, female academic staff may not be appointed to any senior administrative position in the university. This is a major setback for the female academics' advancement in the university sector.

University regulations do not allow academic staff without PhD to supervise post graduate students. This means that there will be fewer female academic staff available to supervise or to mentor post graduate students. This situation may have two negative effects. One is that, young potential female academics will lack role models whom they would look upon for guidance and inspiration. Secondly, the male academics being more than the female will be supervising female PhD students. In such situations, the challenges of power relations and cultural dictates might hamper serious academic engagements. Young female academics may not be free to ask incisive questions or seek clarifications on pertinent issues they wish to undertake research in when dealing with the male academics.

Cultural or religious inhibitions sometimes hinder in depth academic engagement and scrutiny when the male academics are supervising female candidates. Working closely and frequent encounters occasionally make women uncomfortable with the male supervisors – especially

when their meetings stretch into late hours or when they arrange to meet in none official days or even in un-official designations. All these are possibilities that affect the progression of learning and completion of graduate work.

Where the female academics are married, matters become even more complicated. Finding time to attend to numerous family obligations and keeping pace with the demands of graduate work is quite daunting. One would then appreciate the challenges that female academics go through in their quest to attain and match their male counterparts.

Distribution of Academic Staff by Gender and Rank

In terms of gender, the academic staff composition stood at 68% male and 32% female. The male staff dominates all ranks, except in the rank of graduate assistant where the difference is only 1%. The gender gap widens as the ranks progress to the level of Senior Lecturer and Professor. An in depth analysis of gender disparities in public and private universities reveals that the gap is much wider in public than in private universities. However, female staff are generally under-represented in all academic ranks. Table 4 provides this information.

Table 4

Distribution of Academic Staff by Gender and Rank

Gender		Rank					Total
		Professors	Senior Lecturers	Lecturers	Assistant Lecturers	Graduate Assistants	
Male	Count	1,403	1,511	4,153	3,248	595	10,910
	% of Total	9%	9%	26%	20%	4%	68%
Female	Count	265	499	2,057	1,832	438	5,091
	% of Total	2%	3%	13%	11%	3%	32%
	Total Count	1,668	2,010	6,210	5,080	1,033	16,001
	% of Total Count	10%	13%	39%	32%	6%	100%

Source: CUE, Data (2016)

The rank of an academic staff in the university is of paramount importance as it determines the academic as well as administrative position one can hold. For instance the position of Dean, Director, Registrar, Principal, Deputy Vice Chancellor and Vice Chancellor are all dependent on

the rank of an academic staff. The low representation of female academics at higher ranks in the university means that few of them will hold key administrative academic or administrative positions. By extension, it also means that women generally will be excluded when key policy decisions are made. In the same breath, recruitment committees in the universities are often dominated by men who would most likely hire male staff once the bare minimum of one third rule has been taken care off. This perpetuates the marginalization or exclusion of female in the university sector.

To vindicate this argument, consider the present scenario where only 5 or 7% of the seventy (70) Vice Chancellors are women! Going by the Law or policy, the number of women Vice Chancellors ought to be at least 21 (30%). This is a blatant violation of the Law. In the political arena, the Kenya National Assembly, which enacted the Law has not complied with the Law as stipulated. The number of women representatives in August House is less than one third; which is a contradiction of the laws they have made and have sworn to protect.

Legal Provisions

The Constitution of Kenya makes provisions that outlaw discrimination against any person on grounds of gender, ethnicity, religion or disability. At the level of management, public chartered universities have not adhered to the two-thirds gender rule with the exception of three. It was noted in one of the Universities that all of the management staff are male. Like the Management, academic staff in most public chartered universities have not adhered to the two-thirds gender rule. Only five (5) out of the thirty-three (33) public universities have adhered to the rule.

Conclusion and Recommendations

Data has revealed that there are glaring disparities with gender in terms of university type (public or private); qualification and rank in the university sector. Although private universities have fewer staff compared to the public universities, the number of female staff compares favourably with the male staff. In public universities, the male staff far outnumber the female staff.

The high student-staff ratios currently experienced in universities present a daunting challenge to the teaching faculty as a whole, but particularly so for those in the early stages of their career.

The cluster, which had the highest staff to student ratios have been found to be in Education (Arts) and Social Sciences where most of the female staff are concentrated in. This is also where most students are enrolled. The workload that accompanies responsibility for large student numbers imposes significant career-stalling burdens on young female scholars. The anxiety that comes with such a burden, in a context that demands high standards of research productivity, can weigh down potential female academics.

In order to address this concern, institutions need to provide relief to those in the early stages of their careers while helping them to gain skills needed to meet career expectations. This can be done by giving them course releases; not assigning them the most highly-subscribed courses; providing them access to professional development opportunities that enable them to acquire pedagogical skills and to obtain an aptitude for balancing the multiple demands of academia and personal life (Tettey, 2010). Institutions' sensitivity and responsiveness to young employees' work-life circumstances is particularly helpful in attracting and retaining female academics whose careers tend to be significantly compromised by the contending demands of home and work.

The gender dimension of postgraduate enrolments and its implications, not only for the composition of the future faculty staff, but also in absolute numbers, cannot be ignored. Data cited in this paper shows significant gaps in the proportion of male and female enrolments at the postgraduate level. There is need to find an affirmative mechanism for supporting the female staff to earn PhD qualification.

Concerted efforts have to be put in place to encourage female enrolment in postgraduate programmes, support them to stay in those programmes, ensure that they are able to complete their programmes successfully, and to mentor them to pursue academic careers. These efforts will lead to growth in the numbers of female staff who can then serve as role models and mentors for subsequent generations of female students and help them sustain their careers when they become academics. Statistics have shown that programmes offered in Universities are heavily skewed towards Humanities and Arts; Social Science, Business and Administration.

In the same vein, female academic staff tends to be over-represented in Arts and Humanities domain while the male staff are found mainly in the Science, Technology and Mathematics disciplines. This situation presents a misleading picture on specialization in which Arts is seen as female-belonging terrain, while Science and Technology are the preserve of male academics. This requires a shift from that myopic lens to a more strategic programme development that ensures a healthy balance between Humanities/Arts and the urgency of building excellent capacity in areas of Health and Welfare, Science, Technology, Agriculture, Engineering, Manufacturing and Construction; and aligning research agendas closer to national development priority areas and sustainable development goals.

The need to increase enrolment in medicine, pharmacy, engineering and technical-based programmes of men and women alike cannot be over-emphasized, since there remains a shortage of these professionals in the country. Despite both male and female under- enrolment in these programmes, the case for enhancing the enrolment of female students is more compelling. Persistent gender imbalances at the tertiary level of education are a reflection of gender bias and structural differences in access to education (Kilemi, 2007). The under-representation of female students cuts across all the public universities, despite the application of affirmative action by the Kenya Universities and Colleges Placement Service (KUCCPS). This problem has roots in the country's education system as a whole.

Although educational programmes in primary and secondary education are outside the realm of university education, universities can make a substantive contribution in alleviating gender imbalance by encouraging women and girls to venture into the traditionally male-dominated fields of science and technology (ibid). More funding should be allocated to support Science, Technology, Engineering and Mathematics (STEM) subjects and sustained effort should be put to encourage students of both gender to enroll in STEM areas. The capacities of the universities to deliver quality training, research and innovation should be strengthened. Public – Private Partnerships and involvement of stakeholders should be enhanced to contribute to development of the university sector.

References

- Beutel, M., & Nelson, J. (2006). The Gender and Race Ethnicity of Faculty in Top Science Research Departments. *The Social Science Journal*, 43(1) 111 - 125.
- Bunyi, G. W. (2003). Interventions that increase enrolment of women in African tertiary institutions. *Improving Tertiary Education in Sub-Saharan Africa: Things That Work*, (pp. 23 - 25). Accra.
- CUE. (2016). *Gender and Diversity Report*. Nairobi: Commission for University Education.
- CUE. (2016). *University Statistics in Kenya*. Nairobi: Commission for University Education.
- Education for All National Review Report (2015)*. Washington D.C: World Education Forum. ibid. (n.d.).
- Republic of Kenya. (2013). *2nd Medium Term Plan 2013 - 2018: Education and Training*. Nairobi: Government Printer.
- Kilemi, M. (2007). *Higher Education in Kenya*. Nairobi: East African Education Publishers.
- Mumah, J., Kabiru, C., Izugbara, C., & Mukiira, C. (2014). Coping with unintended pregnancies: Narratives from adolescents in Nairobi's slum. *Journal of African population and health research centers*.
- Tettey, J. (2010). *Partnership for Higher Education in South Africa*. Alberta, Canada.
- UNESCO. (2008). *EFA Global Monitoring Report: Education for All - Will we make it?* London: Oxford University Press.

Authors Profile

Too, Jackson, PhD, is an Associate Professor of Pedagogy and Mediated Instruction. He has an impeccable track record of teaching, research and community engagement. He has served in various leadership positions in the university and participated in numerous seminal presentations, as well as involvement in humanitarian initiatives. Currently, he is working for Commission for University Education as Senior Assistant Commission Secretary - Research and Development. His email is jtoo@cue.or.ke

Alice Kande, Ph.D, has been a Lecturer, Head of Department and Research Co-coordinator in charge of both Research Training and Supervision. Currently, she is a Senior Research Officer at the Commission for University Education. Alice has keen research interest in Organizational resilience and competitiveness as well as Issues in University Leadership and Management. Her email is akande@cue.or.ke

Silas Oure holds a Master of Arts in Project Planning and Management and a Bachelor of Arts in Economics from the University of Nairobi. He is also a Certified Public Accountant of Kenya and a member of the Institute of Certified Public Accountants of Kenya. He has extensive experience and knowledge in formulation of development strategies, Planning and Policy formulation and Analysis spanning a period of 9 years in the civil service of Kenya. Currently he is a Supervisor, Corporate Policy Unit at the Kenya Revenue Authority. His email is oureci@yahoo.com

An Audit of ICT Funding Towards Effective Integration of ICT in Selected TVET Institutions in Kenya

Mr. Tirus Muya Maina

Abstract

Developing countries like Kenya have begun to realize the significant role TVET has to play in the development of a competitive workforce and an equally discouraging realization has arose that Governments can no longer be expected to fund TVET to the heights required to meet the needs of the modern world thus Underfunding is an operational problem in the TVET sector. The study was an audit of ICT Funding on Effective Integration of ICTs in TVET institutions in Kenya with specific reference to Michuki and Thika Technical Training Institutes in Murang'a and Kiambu Counties respectively. The research adopted quantitative research approach and used probability sampling which is commonly associated with Survey-based research. The study's main data collection tool was a structured questionnaire. Descriptive statistics was used and simple regression equations were developed to test the strength of association between ICT Funding and integration of ICTs in Kenya TVET sector. The study revealed that Effective Integration is positively correlated with ICT Funding but their relationship is relatively low. The Government is the main source of funding for ICT projects and is not adequate to finance the ICT projects in the institution since the budget allocated is still relatively low compared to needs and priorities required to effectively implement the ICT integration. The Government should and has the primary obligation for TVET institution and should be committed to apportion substantial financial resources to the TVET sector as well as marshalling resources from its partners. The TVET institutions should address the funding challenges they face through generation of other financial resources.

Keywords: ICT Funding, TVET, Budget, Integration, Kenya

Introduction

According to CANTA (2012) the world has begun to realize the significant role TVET has to play in the development of a competitive workforce, an equally daunting realization has emerged that Governments can no longer be expected to fund TVET to the levels required to meet the needs of the modern world of work. Under-funding is a structural problem in the TVET sector in developing countries. The budget allocated is still relatively low compared to needs and priorities required to effectively implement the TVET policy especially on ICT Integration as noted by Musobo and Gaga (2012). TVET budgets are most often not prioritized within overall education budgets, with TVET often suffering from relative underfunding. Even though Governments may declare the importance of TVET, the budgets often do not reflect this priority. In many instances, TVET is spread among several Ministries, with no single point of oversight and no rationalization of resources (CANTA, 2012).

Studies by MacDonald, Nink, and Dugga (2010), suggest that for TVET institutions in Kenya to become a success, they need to have Government sustenance in the way of a continual funding stream. Studies by Wahba (2010) show that in Kenya and developing countries, ICT funding towards TVET is ad hoc and arbitral hence TVET Institutions have been neglected or overtaken by institutions engaged on purely academic education without any practical training. Dramatic budget cuts followed by structural adjustment programmes adversely affected public TVET systems in Kenya to a large extent as noted by Nyerere (2009). He also further noted that in Sub-Saharan Africa, as a result of budget slashes, there is reduced investments in TVET systems making facilities and equipment to decay. Most of the TVET institutions are grossly underfunded resulting to poor service delivery, the appalling state of equipment and instructional materials poor image as observed by Wahba (2010) and Mupinga, Busby, and Ngatiah (2006).

Hooker, et al.(2011) in their research found out that almost one third of the TVET institutions in Kenya don't have an ICT specific budget, signaling that ICT is not a priority issue for a significant number of institutions. The institutions that have an ICT specific budget specify mainly ICT infrastructure such as hardware, software and maintenance of equipment. Professional development in use of ICTs is only present in 33 percent of the budgets and hence not as prioritized.

Although expenditure on education in Kenya has been on the increase to an average of about 35 percent of the national budget, the allocation to the TVET sector has consistently been low thus contradicts the prioritization of TVET in Vision 2030 as highlighted by MoHEST (2008), in their strategic plan 2008-20012. The Government doesn't seem to tie its provided funds to the acquisition of computer equipment; rather it gives development funding that the institution can use for development related activities under which ICT procurement falls.

Like other African countries, TVET institutions in Kenya were funded by outside entities and used to receive a large portion of funding from external sources, however this is no longer the case, studies from Mupinga, Busby, & Ngatiah (2006) and MacDonald, Nink, & Dugga (2010) confirm. They also noted that, though these organizations provide needed funding for TVET, the funds are typically not available over a long span of time thus affects the provision and quality of TVET programs. There has been very little technical assistance or donor support from development partners towards technical education at all levels in recent years. Although the Government has the responsibility to fund TVET, this is proving difficult under present economic conditions therefore The TVET institutions in Kenya also have a role to play in addressing the funding challenges they face.

Tuition has traditionally been the source of revenue used to sustain technical education, but this has proved to be inadequate. Whereas national and county Governments assume the main financial responsibility for TVET, international partners are necessary for standard-setting, such as achieving internationally recognized practices in the field of TVET, among other responsibilities. UNESCO-UNEVOC (1996) classifies some of the better known financing mechanisms as follows: Public financing through revenue; Enterprise financing for training its own labour force; Private and public sponsored financing; International donor assistance.

The TVET institutions in Kenya need to secure other sources of funding for equipment and other instructional materials. MacDonald et al(2010) and Bates (2000) identifies several funding strategies that can be considered: Using external grants; Charging student technology fees; levying taxes; Increasing general operating grants from Government to support the use of

technology for teaching; Reallocating internal funds; employer financing; Centralizing or decentralizing funding; Balancing funding between infrastructure, administrative applications, and educational applications; Developing partnership or consortia.

Some TVET institutions also include entrepreneurial programs where students produce a product and learn how to market and sell the product, thus providing another funding source for the schools. While some institutions have put in place income generating activities, these are still weak and require to be strengthened. It is also not entirely clear the effect that these activities have had on the core mandates of these institutions. Community participation in financing TVET is low due to poverty and poor perception of TVET. Development financing which is crucial for capacity development and expansion has been minimal (Mupinga, Busby, & Ngatia, 2006).

Aim of the Study

The aim of the study was an Audit of ICT Funding on Effective Integration of ICTs in TVET Institutions in Murang'a and Kiambu Counties, Kenya.

Research Questions

The study was guided by the following specific objectives:

1. Find out the adequacy of the Government as the main sources of funding for ICT projects in the TVET institutions
2. Find out the existence of the budget allocation for the ICT department in TVET Institutions
3. Determine the alternative sources of ICT funding for the TVET Institutions
4. The relationship between ICT Funding and Effective Integration of ICTs in TVET in Kenya

Research Methodology

Research Approaches

Creswell (2003) noted that if the problem is identifying factors that influence an outcome, the utility of an intervention, or understanding the best predictors of outcomes, then a quantitative approach is best. Quantitative research method is essentially about collecting numerical data to explain a particular phenomenon, particular questions seem immediately suited to being answered using quantitative approach.

Survey Research Design

The Survey used a cross-sectional research design that was carried out at just one point in time and popularly used in education (Creswell, 2012). According to Creswell (2008) this provides with a snapshot of what is happening in that group at that particular time. The researcher opted to use this kind of research in this study considering the desire to acquire vital data from the respondents so as to formulate rational and sound conclusions and recommendations.

Study Area

The study was confined to Michuki Technical Training Institute (MTTI) in Murang'a County and Thika Technical Training Institute (TTTI) in Kiambu County. Both Technical Training Institutes operate under the Education Act as stipulated in the Laws of Kenya. The Institutes operations are also carried out in accordance with the Government policies and procedures as spelt out in official documents and circulars. The Institutes are conscious of the Government's policy of industrialization by the year 2020, and the Vision 2030. They are gearing towards playing a significant and leading role in the fulfillment of this policies.

Target Population

The study sample was drawn from a population of 195 consisting of Management staff, which included Board of Management and the Principal. Administrative staff included Deputy Principal, Heads of Departments, Heads of Sections and Administration Assistant, teaching staff and technical staff as shown in Table 1.

Table 1

Target Population Table

Category	Size of stratum(N)		Total
	Michuki TTI	Thika TTI	
Management staff	7	9	16
Administrative staff	9	16	25
Teaching Staff	41	93	134
Technical staff	6	8	14
Total	63	126	195

Source: Registrar office MTTI and TTTI, 2015

Sample Size and Sampling Techniques

The study adopted the probability sampling which is commonly associated with survey in which every individual in the population has an equal probability of being selected with randomization. A representative sample from a population provides ability to generalize the findings to a population (Babbie, 1990; Creswell, 2012). Stratified random sampling was used as the most appropriate sampling technique, since the population is not a homogeneous group (Kothari, 2009; Creswell, 2012). The population was divided into 4 sub- population Management staff, Administrative staff, teaching staff and Technical staff as shown in Table 1.

Sample Size Determination

To get sample size from the target population, Taro Yamane simplified formula was adopted, it provided a simplified formula to calculate sample size (Yamane, 1973). It's a random sampling technique formula to estimate sampling size and is used to calculate the sample size (n) given the population size (N) and a margin of error () at 95 percent confidence level (Israel, 2013). The sample size of 150 respondents was represented as follows; 13 Management staff, 20 Administrative staff, 106 Teaching staff and 11 Technical staff as shown in the Distribution of Population sample in Table 2.

Table 2***Distribution of population sample***

Category	Michuki TTI		Thika TTI		Total
	size of stratum (N)	sample size $i_1 = n (N/P)$	size of stratum (N)	sample size $i_2 = n (N/P)$	$i_1 + i_2$
Management staff	7	6	9	7	13
Administrative staff	9	8	16	12	20
Teaching Staff	41	35	93	71	106
Technical staff	6	5	8	6	11
Total	63	54	126	96	150

Source: Registrar office MTTI and TTTI, 2015

Research Instruments and Data Collection Procedure

The main data collection tool was a structured questionnaire. The structured questionnaire was properly formatted with both open ended and closed questions adopting a five-point Likert scale with a view to uniformed information. A questionnaire is a form used in a survey design that participants in a study complete without intervention of the researchers collecting the data and return to the researcher (Wolf, 2008; Creswell, 2012; Rubin & Babbie, 2008). Observation method was also used by the researcher in the field as an independent evaluation tool to respond to research objectives.

Results and Discussion

This section presents the data from the respondents regarding the Audit of ICT Funding on Effective Integration of ICTs in TVET Institutions in Murang'a and Kiambu Counties, Kenya

The Government as a Source of Funding for ICT Projects in TVET Institution

The study sought to find out that whether the Government is the main source of funding for ICT projects in selected TVET Institutions in Kiambu and Murang'a Counties, Kenya.

Table 3***The Government as source of funding for ICT projects in TVET institutions***

		Disagree	Undecided	Agree	Strongly Agree	Total
Institutions	Count	10	19	74	10	113
	% within Institution	8.8%	16.8%	65.5%	8.8%	100.0%

Source: Author Data (2015)

The study results revealed by Table 3 shows 74(65.5%) and 10(8.8%) of the respondent agree and strongly disagree that the Government is the main source of funding for ICT projects in the institution, 10(8.8%) disagreed and 19(16.8%) were undecided. From the findings it was revealed that the Government of Kenya is the main source of funding for ICT projects in TVET Institutions. The Government is the major financier and that its funds are used to finance public sector TVET Institutions as deduced by Raihan, (2013). Republic of Rwanda (2008) and Republic of Kenya, (2012) were in agreement of the findings that the Government has the primary responsibility for TVET and should be committed to allocate significant financial resources to the TVET sector as well as marshalling resources from its partner.

The Adequacy of Government Funding

The study sought to find out whether the Government funding is adequate to finance the ICT projects in selected TVET Institutions in Kiambu and Murang'a Counties, Kenya.

Table 4***The Government funding is adequate to finance the ICT projects in the institution***

		Strongly Disagree	Disagree	Undecided	Total
Institutions	Count	15	82	16	113
	% within Institution	13.3%	72.6%	14.2%	100.0%

Source: Author Data (2015)

The findings of Table 4 reveals that 82(72.6%) and 15(13.3%) disagreed and strongly disagreed that the Government funding is adequate to finance the ICT projects in the institution and only 16 (14.2%) were undecided. The Government funding is not adequate as it has been noted by 85.8% of the respondents from Table 4 and supported by CANTA (2012) that an equally daunting realization has emerged that Governments can no longer be expected to fund TVET to the levels required to meet the needs of the modern world of work. Under-funding is a structural problem in the TVET sector in developing countries and the budget allocated by Government is still relatively low compared to needs and priorities required to effectively implement the TVET policy especially on ICT Integration as noted by Musobo & Gaga (2012).

The Budget Allocation for the ICT Department

The study sought to find out whether there are budget allocations for the ICT department in selected TVET Institutions in Kiambu and Murang'a Counties, Kenya.

Table 5

The Institution has budget allocation for the ICT department

		Disagree	Undecided	Agree	Strongly Agree	Total
Institutions	Count	4	18	70	21	113
	% within Institution	3.5%	15.9%	61.9%	18.6%	100.0%

Source: Author Data (2015)

The results from Table 5 showed that 70 (61.9%) and 21 (18.6%) of the respondents agreed and strongly agreed that the Institutions have budget allocations for the ICT department. Hooker, et al., (2011) in their research found out that almost one-third of the TVET institutions in Kenya don't have an ICT specific budget, signaling that ICT is not a priority issue for a significant number of Institutions. The institutions that have an ICT specific budget specify mainly on ICT infrastructure such as hardware, software and maintenance of equipment. Professional development in use of ICTs is only present in 33 percent of the budgets and hence not as prioritized.

The Internal Sources of Funding

The study sought to find out whether the internal sources of funding are adequate to finance the ICT projects in selected TVET Institutions in Kiambu and Murang'a Counties, Kenya.

Table 6

The internal sources of funding are adequate to finance the ICT projects in the institution

		Strongly Disagree	Disagree	Undecided	Agree	Total
	Count	17	65	16	15	113
Institutions	% within Institution	15.0%	57.5%	14.2%	13.3%	100.0%

Source: Author Data (2015)

The results from the Table 6 show that 65(57.5%) and 17(15%) disagreed and strongly disagreed that the internal sources of funding are adequate to finance the ICT projects in TVET Institutions, 15(13.3%) agreed and 16(14.2%) were undecided. From the findings of Table 6, it can be inferred that the internal sources of funding are not adequate to finance the ICT projects in the Institutions. Tuition has traditionally been the source of revenue used to sustain technical education, but this has proved to be inadequate, this concurs with the study findings of MacDonald et al. (2010).

The ICT Income-Generating Activities as Sources of Funds

The study sought to find out whether the Institutions generates financial resources through ICT income-generating activities in the selected TVET institutions in Kiambu and Murang'a Counties, Kenya.

Table 7***ICT income-generating activities as source of Funds***

		Strongly Disagree	Disagree	Undecided	Agree	Total
	Count	15	88	6	4	113
Institutions	% within Institution	13.3%	77.9%	5.3%	3.5%	100.0%

Source: Author Data (2015)

The findings from Table 7 reveals that 88(77.9%) and 15(13.3%) of the respondent disagreed and strongly disagreed that the Institution generates financial resources through ICT income-generating activities such as cyber café and professional courses and 4(3.5%) of the respondent s agreed to statement. However, 91.2% of the respondents indicated that the respective Institutions have not incorporated entrepreneurial activities, this can be inferred that they have concentrated on tuition fees and Government as the main source of funding. Although the Government of Kenya has the responsibility to fund TVET, this is proving difficult under present economic conditions therefore the TVET Institutions in Kenya also have a role to play in addressing the funding challenges they face (Mupinga, Busby, & Ngatiah, 2006). MacDonald et al. (2010) noted that some TVET Institutions also include entrepreneurial programs where students produce a product and learn how to market and sell the product, thus providing another source of funding for the institution.

Government Budgetary Allocation Usage

The study sought to find out the Government budgetary allocation usage in the selected TVET Institutions in Kiambu and Murang'a Counties, Kenya. The findings in Figure 1 reveals that 41(36.30%) of the respondent indicated that Government budget allocation is used for development of ICT structures/buildings, 39(34.5%) for acquisition of ICT Hardware, 28 (24.8%) for maintenance of equipment and only 5(4.4%) to pay staff.

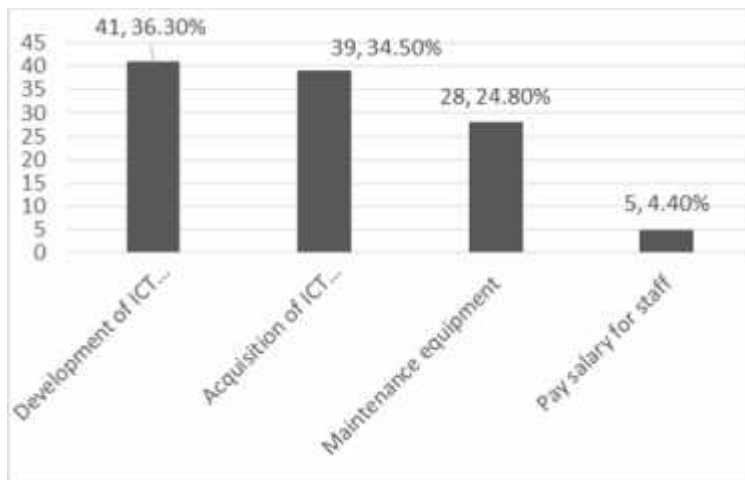


Figure 1. Government budgetary allocation usage *Source: Author Data (2015)*

From the findings it can be inferred that The Government doesn't seem to tie its provided funds to the acquisition of computer equipment; rather it gives development funding that the institution can use for development related activities under which ICT procurement falls as it is supported by MoHEST (2008).

Alternative Sources of Funding For the Institutions

The study sought to find out that whether there are alternative sources of funding for ICT projects in selected TVET Institutions in Kiambu and Murang'a Counties, Kenya.

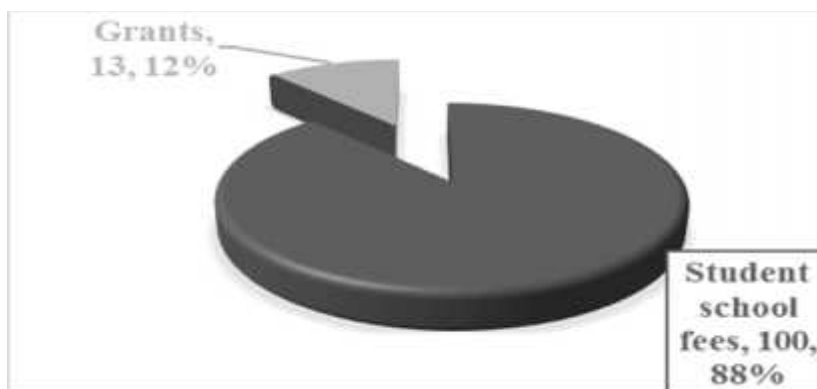


Figure 2. Alternative sources of funding for the institutions. *Source: Author's Data (2015)*

From Figure 2, the findings show that 100(88%) of the respondents indicated that the main alternative source of funding is payment of students school fees and only 12% said from grants. This can be inferred that TVET Institution in Kenya are dependent on students' school fee as the

main source of alternative funding. This finding were supported by UNESCO-UNEVOC (1996) that Tuition has traditionally been the source of revenue used to sustain technical education, but this has proved to be inadequate. Raihan (2013) concurred that students also contribute to TVET financing by paying tuition and examination fees.

The TVET institutions in Kenya need to secure other funding sources for equipment and other instructional materials. MacDonald et al., (2010) and Bates (2000) identifies several funding strategies that can be considered including: using external grants; charging student technology fees; levying taxes; increasing general operating grants from Government to support the use of technology for teaching; reallocating internal funds; employer financing; centralizing or decentralizing funding; balancing funding between infrastructure, administrative applications, and educational applications and developing partnership or consortia.

Relationship between ICT Funding and Effective Integration of ICTS in TVET in Kenya

The study sought to establish the relationship between ICT Funding and Integration of ICTs by using simple regression for the selected TVET institutions in Kiambu and Murang'a Counties, Kenya.

Table 8

Model Summary for Funding

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.591 ^a	0.349	0.344	0.817

a. Predictors: (Constant), ICT Funding

b. Dependent Variable: Effective Integration

Source: Author's Data (2015)

Table 8 represents the simple correlation which indicates a degree of correlation. The R² value indicates how much of the dependent variable, Effectively Integration, can be explained by the independent variable, funding. In this case, 34.9% can be explained, which is relatively low.

Table 9***ANOVA Table Funding***

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.814	1	39.814	59.627	000 ^b
	Residual	74.116	111	0.668		
	Total	113.929	112			

a. Dependent Variable: Effective Integration

b. Predictors: (Constant), ICT Funding

Source: Author's Data (2015)

The ANOVA Table 9 indicates that the regression model predicts the outcome variable significantly well. This indicates the statistical significance of the regression model that was applied since $p < 0.00$, which is less than 0.05, and indicates that, overall, the model applied can statistically significantly predict the outcome variable.

Table 10***Coefficients***

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	0.798	0.434		1.837	69
	ICT Funding	0.769	0.1	0.591	7.722	0

a. Dependent Variable: Effective Integration

Source: Author's Data (2015)

Table 10 provides the information needed to predict Effective Integration from ICT Funding. The constant and Effective Integration contribute significantly to the model thus can present the regression equation as;

$$\text{Effective Integration} = 0.798 + 0.769(\text{ICT Funding})$$

From the regression analysis it can be inferred that the relationship between Effectively Integration and ICT funding is significant, positively correlated but the relationship is relatively low.

Summary of Findings, Conclusion and recommendation

Summary of findings

From the findings, it can be summarized that the Government is the main source of funding for ICT projects in TVET institutions in Kenya. The Government budgetary allocation is used for development of ICT structures/buildings but it is not adequate. The TVET institutions have budget allocation for the ICT department but it is relatively low compared to the needs and priorities required for Effective Integration of ICTs in TVET Institutions in Murang'a and Kiambu Counties. The findings further revealed that internal and external sources of funding are not adequate to finance the ICT projects in the institution and that the main alternative source of funding is payment of school fees by students.

From the regression analysis, the findings revealed that the relationship between Effective Integration and ICT Funding is significant, is positively correlated and their relationship is relatively weak.

Conclusion

Finally, it can be concluded that Effective Integration is positively correlated with ICT Funding but their relationship is relatively low. The Government is the main source of funding for ICT projects in TVET Institutions in Kenya and the funding is not adequate for the ICT projects in the institutions since the budget allocated is still relatively low compared to the needs and priorities required to effectively implement the ICT integration in TVET Institutions in Kenya.

Recommendations

The Government should and has the primary responsibility for TVET institutions and should be dedicated to apportion adequate financial resources to the TVET sector as well as marshalling resources from its partners for effective integration of ICTs. The TVET institutions in Kenya also have a role to play in addressing the ICT funding challenges they face by generating financial resources through income-generating activities and embracing partnerships with public and private sector, community and international partners and partnership with the industry to subsidize some of the cost. Finally the Government through the TVET Authority should make it mandatory for TVET institutions to have an ICT specific budget and allocate significant funds

mainly for capacity development and ICT infrastructure such as hardware, software, Internet provision and maintenance of equipment.

References

- Babbie, E. (1990). *Survey Research Methods* (2nd ed.). Belmont, CA: Wadsworth.
- Bates, A. W. (2000). *Managing Technological Change: Strategies for College and University Leaders*. San Francisco: Jossey-Bass Publishers.
- CANTA. (2012). *Key components of the revised caricom*. Caribbean Association of National Training Agencies (CANTA). Canada: CANTA.
- Creswell, J. W. (2003). *Research Design Qualitative, Quantitative and Mixed Methods Approaches* (2nd ed.). London: Sage.
- Creswell, J. W. (2008). *Research Design Qualitative, Quantitative and Mixed Methods Approaches* (3rd ed.). London: Sage.
- Creswell, J. W. (2012). *Educational research : planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson Education, Inc.
- Hooker, M., Mwiyeria, E., Waweru, S., Ocharo, M., Bassi, R., Palmer, L., et al. (2011). *TVET ICT baseline survey*. TVET Institutions in Kenya, MOHEST & GESCI, Nairobi.
- Israel, G. D. (2013, June). *Determining Sample Size*. Retrieved January 15, 2015, from University of Florida IFAS Extension Service: <http://edis.ifas.ufl.edu/pd006>
- Kothari, C. R. (2009). *Research Methodology: Methods and Techniques*. New Age International Pvt Ltd Publishers.
- MacDonald, S., Nink, C., & Dugga, S. (2010). *Principles and Strategies of a Successful TVET Program*. Management & Training Corporation (MTC). Centerville: MTC Institute.
- MOHEST. (2008). *Quality Higher Education, Science, Technology and Innovation for National Prosperity and Global Competitiveness*. Strategic Plan 2008-2012, Ministry of Higher Education, Science and Technology, Nairobi.
- Musobo, I. C., & Gaga, J. (2012). *Restructuring TVET as part of the Educational Reforms in Rwanda*. Association for the Development of Education in Africa (ADEA). Tunisia: ADEA.
- Nyerere, J. (2009). *Education and Training (TVET) Sector Mapping in Kenya*. Dutch Schokland TVET programme.

- Raihan, A. (2013). A Study to Explore the Practice of ICTs in TVET in Bangladesh and South Korea. *International Journal of Engineering Science and Innovative Technology*, 2(4). Retrieved May12, 2015, from http://www.ijesit.com/Volume%202/Issue%204/IJESIT201304_46.pdf
- Republic of Kenya. (2012). *The Technical and Vocational Education and Training Bill 2012*. Nairobi: The Government Printer.
- Republic of Rwanda. (2008). *Technical and Vocational Education and Training (TVET) Policy in Rwanda*. Ministry of Education. Kigali: Government Printers.
- Rubin, A., & Babbie, E. R. (2008). *Research Methods for Social Work* (6th ed.). Belmont, CA: Thomson Brooks/Cole.
- UNESCO-UNEVOC. (1996). *Financing technical and vocational education: modalities and experiences*. Berlin: UNESCO-UNEVOC.
- Wahba, M. M. (2010). *Technical and Vocational Education and Training (TVET): Challenges and Priorities in Developing Countries*. Competency Assurance & TVET Consultant.
- Wolf, J. (2008). Self-administered questionnaire. In P. Lavrakas, *Encyclopedia of survey research methods* (pp. 804-805). Thousand Oaks, CA: SAGE Publications, Inc.

Author Profile

Mr. Tirus Muya Maina holds a BSc Information Technology degree from JKUAT and is currently pursuing MSC in ICT Policy & regulation at JKUAT. He has acquired vast experience as an ICT specialist and Trainer in various reputable organizations in Kenya. He is a Senior ICT Technologist II in the School of Computing and Information Technology, Murang'a University of Technology. The Author's research and interest include but not limited to ICT's integration in TVET's, Greening TVET, ICT strategic plan and Quality Management Systems procedures, ICT policy and regulation and has published in several peer reviewed international journals and conferences. His contact email is: tirus.maina@gmail.com

**Assessment of Perceived Ease of Use and Instructional Use of ICT
By Lecturers in Technical Training Institutions in Kenya**
Peace B. Agufana, PhD, Jackson K. Too, PhD & Chris W. Mukwa, PhD

Abstract

In the past ten years, Information and Communication Technology (ICT) has become an essential part of our learning and development in education. The rapid development of these new technologies coupled with the worldwide challenge to educate all children has led to a global reform and development of teacher education and motivated educational institutions to redesign and restructure their teaching methods to enable students equip themselves for the future. The main purpose of this study therefore was to explore the relationship between Perceived Ease of Use and instructional use of ICT by Lecturers in Technical Training institutions in Kenya. The study adopted the quantitative research design. A sample size of 629 respondents was drawn from a total population of 2909 Lecturers in Technical Training institutions in Kenya. Data was collected using questionnaires. The quantitative data obtained from the administered questionnaires was analyzed using descriptive statistics. The findings indicated that use of ICT by lecturers' is perceived to greatly improve instruction. The study recommended that lecturers be encouraged to use ICT for instructional purposes because it greatly improves the instruction.

Key Words: Instructional Use of ICT, Perceived Ease of Use

Introduction

Yusuf (2005), posits that the field of education has been affected by Information and Communication Technology (ICT), which has undoubtedly affected teaching, learning, and research. Al-Ansari (2005) contends that a great deal of research has proven the great benefit ICT has on the quality of education. According to Davies and Tearle (1999), Lemke and Coughin (1998), ICT has the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's worker, as well as strengthening teaching and helping schools change. Some educational institutions in Kenya, have subscribed to e-resources consortiums e.g., Kenya Library Information Services Consortium (KLISC) and Kenya Education Network (KENET) that have boosted access to educational resources. Some institutions have also gone ahead to start offering e-learning, increasing access to education through instructional use of ICT.

Kenyatta University a chartered public university in Kenya can be a reference point in regard to embracing e-learning as it offers virtual learning to Online and Distance Learning (ODEL) students. According to Pelgrum (2001), many school leaders still perceive the lack of ICT-related knowledge of teachers as a major obstacle to the realization of their ICT-related goals. The literature describes the kind of skills teachers may need when integrating ICT in new student-centred learning approaches. However, identifying which competencies each teacher needs to acquire is far from simple, as this depends very much on the circumstances of their particular school. According to Davis, Preston, & Sahin (2009), personal teaching styles also play a major role and, 'one size fits all' approach does not usually work. Therefore, the need to recognize that substantial learning can take place while teaching, and even learning, from students can easily be achieved through use of ICT.

Global organizations have joined forces with national Governments, ministries, and institutions in implementing ICT in different sectors. Institutions of learning are reforming their systems to accommodate new media of learning. Within this framework, Africa is seeking to establish and improve its competence in ICT. In 2002, African states established the NEPAD (New Partnership for African Development) whose objectives strongly focus on the dual strategies of ICT Development (ICTD) and ICT for Development (ICT4D). The World Summit for Information Society (WSIS) held in 2003 identified a significant role for information and communication technologies in strategies for African development.

On ICT integration in Technical Training institutions in Kenya, a draft ICT lecturers' competencies framework and e-resource Centre have been developed. Eight (8) technical institutions have started offering Cisco Networking Academy Programmes meant to provide trainees with industry-valued certification in skills to repair and maintain computers. A sensitization workshop and training of teachers on the application of ICT to teaching, learning, and management has also been undertaken. As a way of enhancing greater application of ICTs in TVET, the Ministry of Education Science and Technology has developed a strategy for ICT integration in TVET; connected 43 TVET institutions to internet; started e learning in some programmes and integrated digital literacy course in TVET curricula (Education Sector 2013/2014-2015/2016 Medium Term Expenditure Framework, October 2012).

Continuing education models that will meet workers' lifelong learning needs have to be relevant and flexible to provide just-in-time learning without distance. ICT can play a crucial role in removing distance from education and in developing a lifelong learning culture in TVET. In spite of these potentials, little is known regarding the instructional usage of ICT in Technical Training institutions in Kenya. Therefore, it is against this background that the present study based on to assess perceived ease of use and instructional use of ICT in technical training institutions in Kenya.

Statement of the problem

An Institution's instructional environment impacts on students learning differently. These critical issues exist in the physical, academic and social dimensions of the institution. Research studies indicate that students are negatively affected by poorly equipped learning environments. This problem requires urgent attention as it affects the quality of instruction.

Prior empirical studies have strived to explicate the determinants and mechanisms of users' adoption decisions on the basis of the Technology Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989; Taylor & Todd, 1995; Venkatesh & Davis, 2000) with the conviction that the adoption process influences successful use of particular technology systems (Karahanna, Straub, & Chervany, 1999; Liao, Palvia, & Chen, 2009).

In East Africa, Zigama (2010) investigated the factors affecting primary school teachers' attitudes towards ICT in education in Rwanda, and found out that primary school teachers on overall had a positive attitude towards ICT in education. A few studies have been conducted in Kenya on acceptance of instructional use of ICT. Chemwei (2013) while investigating the factors influencing teacher educators' level of Information Technology Integration in teaching in primary teacher training colleges found out that while ICT's are integrated in primary teacher training colleges in Kenya, their level of integration is quite low. Wanjala (2010) carried out a study on factors affecting the integration of computers in mathematics instruction in secondary schools in Kenya and found out that teachers' attitudes, self-confidence, perceived

usefulness/relevance, accessibility, pedagogical practices and policy formulation were among the determinants to teachers computer technology use.

It is difficult and maybe even impossible to visualize future learning environments that are not supported, in one way or another, by ICT. With the widespread adoption and use of ICT in the world, especially by the young who are at times referred to as the ‘digital generation’, it is clear that ICT will affect the complete learning process today and in the future.

From the above review, it is evident that little research has been done on perceived ease of use and instructional use of ICT. Therefore, the researcher in this study, tries to address this gap by investigating perceived ease of use and instructional use of ICT by Lecturers. The researcher aims at reporting the perception of lecturers towards ease of use of ICT in technical training institutions in Kenya.

The findings of the study will provide insightful reference for educational policy makers, and would benefit a cross-section of education stakeholders, researchers, and scholars in Kenya. The study would also add knowledge to the area of educational policy.

Purpose of the Study

The purpose of the study was to investigate the relationship between perceived ease of use, and instructional use of ICT in technical training institutions in Kenya. The specific objectives of this study were to: establish Lecturers, ease of learning to operate ICT; determine Lecturers’ flexibility of interacting with ICT; examine the mental effort required by Lecturers’ to interact with ICT; and assess the effort required by Lecturers’ to become skilful at using ICT.

Materials and Methods

This study was conducted on Lecturers in Technical Training institutions in the Republic of Kenya. The research adopted the quantitative research design as it tried to identify broad trends in a population, and in the end generalize the findings over a large population who are Lecturers’ in Technical Training institutions in Kenya.

The researcher settled on the quantitative research design for the present study because it seeks to gain insight into an occurrence as a way of providing information on the perceived ease of use of ICT in technical training institutes which are many in Kenya. The characteristics of the design were non-experimental and dealt with variables in their natural settings. According to Polit and Hungler (2004), research methodology is a way of obtaining, organizing and analyzing data and thus methodology decisions often depend on the nature of the research questions. In this study, the methodology refers to how the research was done and its logical sequence.

In the present study, all Lecturers in Technical Training institutions in Kenya were targeted to take part in the study as respondents. According to Burns and Grove (2003) population refers to all the elements that meet the criteria for inclusion in a study. In other words, population is the aggregate of all that conforms to a given specification.

Stratified random sampling was used to get representation from lecturers in Technical Training institutions across the country. Wimmer and Dominick (2006) support the use of stratifying in cases where respondents belong to identifiable subgroups, in order to give each person in the population an equal chance of being selected. Stratifying lecturers according to the regions they taught guaranteed the desired distribution across the country hence improved the representativeness of the sample. To get the desired representative distribution across the eight (8) strata's, the following sample was drawn with respect to the actual population ratios of lecturers in Technical Training institutions as follows: Central (n=122); Coast (n=41); Nairobi (n=98); Rift Valley (n=148); Western (n=46); Nyanza (n=90); North Eastern (n=10); Eastern (n=74). The total sampled respondents were 629.

The researcher used a standardized questionnaire for data collection. The choice of the data collection instrument is often very crucial to the success of a research and thus when determining an appropriate data collection method, one has to take into account the complexity of the topic, response rate, time and the targeted population. According to Parahoo (1997), a research instrument is a tool used to collect data. Research instruments are therefore useful to researchers because they help in data collection.

The research used questionnaires presented in structured and semi-structured questions and a four (4) point Likert scale. Likert scales are good because they show the strength of the persons feelings to whatever is in the questions, they are easy to analyze, they are easy to collect data, they are more expansive and they are quick (Kothari, 2004).

In data analysis, descriptive statistics (Percentages and frequencies) were calculated on the variables to summarize and describe the data collected. Quantitative data was displayed using appropriate tables that depicted the relationship between the dependent variable and the independent variables. Inferences were made from the trends observed from the analyzed data and were used to reach conclusions and make generalizations about the characteristics of populations based on data collected from the respondents. This agrees with Hyndman (2008), who posits that data processing involves translating the answers on a questionnaire into a form that can be manipulated to produce statistics. This involves coding, editing, data entry, and monitoring the whole data processing procedure.

Results and Discussion

The aim of the study investigated perceived ease of use and instructional use of ICT by Lecturers in Technical Training institutions in Kenya. The key Ease of Use factors of interest to the study were to: establish Lecturers ease of learning to operate ICT; determine Lecturers flexibility of interacting with ICT; examine the mental effort required by lecturers to interact with ICT; and assess the effort required by lecturers to become skilful at using ICT. The following sections highlight the study results on these set of perceived ease of use factors.

The first question item investigated how easy it was for Lecturers to operate ICT. Table 1 shows the response on this item. The study results revealed that 47.5% of lecturers often regarded learning to operate ICT as easy, while another 37.5% of lecturers sometimes regarded learning to use ICT use as easy. From these findings, we can make several inferences. Firstly, learning to operate ICT was easy. Secondly, lecturers could easily acquire ICT skills to use in instruction. Thirdly, lecturers could easily use ICT in instruction. This agrees with Karaliotas (1977), who posits that resource-based method of teaching, which is a hallmark of Computer Assisted

Learning, defines the position of a teacher as a facilitator in the learning process, rather than a source of knowledge. In general, learning to operate ICT was easy.

Table 1
Ease of Learning to Operate ICT

	Frequency	Percentage
Often	265	47.5
Sometimes	209	37.5
Rarely	42	7.5
Never	42	7.5

Source: Primary Research Data (2013)

The second item in this question item investigated Lecturers' flexibility of interacting with ICT and results are presented in Table 2. The study results revealed that 52.5% of lecturers often find it flexible to interact with ICT, while another 32.5% of lecturers sometimes find it flexible to interact with ICT. From the results, we can infer that Lecturers' interacted with ICT flexibly. Tully (2003) in light of this states that the environment where one grows up can determine his or her ability to fully use modern technologies. In general, lecturers interacted with ICT flexibly.

Table 2
Flexibility of Interacting with ICT

	Frequency	Percentage
Often	293	52.5
Sometimes	181	32.5
Rarely	56	10.0
Never	28	5.0

Source: Primary Research Data (2013)

The study also investigated the mental effort required by Lecturers' to interact with ICT. Table 3 shows the response on the level of mental effort required to interact. The study results revealed that 47.5% of lecturers sometimes find that they required a lot of mental effort to interact with

ICT, while another 32.5% rarely required a lot of mental effort to interact with ICT. From the above findings, we can infer that Lecturers' did not require a lot of mental effort to interact with ICT. This is echoed by Punie and Canberra (2006), who posit that the role of ICT in instruction should be seen in the light of its contribution to emancipation, empowerment, and self-fulfillment of individuals using it. In general, interacting with ICT was easy.

Table 3

Mental Effort of Interacting with ICT

	Frequency	Percentage
Often	56	10.0
Sometimes	265	47.5
Rarely	181	32.5
Never	56	10.0

Source: Primary Research Data (2013)

The last question item in this section investigated the effort required by Lecturers' to become skillful at using ICT. The findings are presented in Table 4. The study results revealed that 47.5% of lecturers sometimes required a lot of effort to become skillful at using ICT, while another 27.5% often required a lot of effort to become skillful at using ICT. We can make several inferences from this research data. Firstly, it needs to put in a lot of effort to be skillful at using ICT. Secondly, to be skillful in using ICT there is need for a lot of exposure. Thirdly, practical handling of ICT was necessary in order to enhance use of ICT. This agrees with Lankshear & Snyder (2000), who posit that there is no doubt that teachers who use ICT in classrooms have to demonstrate high levels of energy, hard work and perseverance, often in the 'face of considerable odds'. In, general, a lot of effort is required to become skillful at using ICT.

Table 4***Effort required to become Skillful at Using ICT***

	Frequency	Percentage
Often	153	27.5
Sometimes	265	47.5
Rarely	70	12.5
Never	70	12.5

Source: Primary Research Data (2013)

Conclusion

The study sought to assess perceived ease of use and instructional use of ICT by lecturers in Technical Training institutions in Kenya. Based on the findings of this study, it was concluded that; learning to operate ICT was easy, lecturers interacted with ICT flexibly, and interacting with ICT was easy. However, a lot of effort is required to become skillful at using ICT. Therefore, Lecturers in Technical Training institutions perceived instructional use of ICT as easy, and this can be harnessed for use for instructional purposes.

References

- Annan, K. (2001, November 20). Launching Information and Communications Technology (ICT) Task Force, Secretary-General Appeals for Support from Private Sector Meetings Coverage and Press Releases. Retrieved February 17, 2017, from <http://www.un.org/press/en/2001/sgsm8037.doc.htm>.
- Chimwei, D. (2013). *Factors Influencing Teacher Educators' Level of Information and Communication Technology Integration in Teaching in Primary Teacher Training Colleges in Kenya*. PhD. Un-published Thesis, Moi University Eldoret.
- Cohen, J., Cohen, P., West, S., & Aiken, L (2003). *Applied Multiple Regression/ Correlation Analysis for the Behavioural Sciences* 3rd Ed).
- Davis, F., Bagozzi, R., & Warshaw, P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982-1003.

- Karahanna, E., Straub, D., & Chervany, N. (1999). Information Technology Adoption Across Time: A Cross-Sectional Comparison of Pre-Adoption and Post-Adoption Beliefs. *MIS Quarterly*, 23, 183-213.
- Karaiotas, Y. (1997). *Project Report, Learning on and over the Internet: Dynamics and Limitations: Will the New Technology Become the Main Vehicle for a Learning Society? 12 November 1997.*
- Lankshear, C., & Snyder, I. (2000). *Teachers and Techno literacy*. St. Leonard's, NSW: Allen & Unwin.
- Liao, C., Palvia, P., & Chen, J. (2009). Information Technology Adoption Behavior Life Cycle: Toward a Technology Continuance Theory (TCT). *International Journal of Information Management*, 29(4), 309-320.
- Naing, L., Winn, T., & Rusli, B. (2006). Practical Issues in Calculating the Sample Size for Prevalence Studies. *Archives of Orofacial Sciences*, 1, 9-14.
- Punie, Y. & Canberra, M. (2006). 'The Future of ICT and Learning in the Knowledge Society', Report on a Joint DG JRC/IPTS-DG EAC Workshop held in Sevilla, 20-21 October 2005. *DG JRC-IPTS, European Communities, March 2006.*
- Taylor, S., & Todd, P. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research*, 6(1), 144-176. 137.
- Tully, C. (2003). Growing Up in Technological Worlds: How Modern Technologies Shape the Everyday Lives of Young People. *Bulletin of Science, Technology and Society*, 23(6), 444-456.
- Venkatesh, V., & Davis, F. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, 46(2), 186-204.
- Wanjala, M. S. M. (2010). *Factors Affecting the Integration of Computers in Mathematics Instruction in Secondary Schools in Bungoma District of Western Province, Kenya*. Ph.D. Un-published Thesis: Moi University, Eldoret.
- Zigama, C. (2010). *Factors Affecting Primary School Teachers' Attitude towards ICT in Education in Rwanda*. PhD Unpublished Thesis. Moi University, Eldoret.
- Al Ansari, H. (2006). Internet Use by the Faculty Members of Kuwait University. *The Electronic Library*, 24(6), 791-803.

- Burns, N. and Grove, S. (2003). *The Practice of Nursing Research: Conduct, Critique and Utilization*. Philadelphia: W. Saunders.
- Davis, E., & Tearle, P. (1999). *A Core Curriculum for Telematics in Teacher Training*. Retrieved October 12, 2015, from http://www.researchgate.net/publication/220946304_A_Core_Curriculum_for_Telematics_in_Teacher_Training.
- Davis, N., Preston, C., & Sahin, I. (2009). ICT Teacher Training: Evidence for Multi-level Evaluation from a National Initiative. *British Journal of Educational Technology*, 40(1), 135-148.
- Hyndman, D. (2008). *Introduction. Analog and Hybrid Computing, 1-14*.
- Kothari, C. (2004). *Research Methodology: Methods & Techniques, (2nd Ed)*. New Delhi: New Age International Publishers.
- Lemke, C., & Coughlin, E. C. (1998). *Technology in American schools*. Available at: <http://www.mff.org/pnbs/ME158.pdf>.
- Parahoo, K. (1997). *Nursing Research: Principles, Process and Issues*. New York: Palgrave.
- Pelgrum, W. (2001). Obstacles to the Integration of ICT in Education: Results from a Worldwide Educational Assessment. *Computers and Education*, 37,163-178.
- Polit, D., & Hungler B. (2004). *Research Design and Methodology (6th Ed)*. Lippincott Williams and Wolkins ISBN 0787-15636
- Republic of Kenya (2012). *Education Sector Report 2013/14-2015/16, Medium Term Expenditure Framework*, October, 2012. Nairobi: Government Printer.
- Taylor, S., & Todd, P. (1995). Understanding Information Technology Usage: A Test of Competing Models. *Information Systems Research*, 6(1), 144-176. 137.
- Wimmer, D., & Dominick, J. (2006). *Mass Media Research: An Introduction (8th Ed.)*. Boston: Wadsworth.
- World Telecommunication/ICT Development Report (2010). *Monitoring the WSIS Targets: A Mid-Term Review*. *International Telecommunications Union, Geneva: Switzerland*.
- Yusuf, M. (2005). Information and Communication Education: Analyzing the Nigerian National Policy for Information Technology. *International Education Journal* 6 (3), 316-321.

Authors Profile

Agufana, B. Peace (Ph.D.) holds a PhD in Educational Technology and Media from Moi University, Kenya. He has served for several years in leadership positions at the Ministry of Education – in the Directorate of Quality Assurance & Standards, and as a teacher with the Teachers Service Commission. He is a reviewer of course materials with the Kenya Institute of Curriculum Development. He has taken part in many peace education initiatives in Kenya, and has also been a trainer of volunteer teachers. He has taken part in many conference presentations. Currently, he is an Assistant Commission Secretary- Programme Accreditation at the Commission for University Education. His email contact is: agufpis@gmail.com

Mukwa W. Chris (PhD.) is a Professor of Educational Technology and Media. He obtained his Doctorate degree from Michigan State University, USA. Before joining Moi University where he is currently teaching, he taught in the University of Nairobi and Kenyatta University for several years. He is a champion of Distance Education and has published extensively in that area. He was very instrumental in developing and running the College of Adult and Distance Learning in the University of Nairobi. He has a commendable record of teaching, research, supervision and publishing. He has also served in various leadership positions in the university and participated in many local and international conferences.

Too, K. Jackson (Ph.D.) is an Associate Professor of Pedagogy and Mediated Instruction. He has an impeccable track record of teaching, research and community engagement. He has served in various leadership positions in the university and participated in numerous seminal presentations, as well as involvement in humanitarian initiatives. Currently, he is working for Commission for University Education as Senior Assistant Commission Secretary - Research and Development.

**Interrogating the Harmonized Promotion Criteria Towards
Quality Assurance in Kenya's University System**
Fuchaka Waswa, Daniel Akunga and Mark Obonyo

Abstract

That the quality of higher education in Kenya has deteriorated in recent times is not in doubt. While the causes are myriad, a hitherto conveniently forgotten component when it comes to intervention measures is the quality of academic staff. For the last several decades, University Councils have been complicit in the devaluation and degradation of the title "Professor" as evidenced by different qualifications and competences attracting this same position across public and private universities. This translates into loss of quality in teaching and training, research, consultancies and community service. Inter-personal respect among dons has also suffered, while the public no longer esteems the highest academic titles in Universities. While the effort made by the Commission for University Education towards harmonizing promotion criteria is commendable, gaps still exist there-in that are likely to permit mischief and unfair competition to thrive in upward mobility. Further, the harmonised criteria is silent on the way forward when it comes to academic staff who have been promoted fraudulently in the past and still would not qualify for the positions they hold were they to be vetted on these harmonised guidelines. This paper has elaborated on these concerns among others and provided possible solutions to maximise benefits from the harmonized criteria. The academic staff union is a key stakeholder in University Education and is convinced that ideas represented in this paper will go a long way to add value to quality assurance in higher education in Kenya and beyond.

Key Words: Standards, Upward Mobility, Academic Staff, Universities

Introduction

Due to *massification* of university education in Kenya the demand for academic staff with PhD qualification has been on the increase. To address this challenge that is also driven by inter-university competition for staff, academic *nomadism* for quick promotions and irregular intra-university promotions have been popular practices.

The consequence has been disparities in appointments and promotion of academic staff and hence low morale on the part of deserving yet marginalised staff. Consequently the expected quality in higher education, particularly the teaching function has taken a drastic decline (Waswa, 2016).

From not having common promotion criteria in the past, and catalysed by unethical practices, Universities in Kenya are populated by persons who at best are fraudsters as far as their academic grades are concerned. In a few cases intra-staff academic and intellectual cum professional respect does not exist under such circumstances where mediocrity appears to be rewarded, while meritocracy and academic freedom tends to be punished. Under such circumstances, disenfranchised academic staff often withhold their best in service delivery (teaching, research and community service), which leads to poor quality of the human resource universities deliver to society for national development. This explains in part why the Commission for University Education (CUE) has attempted to address these differential appointment and promotion for academic staff through harmonised criteria. The guidelines developed however have some gaps that may undermine the envisaged goal of harmonization and standardization. The strengths and weaknesses that exist in these criteria for the smooth running of Kenyan universities is the central thesis of this discussion paper.

It is hoped that the gaps articulated and past anomalies cum injustices in promotions will be addressed in accordance with article 41 (1) of the Constitution of Kenya that provides for fair labour practices and article 232 (1) that provides for principles and values of public service, and in particular sections that outline high standards of professional ethics; involvement of the people in the process of policy making and fair competition and merit as the basis of appointments and promotions (Republic of Kenya, 2010). The Commission too in performing its functions as stipulated in article 5 (1) (a, c and h) of the Universities Act 2012 should maximise on the positive aspects of this paper and not view the paper as an attack on its competence.

Procedure of Interrogating the Criteria

In interrogating the harmonised criteria the authors made reference to several documents including Universities Act, 2012, report of the committee on minimum criteria for appointment and promotion of academic staff in universities in Kenya (2015), the 2010 national Constitution and a variety of secondary data among others. Informal discussions were also held with members of the academic staff across the established grades to gauge their level of participation in the development, and awareness of the existence of the harmonised criteria. By virtue of the authors placement, much of the data (tangible and tacit) used in this paper was solicited from Kenyatta University. Taking cognisance of the University's premier status, the content of this paper plausibly represents the widely held views and opinions of key stakeholders, who are supposed to be served by these appointment and promotion criteria. The authors equally acknowledge that an audit study of the harmonised criteria across stakeholder universities would yields more information critical in its improvement for posterity.

Gap Items in Process and Substance of the Harmonised Promotion Criteria

Composition of Criteria Harmonization Committee

The report of the committee on minimum criteria for appointment and promotion of academic staff in Universities in Kenya dated April 2015 details the membership that developed the harmonised guidelines. While some form of stakeholder participation is implied, this list fails to capture the minimum representation, particularly from teaching staff from public universities who are main clientele affected by the promotion criteria. The Commission is also silent on whether several prior consultative meetings with key stakeholders were held. A bottom-up approach involving key stakeholders from departments and cascading to the Council of each University would have added much needed value in content and representation. A final representative team/committee with the Commission as secretariat would then have collated and harmonised the various opinions before subjecting the harmonised draft to various senates for further fine-tuning and adoption. A random check among academic staff indicated lack of awareness of any such process, meaning the level of representation and participatory decision-making falls below expectations.

In the final list provided by the Commission, membership from pioneer and leading Kenyan Universities was conspicuously missing thus denying the harmonization team the valuable experience on past promotion dynamics and their implications. Relying mainly on top level University managers failed to take cognisance of full representation, participation and inclusiveness of key stakeholders as envisaged in the national Constitution. It is the position of this discussion paper that based on a bottom-up approach as indicated in preceding sections, the final drafting committee should have at the minimum composed of:

1. *A sample of Bonafide* professors whose promotions attract academic respect to represent various senates
2. Membership from IUCEA for benchmarking in the spirit of regional integration
3. Membership from the Academic Staff Unions by virtue of their role in welfare enhancement
4. Membership from the Vice Chancellors being the Chief Executive Officers of Universities
5. Membership from University Council Chairpersons by virtue of their role in policy formulation and implementation
6. Retired professors who attract intellectual and research respect within academic circles
7. The Commission for University Education as the secretariat

Grading Nomenclature

Table 1 describes the grading nomenclature (CUE, 2014) and associated qualifications of academic staff (Article Authors, 2016). The Commission rightly indicates that the grade of Graduate Assistant/Research Assistant is contractual and is meant to facilitate identification of outstanding Bachelor's degree holders to be trained for academic positions (i.e. succession staff development). Traditionally, outstanding Bachelors were represented by first class honours degrees, and planning for staff development was reserved for first class honours, although this tradition has slowly died out. Opening up this position to persons with an upper second class honours qualification as indicated in CUE (2014) is tantamount to creating a loophole that could be exploited through unethical practices to marginalise the first class honours graduates whose numbers continue to increase with every graduation ceremony. Ultimately the risk of failure to plan for continuity/succession within teaching staff is real.

Table 1***Grading nomenclature***

SN	Academic level	Expected minimum qualifications
1	Graduate Assistant/Research Assistant	Bachelor's degree of 1 st class honours and enrolled into a master degree programme for staff development.
2	Tutorial Fellow/Junior Research Fellow	Master's degree
3	Lecturer/Research Fellow	PhD or Masters+
4	Senior Lecturer/Senior Research Fellow	PhD++
5	Associate Professor	PhD+++
6	Professor	PhD++++
7	Adjunct Academic Staff	PhD
8	Visiting Academic Staff	PhD or Masters with 5 years of active experience in industry.

Notes: + means other additional requirements in increasing quantities

Although the Commission proposes a system of maintaining an updated list of bona fide Professors and a proviso to publish the list on its website, to date no such list exists. While the vision is noble, the list must be linked to individuals' downloadable Curriculum Vitae in prescribed format for accountability to the tax-paying public that sustains their remunerations. The public must be proud of its professors, hence the need to be transparent and NOT opaque. Such a list would also provide Government and other interested parties a quick reference for identifying persons for specialized tasks and networking.

Awarding Points for Administration Responsibilities

In this paper, we argue that awarding points based on administration responsibilities should be removed from the criteria because academic staff members do not have equal chances of landing such positions, by virtue of the appointments being at the discretion of Vice Chancellors. These positions tend to benefit people based on factors like loyalty perceptions rather than competence and seniority. In addition, assuming that fairness is upheld in such appointments, it would take for example 30 years for the 15th most senior lecturer in a department to be appointed as chairperson, based on a term limit of two years. Besides, holders of such positions are already compensated through reduced workloads and monthly allowances. Consequently including this

item in the guidelines translates into multiple compensation and unfairness that significantly disadvantages ordinary academic staff. Best practices in world class Universities base such administrative appointments on seniority in the department in order to avoid cases where newly graduated PhD holders suddenly become managers of their Professor supervisors who have not held such offices in the past. Such contradiction can be exemplified in the unlikely event where generals in the military are forced to take orders from sergeants! The negative impact on the professors' sapiential authority and influence cannot be overemphasised.

Weighted Publication Points for Multiple Authorship

In the harmonised guidelines, scientific publication on a minimum is weighted at 50% making this item the most important across all academic grades. Traditionally, the first author contributes most and also receives most of the credit. The positions of subsequent authors are usually decided based on contribution, alphabetical order, or reverse seniority. While ranking the first or second author in a two-author paper is straightforward, the meaning of position becomes increasingly arbitrary as the number of authors increases beyond two. The practice in the biomedical sciences often places the last author in the same league as the first because he or she is assumed to be the driving force, both intellectually and financially. According to Lawrence (2006) and Weltzein et al. (2006) there is no accepted yardstick in assessing the actual contribution of an author to a given scientific publications. As such, interpretation of author sequence can be like a lottery.

In the harmonised guidelines, it is assumed that contribution of authors reduces sequentially, which may not be the case. A simple and straightforward approach to estimate the credit to be attached to a series of authors that is free from any arbitrary rank valuation is needed. This will eliminate the danger of rewarding academic fraud, stifling of multidisciplinary research activities, and intimidation of junior authors by their seniors. Although the first author is widely assumed to have made the greatest contribution in a multi-authored publication (Hunt, 1991; Schmidt, 1987 and Verhagens, *et al*, 2003), assigning credits to subsequent authors differs across traditions, scientific fields, and countries (Lawrence, 2006 and Weltzein *et al.*, 2006). A practical example of differential crediting is given in Table 2.

Table 2***Models of allocating publication points (exemplified on a 5-authorship case)***

Author	SDC	CUE	EC	FLAE	%. PCI
1	2.67		1.6	3.82	60 = 4.82
2	2.13		1.6	0.75	20 = 1.59
3	1.6		1.6	0.75	10 = 0.82
4	1.07		1.6	0.75	05 = 0.38
5	0.53		1.6	1.92	05 = 0.38
Total	8		8	8	100% =8.00

Notes: SDC: Sequence Determines Credit, EC: Equal Contribution; FLAE: First Last Author Emphasis; PCI: Percent Contribution Indicated; CUE: Harmonised guidelines. The totals are based on CUE's basis of 8 as maximum publication points per paper.

According to the “Sequence-Determines-Credit” (SDC) approach, which the harmonised guidelines seems to have adopted, five authors would share publications points as shown in column one regardless of their contribution to the paper. The sequence of authors in this case reflects the declining importance of their contribution, as suggested by previous authors (Hunt, 1991; Schmidt, 1987 and Verhagens, *et al*, 2003). That author five would be significantly disadvantaged is apparent. While this approach eliminates “Joy-riding” it could also discourage teamwork, networking and partnership because of the decreasing points one earns along the authors’ list. The SDC approach, which seems to be recommended procedure in the harmonised criteria fails to take into considerations other internationally established norms like FLAE, EC as well as PCI. Where equal contribution is the model, authors obtain equal credits in this case, 1.6 for each of the five authors. This approach is likely to encourage team work and collaboration, tenets that are the norm in contemporary research for development.

The “first-last-author-emphasis” (FLAE) is commonly applied in biomedical and laboratory-based researches. This criterion places great emphasis on the first and last authors. The first author gets credit of the whole impact, the last author half, and the credit of the other authors in the middle is the impact divided by the number of all authors. In the “percent-contribution-indicated” approach (PCI), credits are awarded based on actual contribution to the paper as agreed upon by the authors (Anderson, 1992). This approach too is likely to enhance partnerships and collaborations, while stifling *joy-riding*.

While scoring for minimum publication points in preceding write-ups and summarised tabulations for lecturers and senior lecturers is consistent at 24 and 32 respectively, inconsistencies for associate professors and professors exist at 48 (36) and 60 (39) respectively (Table 3a).

Table 3a

Academic Staff compared on publication points and postgraduate supervision

Grade	Min Publ. Pts.	Cumulative score	PhDs supervised	Cumulative score	Masters supervised	Cumulative score
L	24	24	0	0	0	0
SL	32	56	0	0	3	3
AP	48 (36)	104 (92)	1	1	5	8
P	60 (39)	164 (131)	2	3	6	14

Notes:

- i) *L: Lecturer; SL: Senior Lecturer; AP: Associate Professor; P: Professor.*
- ii) *Minimum publications Points for Lecturer and SL are consistent in write up and table (see section 3.3 and 3.4 of CUE (2014) harmonized criteria.*
- iii) *For AP and P, the Figures conflict: 48 in the write up and 36 in table for AP and 60 in write-up and 39 in table for P.*

In an attempt to create consistency, the authors adjusted the minimum publication points using 8 as the maximum points for a publication and hence 3 papers as the minimum papers a lecturer must have in order to score the minimum 24 publication points (Table 3b). The Senior Lecturer follows with 4 papers or 32 publication points. For the Associate Professor two scenarios emerge: 6 publications (48 publications points) or 4.5 publications (40 publication points). For the Professor inconsistency exists as exemplified by either 7.5 publications (60 publication points) or 4.8 publications (39 publication points). Based on equivalent publication numbers the gap between Lecturer and Senior Lecturer is 1, that between Senior Lecturer and Associate Professor is 2, while the gap between Associate Professor and Professor is also 2 (see Table 3b column c and round off 7.5 to 8). By implication the effort needed for one to become a Professor is minimized instead of being increased.

Table 3b***Inconsistencies around Minimum Publication Points for APs and Ps***

a	b	Current status (CUE, 2014)		Authors' Suggestions		
		c	d	e	f	g
Grade	Min. Publ Point	Equivalent No. of publications	Cumulated publications	Equivalent No. of publications	Min Pub Point	Cum Score
L	24	3	3	3	24	24
SL	32	4	7	4	32	56
AP	48 (36)	6 (4.5 5)	13 (17.5 18)	6	48	104
P	60 (39)	7.5 (4.8 5)	20.5 (22.3 22)	8 (9)	64 (72)	168 (176)

To equitably separate the Professor from the Associate Professor, the interval between them in terms of number of publications should change from 2 to 3, which translates into 9 publications or 72 minimum publications points, and hence 176 cumulative publications points (see column g Table 3b). The Commission needs to consider this suggestion in order to set apart the Professor from the Associate Professor, while respecting equity principles.

Separating this points (or number of publications) would yield three distinct statistical levels, thus: Lecturer-Senior Lecturer; Associate Professor and Professor (see Figure 1). That means the Professor must stand out prominently from an Associate Professor, while an Associate Professor must stand out prominently from a Senior Lecturer. The question to ask is whether their remunerations reflect this pattern. While equity in remuneration is necessary, inter-grade gaps must also be wide enough to encourage people to seek to climb upwards. Insignificant additional remuneration undermines hard work as people get contented in their current positions.

It is the opinion of the authors that all fake grades corruptly earned should be revoked and persons placed in their rightful grades if the respect of academic and merit in higher education could be reclaimed. On the minimum promotion to associate and full professor must be based on cumulative performance at all other previous levels in addition to the minimum requirements to this position. This way persons who were promoted irregularly in preceding grades will not qualify for the ultimate academic position (Professor), thus sanctifying and rightly compensating this position. *Bona fide* Professors should then be recognised and be required to give their

inaugural lectures within one year of the promotion, after which an additional allowance should be factored in their remuneration package.

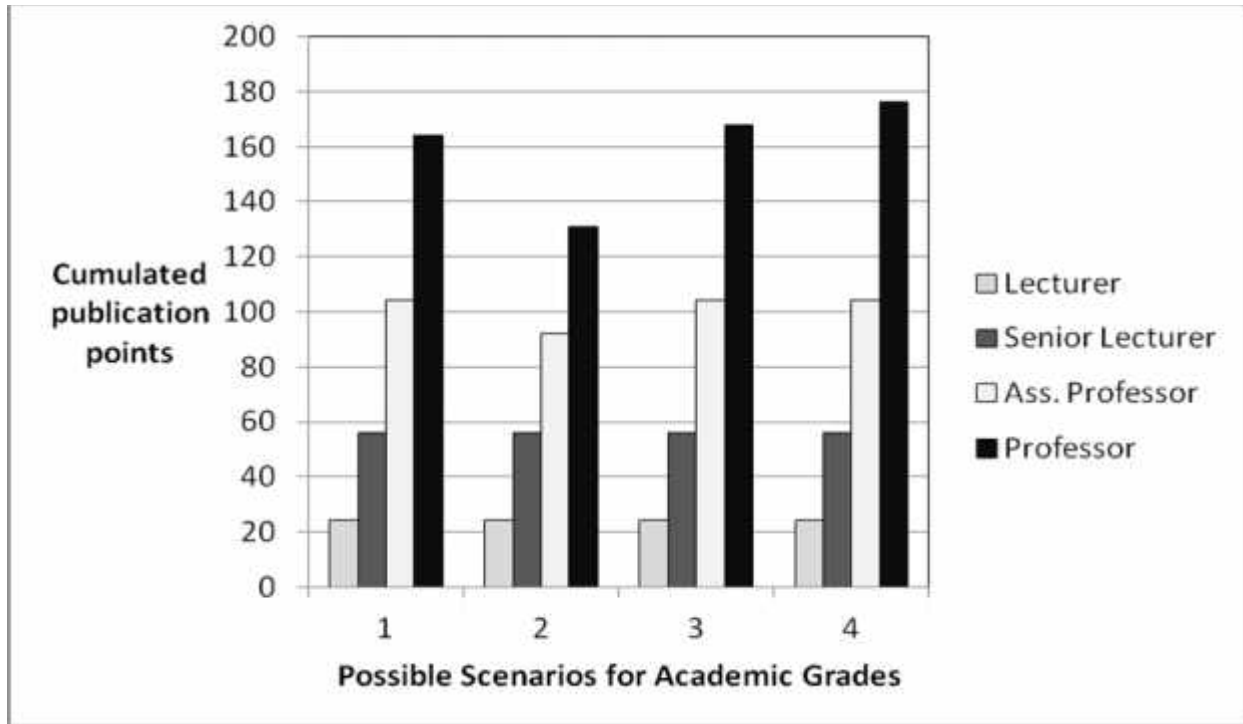


Figure 1. Cumulative publication points within university academic grades. Scenarios 1-3 are derived from the harmonised criteria (CUE 2014). Scenario 4 is the suggestion of authors after correcting the inconsistencies on associate professor and professor

Workload Distribution

According to Table 4, there is a contradiction between actual work load performances and expected weighted contribution as provided in the harmonised guidelines. For instance while a Professor is expected to spend 65% of his/her time in research and publications, the University allocates only 35% of his/her time for the same (i.e. 14 out of 40 hours per week). The same applies to an Associate Professor and all other cadres for persons not holding administrative responsibilities. Besides the statutory workload of 3 units per semester per teaching staff, the University still expects staff to take up extra teaching workloads from other programmes like open learning and Institution-based programmes. This pushes upwards the proportion allocated to teaching and instruction, while research and other core tasks suffer immensely.

It is paradoxical that during promotion in some public Universities, the same marginalised research is supposed to account for the largest proportion of weighted points.

Table 4

Relative weighted points for different cadres of academic staff

Area of Contribution (Tasks)	Prof	Ass. Prof	Senior Lecturer	Lecturer	Std. Workload (KU)
Research and Publications	65	60	50	40	35 (14)
Teaching and Instruction	15	20	25	30	60 (24*)
Professional consultancy/industry	10	10	10	0	0 (0)
Administrative Responsibility	5	5	10	20	5 (2)
Community engagement	5	5	5	10	0 (0)
Total	100	100	100	100	100 (40)

Source: *CUE Promotion Guidelines (except last column which shows Kenyatta University workloads per week in parenthesis (*) 10 hours of actual teaching and 14 for preparing to teach)*

According to the harmonised guidelines, Lecturers are supposed to participate in administration as opposed to other cadres. In practice however, the reverse is true. Professors who are expected to offer academic and research leadership tend to be appointed to clerical positions in top management, thus denying their mother departments critical academic expertise.

Similarly the guidelines expects Lecturers to have more community engagement, when their allocation for research and consultancies combined is the lowest, thus raising questions on the quality of community engagement expected from them. Strangely also the Lecturer is not expected to undertake professional consultancies and or industrial engagements, raising the concern as to whether a lecturer with consultancy evidence will be denied points, when under research and publications, this item carries 4 points.

Quality Teaching and Learning

In terms of quality of teaching and learning it is not clear in the guidelines how one could objectively rate lecture notes, student advising and mentoring. This will always be a challenge because at this level, students are supposed to be mature and take their own notes as lectures proceed. Further it is also plausible to assume that students who loath intensive individual

academic input are likely to underscore concerned lecturers when completing lecturer evaluation forms. Consequently there is need to development and implement a proper, tested, objective and proven criterion of measuring quality teaching and learning.

Community Engagement and Other Contributions

A challenge on this guideline is how to measure community engagement and other contributions. The tendency has been the requirement for academic staff to produce formal evidence when in most cases community service happens in very informal settings. It is therefore recommended that either all lecturers score the same on this item or it be deleted from the guidelines. Further provisions like “other guidelines to be developed by individual universities” are obvious loopholes that will be used to introduce non-academic variables to discriminate against the “unwanted” academic members of staff.

In terms of professional affiliations as a requirement, the paper questions the merit thereof because one could be a registered member of a professional body but totally absent and inactive. Unless this can be measured, the item should be deleted from the guidelines. Also the item on recognition, awards and honours would be a challenge because in Kenya where merit and hard work is criminalised, deserving persons are always victims of marginalization due to the process of awards being highly politicised. The guidelines should leave it at academic awards only.

Patents, Innovations and other Academic Achievements

While the maximum points to be earned from such items as patented Inventions or Innovations; consultancy and project reports and refereed exhibitions and performances are indicated, the maximum number of these performance indicators above which extra scoring may be necessary is not provided. As such scoring a person with 10 patented innovations equally with another who has one patented innovation is likely to discourage the drive for top performance. Although it is commendable for academic staff to be registered with relevant professional bodies, membership *per se* without evidence of active involvement in the functions of such professional bodies should not be a requirement in promotion.

Opening a Pandora's Box

Also the argument that in determining suitability for promotion individual universities may introduce other sub-categories is opening a Pandora's Box subject to abuse particularly in Kenya where standards are conveniently ignored in pursuit of private, sectarian, ethnic and unprofessional goals. Bearing in mind the enormity of past fraudulent promotions and the national cancer of corruption, this is a sure way of introducing mischief and thus encouraging an animal farm like scenario where different competences will attract the same promotion positions and hence compensation, depending on subjective opinion of the management. Subjective criteria that have been used in the past such as loyalty, supportiveness and personal friendship should never be used again.

Adjunct and Visiting Academic Staff

The appointment and promotion criteria establish the positions of Adjunct and Visiting Academic staff. While this is a good move and will help blend industry, research institutions and other relevant experiences, the threshold of 2 years of industrial experience is very low. Most consultants in other professions require a minimum of five years post qualification experience. It is thus the authors' considered opinion that a holder of a master's degree in the relevant field with 5 years of active industrial experience would make more sense. In addition, adjunct academic staff members should qualify academically on the harmonised criteria their professional experience notwithstanding.

As for the visiting academic staff, item (v) should be qualified to imply that visiting scholars particularly from other Universities will be vetted on the harmonized criteria and invited under the appropriate grades. This would eliminate academic fraud and impersonation, when people use titles they fraudulently obtained. Again it is worth noting that the position of external part-time lecturers is not mentioned anywhere in the appointment and promotion criteria established yet this is rampant in all universities in Kenya. It therefore deserves a mention.

Guidelines on the Transition Period

The effective date for implementing approved harmonized criteria was given as October 2014, being the date of approval by stakeholders during their meeting held at the Kenyatta International Convention Centre. As mentioned earlier, the greater majority of academic staff in public Universities was not aware of such a gathering. Had they known, their representative would have brought on board their views.

Although article 5 (iv) in CUE (2014) expects all existing staff who do not meet the minimum standards to work towards their attainment within 5 years (from the effective date, being 2014), the guidelines are silent on what should happen to staff who fail to meet these standards. Were an audit of all academic staff to be carried out in both public and private universities, including for persons in private sector and in state positions using these harmonised guidelines, a web of contradictions would be galore and a slur on the status and image of Universities and regulatory agencies.

If plagiarized PhDs are being recalled worldwide, Judges and police officers are being vetted in Kenya and imposters are stripped of their false positions, the precedent has been set upon which the Commission is duty bound and further based on morally in the public interest to vet all academic staff based on their cumulative points and rightfully place them. Avoiding such radical surgery would unfortunately communicate the message of self-preservation and thus give credence to the popularly held opinion that most people in top university policy and administration position are unlikely to meet the requirements of these harmonised guidelines. In the university there is no honour in carrying an academic grade that colleagues and peers know that one does not qualify to have.

Conclusions and Recommendations

There is no doubt that adherence to the harmonised promotion criteria will add a lot of value to the quality of academic service providers in Kenya. The guidelines offer a good start in reclaiming sanity and order in higher education across public and private universities. However in their current form they lend themselves to various loopholes that could be abused and thus defeat their envisaged goal. Accordingly, it is recommended that:

- There is need to maximise on stakeholder participation based on a bottom-up approach in seeking further input to enrich the guidelines. The final committee that would harmonise all collected views should be more representative and widely accepted by the key stakeholders that are to be served by the revised guidelines.
- For not providing academic staff equal opportunities, administrative positions should not attract any points in the promotion guidelines
- All items that attract points must be specified quantitatively and proportionately as a way for rewarding top achievers.
- Being subjective in their nature, student evaluations of lecturers should not attract any points in promotion, unless fair and a tested criterion is developed.
- Weighted publication points should encourage inter-disciplinary and multi-disciplinary research while at the same time discouraging joy-riding. To do this, authors should be expected to indicate their percentage contributions in any publication for use in sharing points. The Percent Contribution Indicator model stands out as the preferred approach.
- No room should be given to University Authorities to introduce “other” criteria that may not be academic and measurable. All items that attract points must be measurable with academic staff having equal opportunity to indulge in them.
- To reclaim the honour of merit and professional mutual respect, all academic staff regardless of their current grade should be vetted on a cumulative score based on a revised criteria and be placed where they rightfully belong. This way a message will be passed that corruption does not pay.
- Councils that have in the past violated standards and best practices, thus defaming Universities through corrupt appointments and promotions should be singled-out for accountability in-line with constitutional requirements in chapter 6 article 73 (1) on leadership and integrity.

- With such high requirements for promotion within academic grades, any purported “equivalents” to academic staff must be persons who have equivalent qualifications/professional, and can perform the same duties as the academic staff if called upon. Anything on the contrary would represent academic and professional fraud that has been prevalent in the past.

References

- Anderson C (1992). *Writer's Cramp*. Nature: 355:101
- Commission for University Education (2014). Harmonised Criteria and Guidelines for Appointments and Promotion of Academic Staff in Universities in Kenya, Nairobi.
- Commission for University Education (2015). Report of the Committee on Minimum Criteria for Appointments and Promotion of Academic Staff in Universities in Kenya
- Hunt R (1991). *Trying an Authorship Index*. Nature: 352:187.
- Johnson S (2006). *Are Ecologists Becoming More Gregarious?* Bull British Ecol Soc. 37:23-24.
- Laurence WF (2006). *Second Thoughts on Who Goes Where in Author Lists*. Nature 442:26.
- Leash E (1997). *Is it time for a new approach to authorship?* J Dental Res. 76:724-727.
- Regaldo A (1995). Multi-author Papers on the Rise. Science 268:25.
- Republic of Kenya (2010). The National Constitution. Government Printers, Nairobi.
- Republic of Kenya (2012). The Universities Act. Kenya Gazette Supplement No. 192, Nairobi.
- Schmidt RH (1987). *A Worksheet for Authorship of Scientific Articles*. Bull Ecol Soc America. 68:8–10.
- Verhagens JV, Wallace KJ, Collins SC and Thomas TR (2003). *QUAD system offers fair shares to all authors*. Nature 426:602
- Waswa F (2016). Reflections on Quality Assurance and Academic Titles in Kenya’s Higher Education System. Keynote Address presented in the Kenya DAAD Scholars Association, Mount Kenya Region, Annual Conference, 10th - 12th February, Karatina University
- Weltzien JF, Belote RT, Williams LT, Keller JF and Engel EC (2006). *Authorship in Ecology: Attribution, Accountability, and Responsibility*. Frontiers in Ecology and the Environment 4:435–441

Authors Profile

Prof. Fuchaka Waswa is an Agricultural Scientist and holds a PhD in Agricultural Land and Water Management from the University of Bonn, Germany. He is currently serving as an Associate Professor of Environmental Agriculture in the School of Agriculture and Enterprise Development, Kenyatta University. Fuchaka has published widely and supervised many Masters and PhD students. He is an alumni of DAAD (Germany), Fulbright Fellowship (USA) and Mashav (Israel). By virtue of his vast experience, Prof Waswa is also an authority in Higher Education Management, particularly Organizational Development and Change Management. For details visit faculty staff profiles at www.ku.ac.ke

Dr. Daniel Nyagetiria Akunga holds a PhD in environmental health from Kenyatta University and lectures in the Department of Environmental and Occupational Health, Kenyatta University. He has a proven record of research and postgraduate supervision; and also vast experience on consultancies with the industry. Daniel is a heart for championing the rights of people, a value that propelled him into becoming a valiant Organizing Secretary of the Universities' Academic Staff Union, Kenyatta University Chapter. For details visit faculty staff profiles at www.ku.ac.ke

Dr. Mark Makori Obonyo is a lecturer of Sociology of Education and Policy in the at Kenyatta university in Nairobi, Kenya. He holds a Bachelor of Education, a M.Ed. and PhD from Kenyatta University. He has written papers on Education and Career Expectations, Widening Access to Universities for students from marginalized regions and Access and participation in basic education for students from nomadic pastoralist communities in Kenya. Dr. Obonyo has participated in research projects as a research assistant touching on Corporatization of Public Universities in East African Region and Graduate Employability in Kenya.

The biographies of Dr Itolondo and Dr Mahiri can also be accessed from www.ku.ac.ke under respective faculty staff profiles

Building the University Sector of the Future: Experiences from Kenya

Eusebius Mukhwana, Jackson Too & Alice Kande

Abstract

Kenya has attached great interest in education as a stimulant for economic and social development since 1963. Higher education evolution in Kenya has been rapid and increased demand and pressure from the public has led to calls for innovative, adaptive and futuristic universities. Given the progressive growth of the sector, a number of measures have been and continue to be enforced by the Government and its agencies to ensure that universities comply and deliver on their mandates of teaching, research and community engagement. Prior to 2013, public universities were autonomous in their management having been created under their own Acts of Parliament; whereas the then Commission for Higher Education (CHE) only accredited and regulated private universities. While lauded for complying with universal principles to create independent and “thinking” universities, the autonomy was abused, and little attention was paid to quality. The universities opened large numbers of campuses across the country, launched many programs for which they neither had capacity nor resources and neglected support to post graduate training, research and outreach. Though the Commission for University Education (CUE) is mandated to regulate, coordinate and assure quality in both private and public universities in the country, the rapid expansion of the university sector has raised concerns on relevance, sustainability and the future of the sector. Informed by the recent reforms within the university sector, existing literature and recent studies conducted by CUE, this paper highlights some of the key emerging issues that play a significant role in shaping the university sector. Further it makes recommendations on strategic ways to build a resilient, vibrant and sustainable university education sector for the country.

Key words: Education, Quality, Equity, Relevance, Competitiveness

Introduction

In a knowledge economy, universities are considered the most important conduits for generating preserving, disseminating, and transforming knowledge into wider social and economic benefits (McCowan, 2009). While university expansion is a global phenomenon, the globalization process and growth of the knowledge economy which depended heavily on Information Technology and highly trained personnel necessitated rapid expansion and growth of university sector in 1990s across Africa (Bloom, Canning, & Chan, 2006) signaling that nations had embraced the need for investing in higher education. In reiterating the need for university sector in the region, the UN Secretary General Kofi Annan stated that:

“The university must become a primary tool for Africa’s development in the new century. Universities can help develop African expertise; they can enhance the analysis of African problems; strengthen domestic institutions; serve as a model environment for the practice of good governance, conflict resolution and respect for human rights, and enable African academics to play an active part in the global community of scholars” (United Nations Information Service, 2000).

The State of Higher Education in Africa report (2015) indicates that at 21% return on Investment, Africa receives the highest returns in the world from investing in higher education. This is despite the fact that only 6% of the young people in Sub-Saharan Africa are enrolled in higher education institutions compared to the global average of 26 percent. The promising news is that universities in many African countries are still experiencing a surge in enrolment given that between 2000 and 2010, higher education enrolment more than doubled, increasing from 2.3 million to 5.2 million. In Kenya, the changes in the 1990s necessitated diversification of funding and institutional arrangements for provision of university education became necessary. To supplement the then insufficient capitation by the Government, public universities introduced module II programmes while the need to increase access to higher education opened doors to establishment of private universities.

With the apparent support by the Government to increase access at all levels of the sector, the Kenya National Economic Survey of 2016 indicated that the education sector was among the key sectors that drove the economy making a contribution of 5.0% of GDP (KNBS, 2016). This

coupled with affirmative action activities that encouraged people living with disability, women and students from marginalized communities to access university education, has meant that student enrolment has continued to grow rapidly. This however, has not been matched with investments in physical, human and financial resources to support the sector (CUE, 2014). While the exponential growth of the university sector is applauded, of critical importance is the sustenance of quality university education to ensure that universities continually deliver on their mandate of producing qualified graduates capable of fitting in the highly dynamic industry and agile enough to embrace the changes in the future.

Objective

The general objective of the study was to determine the significant issues in the university sector that impact on the sectors sustainable future.

Methodology

The study used purely secondary data to address the objective. Data was obtained from documented sources at the Commission for University Education (CUE). Extensive references were made to data contained in the book: *The State of University Education in Kenya (CUE, 2016)* published by the Commission. Library and Internet search was undertaken to get current and relevant literature.

Background of the University Sector in Kenya

Higher Education in Kenya has gone through a trajectory dating back in 1922 when the then Makerere College in Uganda was established as a small technical college which was then expanded to meet the needs of the three East African countries; Kenya, Uganda and Tanganyika/Tanzania, as well as Zambia and Malawi. In the 1940s and early 1950s it was only Makerere College that was providing university education in East Africa. This lasted until 1956 when the Royal Technical College was established in Nairobi. In 1963, the Royal Technical College became the University College, Nairobi, following the establishment of the University of East Africa with three colleges which offered programmes and degrees of the University of London till 1966.

In 1970, the University of East Africa was dissolved to create three autonomous universities; University of Nairobi, Dar es Salaam and Makerere. The University of Nairobi was thus established as the first university in Kenya. Four decades later, the sector has expansively grown to a total of seventy (70) universities - thirty eight (38) privately established and thirty two (32) public universities (CUE, 2015), an unmatched growth in the African region besides that of the Republic of South Africa. This has been largely attributed to the liberalization of the higher education industry, the increasing number of secondary school graduates qualifying to join universities annually as well as the evidently growing population. The recognition of the key contribution of Education to attainment of the country's vision (Kenya Vision 2030) has also seen the sector receive commendable and increasing support from the Government such as increase in the amount of funds allocated for research as well as the placement of Government funded students in private universities, a move that resonated well with the national effort to expand access in higher education sector.

Status of University Education in Kenya – Enrolment and Graduation Rates

The expansive growth of the university sub sector in the country led to the need for establishment of the Commission for University Education (CUE) to regulate, coordinate and assure quality in the university education. CUE is mandated to ensure standards, quality, and relevance in all aspects of university education, training, research and community engagement. The Commission mainstreams quality assurance practices and encourages continuous improvement in the management of the sub sector. To perform its mandate, CUE collects data on regular basis from all the universities which is then used to generate policies and advisories relating to university education. For the purpose of addressing the objective of this write-up, the authors extensively referred to data on enrolment, graduation and publications.

Enrolment

That student enrolment in Kenyan universities has exponentially grown is indisputable. A recent study by CUE observed that student population in universities had increased from 195,428 in 2012 to 539, 749 in 2015 (Table 1). This depicted a 36 % increase in only three years. Of the total student enrolment in the year 2015, 90% were in public universities, while 10% were in private universities (CUE, 2016).

Table 1***Student Enrolment by Gender in Public and Private Universities***

Universities	Postgraduate Diploma		Bachelor		Master		PhD		Grand Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Public Universities	668	300	245,849	163,373	27,407	18,164	4,231	1828	461,820
Private Universities	272	152	32,663	33,865	5,505	4,385	684	403	77,929
Total	940	452	278,512	197,238	32,912	22,549	4,915	2,231	539,749

Source: (CUE, 2016)

The enrolment in the universities in Kenya is expected to soar even more and while this is a good reason to cheer, the preparedness of the universities by ensuring that they have qualified lecturers, instructional materials, and supportive infrastructure development have not kept pace with the heavy demand (Basheka, 2008; Gudo et al., 2011; Otara, 2012). Rising enrolment rates have drastically outpaced an increase in education funding, resulting in shortages of instructional materials and supplies, poorly stocked libraries and overuse of school facilities. Indeed, while more students are in school classrooms, there is a deeper learning crisis at play: many students are not gaining basic skills while attending school.

For an economy that pegs its future development on knowledge, the feedback from the industry and other stakeholders on inadequacy of the universities to fully deliver on their mandate is a great undoing.

Graduation Trends and Graduate Employability

It is widely recognized that long-term economic growth can only be achieved through investing in and producing highly skilled workforce. In the context of the knowledge economy, higher education has become particularly critical where universities are considered the most important mechanism for generating, preserving, disseminating, and transforming knowledge into wider social and economic benefits (AAI, 2015).

Kenya, through the 2010 Constitution and Vision 2030 affirms its support to enhancing higher education and training which is considered a critical part of the roadmap towards the actualization of the social transformation of the country (MOE, 2013). The country has generally been on the right track given the progressive increase in the number of students graduating from the universities, however, responsibility for the university education sector is to be able to meet the human resource requirements for a rapidly changing and more diverse economy.

With the increasing enrolments over the years, graduation trends in the country has soared extensively. However, as indicated in Table 2, the graduation rate does not match the high rate of enrolment and while the low graduation Figure could be attributed to many factors such as availability of funds, the status could also be partly attributed to students seeking alternative and more fulfilling ways to pursue their purpose in life as the Universities fail to deliver on their mission of transforming minds and the society through teaching, training, research and community development.

Table 2

Graduation Rates in Public and Private Universities (2012 – 2015)

Prog Levels	2012		2013		2014		2015		Total		Grand Total
	M	F	M	F	M	F	M	F	M	F	
Bachelor	17,412	14,311	21,537	18,628	28,986	23,783	32,995	27,866	100,930	84,588	185,518
PGD	336	244	507	304	1282	853	858	568	2983	1,969	4,952
Masters	2,415	1,932	2,949	2,340	4,022	3,248	4,865	3,726	14,251	11,246	25,497
PhD	134	63	167	102	268	159	295	174	864	498	1,362
Total	20,297	16,550	25,160	21,374	34,558	28,043	39,013	32,334	119,028	98,301	217,329

Source: (CUE, 2016)

The status of university education in Kenya indicates a progressive increase of 16% in the number of those who graduated between the year 2012 and 2015. While the output by the universities is evidently commendable, the Figures indicated that graduation rates at post graduate levels were quite low with only 0.6% and 11.7 % graduating at PhD and masters levels respectively in the year 2015. Given that the nation relies heavily on the university sector to drive the social and the economic pillar of Kenya Vision 2030, the country then currently operates in a precarious situation as the impact of university education may not be felt as much.

While the number of graduating students at undergraduate level has been soaring, there is widespread concern about the work readiness of graduates. Existing literature (AAI, 2015; Gudo et al., 2011) and anecdotal reports have indicated severe mismatch between the skills of young graduates and the skills that employers need for today's global workforce. While employers are generally satisfied with the disciplinary knowledge of students, they perceive significant gaps in their IT skills, personal qualities for instance reliability and transferable skills for instance team working and problem solving skills.

The observation on graduate employability is however not a Kenyan only situation. A report on graduate employability in Sub - Saharan Africa by McCowan (2009) indicates that despite the rapid expansion of higher education enrolments resulting to high number of graduates, there are serious concerns about the ability of universities to produce globally competitive graduates. This then implies that for the universities to proof their relevance and assure their sustainability into the future, there is need to redefine their purpose and ensure that they are in tandem with the industry needs. A university of the future should emphasize on producing employable graduates within the globalized market rationality.

Significant issues that influence and shape the future of universities

A world-class university can be characterized by the critical success factors it exhibits, including high concentration or critical mass of talent (both faculty and students); availability of sufficient resources to provide an extensive, comprehensive learning environment and a rich environment for advanced research; favorable governance allowing and encouraging autonomy, strategic vision, innovation; efficient resource management and flexibility (Bloom, Canning, & Chan, 2006). Drawing from existing literature and recent studies conducted by Commission for University Education, this paper highlights some of the key emerging issues that play a significant role in shaping the university sector and that impact on the universities sustainable future.

Access and equity in University education

University access has to do with enabling the admittance of a broader range of learners into higher education than are conventionally incorporated (Mulongo, 2013). This involves facilitating substantial number of candidates, especially drawn from marginalized categories (such as the poor, historically sidelined regions or tribal subgroups) to attain/access higher education. During the past decade enrolment in both public and private universities in Kenya has been characterized by rapid expansion (CUE, 2016). Patterns of access to both public and private universities tend to reflect increasing regional, gender and socio-economic differentiation in the Country. Commendable effort has been expended to ensure and promote expansion to satisfy the demand for university places of the growing population. This has been supported by putting in place and implementing policies to provide incentives and creating an enabling learning environment. For instance, in 2016 a total of 12,096 Government sponsored students were placed in private universities. This was applauded as a move in the right direction to enhance access in university education and to provide chances for more students to pursue courses of their choice.

The country has also put measures and developed policies to ensure that universities enroll and graduate sufficient post graduate students who are not only expected to make a great contribution through impact research but also for posterity of the growing university sector. As the country inches closer to the year 2030, there has been a lot of emphasis on the need to address issues related to access, equity and management of university education. Generally, access to university education in Kenya has expanded remarkably; providing more choices and varied modes of delivery (Otara, 2012). These gains could further be enhanced through introduction of Open, Distance and E-Learning (ODEL) to provide more study opportunities.

Quality and Relevance of University Education

Despite the rapid growth of the university sector as depicted by increased enrolments and number of graduates from the universities, the issue of failure to adhere with quality standards is a global as well as regional phenomenon (Bloom, Canning, & Chan, 2006). In Kenya, the current unprecedented expansion of universities, though in line with the country's development goal, has also been frequented by complaints about compromising the quality of education (Odhiambo, 2014) as well as failing to address the market demands (Gudo, Olel, & Oanda, 2011).

Odhiambo (2014) opines that Universities in Kenya have failed to clearly articulate their missions that stipulate, in no vague terms, the kind of graduates that they wish their education systems could produce. As the country aims at creating an adaptable human resource base that is relevant to the dynamic labour market, there is therefore need for a paradigm shift to ensure that the education provided meets high quality standards, and that its contents are relevant to the needs of the economy and society. This might require the universities to rethink their mission and ensure clear articulation and alignment of among others, their key functions of teaching, research and community engagement as well as ensuring total compliance with existing standards and regulations as stipulated by Commission for University Education.

To keep pace with the current dynamic global trends in higher learning, the university sector in Kenya needs to foster relevance by ensuring support for multidisciplinary learning to improve the current heavily skewed concentration by majority of the universities on Humanities and Arts as opposed to Science based courses (CUE, 2016). As provided Table 3 on graduation per cluster, it is evident that Kenya is not producing enough human resource in Science, Technology, Engineering and Mathematics (STEM), an area that is very critical if the country is to attain the aspired development stipulated in the national development blue print. The 2016 report by CUE as seen in Table 3 indicates that only 13% of graduates were in STEM courses.

Table 3***Graduation Trends per Cluster in Public and Private Universities in Kenya***

Clusters	Public Universities			Private Universities			Total			Proportion
	M	F	T	M	F	T	M	F	T	
Agriculture, Forestry and Fisheries	3,339	2,042	5,381	265	131	396	3,604	2,173	5,777	2.7%
Architecture	926	357	1,283	0	0	0	926	357	1,283	0.6%
Business and administration	22,748	16,669	39,417	13,175	14,827	28,002	35,923	31,496	67,419	31.0%
Computing	4,255	1,527	5,782	3,730	1,912	5,642	7,985	3,439	11,424	5.3%
Education (Arts)	12,826	11,309	24,135	6,388	8,594	14,982	19,214	19,903	39,117	18.0%
Education (Science)	3,950	2,183	6,133	1,630	994	2,624	5,580	3,177	8,757	4.0%
Engineering	6,209	1,364	7,573	31	6	37	6,240	1,370	7,610	3.5%
Environment	1,978	1,253	3,231	40	66	106	2,018	1,319	3,337	1.5%
Health and Welfare	4,397	3,909	8,306	2,221	2,465	4,686	6,618	6,374	12,992	6.0%
Humanities and Arts	6,877	6,926	13,803	2,502	1,641	4,143	9,379	8,567	17,946	8.3%
Journalism and Information	1,626	1,687	3,313	633	1,433	2,066	2,259	3,120	5,379	2.5%
Law	1,642	1,564	3,206	858	990	1,848	2,500	2,554	5,054	2.3%
Life Science and Physical Science	4,968	3,054	8,022	25	46	71	4,993	3,100	8,093	3.7%
Manufacturing	221	58	279	0	0	0	221	58	279	0.1%
Mathematics and Statistics	2,336	1,239	3,575	89	122	211	2,425	1,361	3,786	1.7%
Security and Conflict Resolution	1,354	584	1,938	109	100	209	1,463	684	2,147	1.0%
Services	743	862	1,605	65	139	204	808	1,001	1,809	0.8%
Social and Behavioral Science	2,373	1,949	4,322	1,053	2,214	3,267	3,426	4,163	7,589	3.5%
Teacher Training	812	930	1,742	817	1,527	2,344	1,629	2,457	4,086	1.9%
Veterinary	146	56	202	0	0	0	146	56	202	0.1%
Other	10	4	14	1,661	1,568	3,229	1,671	1,572	3,243	1.5%
Total	83,736	59,526	143,262	35,292	38,775	74,067	119,028	98,301	217,329	100.0%

Source: (CUE, 2016)

While there is an acute shortage of manpower in the engineering, ICT, science and medical fields, Universities are training students mostly in Business, Arts and humanities, who constitute 74% of all students enrolled. Yet the national agenda emphasize more on skills in medicine, pharmacy, engineering and technical-based programmes (STEM) as key requirements for the country to grow and attain its development aspirations. The prevailing situation in which the Humanities courses dominate the total student enrolment in universities seems to be holding back the achievement of this vision.

Governance and Leadership of Universities

There has been a move towards greater autonomy of the universities in the management of their internal affairs in Kenya (Odhiambo, 2014). With all universities now governed by the Universities Act, operations of the sector have been harmonized leading to an improvement in the previously segregated mode of running the universities. The competitive recruitment process of Vice chancellors and other senior managers, for instance, that is currently in place is quite commendable and should be protected as it is transparent, accountable and meritocratic (GOK, 2012). While the new law has addressed this by setting out clear organs of managing universities and their roles and responsibilities, the country is yet to see the outcome of proper utilization and implementation of the stipulated guidelines as far as steering universities growth is concerned.

A major challenge which has bedeviled the sector has been the process of appointing Members of the Councils/Boards of these institutions (Odhiambo, 2014). For quite a while, there were no clear guidelines for this process as it was left to the discretion of the Minister of Education and the Head of State (GOK, 2012). This created a lacuna where the political elite and others with vested interests nominated their cronies. The result was appointment of persons with little or no experience in University management and administration who failed to steer the institutions in the right direction. Gudo et al., (2011) opines that the universities that succeed best are likely to be those with strong leadership that has the confidence to challenge vested interests.

Research, Innovation and Community Service

Recent evidence as indicated in Figure 1 reveals that research productivity in Kenya is quite low compared to other countries in Africa, such as South Africa, Egypt, Nigeria and Algeria and the little that is done is largely academic that does not benefit the end users (CUE, 2016). While universities are required to play their three crucial roles of teaching, research and outreach, regulations by the CUE have only tended to emphasize teaching at the expense of these other roles (University Standards and Guidelines, 2014). Previous interrogation has indicated a number of factors that have greatly contributed to low research activities such as insufficient funding, limited time for university academic staff as they focus more in teaching at the expense of researching, lack of research infrastructure, lack of clear research focus, misinformed priorities for universities as well as poor absorption and use of research (Odhiambo, 2014). Figure 1 shows the number of publications produced in the country in peer reviewed journals from 1996 until 2014, while Figure 2 shows publications per program during the same period.

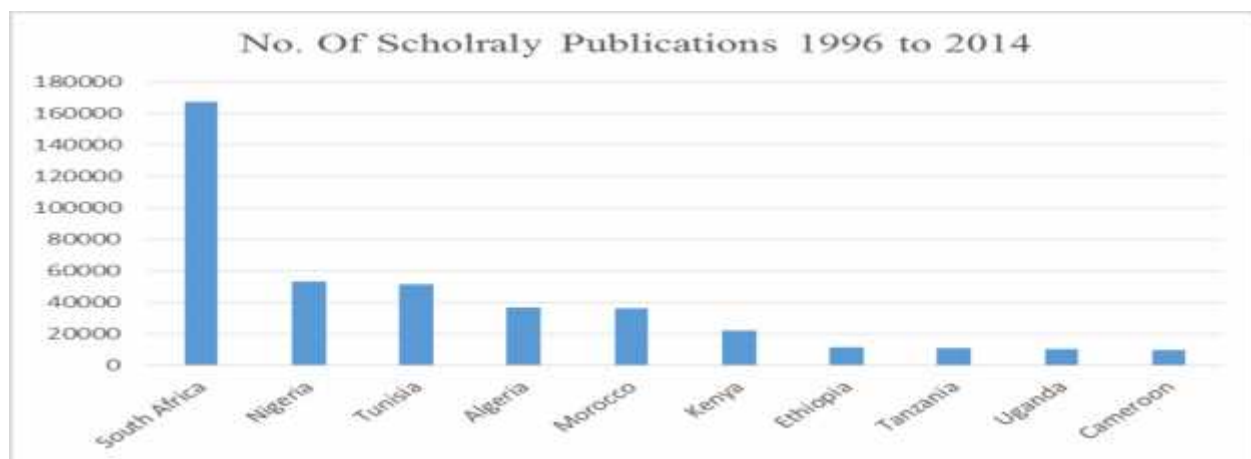


Figure 1. Publications from Kenya, 1996 to 2014

Source: (CUE, 2016)

Absorption of existing research funds has been less than optimal, which is cited as a major hindrance to impactful research by universities (Otara, 2012). However, as established in the ST&I Act of 2013 and with the establishment of the National Research Fund, funding allocation to university research is expected to rise if the Government meets its commitment of 2% of the country's Gross Domestic Product to facilitate research and innovation in all fields of Science and Technology for the growing economy (NRF, 2016).

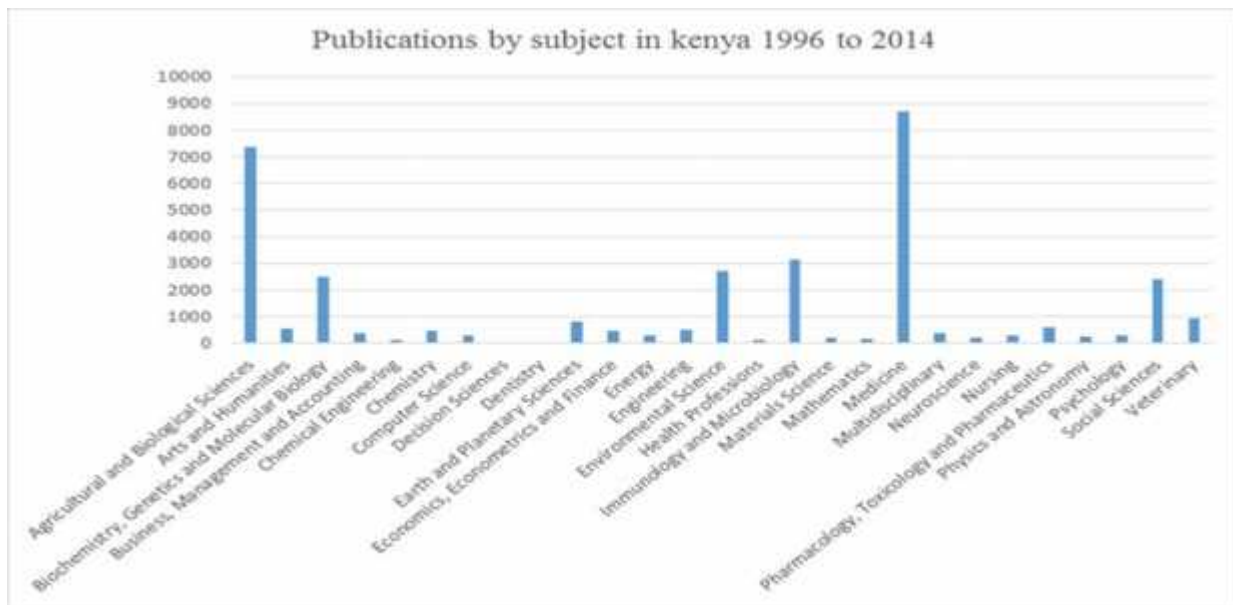


Figure 2. Publication by subject Source: (CUE, 2016).

The current situation in higher education is worrying as little has been done to tap the latent pool of creative initiatives and research outputs for economic use to transform lives. There is an abysmal dearth of knowledge on how to use research findings to catalyze innovation to make life easier or mitigate everyday life problems (McCowan, 2009). Related to this is the issue of Intellectual Property Rights, an area that players in the University Education sector have little knowledge about, on how to have their products evaluated and secured through patents. (KIPI, 2015). A report by KIPI on enhancing Intellectual Property awareness in the country indicated that the country has great potential to harness innovations but unfortunately local research centers, innovation hubs and higher education institutions do not utilize the available opportunities to innovate. To build resilience, universities are expected to be at the forefront embracing research and innovation if they are to play their expected role in driving the national development agenda.

Linkages with TVET sector

Kenya Vision 2030 places great emphasis on the link between Education, Training and the labor market as well as the need to create entrepreneurial skills and competencies and strong public and private partnerships (MOE, 2013). Among the key players mandated to drive the socio-economic and technological transformation agenda is the Technical and Vocational Education and Training Authority (TVETA) considering their contribution towards producing globally competent and sustainable human capital.

Despite the critical role that TVET plays in contributing to national development, the Sector Performance Standards report of 2015 pointed out some of the major challenges that the sector faces including low student enrolment fueled by negative perception about TVET by parents and potential students, lack of dynamism in the curricular, obsolete technology, poor funding and an apparent bias for degree programmes (Sector Performance Standards, 2015). The sector is also faulted for lack of a clear career path for a long time that tended to discourage many potential students and made universities to usurp the mandate of TVET institutions by mounting diploma and other tertiary courses.

The absence of strong Government support, lack of leading TVET champions and apparent apathy from the general public led to a number of TVET Institutions being elevated to Universities (Ndunda, 2016) despite the lack of sufficient resources. The dire consequences of elevation of TVET institutions to universities however called for Government attention and action and by 2016, the Government had built 70 TVET institutions while 87 more were under construction to meet the increased demand for mid-level manpower training programmes (TVETA, 2016).

University and the TVET sectors contribution towards national sustainable development can only be attained through leveraging on each of the sectors strengths as per their mandates unlike engaging in unhealthy competition that makes the institutions lose focus and relevance. Similarly, as the key definers of the skills needs of the economy and the key beneficiaries of the skilled workers produced by universities, the industry plays a crucial role in developing the university sector (Bloom, Canning, & Chan, 2006).

The industry should tap the resources available in universities more effectively, while the universities should become more flexible in meeting the industry needs.

Postgraduate Research and Training

Postgraduate qualifications are increasingly a necessity for careers in the public and private sectors alike (Basheka, 2008). A forward looking nation is expected to strengthen the flow of skills at the highest level into key sectors of the economy as well as ensure preparedness of tomorrow's leading academics for posterity of the higher education sector.

The low enrolments rates and the subsequent low graduation rates at the post graduate level as observed in Tables 1 & 2 indicates that the country falls short of producing a critical component of driving the national development agenda while the sufficiency of universities future academic leaders may be at bleak. A 2016 report on post graduate research and training in Kenya indicated that while the expansion of undergraduate access to university education is receiving increasing attention, universities are not allocating adequate resources to the development of postgraduate programmes (Too, 2016). In 2015 for instance, university statistics indicate that graduate enrolment stood at approximately 11.9% of the student population up from 10% in 2014, a situation that is deemed to be insufficient in view of the country's current and future needs (CUE, 2016). Drawing from success stories from the West, a university of the future is expected to strengthen its post graduate training, research capacity and innovativeness while ensuring that the outcomes are translated into economic impact (Tam & Thompson, 2012).

Internationalization of Education

Higher education globally has experienced dramatic changes in recent years. There is no doubt that it should be viewed in the global context and not solely from a domestic point of view. The presence of international students is now a core part of the student body for the world's leading universities (International Trends in Higher Education, 2015). According to a report on the future of Higher Education, Internationalization is no longer just about the mobility of students and signing of international memoranda of understanding, but also pertinent aspects such as internationalization of curriculum, internationalization of research, offering of dual degrees with foreign partners, establishing of branch campuses abroad, involvement of international

alumni, creation of international quality assurance frameworks, proliferation of international rankings and increased competition for international students in a globally interconnected world (Francisco, 2011). The university sector in Kenya has been applauded for making efforts to open doors to international students as well as enhancing collaborative links with international bodies (Otieno, 2012), however, the sector still falls short of meeting the global competitiveness as far as internationalization is concerned as observed in the recent study on the status on university education in Kenya (CUE, 2016).

Conclusion

Many nations are investing in university education, seeing that the higher level skills of graduates and the social and economic benefits of research are central to an advanced 21st century society. The role of the university is no longer seen as uniquely being an institution for the personal development of its students. Increasingly, there is an expectation on universities to engage with the local communities in which they exist and to help the socially-excluded to adapt to the demands of the knowledge economy. Universities that are engaged with businesses and the local community are vital in driving economic and social prosperity both for the region in which they sit and beyond. The Kenyan University sector, like any other globally, must work tirelessly to obtain and maintain its international standing and contribution in the knowledge economy. While the enrolment trend continues to go up, the universities will require a sustainable strategy to ensure that as the world becomes more technological, the institutions evolve to provide the right education and training for jobs in today's workforce in readiness for the future expectations (Basheka, 2008).

Thus, to meet the demands of competitiveness in the 21st century and of the future, universities must work in smarter and more innovative ways. The University sector of the future must be agile enough to embrace the multiplicity of the dynamics in the sector.

Recommendations

While there have been policy and legal reforms within the Kenyan university sector, these are yet to bear fruits. There is need for more efforts and dialogue in order to create world class universities of the future in the local setting. Of critical importance is to implement the proposed

Differentiated Unit Cost (DUC) funding system to develop and support education programmes that deliver strategic skills needed in the country. This will mean enhanced support to the programmes that support development of the key sectors identified in the national development blue print, as well as other skills that will underwrite the country's competitive advantages as stipulated in Kenya Vision 2030. However, whereas Government capitation is important, it is critical to note that in the current circumstances, getting sufficient funding through public expenditure alone will be extremely difficult. It is therefore important for universities to develop diverse set of funding streams if the quality of higher education is to be maintained and improved. Universities should endeavor to engage in more local and international partnerships so as to enhance their long term ability to compete. Ensuring the long-term sustainability of our universities and growing their reputation will lead to greater partnership potential.

Generally, universities should put mechanisms in place to ensure that graduates are equipped with required skills, as opposed to academic qualifications devoid of competency. The university sector in Kenya should be responsive to the demands of both undergraduate and postgraduate training, embedded and integrated in a wider education and skills framework and capable of equipping all students with the capabilities and confidence to prosper - This is an absolute priority for posterity of the university sector.

References

- AAI. (2015). *Sate of Africa Education Report: A report card on the progress opportunities and challenges confronting Higher Education sector*. Africa- America University.
- Basheka, B. C. (2008). *Value for Money and Efficiency in Higher Education: Resources Managaement of Higher Education in Uganda and its Implications for Quality Education Outcomes*. Kampala: Uganada Management institute.
- Bloom, D., Canning, D., & Chan, K. (2006). *Higher Education and Economic Development in Africa*. Harvard University.
- CUE. (2014). *Handbook of Universities in Kenya..* Commission for University Education. Nairobi
- CUE. (2016). *University Statistics in Kenya*. Commission for University Education In Kenya. Nairobi

- DBIS. (2009). *Future of universities in a knowledge economy*. European Consortium, Department of Business Innovation Skills. Spain
- Francisco, M. (2011). *The Future of Higher Education Internationalization*. The Chronicles of Higher Education.
- GOK. (2012). *Amended University Act No. 42 of 2012 (Amended 2016)*. National Council for Law. Nairobi
- Gudo, C., Olel, M., & Oanda, I. (2011). University Expansion in Kenya and Issues of Quality Education: Challenges and Opportunities. *International Journal of Business and Social Science*, 2(20) 203 - 214.
- International Trends in Higher Education*. (2015). University of Oxford.
- KIPI. (2015). *Enhancing Intellectual Property Awareness*. Nairobi: KIPI.
- McCowan, T. (2009). *Can Higher Education solve Africa's job crisis? Understanding Graduate Employability in SSA*. British Council.
- MOE. (2013). *Kenya Vision 2030 MTP 11: Education and Training*. Nairobi: MOE.
- MOE. (2013). *Kenya Vision 2030: Medium Term Plan 11*. Nairobi: MOE.
- Mulongo, D. (2013). Inequalities in Accessing Higher Education in Kenya: Implications for Economic Development and Well Being. *International Journal of Humanities and Social Sciences*, 3(16) 49 - 61.
- Ndunda. (2016). *Council reforms Technical Institutes to close gap*. Nairobi: Nation Media.
- NRF. (2016). *National Research Fund*. Nairobi.
- Odhiambo, G. (2011). Higher Education Quality in Kenya: A critical Reflection of Key Challenges. *Quality in Higher Education*, 17(3) 299 - 315.
- Odhiambo, G. (2014). The Challenges and Future of Public Higher Education Leadership in Kenya. *Journal Of Higher Education Policy and Management*, 36(2) 183 - 195.
- Olel, M. (2011). *Privatization of Higher Education: Effect of privately sponsored students programme on Efficiency and Equity in Public Universities in Kenya and Uganda*. Lambert Academic Publishing.
- Otara, A. (2012). The Future of Education and its Challenges in Africa. *International Journal of Humanities and Social Science*, 2(9) 151 - 156.

- Otieno, A. (2012). Internationalization of an African University in the Post Colonial Era: A Case Study of University of Nairobi. *Education Policy Studies and Evaluation*, Paper 3 http://uknowledge.uky.edu/epe_etds/3.
- Sector Performance Standards, 2nd ed.* (2015). Nairobi: Ministry of Devolution and Planning, Kenya.
- Tam, J., & Thompson, A. (2012). *The Importance and Characteristics of UK's World Class Universities*. Britain: Russel International Excellence Group.
- Too, J. (2016). *Report on University Post Graduate Research and Training in Kenya*. Commission for University Education. Nairobi
- TVETA. (2017, March 17). Retrieved from <http://www.tvetauthority.go.ke/>.
- United Nation Universities Report*. (2009). Japan: UNU.
- United Nations Information Service*. (2000, August 3). Retrieved from Information Technology should be used to tap knowledge from greatest universities to bring learning back: www.unis.unvienna.org/unis/pressrels

Authors' Profile

Eusebius Mukhwana, PhD is the immediate former Deputy CEO in charge of Planning, Research and Development with the Commission for University Education in Kenya where he largely contributed in the the Commission's research agenda. Though trained as a soil microbiologist, Dr. Mukhwana has vast interest and experience in Educational Policy, Management and Educational Leadership. He has authored and co-authored numerous articles and books on University Education status.

Too, Jackson, PhD. is an Associate Professor of Pedagogy and Mediated Instruction. He has an impeccable track record of teaching, research and community engagement. He has served in various leadership positions in the university and participated in numerous seminal presentations, as well as involvement in humanitarian initiatives. Currently, he is working for Commission for University Education as Senior Assistant Commission Secretary - Research and Development.

Alice Kande, PhD, has been a Lecturer, Head of Department and Research Co-coordinator in charge of both Research Training and Supervision. Currently, she is a Senior Research Officer at the Commission for University Education. Alice has keen research interest in Organizational resilience and competitiveness as well as Issues in University Leadership and Management. Her email is akande@cue.or.ke

Towards Becoming an Industrialized Middle-Income Country: Recasting the Focus

Jackson Too, Muriithi Njeru and Claris Adoyo

Abstract

The level of enrolment and staff in Science, Technology, Engineering and Mathematics (STEM) in Africa still remains low despite the efforts by Government and other interest groups. Yet these are the subjects, which would catapult the continent to greater heights of development. The disconnect between public policy statements and what is obtained on the ground is quite worrying. The situation on enrolment and teaching at university level in Kenya, best exemplifies the sorry picture of these subjects in Africa. A survey conducted in both public and private universities in Kenya reveal depressing statistics: out of 539,749 students enrolled in all universities in Kenya, less than 5% are enrolled in science-related courses namely: Agriculture, Forestry and Fisheries; Mathematics and Statistics; Engineering; Manufacturing; Architecture; Education Science, Veterinary and Environment. In contrast, Humanities and Arts; Business and Administration; Education Arts and Social Health studies have all their enrolments surpassing 10%. Data obtained for staffing for these courses shows a corresponding pattern where the academic staff for science and technology courses are very few. This scenario negates all efforts that have been claimed to promote the teaching and learning of these disciplines in higher education. The conclusion drawn from these findings is that there is a need to review the existing policies, curriculum and pedagogy, entry requirements, learning equipment, staffing, infrastructure, and the funding model of STEM in Kenya.

Key Words: Curriculum; Enrolment; Pedagogy; Staffing; Technology

Introduction

The evolution of technology over the years and the impact it has made on every facet of our lives has been quite fascinating and amazing (Matos, 2008). The impact of science and technology, particularly the Information Technology (IT) in the 20th Century has been very significant (Tettey, 2006). It is the realization of what science and technology can do that has shaped the thinking of policy makers in different parts of the world. The achievement of Russian State by sending man into the outer space using a spacecraft in early 60s, jolted the American Nation into researching intensely; culminating in their putting the first man in the moon in 1969.

Over the years relentless effort and resources have been put to Science, Technology, Engineering and Mathematics (STEM). This effort has been evident in the school curricula and training at all levels. In Africa, there has been more talk about Science and Technology, but little has been achieved over the years. Apart from the M-Pesa innovation that has been acclaimed worldwide for having revolutionized paperless transaction of money and transformed lives; there is no other well-known tangible product or innovation that Africa can proudly celebrate as her great achievement.

The African Union envisions that Africa will achieve an innovation led economy by 2024 and has put forward the Science, Technology and Innovation Strategy for Africa (STISA-2024) to foster social transformation and economic competitiveness, through human capital development, innovation, value addition, industrialization and entrepreneurship. The African Heads of States have yet an opportunity to back their commitment towards this regional agenda by implementing their national socioeconomic plans.

The Kenyan Government's blue print—Vision 2030—at its core articulates the need to emphasize science and technology courses to help the country transform into “a newly industrialized, middle-income country providing a high quality life to all its citizens by the year 2030 (Republic of Kenya, 2013). Yet even this long-term vision fails to outline substantive measures taken to address pre-existing issues already affecting the system and to delineate a framework that lays out a clear path on how to get there by 2030.

What is clear is that Kenya's public higher education sector requires reforms for it to play a catalytic role in transitioning Kenya from a subsistence economy towards a knowledge economy. In Kenya, researchers and curriculum experts have made tremendous efforts to influence the Government to commit more resources to science and technology. To some extent the Government has made strides to meet those needs; however the results of those endeavours have not been felt.

Objectives

The objectives of the survey were as follows:

- i. To determine the number of students enrolled in science and technology programmes in the university;
- ii. To establish the ratio of staff to students in the science and technology based programmes in the university;
- iii. To analyze the impact of the type of programmes on offer in universities and the number of students enrolled on realization of national priorities.

Literature Review

A look at the experiences of newly industrialized countries reveals that they have struggled with problems similar to Kenya's current challenges including poor infrastructure, low GDP, and low levels of funding for academic research (Johnson, 2002; Mazzoleni, 2008). But remarkable economic growth and tremendous success of Brazil, China, Korea, and Taiwan was underpinned and enhanced greatly by critical investments in a number of areas including: reforms focused at modernizing institutions of higher education; policies supportive of STEM fields; aggressive collaborative investments in academic research (R&D) by both Governments and the private sector and clear links between higher education and the economy at both conceptual and policy levels.

Specifically, investments in higher education focused on rapid expansion of university systems, increased enrolments in general and specifically in STEM education, funding the development of public research laboratories, funding research activities collaboratively with the private sector and creating incentives to encourage foreign-based scientists to return and reverse brain-drain

(Gardner, 2011; Johnson, 2002; Mazzoleni, 2008). This mix of initiatives resulted in the creation of a large, skilled talent pool that continues to drive research production, technological capabilities and ultimately economic growth in these countries.

Partnerships between universities, industry, and Government have proved useful to enhancing economic growth and competitiveness both in post-industrial economies of the West and in newly industrialized economies of the East (Douglass, 2009). Compelling empirical evidence of the vast potential and immense benefits of these collaborations is visible in the United States of America where the federal Government and industry invest billions of dollars in cutting-edge research programs at leading research universities spread out across the country including in California (Silicon Valley), Massachusetts (Kendal Square), and in Texas (Austin Area) (Douglass, 2009; King, 2009).

Similar kinds of research-focused collaborations are visible across Europe and in parts of Asia - China, Taiwan, Singapore (Etzkowitz & Zhou, 2009; Lin, 2009). In Taiwan, for instance, university-industry-Government collaborations led to the creation of innovative technologies that played a major role in transitioning that country's agrarian economy of the 1950's to the modern knowledge-based economy where economic activity is driven by explosive growth in demand for and sales of electronics worldwide (Johnson, 2002; Lin, 2009). Kenya's Konza techno-city project needs to be fast-tracked if the country is to be taken seriously as developing.

Methodology

This paper is based on a survey of all universities in Kenya. The data collected from both public and private universities covered various variables in the university such as enrolment, staffing, programmes, staff qualification, graduation trends and enrolment of students with disabilities.

The design of the data collection process was quantitative. The target population included students and academic staff in all public and private universities in Kenya. The sampling design used was a saturated census in which all the cases were considered. Data was collected over a period of six months from all the 68 public and private universities licensed to operate in Kenya at the time of data collection. A closed-ended questionnaire was used to capture enrolment of

students in public and private universities disaggregated by gender and academic level. For academic staff, gender, academic qualification, establishment and tenure (i.e. whether full time or part time) were captured in the tool.

In order to secure the validity and usability of the questionnaire, it was subjected to two validation workshops. The university representatives were taken through the tool to be familiar with each item and to seek clarification where there was ambiguity. The intense discussions, which followed, contributed significantly to the improvement of the tool. Filled questionnaires were sent through the email. Universities, which delayed in sending the questionnaires, were tracked and phone calls made. Questionnaires, which were not duly filled were sent back and the persons concerned in the university asked to complete them fully.

Findings

All the questionnaires received from universities were collated and entered into one main excel sheet. Data was extracted from the excel sheet and analyzed according to the following variables: university programmes, student enrolments, staff qualifications and establishments. Descriptive statistics, which included frequency tables, percentages, ratios, charts and graphs were used to analyze data. These were then compiled into one document.

Programmes in Public and Private Universities

Humanities and Arts cluster had the highest proportion of programmes across the universities at 14%, followed by Business and Administration and teacher training at 11.1%, Life Science and Physical Science programmes as well as Agriculture, Forestry and Fisheries with 10.7% each. On the other hand, the least represented clusters were Manufacturing, Law, Architecture and Veterinary. Table 1 gives a summary of the number of programmes per cluster in both public and private universities.

Table 1***Programmes per cluster in Private and Public Universities***

Cluster	Public Universities	Private Universities	Total	Proportion
Agriculture, Forestry and Fisheries	354	9	363	10.7%
Architecture	26	0	26	0.8%
Business and Administration	268	117	385	11.3%
Computing	109	54	163	4.8%
Education (Arts)	219	68	287	8.4%
Education (Science)	50	6	56	1.6%
Engineering	138	7	145	4.3%
Environment	126	8	134	3.9%
Health and Welfare	244	60	304	8.9%
Humanities and Arts	326	149	475	13.9%
Journalism and Information	69	16	85	2.5%
Law	6	7	13	0.4%
Life Science and Physical Science	352	13	365	10.7%
Manufacturing	10	1	11	0.3%
Mathematics and Statistics	127	13	140	4.1%
Security and Conflict Resolution	41	9	50	1.5%
Services	59	12	71	2.1%
Social and Behavioral Science	120	57	177	5.2%
Teacher Training	65	29	94	2.8%
Veterinary	31	1	32	0.9%
Other	13	19	32	0.9%
Total	2,753	655	3,408	100.0%

*CUE Data, 2016***Enrolment per Cluster in Public Chartered Universities**

In Public Chartered Universities at Bachelors level, the cluster with the highest enrolment was Business and Administration with 65,832 students, followed by Education (Arts) with 62,095 and Humanities and Arts with 33,030. The clusters with lowest enrolment were in Veterinary with 1,022 students; Manufacturing with 2,157 students and Law with 3,248 students.

At Master's level, the clusters with the highest enrolment were Business and Administration with 18,436 students, Humanities and Arts with 5,745 students and Health and Welfare with 3,637 students. Those with the least were manufacturing with 1 student, Veterinary with 59 students and Architecture with 172 students. At Doctorate level, the clusters with the highest level of enrolment are Business and Administration with 2,301 students, Education Arts with 579 students and Social and Behavioral Science with 461 students. The two with the least are Law and Manufacturing with no students enrolled. For Post-graduate Diploma program the three clusters with the highest level of enrolment are Education (Arts) with 378 students, Humanities and Arts with 129, Teacher Training with 109 students and Engineering with 79 students.

In general, the clusters with the highest number of enrolments were Business and Administration with 86,643 students and that with the lowest enrolment is Veterinary with 1,122 students. Table 2 shows the total enrolment of students grouped in different clusters in Public Chartered Universities. Private Universities had a similar trend, but had much fewer courses compared to public universities. It is evident from these statistics that the university training in the country is giving too much attention to quantity instead of quality.

Table 2***Enrolment per Cluster in Public Chartered Universities***

Clusters	Bachelors		Postgraduate Diploma		Master		PhD		Grand Total	Proportion
	M	F	M	F	M	F	M	F		
Agriculture, Forestry & Fisheries	14,623	8,738	0	0	1,130	491	181	52	25,215	5.70%
Architecture	3,347	1,530	0	0	137	35	7	1	5,057	1.10%
Business & Administration	38,787	27,045	48	26	11,057	7,379	1,678	623	86,643	19.60%
Computing	10,267	2,278	8	8	814	225	143	54	13,797	3.10%
Education (Arts)	32,524	29,571	256	122	1,549	1,573	347	232	66,174	15.00%
Education (Science)	16,774	8,417	0	0	137	104	16	8	25,456	5.80%
Engineering	16,530	3,321	64	15	877	197	61	10	21,075	4.80%
Environment	4,490	3,623	2	2	620	305	183	89	9,314	2.10%
Health & Welfare	10,076	9,413	62	13	2,045	1,592	174	149	23,524	5.30%
Humanities & Arts	16,415	16,615	85	44	3,174	2,571	301	136	39,341	8.90%
Journalism & Information	5,262	4,465	0	0	417	399	127	80	10,750	2.40%
Law	1,605	1,643	0	0	194	200	0	0	3,642	0.80%
Life Science & Physical Science	21,359	9,946	34	5	1,277	593	252	79	33,545	7.60%
Manufacturing	1,833	324	0	0	1	0	0	0	2,158	0.50%
Mathematics & Statistics	8,451	3,909	43	10	533	219	145	75	13,385	3.00%
Security & Conflict resolution	3,270	1,235	0	0	366	181	26	5	5,083	1.20%
Services	3,735	4,291	0	0	244	310	29	31	8,640	2.00%
Social & Behavioral Science	16,650	12,546	6	2	2,043	1,399	366	95	33,107	7.50%
Teacher Training	2,423	2,151	57	52	381	151	98	63	5,376	1.20%
Veterinary	745	277	0	0	44	15	29	12	1,122	0.30%
Other	5063	4889	0	0	189	93	3	0	10237	2.30%
Total	234,229	156,227	665	299	27,229	18,032	4,166	1794	442,641	100%

CUE Data, 2016

Academic Programmes to Students Ratio

On average, the number of students per programme is 158. The most popular cluster is Law with an average of 551 students per programme, followed by Education (Science) with an average of 543 students per programme. Business and Administration cluster had an average enrolment of 312 students. Some of the clusters with the least number of students include Veterinary, Environment, Agriculture, Forestry and Fisheries with 36, 73 and 74 students per program respectively. This information is presented in Table 3.

Table 3

Programmes to Students Ratio in Public and Private Universities

Cluster	No. of Programmes	No. of Students	Prog: Students
Agriculture, Forestry and Fisheries	363	26,916	1:74
Architecture	26	5,057	1:195
Business and Administration	385	120,223	1:312
Computing	163	22,650	1:139
Education (Arts)	287	79,368	1:277
Education (Science)	56	30,432	1:543
Engineering	145	21,872	1:151
Environment	134	9,843	1:73
Health and Welfare	304	30,578	1:101
Humanities and Arts	475	46,139	1:97
Journalism and Information	85	14,623	1:172
Law	13	7,161	1:551
Life Science and Physical Science	365	34,569	1:95
Manufacturing	11	2,293	1:208
Mathematics and Statistics	140	14,834	1:106
Security and Conflict resolution	50	5,890	1:118
Services	71	9,341	1:132
Social & Behavioral Science	177	38,373	1:217
Teacher Training	94	6,945	1:74
Veterinary	32	1,148	1:36
Other	32	11,494	
Total	3,408	539,749	

CUE Data, 2016

Academic Staff per Cluster and Rank

An analysis of the spread of academic staff along the five academic ranks gives some interesting insights about staff in universities. Table 4 shows that most professors were found in the science-related fields: Agriculture 211 (1%); Health and welfare 250 (2%); Life and Physical Sciences 248 (2%). On the other hand, staff in the rank of lecturers were concentrated in Business and Humanities. Specifically, 1,358 (8%) lecturers were in Business and Administration; 726 (5%) lecturers were in Humanities and Arts and 581 (4%) lecturers were in Education (Arts). Staff in the rank of Assistant Lecturers again were mainly concentrated in Business and Administration 1,240 (8%) and Education (Arts) 543 (3%). Table 4 shows academic staff per cluster and rank.

Academic Staff per Cluster in Public and Private Universities

There were 16,001 academic staff by rank in public and private universities consisting of 11,828 in public and 4,173 in private universities. Business and Administration cluster had the highest number of academic staff at 3,082 representing 20% of the total academic staff. Health and Welfare cluster had 1,753 teaching staff representing 11% followed by Humanities & Arts cluster with 1,635 representing 10%. The clusters with the smallest number of academic staff were Manufacturing, Security and Conflict Resolution and Education (Science) and Architecture with 50, 128, 152 and 231 respectively. All these clusters registered a proportion less than 1% of the total teaching staff in public universities. Table 5 shows the number of teaching staff in public and private universities. Unless this pattern is regulated, the country will continue witnessing mass production of graduates in Business Administration, Humanities and Arts, with scant staff, which contradicts the current focus on science, technology and innovation for industrialization agenda as espoused in the Kenya Vision 2030 (Republic of Kenya, 2013).

As indicated in Table 5, analysis of these two broad categories of universities of the staffing levels per cluster shows that public universities generally have higher staff levels compared with private universities in all the clusters offered. But there exists a striking similarity in the proportion of academic staff for some clusters. Business and Administration; Health and Welfare and Education (Arts) registered high staff levels in both public and private universities.

It is worth noting that private universities do not offer some clusters especially those that are science-oriented: in fact there were no Lecturers for those clusters.

Table 4
Proportion of Academic Staff per Cluster and Rank in Public & Private Universities

Clusters	Rank					Total
	Professors	Senior Lecturers	Lecturers	Assistant Lecturers	Graduate Assistants	
Agriculture, Forestry and Fisheries	211	133	288	193	78	903
	1.3%	0.8%	1.8%	1.2%	0.5%	5.6%
Architecture	24	36	101	56	14	231
	0.1%	0.2%	0.6%	0.3%	0.1%	1.4%
Business and Administration	114	279	1,358	1,240	91	3,082
	0.7%	1.7%	8.5%	7.7%	0.6%	19.3%
Computing	40	87	355	363	48	893
	0.2%	0.5%	2.2%	2.3%	0.3%	5.6%
Education (Arts)	123	188	581	534	39	1,465
	0.8%	1.2%	3.6%	3.3%	0.2%	9.2%
Education (Science)	15	23	53	40	21	152
	0.1%	0.1%	0.3%	0.2%	0.1%	0.9%
Engineering	79	108	220	200	155	762
	0.5%	0.7%	1.4%	1.2%	1.0%	4.8%
Environment	35	58	171	204	44	512
	0.2%	0.4%	1.1%	1.3%	0.3%	3.2%
Health and Welfare	250	318	726	346	113	1753
	1.6%	2.0%	4.5%	2.2%	0.7%	11.0%
Humanities and Arts	176	204	726	471	58	1635
	1%	1%	5%	3%	0%	10%
Journalism and Information	20	29	175	105	31	360
	0.1%	0.2%	1.1%	0.7%	0.2%	2.2%
Law	21	47	197	90	21	376
	0.1%	0.3%	1.2%	0.6%	0.1%	2.3%
Life and Physical Sciences	248	201	498	452	116	1515
	1.5%	1.3%	3.1%	2.8%	0.7%	9.5%
Manufacturing	10	7	13	7	13	50
	0.1%	0.04%	0.1%	0.04%	0.1%	0.3%
Mathematics and Statistics	57	48	136	235	39	515
	0.4%	0.3%	0.8%	1.5%	0.2%	3.2%
Security and Conflict Resolution	7	15	30	63	13	128
	0.04%	0.09%	0.19%	0.4%	0.1%	0.8%
Services	11	16	38	98	33	196
	0.07%	0.10%	0.24%	0.61%	0.21%	1.2%
Social and Behavioral Sciences	125	133	432	241	71	1,002
	0.8%	0.8%	2.7%	1.5%	0.4%	6.3%
Teacher Training	5	14	36	68	4	127
	0.03%	0.1%	0.2%	0.4%	0.02%	0.8%
Veterinary	55	36	52	32	27	202
	0.3%	0.2%	0.3%	0.2%	0.2%	1.3%
Other	42	30	24	42	4	142
	0.3%	0.2%	0.1%	0.3%	0.02%	0.9%
Total	1,668	2,010	6,210	5,080	1,033	16,001
	10%	13%	39%	32%	6%	100%

CUE Data, 2016

Table 5***Academic Staff per Cluster in Public and Private Universities***

Clusters	Public Universities	Private Universities	Total
Agriculture, Forestry and Fisheries	819 5%	84 1%	903 6%
Architecture	231 1%	0 0%	231 1%
Business and Administration	1,883 12%	1,199 7%	3,082 19%
Computing	452 3%	441 3%	893 6%
Education (Arts)	1,048 6.5%	417 2.6%	1,465 9.2%
Education (Science)	144 0.9%	8 0.05%	152 0.95%
Engineering	761 4.8%	1 0.01%	762 4.76%
Environment	433 2.7%	79 0.5%	512 3%
Health and Welfare	1,338 8.4%	415 2.6%	1,753 11.0%
Humanities and Arts	962 6.0%	673 4.2%	1,635 10.2%
Journalism and Information	248 1.5%	112 0.7%	360 2.2%
Law	210 1.3%	166 1.0%	376 2.3%
Life and Physical Sciences	1,484 9.3%	31 0.2%	1,515 9.5%
Manufacturing	50 0.3%	0 0%	50 0.3%
Mathematics and Statistics	431 2.7%	84 0.5%	515 3.2%
Security and Conflict Resolution	128 1%	0 0%	128 1%
Services	172 1%	24 0%	196 1%
Social and Behavioral Sciences	694 4.3%	308 1.9%	1,002 6.3%
Teacher Training	124 0.77%	3 0.02%	127 0.79%
Veterinary	193 1.2%	9 0.1%	202 1.3%
Other	23 0.1%	119 0.7%	142 0.9%
Total	11,828 74%	4,173 26%	16,001 100%

CUE Data, 2016

Academic Staff to Student Ratio per Cluster in Public Universities

Staff to student ratio is one of the most important statistics in any learning institution. This helps in determining the loading levels of the faculty, adequacy of learning space and availability of materials for teaching and learning. Data presented in Table 6 shows the teacher student ratio in public universities. Three clusters stand out as having a relatively high teacher student ratio. These were Education (Science) (1:186); Education (Arts) (1:66) and Business and Administration (1:50).

The clusters with the least ratio included Veterinary, Law, Environment, Health and Welfare and Architecture. The overall staff: student ratio in public universities is 1: 39. This data is presented in Table 6.

Table 6
Academic Staff to Student Ratio per Cluster in Public Universities

Clusters	No. of Staff	No. of Students	Ratio
Agriculture, Forestry and Fisheries	819	26,648	1:33
Architecture	231	5,057	1:22
Business and Administration	1883	93,331	1:50
Computing	452	15,137	1:34
Education (Arts)	1048	69,188	1:66
Education (Science)	144	26,772	1:29
Engineering	761	21,710	1:29
Environment	433	9,587	1:22
Health and Welfare	1338	23,599	1:18
Humanities and Arts	962	40,179	1:42
Journalism and Information	248	11,298	1:46
Law	210	3,642	1:17
Life and Physical Sciences	1484	34,385	1:23
Manufacturing	50	2,290	1:46
Mathematics and Statistics	431	14,396	1:33
Security and Conflict Resolution	128	5,126	1:40
Services	172	8,934	1:52
Social and Behavioral Sciences	694	33,491	1:48
Teacher Training	124	5,673	1:46
Veterinary	193	1,122	1:06
Other	23	10,255	
Total	11,828	461,820	1:39

CUE Data, 2016

The staff to student ratios obtained in public universities (1:39) is the same as those in Ghanaian universities (1:39) in 2006/2007 (Tettey, 2010). However, Ghana's private universities have more pressure on the academic staff as the ratio stands at 1:41; compared to the Kenyan case (1:19). On the other hand, South Africa, maintained an average ratio above 1:40 during the period 2001 – 2006 (ibid). But the OECD and EU countries averages were recorded at 1:16 and 1:16 respectively in 2009. (UNESCO Institute of Statistics downloaded from www.oecd.org/edu/eag2011). Kenya might take a long time to reach the EU standards of staff to student ratio since the rate of student enrolment is much higher than the staff development programmes.

Implications of the nature of Programmes offered in Universities in Kenya

The current findings have clearly indicated that public and private universities in Kenya have prioritized programmes in Business Administration, Humanities and Arts. While the market requires graduates in the manufacturing, construction, ICT and other Science related courses, too much concentration in arts at the expense of science – oriented programmes is likely to disadvantage some key national development sectors, which require more practical skills. The findings also indicated that most programmes offered in universities were similar which implies that competition for enrolment into each programme by various institutions would mean lean class sizes and over-production of graduates with similar skills.

These findings are not unique to the Kenyan university sector. The World Bank Annual Report (2014) indicated that the Japanese and British education systems have lately suppressed support and mounting of courses in Arts and Humanities in favour of practical subjects which better target the development needs of these nations. Some programmes were found not to be market-driven but mounted with the expectation of generating revenue for the respective institutions. Notably, some universities developed and mounted programmes with insufficient physical facilities as well as teaching capacity in STEM. There is therefore need to consider the current as well as the future market trends in determining the programmes. Similarly, universities should be encouraged to focus more on their areas of specialization. This will eliminate unnecessary competition and assure quality delivery.

The rapid expansion of the university sector in Kenya has provided an opportunity for majority of students who qualify to access higher education. While having an educated populace is a good indicator for the country's development index, it has also posed a number of challenges such as having many graduates who are not adequately prepared for the market or whose qualifications do not match the market demands (MacGregor, 2008). This calls for continuous review of the programmes offered to ensure alignment to the current and future market demands.

Alignment of Universities Programmes to the Kenya Vision 2030

The Kenya Vision 2030 envisages a “*Globally Competitive Quality Education, Training and Research for Sustainable Development*”. In this regard, university education is meant to contribute to national development through high level relevant manpower training; develop the intellectual capability of individuals to understand and appreciate their local and external environments; and acquire both physical and intellectual skills which will enable individuals to be self-reliant and useful members of the society. The Ministry of Education should explore other ways of growing a competitive workforce. A popular strategy used by newly-industrialized economies is that of sending young scholars abroad to bring back new knowledge and skills in fields such as science, medicine, engineering, technology, law, diplomacy and social services (Republic of Kenya , 2013).

In order to achieve the goals above, university programmes should be clearly aligned to the development needs of the country. The realization of the objectives and targets of the Kenya Vision 2030 similarly, hinge on the successful implementation of the enablers or foundations of the three pillars. These include among others: Infrastructure (roads, rail network, seaports airports and pipeline); Information Communication Technology (ICT) and Science, Technology and Innovation (ST&I). The Kenya Vision 2030 further identifies seven priority sectors with high potential of spurring the country's economic growth and development. The sectors are: Tourism, Agriculture and Livestock, Wholesale and Retail trade, Manufacturing, Business process outsourcing/IT Enabled Services (ITES), financial services, oil and mineral resources. For the nation to attain the anticipated 10 percent GDP in the next 14 years, universities have a critical role to play in producing innovative graduates with relevant skills. This could be attained if curricula is aligned to the seven key priority areas.

Conclusion and Recommendations

From the foregoing discussion, it has emerged that the country has given too much premium to quantity rather than quality. The reality is that we are not doing well in the core business that defines a university- research and outreach (Omanga, Saturday, 11th March 2017 p.10). Universities should re-engineer themselves by focusing more on research and innovation in their programmes. Mere teaching and transfer of content without a corresponding hands-on experience or practical work is an effort in futility.

The Commission for University Education (CUE) should steer the sector in a deliberate and strategic manner that distinguishes a university as either research or teaching university. A research university will be expected to have its staff recruited and maintained solely on their commitment to engage in full time research with minimal teaching. These universities will be expected to run doctoral programmes and graduate schools where there is a strong focus on innovation and research. The rest of the universities would be categorized as teaching universities, where graduate programmes are only up to master's level, with emphasis on teaching undergraduate programmes. There is need to recast the focus of higher education, training and research if Kenya is to become a middle-income industrialized country by 2030.

References

- African Union Commission (2014). Science, Technology and Innovation Strategy for Africa 2024, March 2017.<http://www.hsrc.ac.za/uploads/pageContent/5481/Science,%20Technology%20and%20Innovation%20Strategy%20for%20Africa%20-%20Document.pdf>
- Douglass, J. A. (2009). A world of competitors: Assessing the U.S. high tech advantage, the role of universities, and the process of globalization. Berkeley, CA: Public Policy Press/Center for Studies in Higher Education.
- Etzkowitz, H. & Zhou, C. (2009). Evolution of the university's role in innovation and the new Asia model. In J.A. Douglass, C. J. King, & I. Feller (Eds.), Globalization's muse: Universities and higher education systems in a changing world (pp. 229-246). Berkeley, CA: Public Policy Press/ Center for Studies in Higher Education.

- Commission for University Education (CUE, 2016): University statistics in Kenya, First Edition. Division of Planning, Research and Development, CUE, Nairobi, Kenya.
- Kenya Law (2010). The Constitution of Kenya. Nairobi: Government Printer.
- King, J. (2009). University roles in technological innovation in California. In J.A. Douglass, C. J. Johnson, A. T., & Hirt, J. B. (2011). Reshaping academic capitalism to meet development priorities: The case of public universities in Kenya. *Higher Education*, 61(4), 483-499.
- Lin, O. C. (2009). Bridging university and industry: Taiwan's model of a national innovation system. Press/Center for Studies in Higher Education.
- OECD, Argentina, China, Indonesia: UNESCO Institute for Statistics (World Education Indicators Programme) – www.oecd.org/edu/eag2011.
- MacGregor, K. (2008). Africa: Lag in Sub-Saharan Participation. *University World News*, April 27. <http://www.universityworldnews.com/article.php?story=20080424153306970>.
- Matos, N. (2008). Trends and Challenges of Higher Education in Africa. Address at the Meeting of the Steering Committee of the Working Group on Higher Education by Narciso Matos, Executive Director of the Foundation for Community Development, Maputo.
- Mihyo, P. (2007). *Staff Retention in African Universities and Links with Diaspora Study*. Report for the Association for the Development of Education in Africa Working Group on Higher Education.
- Nyangau, Z. (2014) "Higher Education as an Instrument of Economic Growth in Kenya," *FIRE: Forum for International Research in Education*: Vol. 1: Iss. 1, Article 3.
- Republic of Kenya (2006). Transformation of Higher Education and Training in Kenya to Secure Kenya's Development in the Knowledge Economy: Report of the Public Universities Inspection Board. Nairobi: Government Printer.
- Omanga, D. (2017). To beat the best; we must separate Research and teaching Universities, Nation Media Group, Nairobi.
- Republic of Kenya (2012). The Universities Act No. 42 of 2012. Nairobi: Government Printer.
- Republic of Kenya (2013). Kenya Vision 2030 Medium Plan II Education and Training 2013-2018. Towards a Globally Competitive and Prosperous Kenya. Nairobi: Government Printer.
- Tetty, J. (2010). Partnership for Higher Education in South Africa, Alberta Canada.
- The World Bank (2014). The World Bank Annual Report. Washington D.C.

UNESCO. (2008). *EFA Global Monitoring Report 2008: Education for All by 2015: Will we make it?* London: Oxford University Press.

Gardner, E. (2011, August). Brazil promises 75,000 scholarships in science and technology. *Nature*. Retrieved July 2, 2013 from <http://www.nature.com/news/2011/110804/full/news.2011.458.html>

Mazzoleni, R. (2008). Catching up and academic institutions: A comparative study of past national experiences. *Journal of Development Studies*, 44(5), 678-700.

Authors Profile

Too, Jackson, PhD, is an Associate Professor of Pedagogy and Mediated Instruction. He has an impeccable track record of teaching, research and community engagement. He has served in various leadership positions in the university and participated in numerous seminal presentations, as well as involvement in humanitarian initiatives. Currently, he is working for Commission for University Education as Senior Assistant Commission Secretary - Research and Development.

Muriithi Njeru is an experienced data analyst and works at the Commission for University Education in the department of Research and Development.

Claris Adoyo is a Research Officer at the Commission for University Education. She holds a Master of Arts in Project Planning and Management and a Bachelor of Science in Biochemistry and Chemistry from the University of Nairobi.

Uncertainty in Universities in Kenya: The Role of Public Relations Function

Catherine Nandain

Abstract

Universities are riddled with uncertainty at unprecedented levels. Even though organizational change is inevitable, the ongoing statutory and regulatory structural changes are contributing to vagueness, ambiguity and disorientation in the internal operations and planning functions of universities, as well as among its internal publics. This situation is further aggravated by the absence of effective public relations function in the management structures and corporate leadership roles. A recent empirical study revealed unprecedented state of uncertainty of up to 90 percent caused by legal framework such as Universities Act 2012, upgrading of technical and middle level colleges into universities, sporadic student enrolments as well as proliferation of campuses without commensurate facilities. These are all external changes that have caused uncertainty in the internal operations of the universities. Based on the findings of the study, it was apparent that although public relations function plays a critical role in management of organizational uncertainty, this is not effectively mainstreamed in the operations of universities. The study adopted a triangulated design and data collection based on self-administered questionnaires, structured and in-depth interviews as well as focus group discussions. This paper recommends the mainstreaming of PR function in the university's corporate leadership structure and its strategic management.

Introduction

Although public relations function plays a critical role in management of organizational uncertainty, the study revealed absence of it. A triangulated design and data collection based on self-administered questionnaires, structured and in-depth interviews as well as focus group discussions were administered. Mainstreaming of PR function in the university's corporate leadership structure was recommended.

Public Relations (PR) is “one of the key management functions within the organization” (Jugo, Sruk, & Hruška, 2013, p. 820). It is the communication management function that is known for establishing and maintaining mutual and beneficial relationships between organizations and their

publics, on whom their success or failure depends (Belasen, 2008; Broom, 2009; Cutlip, Center & Broom, 2000; Grunig, 1992 a, 1992 b). Every organization is therefore expected to establish and maintain processes, activities and functions that provide an enabling environment, for PR to thrive. PR function can therefore be viewed as a subset tool of PR, whose main responsibility is that of identifying, analyzing, and disseminating information between an organization and its publics, with the aim of persuading them to maintain a certain point of view or positive orientation about the organization's activities (Broom, 2009; Van Riel, 1995).

Uncertainty has become a common phenomenon in modern organizations. This is particularly due to the ever-changing internal and external environments that organizations have to operate in. From the foregoing description, uncertainty is therefore a state of mind, whose key characteristics are; unpredictability, unreliability, inconsistency, unsureness, indecision, hesitancy, skepticism and lack of certainty, all of which are caused by an environment of anonymity about the future (Clampitt & Williams, 2000; Milken, 1987). Uncertainty, therefore, depicts a state of disorientation or disharmony in people's minds. As emphasized by Milken (1987), it is people in the organization who feel uncertain and not organizations. To this end, the use of the phrase 'organizational uncertainty' implies the people in the organizations not the organizations themselves.

Statement of the Problem

The growing demand for university education in Kenya prompted the Government to respond by upgrading middle level colleges to university status and introduction of new rules, standards and regulations for quality assurance. However, eventual compliance to these regulations have significantly altered the usual structural, operational and interpersonal relationships leading to uncertainty. If uncertainty is not minimised, efforts to fulfil the university's vision, mission and objectives shall remain hindered (Clampitt & Williams, 2000, p. 13).

Previous studies have shown that, organizational uncertainty can be lessened through effective use of public relations function. This study therefore was to assess the role of PR function in managing organizational uncertainty among the internal publics of public Universities in Kenya.

Purpose of the Study

The purpose of this study therefore was to assess the role of PR function in bridging communication gaps with a view of minimizing, lessening or eliminating uncertainty during the transitional period.

Research Questions

The following questions guided the study to its conclusion; what types of uncertainty existed? What communication factors caused uncertainty? What was the role of PR function in managing uncertainty?

Theoretical Framework

Two theories were adopted; first, is Taylor's co-orientation theory of organization which explains organizational changes, the theory posits that if change is not well communicated it leads to disorientation, hence uncertainty (Newcomb & Theodore, 1953). The second is C.R Berger and Calabrese's uncertainty reduction theory (URT) which explains how an organization's management can make deliberate attempts to manage uncertainty caused by organizational change among its internal publics (Berger and Calabrese, 1975). In both these theories, PR function as a relational management tool is usually used to enhance communication and to minimize uncertainty.

Methodology

A descriptive survey design was adopted (Austin & Pinkleton, 2006; Chandra, 2004; Stacks, 2006), with a mix of quantitative and qualitative approaches. Because descriptive surveys seeks for detailed data and insights about respondents, especially attitudes, beliefs, actions, and opinions, it was found appropriate for the study (Stacks, 2006).

The study aimed at collecting detailed factual information that described existing phenomena (Vyhmeiser, 2001). The information contains responses from respondents on their attitudes, feelings, behavior and opinions in relation to organizational change and uncertainty management at Technical University of Kenya(TUK), (Kothari, 2004; Orodho, 2003).

On the one hand, qualitative approach determined the instruments for collecting data from respondents by engaging participants in flexible interactions, which yielded information that is rich and extensive to measure subjective levels of accuracy, precision and validity (Austin & Pinkleton, 2006; Chandran, 2004; Creswell, 2009; Kothari, 2004). Interview schedules and Focus Group Discussions were used in the collection of qualitative data, a structured questionnaire was used to collect numerical data, in relation to demographics like age, number of years worked, level of education, job designation, communication approaches used and the level of effectiveness.

Data Analysis

The filled questionnaires were collected, and subjected to Statistical Package for Social Sciences (SPSS) for processing and presentation, while responses from interviews and focus group discussions were, first transcribed, then presented. Data from focus group discussions and subjected to Qualitative Data Analysis (QDA) software as well as descriptive data presentation, while data from interviews was presented using tables and descriptive approach. The following section deals with data presentation, analysis and interpretation from each of the three tools of data collection.

Discussion

The discussion of the findings were based on the objectives of the study, which were; to establish the types of uncertainty, to determine the communication factors causing uncertainty and to examine the role of PR function in managing uncertainty at TUK.

PR Role in Uncertainty Management

PR function in managing uncertainty at TUK with the question; what is the role of PR function in managing uncertainty at the Technical University of Kenya? This objective was addressed by question 15 of the questionnaire, question 12 of the interview guide and question 4 of the focus group discussion guide. Majority of the questionnaire respondents (50.0%) disagreed with the assertion that, public relations played a key role in identifying and communicating information between the University's management and the rest of the staff to reduce uncertainty. The findings point to the fact that PR function did not play any significant role in ensuring that

uncertainty among internal publics was managed. Responses from interview respondents indicated that PR function was actually none functional in accordance with the construct of this study, while responses from focus group discussions indicated that PR was for the external publics and not internal. These opinions can further be justified by the organizational chart of TUK, which clearly shows that the corporate communications and marketing director is not among the senior management functions of the University.

Conclusion

Deriving from this study, and in addressing specific objectives of the study as well as addressing the statement of the problem of the study, the following conclusions were highlighted:

Environmental (external), organizational (group) as well as individual (job-related) uncertainty all existed among different cadre of internal publics of TUK as a result of the ongoing change process.

Communication factors such as; predominant use of one- way approach of communication, provision of untimely, unclear, imprecise and incomplete information; ineffective methods of gathering and utilizing feedback were responsible for the existence of organizational uncertainty at TUK.

Despite the existence of clear trends that public relations hold an increasingly important role in organizational management at the global level, there was significant evidence that the role of PR function was misunderstood, and so it was not playing its role effectively towards managing uncertainty at TUK, especially on the strategic level.

Recommendations

The study recommends that the management should incorporate the PR function in the executive management, so that the officer is part of the planning and execution of change processes, with the view of harmonizing and building consensus between the internal publics, especially in making decisions and responses to changes at the university.

Areas for Further Research

The study also makes the following recommendations for further research;

- Methodological study on the identification and management of uncertainty at the university during the transition period in public universities in Kenya should be carried out.
- Communication audit studies should be conducted at various universities including Technical University of Kenya with a view of developing communication approaches and networks and PR models that lessen uncertainties.
- Studies on alternative communication approaches in university education sector should be done with a view of contributing to existing literature.
- A research to establish public relations function framework in public Universities in Kenya should also be conducted.

References

- Austin, E.W., & Pinkleton, B.E. (2006). *Strategic public relations management: Planning and managing effective communication programs*. New York: Routledge
- Belasen, A. T. (2008). *The theory and practice of corporate communication: A competing values perspective*. London: SAGE Publications.
- Berger, C. R., & Calabrese, R. J. (1975). Some explorations in initial interaction and beyond: Toward a developmental theory of interpersonal communication. *Human Communication Research, 1*(2), 99-112.
- Broom, G. M. (2009). *Effective public relations* (10th ed.). New Jersey: Pearson.
- Chandran, E. (2004). *Research methods: A quantitative approach with illustrations from Christian ministries*. Nairobi: Daystar University.
- Clampitt, P. G., & Williams, M. L. (2000). *Managing organizational uncertainty: Conceptualization and measurement*. Paper presented at the international, communication association conference, San Diego, CA.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approach* (3rd ed.). London: SAGE.

- Grunig, J. E. (1992a). Symmetrical systems of internal communication. In J. E. Grunig (Ed.), *Excellence in public relations and communication management* (pp. 531-575). Hillsdale, NJ: Erlbaum Associates.
- Grunig, J. E. (1992b). Communication, public relations, and effective organizations: An overview of the book. In J. E. Grunig (Ed.), *Excellence in public relations and communication management* (pp. 1-28). Hillsdale, NJ: Erlbaum Associates.
- Jugo, D., Sruck, B., & Hruška, D. (2013). *The role of public relations in the process of corporate governance*: Proceedings of the 1st International OFEL Conference on Corporate Governance, 12th April, 2013, Dubrovnik, Croatia. Retrieved April 7, 2015, from www.gbv.de/dms/zbw/799260606.pdf.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques* (2nd ed.). New Delhi: New Age International (P) Ltd., Publishers.
- Milken, F. (1987). Three types of perceived uncertainty about the environment: State effect, and response uncertainty. *Academy of management Review*, 12(1), 133-143.
- Newcomb, T., & Theodore, M. (1953). An approach to the study of constructive acts. *Psychological Review*, 60(3), 393-404.
- Orodho, A. J. (2003). *Essentials of educational and social sciences research methods*. Nairobi: Masola Publishers.
- Stacks, D. W. (2006). *Primer of public relations research*. New York, NY: The Guilford Press.
- Van Riel, C. B. M. (1995). *Principles of corporate communication*. London: Prentice Hall.
- Vyhmeiser, N. J. (2001). *Your indispensable guide to writing quality research papers*. Michigan: Zondervan.

Authors Profile

Catherine holds a master's Degree in Communication Studies (Corporate option) from Daystar University. She also has a Bachelor of Education (Arts) from Kenyatta University. She is currently pursuing her PhD in Communication Studies at Technical University of Kenya (TUK). She is an Assistant Lecturer, at TUK, in the department of language and Communication Studies, School of Information and Communication Studies, Faculty of Social and Technology Studies. Her email address is; cnandaine@gmail.com

Reviewers

Prof. Madara Ogot

He is an Associate Professor in Mechanical Engineering and the Director, Research and Extension, University of Nairobi. Email: madaraogot@uonbi.ac.ke

Prof. Francis Wambalaba

He is a Development Economist and currently Professor of Economics and Associate Deputy Vice Chancellor of Academic Affairs responsible for Research at the United States International University-Africa (USIU-A). Email: fwambalaba@usiu.ac.ke

Prof. Rose Ruto-Korir

She is an Associate Professor of Educational Psychology at Moi University. She is also the Director of the Institute of Open Distance Learning since February 2016 and Chief-Editor of 'Educational Journal of Behavioral Sciences', a refereed online International Journal housed at Moi University. Email: korircheptoo@gmail.com

Prof. Jackson K. Too

He is an Associate Professor of Instructional Media, Pedagogy and Communication Technology of Moi University. He has served as Post graduate Coordinator and Head of Department for Curriculum and Instruction. Currently, he is a Senior Assistant Commission Secretary and Head of Research and Development at the Commission for University Education (CUE). In this role he oversees the formulation, implementation and review of research policies and strategies of the Commission. Email: jtoo@cue.or.ke

Prof. Marcella Mwaka

Professor Marcella Mwaka is an Associate Professor of Moi University and currently serves as a Senior Assistant Commission Secretary and Head of Programme Accreditation Department at the Commission for University Education. Her email address is mmwaka@cue.or.ke

Conference Sponsors

Diamond Sponsors



Platinum Sponsors



Gold Sponsors



Bronze sponsors



List of Delegates

Denotes those who presented papers

Joseph Hitimana* University of Kabianga, Kenya	Lucia Muia Commission for University Education	Eunice Keta Commission for University Education	Muriithi Njeru* Commission for University Education
John Muraguri* Kenya University and Colleges Central Placement Service	Rose Kanira Commission for University Education	Dr. Peace Agufana* Commission for University Education	Pius Walela* Commission for University Education
Syprine L. Otieno Kenyatta University	George Jobungah Commission for University Education	Valeria Onsando Commission for University Education	Prof. S. M. Kagwanja Chuka University
Prof. R. Manohar Kenyatta University	Geoffrey Wanjala Commission for University Education	Maggy Mwangangi Commission for University Education	James M. Kiburi Ministry of Education
Joshua M. Kilundo Kenya Institute of Curriculum Development	Ronny Mbaabu Commission for University Education	Zachary Waweru Commission for University Education	Dr. J. Gathoni Njoora Independent Researcher
Bala Hussein Kenyatta University	Richard Ambayi Commission for University Education	Judith Oketch Commission for University Education	Clara Kilaha University of Nairobi
James Igamba JIMCO Africa	Jane Ongong'a Commission for University Education	Doris Kirimi Commission for University Education	Lamech Obuya Kenyatta University
Sergio Gonzalez Springer Nature	Caroline Muthoni Commission for University Education	John Mutethia Commission for University Education	Dr. Julius Maiyo* Kibabii University
Judith Mang'eni* Moi University	Arnold Musonga Commission for University Education	Paul Omulupi Commission for University Education	Dr. Gladys Ngao Kenyatta University
Peter Kinaye Musyimi* Karatina University	Ruth Mwaura Commission for University Education	Ann Lucy Githinji Commission for University Education	Catherine Nandain* Technical University of Kenya
Dr. Gilbert Ongera* University of Kabianga	Oliver Ngaira Commission for University Education	Erastus Musa Commission for University Education	James A. Njagaya University of Nairobi
Sarah Ooro Commission for University Education	John Kimeu Commission for University Education	Clifford Gicheru Commission for University Education	Dr. George Wairungu Kenyatta University
Eliza Mbatia Commission for University Education			Esther Njeri Egerton University
			Lucy Wanja Commission for University Education

Dr. Timothy Njoora Kenyatta University	Anne Mutsami* Kenyatta University	Benter Atieno Technical University of Kenya	Morris Komakech* Society for Advancement of Science, Canada
Dr. James Ogutu Kenyatta University	Dr. K'Owino Isaac* MMUST	Leah Wanjama* Kenyatta University	James Igamilusi Thomson Reuters
Kisemei Mutisya Catholic University of East Africa	Prof. Paul Mbugua* Kenyatta University	Dr. Nancy Njiraini University of Glasgow	Jeffrey Clovis* Thomson Reuters
Phoebe Naliaka* University of Nairobi	Maurice Junior Kenyatta University	Dr. John Bwire* Kenyatta University	Dr. P. M. Sinda Kenyatta University
Rachael Muritu Co-operative University	Prof. Migot Adholla Kibabii University	Beatrice Maina* APHRC	Prof. Dr.-Ing. Benedict M. Mutua Kibabii University
Geoffrey Moreka Kenyatta University	Iwona Odongo Kenyatta University	Augustine Oduor The Standard Newspaper	Prof. S. R. Ondigi Kenyatta University
Martha Odhiambo Kenyatta University	Adon Ombura Kenyatta University	Jonah Onyango The Standard Newspaper	Dr. Mark Obonyo Kenyatta University
Dr. Hudson Ouko Kenyatta University	Fr. Caroly O. Achok Uzima University	Betty Mbaabu Kenyatta University	Prof. N.W. Twoli Kenyatta University
Prof. C.I. Muleke Egerton University	Pfungwa Nyamukachi The Conversation Africa	Anita Aggaral Intel College	Prof. G. M. Kirika PUEA
Pavan Ramrakha Springer Nature	Mwarimu Alfred* Kenyatta University	Idah Mugo Kenyatta University	Dr. Juliet Isika* Kenyatta University
Dr. Evans Changamu Kenyatta University	Dr. Peninah Masibo* APHRC	Dennis Ogembo Kenyatta University	Dr. Beatrice Muganda PASGR
Dr. Harun Mbuvi Kenyatta University	Dr. Andrew Kibet Kosgei* University of Kabianga	Christopher Misati Kenyatta University	Anne Mwiti Kenyatta University
Steven Nganga* Strathmore University	Jacob W. Nato Kenyatta University	Dr. Samuel Otor Kenyatta University Dr. Moses Kariuki Kenyatta University	Prof. Ruthie Rono* United States International University-Africa
Dr. Walter Akuno JOUST	Dr. Francis Muregi* Mount Kenya University	Julius Jwan* Kenya Institute of Curriculum Development	Humphrey Kagiri AGT
Augustine Onkware Rongo University College	Prof. Reuben Nasibi Chuka University		Linda Nyando CCM, UNIMA Malawi
Dr. Christine Wasanga* Kenyatta University	Kaumbulu Fredrick Kyalo* Kisii University		

Manabu Tsunoda JICA	Prof. J, N. Aguyoh Rongo University College	Dr. M. Sirera* Kenyatta University	Dr. Hussein Ali UMMA University
Dr. Ruth Thinguri Mount Kenya University	Dr. Rekhu Sharma Kenyatta University	Prof. R.O. Odhiambo JKUAT	Reynold Njue Commission for University Education
Dr. Alfred Kitawi Strathmore University	Dr. Evans Basweti Kisii University	Dr. Rono Kenneth Kenyatta University	Silas Oure* Commission for University Education
Prof. Adrian Mukhebi* JOOUST	M. Murage Muya Kenya Broadcasting Corporation	Dr. Omusula Christopher* Kenyatta University	S.O. Wandiga* Egerton University
Robert Irungu Kenyatta University	Dr. Elizabeth Maina Kenyatta University	Susan Adima Kenyatta University	Dr. Benson M. Mwangi* Muranga University
Dr. Zigama J.C.* University of Eldoret	Dr. Jeremiah Kiplagat Kenyatta University	John Kiruga Kenya Institute of Curriculum Development	Prof. Mark Odhiambo Moi University
Prof. Henry Ayot* Kenyatta University	Paul Ooga ESAMI	Prof. Harriet Njui* Riara University	Michael Wachira University of Nairobi
Prof. Achoka, JSK* MMUST	Hellen Arunga Kenyatta University	Prof. Ezra Maritim* Egerton University	Dr. M.E. Nelson University of Nairobi
Dr. Lucy Ogol* Kenya Institute of Curriculum Development	Lillian Koech Kenya Institute of Curriculum Development	Prof. Fred Keruro Egerton University	Prof. Mike Boit Kenyatta University
Dr. Johnester Mwangulu Kiriri Women University	Ruth Kerubo Kenya Institute of Curriculum Development	Prof. Wilson Kipng'eno* University of Kabianga	Lillian C. Boit* Kenyatta University
Dr. Jan Deinum University of Groningen	Mukirae Njihia* Kenyatta University	Prof. L.M. Mumera South Eastern Kenya University	Isaac Nyanchiri HSBS Group Kenya
Dr. JPR Ochieng' Odero* East Africa Research Fund	Dr. Hellen Guantai Kenyatta University	Abdi Sirato Osman UMMA University	Prof. Samuel K. Kata Africa International University
Dr. Robert K. Karanja PUEA	Tirus Muya Maina* Muranga University	Dr. Andrew Yitambe Kenyatta University	Justus Musila Africa International University
John Machio Education News	Prof. G. Karugu Kenyatta University	Elizabeth Mabele* MMUST	Dr. Purity Muthima* Kenyatta University
	Ibrahim M. Ali Swark Research Centre	Dr. Aloys Osano* Multimedia University	Renee Reagan Thomson Reuters
			Tracey October Thomson Reuters

Prof. Stephen Agong' JOOUST	Isaac Gathirwa* Commission for University Education	Alice Kande* Commission for University Education	Prof. Peter Njagi University of Kabianga
Prof. Adiel Magana Chuka University	Prof. Grace Bunyi Kenyatta University	Monica Gachunga* Commission for University Education	Hudson Nandokha* Commission for University Education
Agnes Gachau* Technical University of Kenya	Hyrine Matheka* Commission for University Education	Pamela Sagala Commission for University Education	Prof. Simon Onywere* Kenyatta University
Dorcas D. Mutemi Technical University of Kenya	Fresiah Waithera Commission for University Education	William Mwangi Commission for University Education	Nickson Otieno* Kenyatta University
Prof. Manu Muteya University of Kabianga	Saul Anziya Commission for University Education	Benson Murgor Commission for University Education	Esther Gathungu Commission for University Education
Michael Tanui Commission for University Education	Samuel Andembe Commission for University Education	Lynnette G. Kisaka* Commission for University Education	Dr. Dorcas Omukhulu Commission for University Education
Dr. Gladys Mengich* MMUST	Benson Kimani* Commission for University Education	Adrian Mugambi Commission for University Education	Dr. D. O. Rugar Kenyatta University
Nancy Dalla JKUAT	Betty Munene Commission for University Education	Prof. David K. Some* Commission for University Education	Eng. Francis Ngokonyo Kenyatta University
Dr. Peter Mwaura* Kenyatta University	Prof. Anne Nangulu* Commission for University Education	Kenneth Ntongondu Commission for University Education	Charles Ng'onga JOOUST
Shadrack Odera Kenya Technical Teachers College	James Kiarie Commission for University Education	Christine Muritu Commission for University Education	Dr. S. Mutweleli Kenyatta University
Francis Kibaru Commission for University Education	Elizabeth Mbugua Commission for University Education	Truphosa Ochuka Commission for University Education	Dr. G. O. Rombo Kenyatta University
Mark Rachuonyo Ogendi Mount Kenya University	Elizabeth Onyango* Commission for University Education Dr. Mercy Gichora KEFRI	David Ajuoga Commission for University Education	Dr. Muiruri Kinganga Kenyatta University
Sharon Barang'a Nation Television	Jayne Mwangi Commission for University Education	Prof. Walter O. Oyawa Commission for University Education	Prof. L. Kisovi Kenyatta University
Sitawa Watanga Multimedia University			Prof. Jain Mohinder Kenyatta University
Dr. Fredrick Maloba Kenyatta University			Dr. James Kilika Kenyatta University

Dr. L. K. Ngari Kenyatta University	Veronica Kahuyu African Nazarene University	Mrs Lucy N. Mbaabu Kenyatta University	Dr. Peter Wamae Kenyatta University
Bulinda H. M. Kenyatta University	Mercy Machiya CNHR	Prof. Monica Ayieko* JOOUST	Martin Gachungu Kenyatta University
Simiyu E. Mungami Kenyatta University	G.A. Owiti* Egerton University	Juliah Njuki Kenya Institute of Curriculum Development	Brigit Musiva Mugulu Kenyatta University
Leonard Mwita Kenyatta University	Dr. Wilson Thagana Kenyatta University	Ouma Wanzala Nation Media	Michael Njoroge Wangui Moi University
Prof. Nicholas Gikonyo Kenyatta University	Prof. M. N. Keraka Kenyatta University	Dr. Kerongo Joash Kisii University	Ann M. Khisa* University of Nairobi
Dr. Anthony Macharia* Kenyatta University	Prof. G.K. Kingei Kenyatta University	Leah Kaburu Commission for University Education	Lucy Ombaka Dedan Kimathi University
Dr. Erick Masika Kenyatta University	Prof. M. K. Koech Kenyatta University	Mohammed Kere* PERC PACE	Dr. Juliet Mugo Kenyatta University
Dr. Nyakwara Begi Kenyatta University	Naomi Wanja Kenyatta University	Margaret Otolu Embu University	Juma Gabriel* Dedan Kimathi University
Belinda Mugala Kenyatta University	Joel Nyawita Kenyatta University	Alice Keitany Mount Kenya University	Fuchaka Waswa* Kenyatta University
James M. Wanjohi University of Nairobi	Ann Ndungu CUCK	Dr. Teresa Bitengo Kenyatta University	Dr. Judith Munga Kenyatta University
Prof. James Ndegwa JKUAT	Wokabi Mugweru Kenyatta University	Kontondeh Shem Kenyatta University	Dr. Esther Mbithi Kenyatta University
Dr. Daniel Akunga Kenyatta University	Jane Wathurima Technical University of Kenya	Monica Njoki Mediamax	Dr. Nadir Hashim Kenyatta University
Prof. Gichua Michael Kenyatta University	Prof. Gikiri Thuo Kenyatta University	Mundia Ongute Milele FM	Eng. Arthur Ongwayo Kenyatta University
Charles Okundi KTTC	Prof. J. Okumu Kenyatta University	Prof. Joseph Ngeranwa Kenyatta University	Dr. Jotham Dinga Kenyatta University
Fasal Omar Swale Research Centre	Esther Mwangi Zetech University	Dr. Joseph Wangia Kenyatta University	Prof. Madara Ogot* University of Nairobi
Muigah Rugara UASU	Dr. Mihesso O' Conner* Kenyatta University	Dr. Kipkirui Langat* TVETA	Prof. Paul Wainaina Kenyatta University
Alex Ezeh* APHRC	Dr. Daniel Kyalo Kenyatta University		


Prof. Eucharika Kenya Embu University College	Dr. Elizabeth Mwaniki Kenyatta University	Margaret Gitau University of Nairobi	Rahab Mugambi Kenyatta University
Prof. Daniel Mugendi Embu University College	Dr. John Muriuki Kenyatta University	Eliud Karani Kenyatta University	Prof. Francis Wambalaba United States International University
Prof. Jackson Wachine Embu University College	Dr. L. K. Mwaru Kenyatta University	Esther Kihungi Kenyatta University	Dr. Samuel. Siringi* Ministry of Education
Peter Mugambi Kenyatta University	Dr. Hildah Kebeya* Kenyatta University	Dr. Tabitha Wangeri Kenyatta University	Monica Ng'ang'a KUCCPS
Prof. Jackson Too* Commission for University Education	Maina Mwangi* Kenyatta University	Dr. Elizabeth Andang'o Kenyatta University	Robert Korir University of Kabianga
Brian Waswala UNEP	Irene Kimaiyo Kenyatta University	Dr. Florence Itegi Kenyatta University	Charles Ronoh University of Kabianga
Prof. Marcella Mwaka* Commission for University Education	Cyprian Ombati University of Kabianga	David Marikah JKUAT	Maswai Towett University of Kabianga
Phyllis Karimi Commission for University Education	Prof. Maurice Okoth University of Eldoret	Dr. Elizabeth Mugendi Kenyatta University	Peter Mwirigi Kenyatta University
Prof. Fatuma Chege Kenyatta University	Dr. Alice Ondingi Kenyatta University	Prof. Nelson Wawire* Kenyatta University	Dr. Doayne Mugambi Kenyatta University
Dr. Elijah. G. Ritaungu Kenyatta University	Dr. Dorcas Otieno* Kenyatta University	Dr. Charles N. Migwi Kenyatta University	Millicent Omukaga Commission for University Education
Dr. Ruth Thinguri* Mount Kenya University	Dr. Koinange Wawire Kenyatta University	Rosemary Omwandho* University of Nairobi	Kanyingi Jackson Kenyatta University
Josephine Nduati Compulynx Ltd	Dr. Kennedy Ocharo Kenyatta University	Dr. Purity Nguhiu Kenyatta University	Michael Lusinde Commission for University Education
Prof. Waceke Wanjohi Kenyatta University	Vincent M. Kamba Kenyatta University	Prof. Agnes Gatumbi Kenyatta University	Angela Nyangera Commission for University Education
Dr. Reuben Njuguna Kenyatta University	Diana Ngila Nation Media Group	Dr. Pacifica Okemwa Kenyatta University	Dr. Josphat Njuguna Kenyatta University
	James Kariuki Nation Media Group	Prof. Julius Nyabundi Maseno University	
	Dr. Mary Nasibi Kenyatta University		

Dr. Julius Mile Kiriri Women University	Dr. C M. Ondieki Kenya University	Dr. Mary Otieno Kenya University	Dr. Leah Wanyama Kenya University
Prof. Romulus Ogendi Maasai Mara University	Dr. Joseph Gathura Kenya University	Dr. Charles Magoma Kenya University	Dr. Priscilla Ndegwa* Kenya University Dr. Muchiri Karega Kenya University
Dr. Nicholas Letting Management University of Africa	Dr. George Kosimbei Kenya University	Dr. Eusebius Mukhwana* Commission for University Education	Japheth Blasto Kenya University
Susan Njagi TVETA	Shem Ochieng Kenya University	Eng. Martin Nsomo Kenya University	Dr. Daniel .O. Oyoo Kenya University
Dr. John Osoro TVETA	James Ngetich Transformational Computers	Mariam Osman UNEP	Dr. Isaiah O. Nation Television
Dr. Fred Keraro Egerton University	Dr. Abbey Chokera Kenya University	Dr. Franciscah Wamocho Kenya University	Samuel Muthike Kenya University
Prof. Robert Michieka Kenya University	Dr. Matthew Ngugi Kenya University	Prof. A. Hofman* University of Groningen	Jared Ayiera Asiago Kenya University
Prof. James Kungu* Kenya University	Dr. Jacob Omolo Kenya University	Dr. Florence Nyamu* Kenya University	Dr. Theresia Kinai Kenya University
Dr. John Onyango Kenya University	Joyce Achieng Ogogo Kenya University	Dr. Catherine Mbaisi* NEMA	Dr. Onesmus Muroki* Kenya University
Prof. Priscah Tuitoek Machakos University College	Gilbert W. Opanga* Commission for University Education	Prof. Lucy Irungu University of Nairobi	Dr. Festus Kiplamai Kenya University
David Musuya Kibabii University	Prof. W. Mwai Kenya University	Meoli Kashorda* KENET	Dr. Jane Kieni Kenya University
Dr. Moses Rugutt* NACOSTI	Dr. Beatrice Bunyasi* Kenya University	Maryjullie Achieng CUE	Elias Ako Kenya University
Jemimah Mbugua Compulynx Ltd	Harry L. Kaane* Moi University	Kishan Vaday Compulynx Ltd	Dr. Felicite N. Kenya University
Dr. George Owino Kenya University	Dr. Margaret Gikuhi Embu University College	Dr. Lucy Maina Kenya University	Thomas M. Rimbui Kenya University
Dr. Arun Datta* Technical University of Kenya	Prof. Ethel Manda Kenya University	Prof. D. Malonze Kenya University	Prof. R.A. Obudhe University of Nairobi
	Mary Wahukuria JKUAT	E. Bosibori Oigo Kenya University	Zipporah Rimbui Kenya University

Dr. Catherine Murungi Kenyatta University	Lyambambaje Alexander* IUCEA, Uganda	Musungu Timothy* University of Nairobi	Dr. Margaret G. Mumbi Embu University College
Evanson Kigeu Kenyatta University	Dr. Rose Okoyo Opiyo* University of Nairobi/CARTA	Prof. Francis Mathooko Machakos University College	Prof. Egara Kabaji MMUST
Elizabeth Kattam Kenyatta University	Martin Kapalanga* Society for the Advancement of Science in Africa	Prof. Joseph Chacha Maseno University	Judith M. Moi University
Dr. Henry Mwangi Kenyatta University	Henry Wanyama The Star	David Aduda Nation Media Group	Cynthia Nyunja University of Nairobi
Joseph Muniu Kenyatta University	Dr. Ali Adan UMMA University	Sylvance Sange* KIPI	T. G. Egwang Med Biotech Laboratories, Kampala
Dr. Anthony M. Ireri Kenyatta University	Prof. Pamela Aloo Karatina University	Maurice Mutisya* APHRC	Caroline Kiragi UMMA University
Mary Mungala Kenyatta University	Frederick Okoth HELB	James Nyaagaya University of Nairobi	Prof. Geoffrey Muluvi SEKU
Murage John W. Kenyatta University	Dr. Catherine Gakii Kenyatta University	Charles Salawa KTTC	Dr. Louise Ngugi Karatina University
Tenai Jackline Kenyatta University	Dr. Judith Bunyasi* Kenyatta University	Prof. E.K. Isutsa Chuka University	Irene Wamiti University of Nairobi
Karimi Gilbert Kenyatta University	Prof. Ruth Nduati* University of Nairobi	Isaac Kariuki Kenyatta University	Mwaka Godffrey University of Nairobi
Caroline Ndeu Kenyatta University	Margaret Opiyo University of Nairobi	Oliver Wekesa Simiyu* Great Lakes University of Kisumu	Phaniel Omarunga University of Nairobi
Prof. Sumesh C. Chabbra Kenyatta University	Theresia Ndunda* Technical University of Kenya	Florence Nyamu University of Kabianga	Ogutu Joel MMUST
Sam Mburu Kenyatta University	Bernard Wanyama Kenyatta University	Rianny Kenneth* KEFRI	Linda Mipando University of Malawi
Lucas Asaava Kenyatta University	Titus Mabeya HELB	Prof. George Ndegwa* JKUAT	Sarah Kiiru CNHR
Susan Debe TVETA	Prof. George Kiragu JKUAT	Rose Opiyo* MMUST	Dr. Josephine Ndirangu University of Nairobi
Dr. Shadrack Mule* University of Kabianga	Roselyne Gwada University of Nairobi	Jude Omondi University of Nairobi	Regina Ndege University of Nairobi

Joyce Ithibutu University of Nairobi	Dr. Nicholas Ozor* ATPS	Anastasia Nzau* Technical University of Kenya
Isaac Nuruka University of Nairobi	Ragen Hillary ATPS	Cleophas Ondieki Technical University of Kenya
Rachel Muritu* CUCK Dr. D. Ayoo Kenyatta University	Gitahi Thuku CNHR	David Ngigi Kenyatta University
Dr. Benard Muok JOOUST	David Dunne* Cambridge University	Dr. George Ombakho Ministry of Education
Prof. Wilson Hassan Nandwa* UMMA University	Louise Ngugi Karatina University	Grace Mbogo Kenya Association of Manufacturers
Dr. Lucas Kilemba University of Kwazulu-Natal	Beatrice Imbiti Kenyatta University	Duncan Irungu Kenyatta University
Dr. Christopher M. Ondieki Kenyatta University	Fred Anampiu* IITA	Owino Vincent* Kenya Institute of Curriculum Development
Erustus Njuu TTUC	Sally Kaitu KAM	Lois Temitope PAUSTI
Dr. Richard Cheruiyot Kenyatta University	Gikonyo Mary Kenyatta University	Dr. Grace Gatheri Kenyatta University
Joseph M. Wambui University of Nairobi	Josephine Njeri Compulynx Ltd	Caroline Nderi Kenyatta University
Prof. Peter Muchaye Kenyatta University	Naheed Kassam Compulynx Ltd	Thomas Andabua Moi University
Newton Osoro* NEMA	Opiyo Atieno* MMUST	Jane M. Njiru Kenyatta University
Irene Muchira Kenyatta University	Jane Ouko University of Eldoret	Dr. P. M. Sizzda Kenyatta University
Dorothy Mukhebi* AWARD	Carolyne Anaye* Chuka University	Moses Nthiga KENET
Prof. Zipporah Nganga SEKU	Moses Wandera* Cooperative University	
	Davis Bundi* University of Nairobi	

Commission for University Education
Red Hill Road, off, Limuru Road, Gigiri
P.O. Box 54999-00200, Nairobi, Kenya

: + 254 (20) 7205120| 0726-445566| 0717-445566| 0780-656575|

 info@cue.or.ke Website: www.cue.or.ke  : @CUE_Kenya

 [Commission for University Education, Kenya](https://www.facebook.com/CommissionforUniversityEducationKenya)



ISBN 978-9966-009-24-1